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European Commission

Period covered: 1 May until 10 June 2019
Issued: 17 June 2019

JRC MARS Bulletin
Crop monitoring in Europe
June 2019

Fair yield outlook at EU level

Hot and dry conditions reduce yield expectations in Iberian peninsula

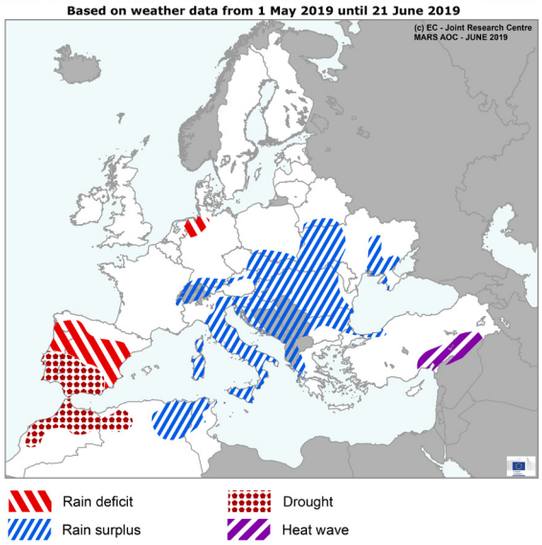
At EU level, the overall yield outlook for cereals slightly improved as the downward revision for barley (most distinctly in Spain) was more than compensated by an upward revision for other cereals. Forecasts for grain maize and sunflowers are distinctly above the 5-year average, reflecting the favourable conditions in large parts of south-eastern Europe.

Beneficial rainfall in northern and northern-central Europe contributed to an improved outlook in regions that experienced a dry spell in April.

Abundant rainfall in Italy, and southern central and eastern Europe also provided benefits in terms of improved water supply, but, combined with cold weather, hampered summer crop growth in large parts of these regions.

In contrast, hot and dry conditions in the Iberian peninsula reduced yield expectations for the main winter crops and spring barley. Moreover, water reservoirs are at below-average fill levels, which could possibly lead to restrictions on water use for irrigation of summer crops later in the season.

AREAS OF CONCERN - EXTREME WEATHER EVENTS
Based on weather data from 1 May 2019 until 21 June 2019



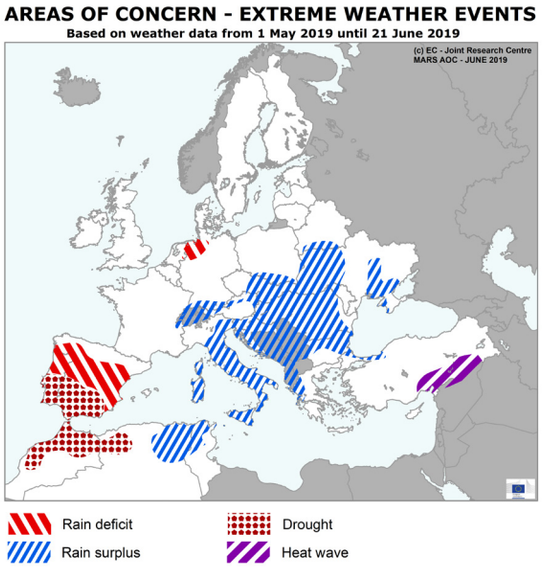
Crop	Yield (t/ha)				
	Avg 5yrs	May Bulletin	MARS 2019 forecasts	% Diff 19/5yrs	% Diff May
TOTAL CEREALS	5.52	5.62	**5.63**	+2.1	+0.2
Total Wheat	5.71	5.82	**5.88**	+3.0	+1.0
soft wheat	5.94	6.05	**6.10**	+2.7	+0.8
durum wheat	3.46	3.51	**3.62**	+4.6	+3.1
Total Barley	4.86	4.96	**4.92**	+1.2	-0.8
spring barley	4.16	4.20	**4.14**	-0.5	-1.4
winter barley	5.79	5.97	**5.96**	+3.0	-0.2
Grain maize	7.62	7.92	**8.05**	+5.7	+1.6
Rye	3.79	3.77	**3.84**	+1.4	+1.9
Triticale	4.13	4.17	**4.23**	+2.6	+1.4
Rape and turnip rape	3.24	3.13	**3.14**	-3.0	+0.3
Potato	33.8	34.6	**34.9**	+3.2	+0.8
Sugar beet	75.4	76.5	**75.7**	+0.5	-1.0
Sunflower	2.20	2.41	**2.37**	+7.8	-1.7

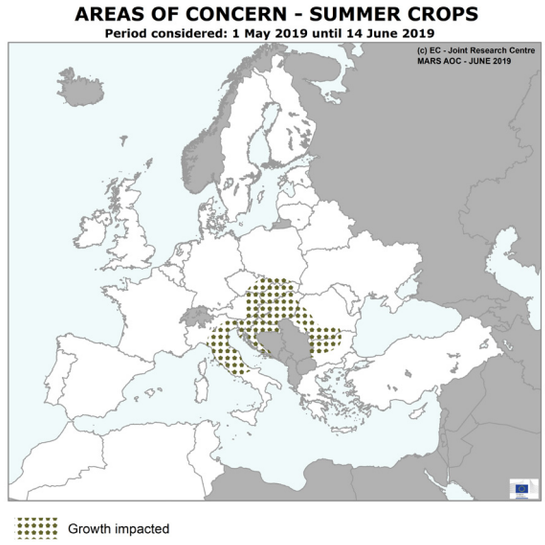
Issued: 14 June 2019

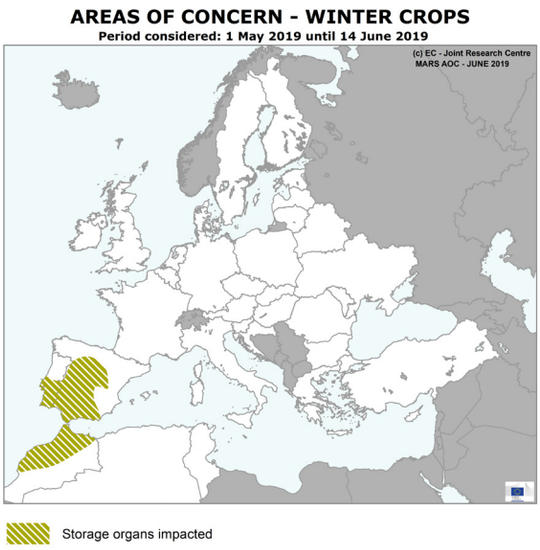
Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern







The cold conditions in May continued until 20 May. The event is not further reported on the map, as already depicted in our May bulletin. Such conditions slowed phenological development but generally did not negatively affect the condition of crops and in several regions even turned out to be beneficial. For example, in **southern Italy** this resulted in extension of the grain-filling period, while in **northern Germany** and other parts of central/northern Europe it reduced crop water demand at a time of limited availability.

Beneficial rainfall was observed in the regions that experienced a dry spell in April and/or May: **south-eastern United Kingdom**, **Netherlands, northern Germany, Poland, Denmark, Sweden, Baltic countries** and **Finland.** However, the rainfall deficit persisted in **north-western Germany** and the **eastern Netherlands**. In this region, above-average rainfall will be necessary in the coming weeks to sustain yield potentials during the grain-filling phase of winter cereals.

Well-above-average rainfall was observed in **Italy, Slovenia, Croatia, Austria, Czechia, Slovakia, Hungary, Romania, Bulgaria** and **western Ukraine**. Most of this precipitation occurred during May and winter crops, mostly in grain-filling phase, benefited from the improved water supply. Rain restored soil moisture reserves and is providing favourable conditions for vegetative growth of summer crops. A general negative effect is increased pressure from pests and diseases

However, the combination of rainy and cold weather in **Italy, Slovenia, Croatia, Austria, Czechia, Slovakia, Hungary** and **western Romania** significantly hampered summer crop growth, already delayed by late sowing as reported in the May bulletin ([1]).

In **Spain** and **Portugal**, the mix of rain deficit and drought (caused by the prolonged rain deficit and the hot days observed during the analysis period) shortened grain filling and reduced yield expectations for the main winter crops. Water reservoirs are at below-average fill levels, which could possibly lead to restrictions on water use for irrigation of summer crops later in the season. Similar weather conditions occurred in **Morocco**, where even the very last part of the season proved unfavourable, with yield expectations further reduced by the ongoing drought.

In **south-eastern Turkey**, a long heatwave with maximum temperatures above 35 °C shortened grain filling in regions affected in previous months by intense rains and floods.

([1]) https://ec.europa.eu/jrc/en/mars/bulletins

1.2. Meteorological review (1 May-10 June)

Slightly warmer-than-usual conditions, for the review period as a whole, were recorded in the Iberian peninsula, eastern and north-eastern Europe, with daily mean temperatures of 0.5 °C to 2 °C above the long-term average (LTA).

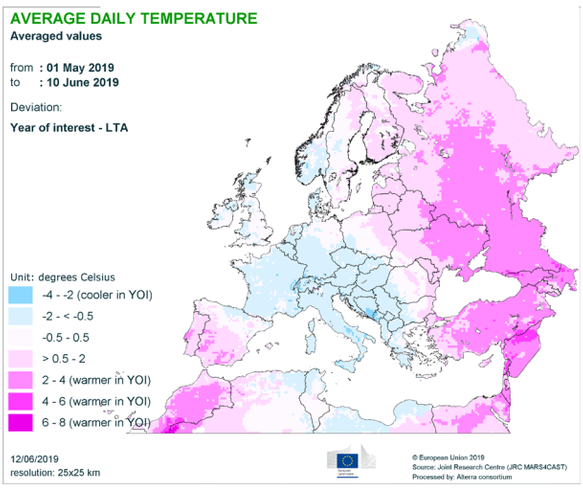
Warmer-than-usual conditions were observed in Ukraine, western Russia and Turkey, with daily mean temperatures of 2 °C to 4 °C above the LTA.

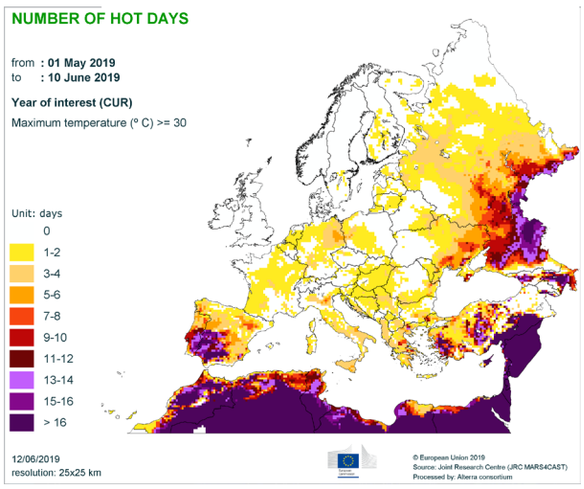
Slightly colder-than-usual conditions were observed in large areas of central Europe, the central Mediterranean region, the Balkan region and south-eastern Europe. Daily mean temperatures in these regions were mainly between 2 °C and 0.5 °C below the LTA.

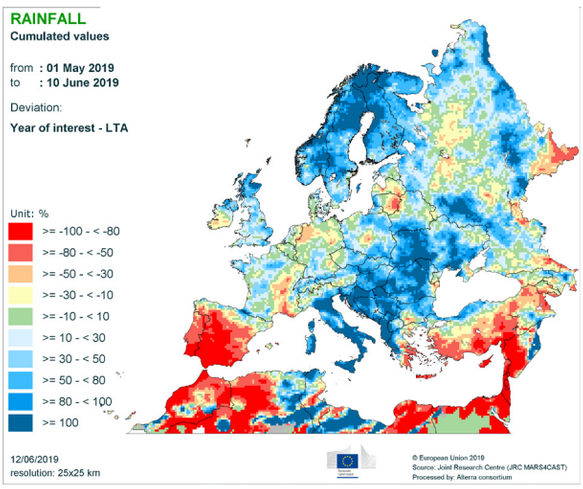
Wetter-than-usual conditions were observed in Italy, and eastern and northern Europe, with positive anomalies of accumulated precipitation (with reference to the LTA) exceeding 100 % in large areas. In these regions, **more than 10 days of significant rainfall** (daily precipitation > 5 mm) were recorded. In most of these regions, the combination of lower temperatures and higher rainfall resulted in large positive anomalies in the climatic water balance, with values more than 100 % above the LTA.

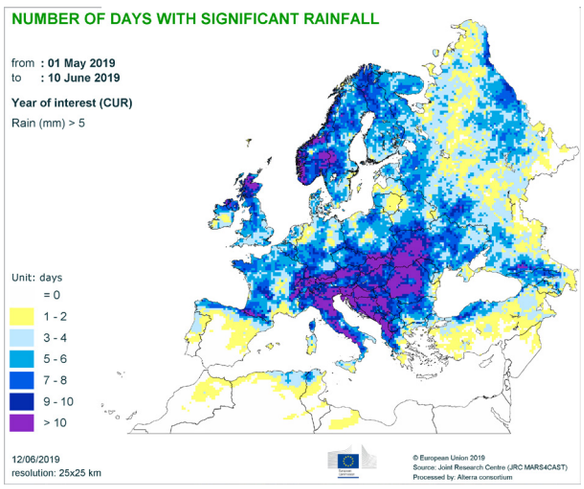
In the Iberian peninsula, **drier-than-usual conditions** were observed, with large negative anomalies in precipitation (80-100 % below the LTA) and **no days with significant rainfall** in the analysis period. An early **heatwave** was also observed in the south-western part of the peninsula, with more than 13 days of daily maximum temperatures above 30 °C.

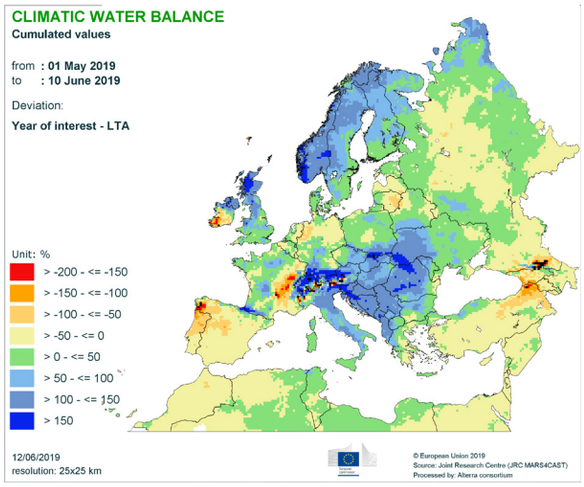
Severe **hail** events, locally causing substantial damage, occurred in many areas in the end of May or beginning of June (e.g. north-western Italy, Bulgaria and southern Germany), while severe strong wind events were reported in countries such as the Netherlands and France.

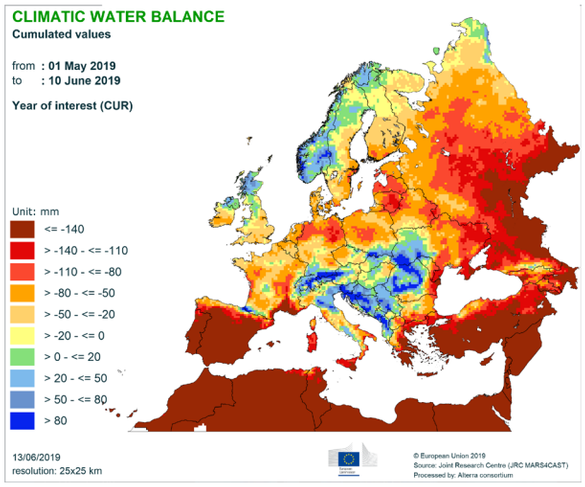






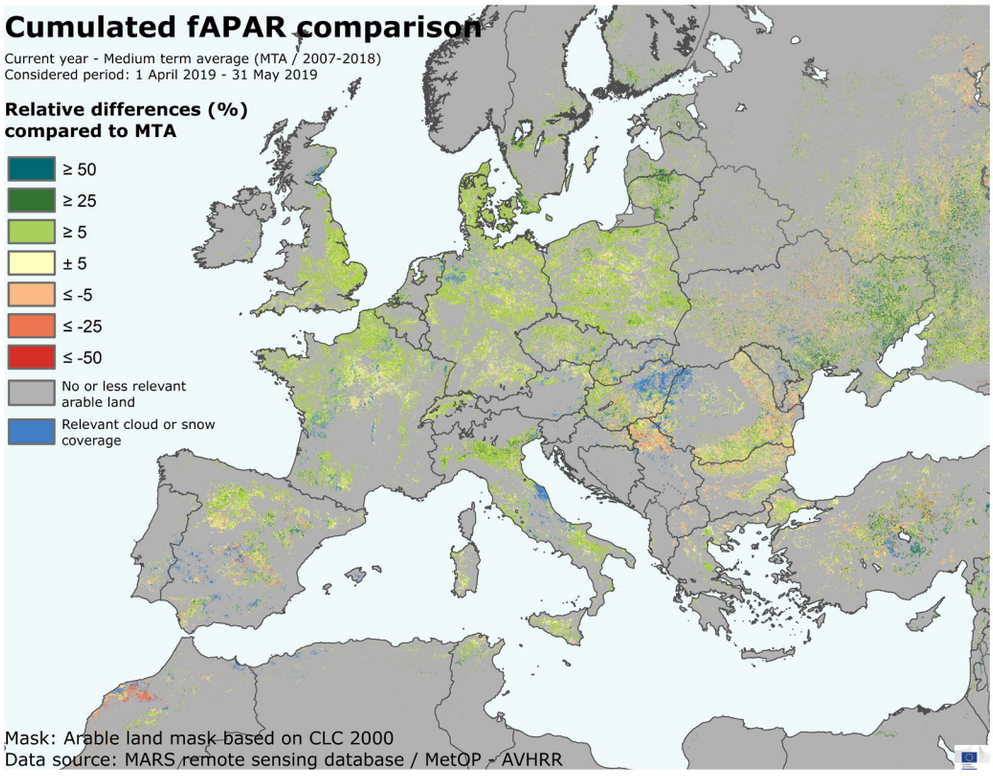



CLIMATIC WATER BALANCE
Cumulated values
from : 01 May 2019
to : 10 June 2019
Deviation:
Year of interest - LTA
Unit: %
> -200 - <= -150
> -150 - <= -100
> -100 - <= -50
> -50 - <= 0
> 0 - <= 50
> 50 - <= 100
> 100 - <= 150
> 150
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


CLIMATIC WATER BALANCE
Cumulated values
from : 01 May 2019
to : 10 June 2019
Year of interest (CUR)
Unit: mm
<= -140
> -140 - <= -110
> -110 - <= -80
> -80 - <= -50
> -50 - <= -20
> -20 - <= 0
> 0 - <= 20
> 20 - <= 50
> 50 - <= 80
> 80
13/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

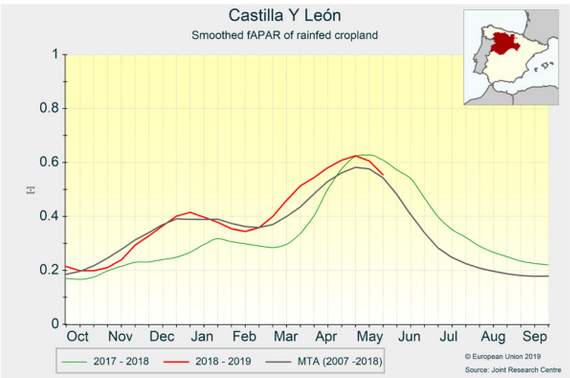
2. Remote sensing — observed crop conditions

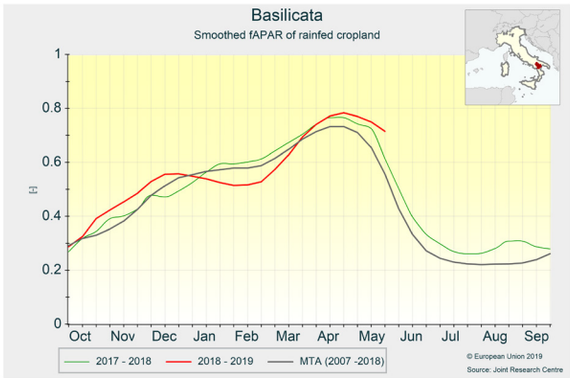
Favourable biomass accumulation throughout Europe with few exceptions

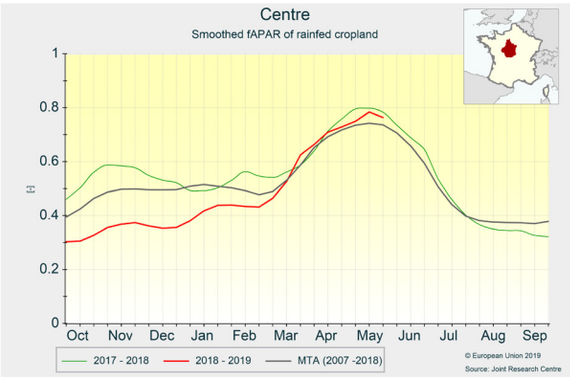


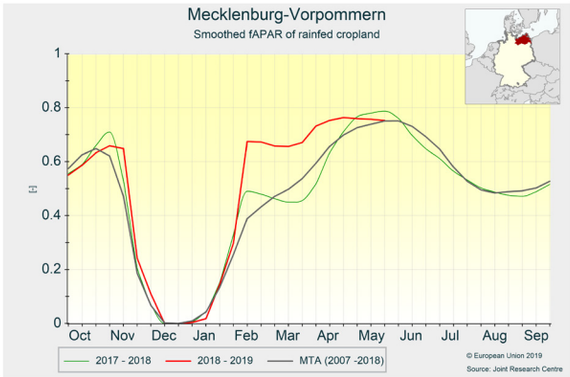
The map displays the differences between the fraction of absorbed photosynthetically active radiation (fAPAR) cumulated from 1 March to 31 May 2019 and the medium-term average (MTA, 2007-2018) for the same period. Positive anomalies (in green) reflect above-average biomass accumulation or early crop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

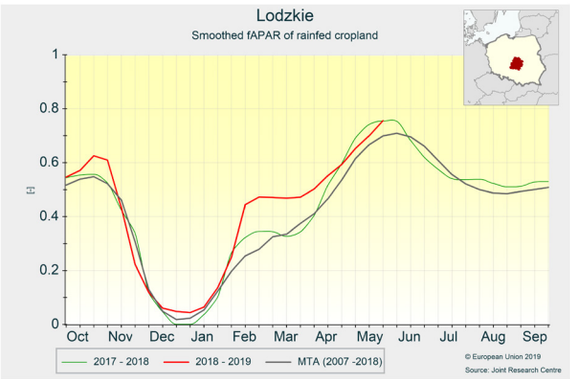
In **Spain,** winter crops suffered from dry and warmer-than-usual weather that shortened grain filling and reduced yield expectations (e.g. *Castilla y Leon*). In southern **Italy,** winter crops are in good shape and are reaching maturity. The cool weather in May extended the grain-filling period (e.g. *Basilicata*), favouring yield formation. In northern regions, the summer crop season is significantly delayed, due to a combination of late sowing and slow growth due to cool weather. In **France**, crop biomass exhibits generally favourable accumulation, with average or slightly advanced phenological development. The precipitation in May sustained crop development and in most regions winter crops are now at the grain-filling stage, with average to favourable conditions (e.g. *Centre*). In the **United Kingdom** and **Ireland,** crop biomass accumulation was favoured by the warmer-than-usual temperature and sustained by the precipitation in late May. In parts of the **Benelux** countries, northern **Germany** and **Denmark**, the reduced precipitation slowed biomass accumulation, which — especially on light soils — reduced from above-average to average conditions (e.g. *Mecklenburg-Vorpommern*). In central and southern **Germany** and in **Poland** (e.g. *Lodzkie*), average to slightly humid conditions in May, and a peak of temperatures in June with a first heatwave, pushed crop biomass above average for advanced stages**.** In central Europe (**Austria**, **Czechia**, **Slovakia** and **Hungary**), favourable precipitation sustained the advanced stages of winter crops just before, or at the very beginning of, the flowering period. In **Romania,** weather conditions are proving favourable for both winter and summer crops, thanks to slightly warmer-than-usual temperatures and abundant precipitation. Winter crops are still slightly delayed but overall biomass accumulation is now somewhat above average (e.g. *Sud-Muntenia*). Similar favourable conditions are observed in **Bulgaria**. In **Greece**, the first week of June proved extremely favourable for grain filling and winter crops are ending the season under average to good conditions. In **Ukraine**, winter crop flowering ended before 15 May and grain filling started with good to very good biomass accumulation (e.g. *Khersons'ka*). In **Russia**, the delayed winter crop stages were accelerated by the warm weather. Crops are now in, or just past, flowering stage with biomass accumulation somewhat above average.

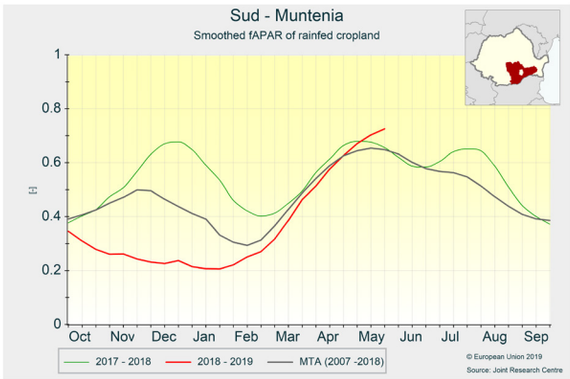

Castilla Y León
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre

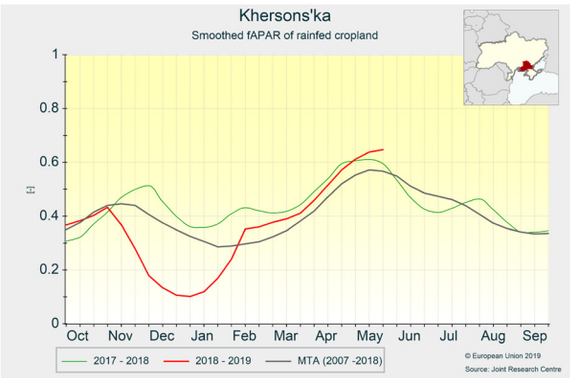

Basilicata
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre

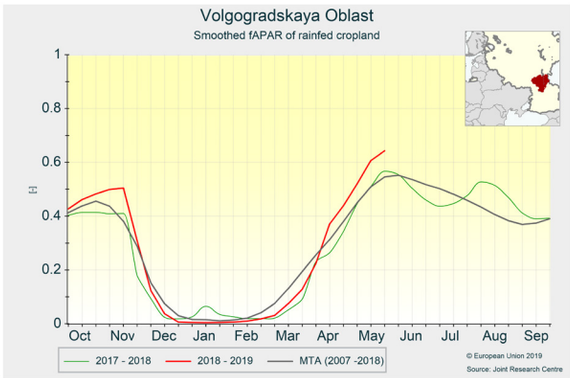

Centre
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Mecklenburg-Vorpommern
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
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


Lodzkie
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
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

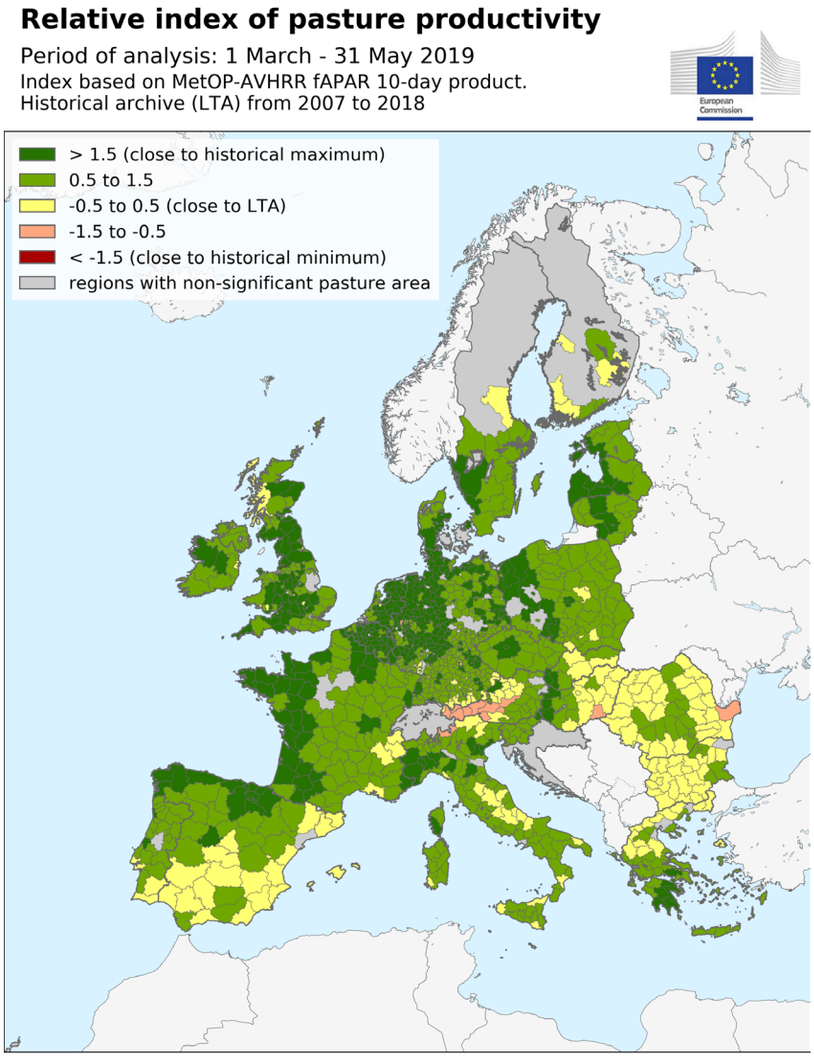

Sud - Muntenia
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Khersons'ka
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
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


Volgogradskaya Oblast
Smoothed fAPAR of rainfed cropland
fAPAR
1
0.8
0.6
0.4
0.2
0
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

Average to above-average productivity



The pasture productivity index (PPI) for the period 1 March to 31 May 2019 is shown on the main map. The predominantly positive values indicate above-average biomass accumulation in most regions. The prevailing favourable conditions are the result of early spring growth led by warm temperatures. The negative PPI showing for a few regions is related more to cloud effects than to actual lack of biomass accumulation.

Persistent dry conditions since the beginning of March in the Iberian peninsula, combined with high temperatures in May, have lowered expectations for grassland productivity, particularly in Castilla y Leon and southern regions. The northern shores may expect slightly above-average pasture productivity. In northern Italy, the unusually abundant rainfall and colder-than-usual temperatures have slowed biomass accumulation for pasture and fodder crops, especially in areas of Emilia Romagna where floods and waterlogging have impacted pasture and fodder areas. Nevertheless, actual biomass accumulation remains above average, although cutting activities have been delayed.

In France, conditions have generally been favourable in western regions, where biomass accumulation in pasture regions is above average. In southern France, the situation is more mixed, with dry conditions in the south-east.

In Germany, the lack of radiation in southern regions and dry conditions in northern regions recently reduced photosynthetic activity. Such change is not yet reflected in the PPI map.

In the United Kingdom and Ireland, the main drivers for productivity have been favourable and grass yields are above average, especially in northern regions where favourable rainfall surplus is observed.

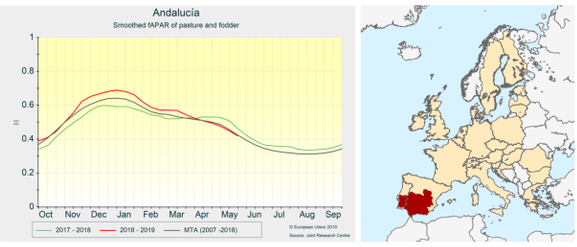
It is noted that the abrupt reduction in the fAPAR signal at the very end of the observation period in the graphs below for both Germany and the United Kingdom is attributed to heavy cloud cover, which prevented a proper signal.

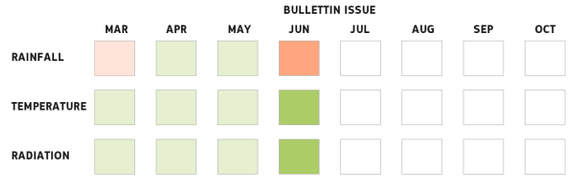
In Poland, the Scandinavian countries and the Baltic region, higher-than-usual fAPAR is observed, thanks to the above-average temperatures and favourable precipitation. In the Baltic countries only, a slight deficit in radiation somewhat slowed pasture growth.

In south-eastern Europe, biomass accumulation is now above average (although this is not yet visible in the PPI map). Hungary and Romania present mixed conditions. In these countries, decreases in radiation and in temperature have limited biomass accumulation, which nonetheless remains above average.

Spain and Portugal - South

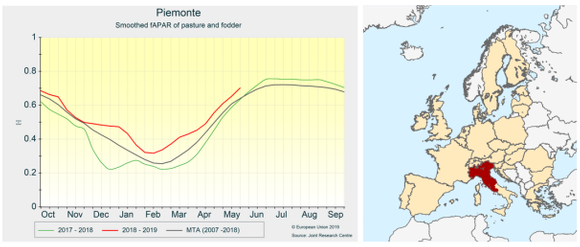
Reference period: 01 May to 14 Jun 2019

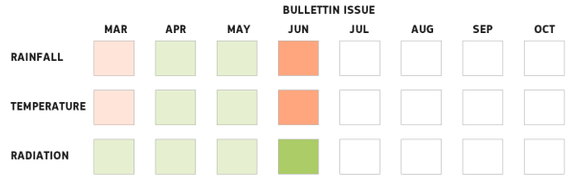




Italy - North and central

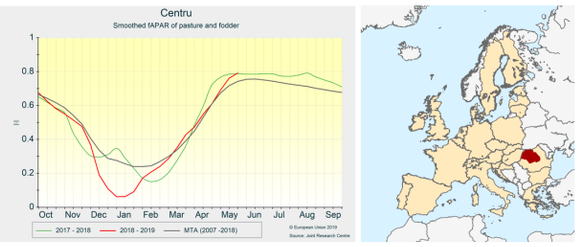
Reference period: 01 May to 14 Jun 2019

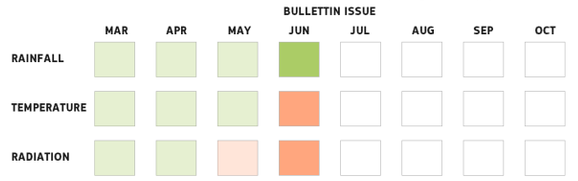




Romania - Central

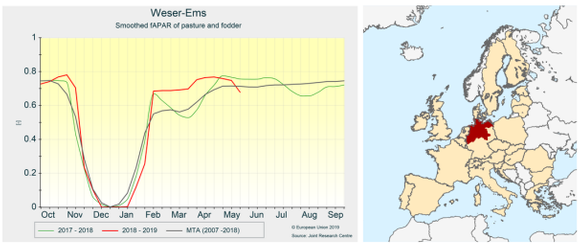
Reference period: 01 May to 14 Jun 2019

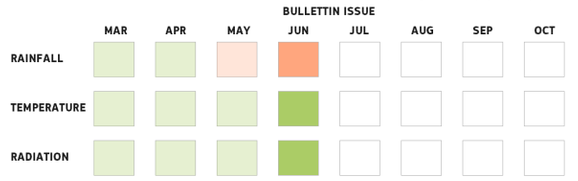




Germany - North

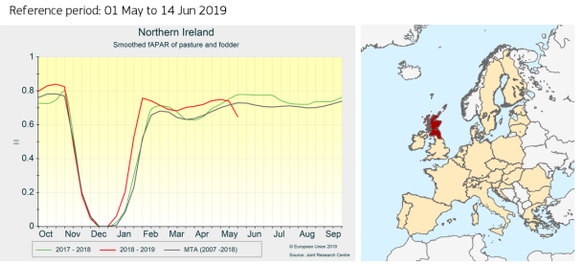
Reference period: 01 May to 14 Jun 2019

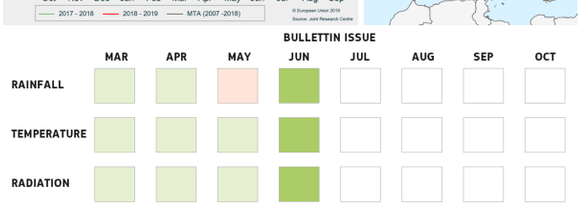




United Kingdom - North

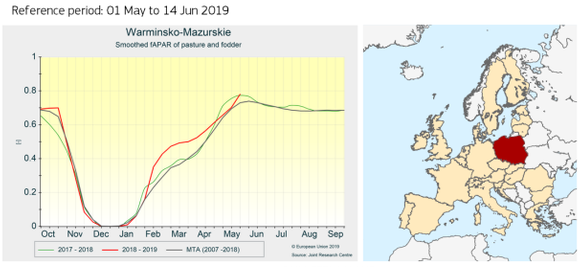
Reference period: 01 May to 14 Jun 2019

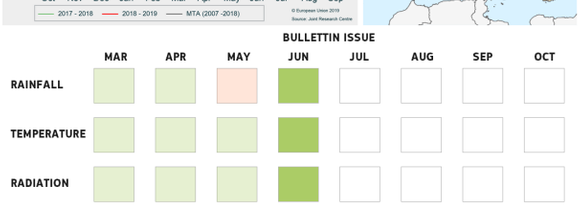




Poland

Reference period: 01 May to 14 Jun 2019





4. Country analysis

4.1. European Union

France

Reduced — but still positive — outlook for winter cereals

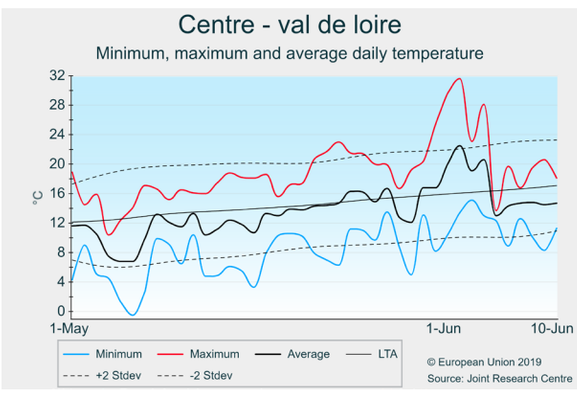
Conditions for winter cereals have been favourable until flowering, but stormy and cloudy/humid weather in the first half of June and high temperatures forecast from mid June onwards will have some negative effects. The yield forecast for winter cereals is maintained above the 5-year average. Summer crops are in good condition.

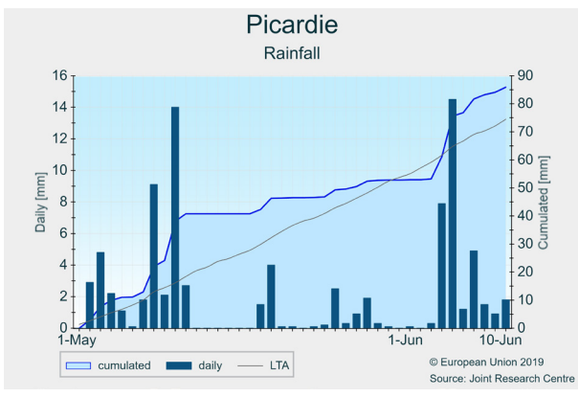
In the analysis period, rainfall was close to or slightly above average except in south-eastern regions (*Rhône-Alpes*, *Auvergne*, *Franche-Comté* and *Provence-Alpes-Côte d'Azur*) where cumulative rainfall was 40 % below average. After a cold snap during the first days of May, temperatures followed the seasonal average in the north, while being slightly below average in the southern half of the country. The first days of June were warmer than usual and maximum temperatures slightly exceeded 30 °C on 2 June, before coming back to the seasonal average when a storm hit the western coast.

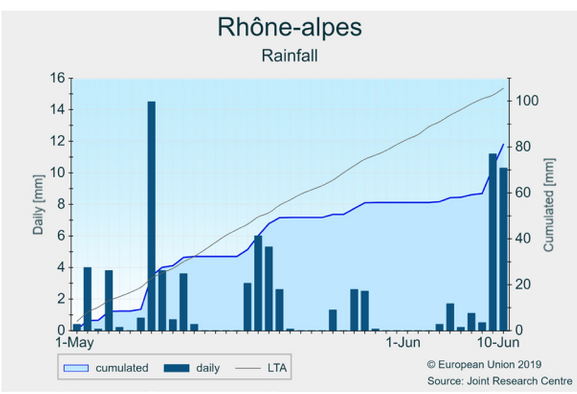
The cold snap at the beginning of May, as well as the warm temperatures at the beginning of June, are not expected to have had a significant impact on crops. However, a few adverse conditions contributed to a decrease in the forecast compared to last month for soft wheat and winter barley: a severe unseasonal storm on 7 June, causing lodging to part of the winter cereal crops in the north; rainy and humid weather between 7 and 14 June, causing increased disease pressure and lower radiation while wheat is in the early phase of grain filling; and the dry conditions in the south-eastern regions.

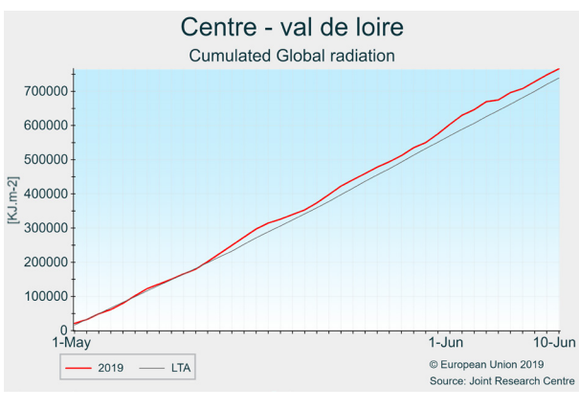
Conditions during soft wheat flowering, at the end of May, were mixed and late wheat varieties may have been exposed to rainy and humid weather, favourable to fusarium head blight.

Forecasts for soft wheat, winter barley, spring barley, triticale and rye are still above the 5-year average, but slightly lowered compared to last month, also in view of above-average temperatures forecast from mid June onwards. The yield forecast for rapeseed is maintained well below the average. Summer crops — grain maize, sunflowers, potatoes and sugar beet — are in good condition, benefiting from the rainfall, and the warm temperatures after mid June will favour rapid growth.









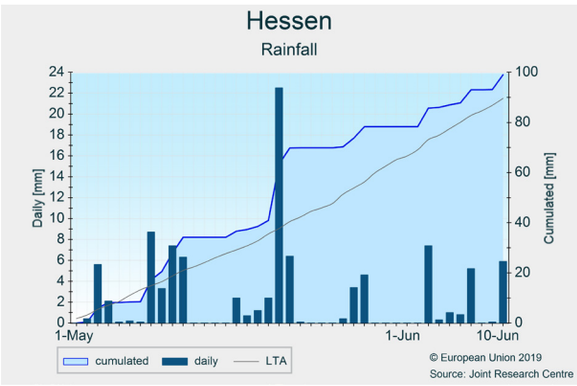
Germany

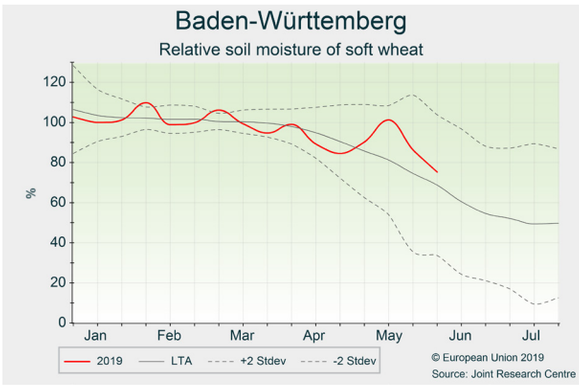
Rainfall during May sustained yield potential

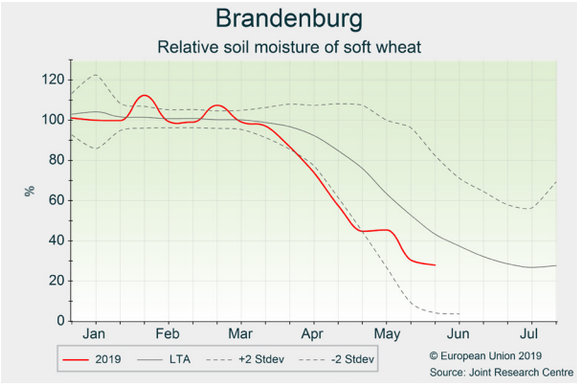
Crop conditions stabilised due to favourable rainfall during May, and the yield potential for winter and spring crops is maintained. Moderate temperatures slowed crop growth and reduced phenological advancement. Yield forecasts were revised upwards.

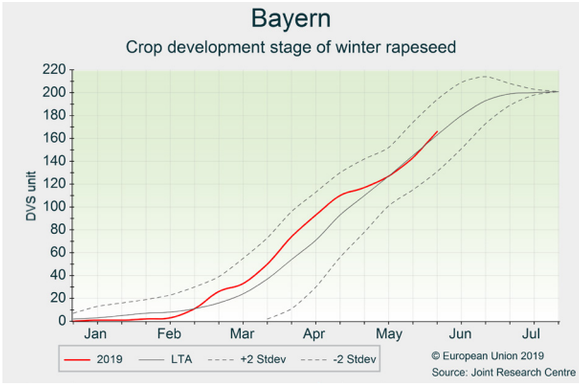
Much-needed rain arrived in May; crop conditions mostly stabilised and soil moisture levels improved just before the demanding grain-filling phase for winter cereals. For summer crops too, soil moisture levels can now sustain adequate growth in most regions. However, precipitation was once again lower than average in the north and especially the north-west (mostly in the range of 30-40 mm), but this time plentiful towards the south (with some daily record values close to the Alps), except for some drier spots in *Bayern* (*Oberpfalz*). In the north and north-east, notably *Brandenburg* and neighbouring areas of *Sachsen-Anhalt*, *Sachsen* and *Niedersachsen*, *Nordrhein-Westfalen* and *Mecklenburg-Vorpommern*, the rainfall brought some relief but the overall water balance for the most affected regions remains negative. In these regions, crops continue to be under some water stress, and more rain is needed to ensure adequate grain filling. Temperature sums for the month of May are below the LTA, slowing crop growth — with positive effects on winter crops due to prolonged ear emergence, but causing a somewhat delayed start to summer crops although at this stage not necessarily hampering yield potential. The temperature deficit is more marked in the south than in the north. During the first half of May, temperatures were clearly below average (with even some light night frosts), but they then oscillated around the LTA to peak in a first heatwave at the beginning of June, ending with locally damaging thunderstorms. The heatwave was most pronounced for the already dry regions.

Due to the precipitation and moderate temperatures throughout May, prospects at country level are average to good, albeit still with a high level of uncertainty. Yield forecasts were revised upwards and are clearly above last year's disappointing yields and close to the 5-year average.









Poland

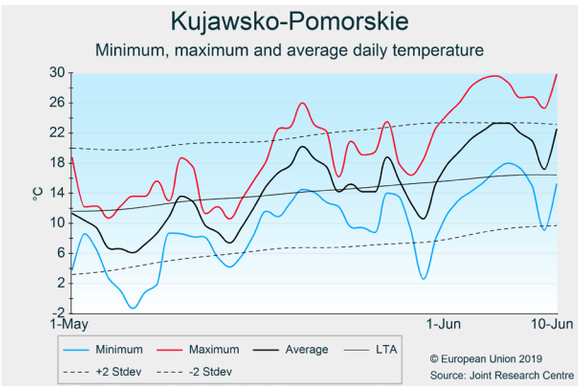
May rains improved crop conditions

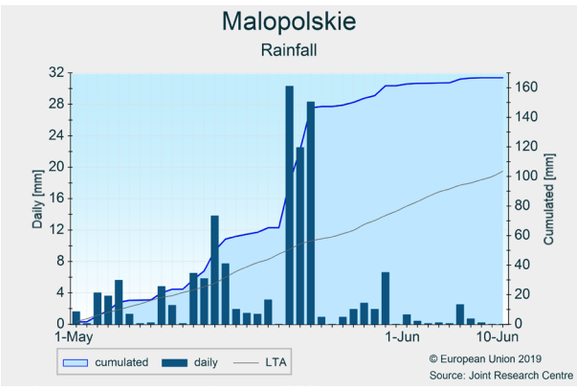
Beneficial rains helped to restore soil water levels and improved crop conditions. Yield forecasts were maintained close to the 5-year average for most crops.

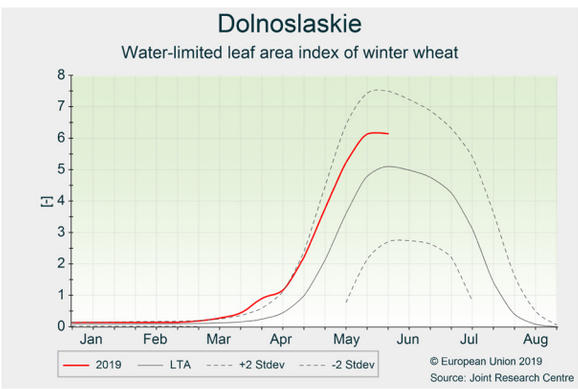
Substantial — in most of the country very abundant — rainfall finally occurred after a very dry April. As a result, soil water content was restored to above-average levels. Some flooding and local crop damage were observed in south-eastern regions. Temperatures during the first half of May were below the LTA, while during the second half of May they oscillated around the LTA. The first dekad of June was associated with above-average temperatures and little rain.

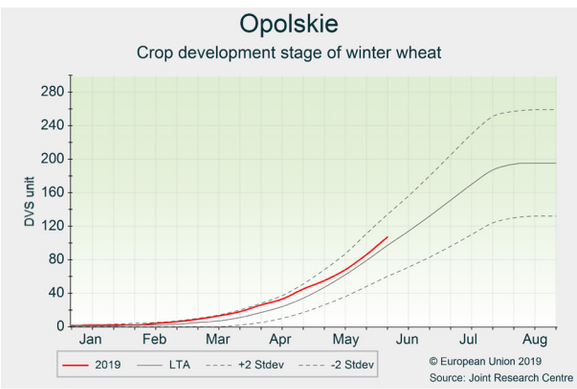
The weather conditions in May allowed crops to recover after the very dry April. In most of the country, spring cereals are in fair condition, while winter cereals (especially wheat) are in good condition, although some pest and disease pressure is observed. Model indicators show that crop development and biomass accumulation are still advanced, despite some slowing due to the colder-than-usual May temperatures. The condition of sugar beet has improved, but plants are still smaller than usual and under high pest and weed pressure. Potato planting was mostly finished by the beginning of May, and early development was delayed due to colder-than-usual temperatures. The warm weather during June has accelerated plant development, which is currently around average.

Yield forecasts are maintained close to the 5-year average, with the exception of sugar beet for which the forecast is maintained below average due to the adverse conditions at the beginning of the season.









Ireland and United Kingdom

Favourable outlook

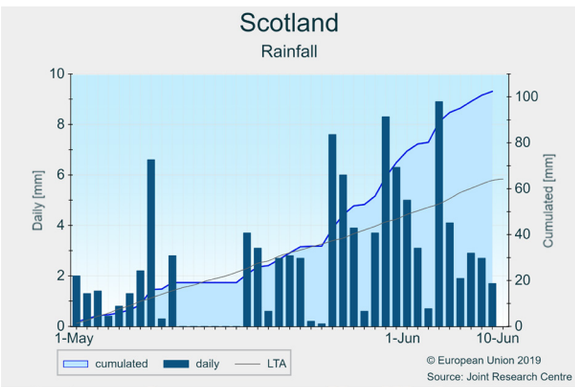
Beneficial rains helped to restore soil moisture in the southern United Kingdom, thus removing concerns about risks of water stress. Yield forecasts were maintained close to the average for both countries.

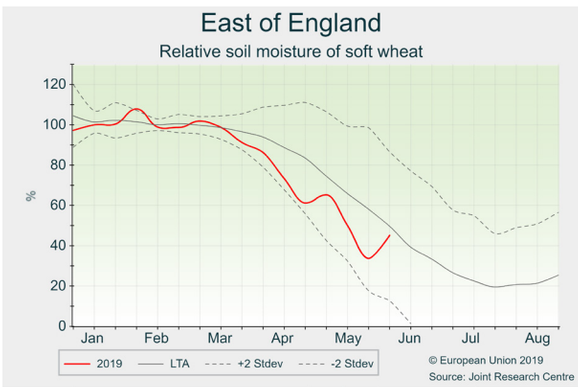
Prevailing temperatures were below average in the first half of May and during the last week of the review period, but close to average for the rest of the period.

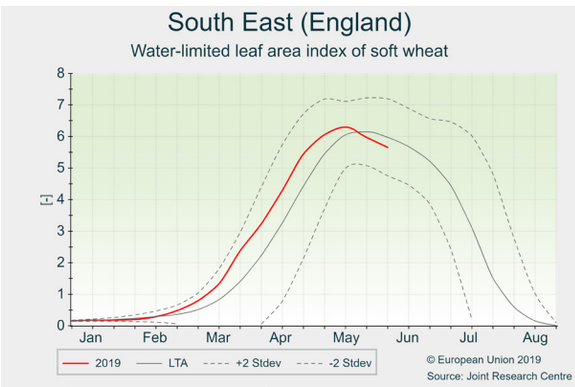
Rainfall was below average, with the exception of Scotland where abundant precipitation has occurred since the end of May. In southern United Kingdom, soil moisture levels reached critically low values at the beginning of May and winter cereals started showing signs of stress due to the lack of rain. However, the rainfall episodes at the beginning of May were particularly welcomed and precipitation at the beginning of June helped to restore soil moisture, removing concerns about water stress during the flowering stage.

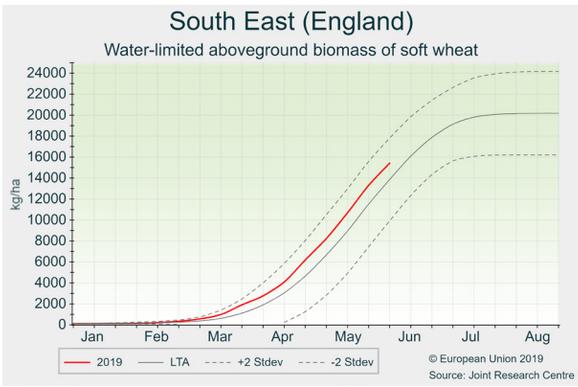
Spring cereals are generally between flag leaf emergence and booting. The majority of winter cereals are now between late booting and heading. Model indicators show close-to-average or just-above-average development and biomass accumulation for winter crops, and restored the soil water content for the southern United Kingdom. Potato planting was completed by the end of May. Sugar beet crops are generally faring well, with crops reaching six to eight true leaves ([2]). Rapeseed has concluded flowering.

Yield forecasts are maintained close to the 5-year average for both countries. The forecast for rapeseed was maintained below average due to continuing dry conditions in the south and the difficult start to the season.









([2]) https://bbro.co.uk/media/50077/19-advisory-bulletin-no-13.pdf

Spain and Portugal

Rain deficit lowers yield outlook

Very dry and warm conditions in May, particularly in the south and centre (Castilla y Leon) of the Iberian peninsula, have lowered yield expectations for winter crops and spring barley. Good summer crop yields are still possible. However, for irrigated summer crops, this will depend heavily on water reservoir levels.

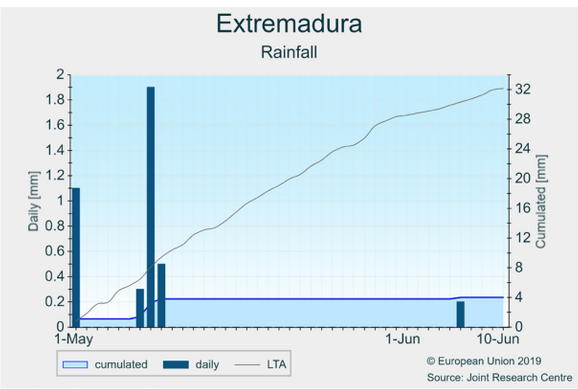
After a rainy April, dry conditions returned to large parts of the Iberian peninsula in May. The dry areas now extend to all regions except the north coast of Spain, areas close to the Pyrenees, *Catalunya* and *Comunidad Valenciana*. Northern Portugal and large parts of Castilla y Leon experienced a rainfall deficit of 40-60 mm during the review period, which would normally represent a highly beneficial contribution to the grain filling of winter crops. In the south, the dry period (which started in winter but was interrupted in April) continues, especially in the regions of *Algarve, Alentejo, Extremadura* and *Andalucía*. The water reservoirs of the *Duero, Tajo* and *Guadalquivir* are at lower-than-usual levels and the *Guadiana* basin reservoirs at very low level ([3]).

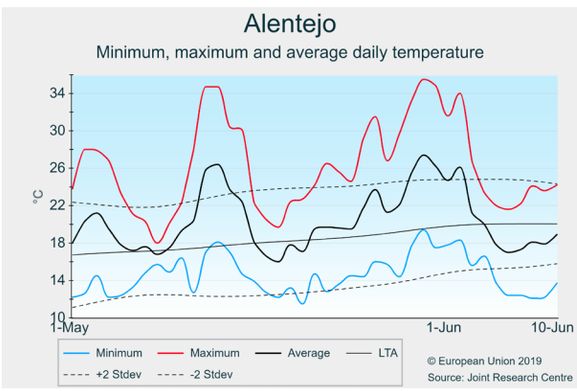
The dry situation was compounded by warmer-than-usual temperatures in *Alentejo,* central Portugal*, Extremadura* and *Andalucía*, which were 2-4 °C above the LTA over extended periods, leading to high evapotranspiration levels.

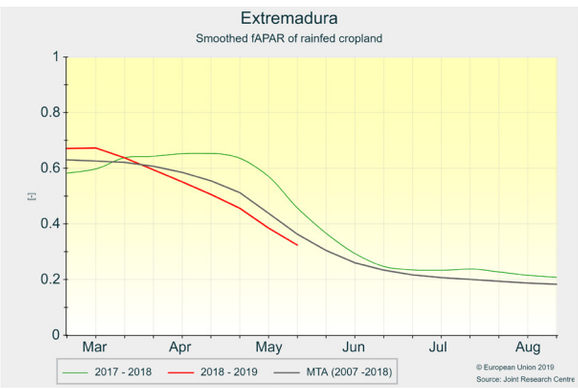
The dry and hot conditions further worsened yield expectations in the south, where winter crops are currently being harvested, but also negatively impacted the yield outlook for wheat and barley in *Castilla y Leon.* Remote-sensing-based fAPAR assessment indicates *Extremadura* as one of the most affected areas, but also reveals affected spots in *Alentejo, Algarve*, *Andalucía* and *Toledo*.

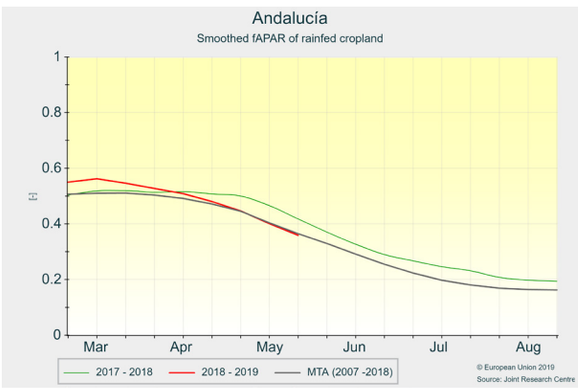
The situation is better where there were less persistent dry conditions prior to this period, such as in the centre and north of Portugal, and in northern and eastern Spain (e.g *Guadalajara, Catalunya*). However, many rainfed areas in the *Ebro* basin (e.g. *Zaragoza* in *Aragón)* are also affected by drought, due to low precipitation in recent months.

In the driest regions, no substantial rain is forecast before 20 June, lowering yield expectations for remaining winter crops significantly. Yield expectations for usually rainfed sunflowers are back to average. Usually irrigated summer crops may still reach average or good yield levels, if irrigation water restrictions are not applied.









([3]) *Source:* www.embalses.net, accessed 14 June 2019.

Italy

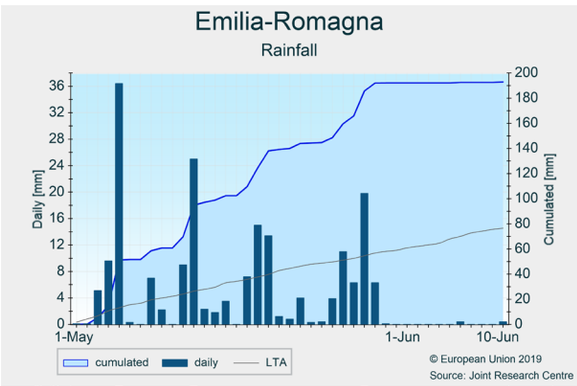
Cool weather favoured yield outlook for wheat

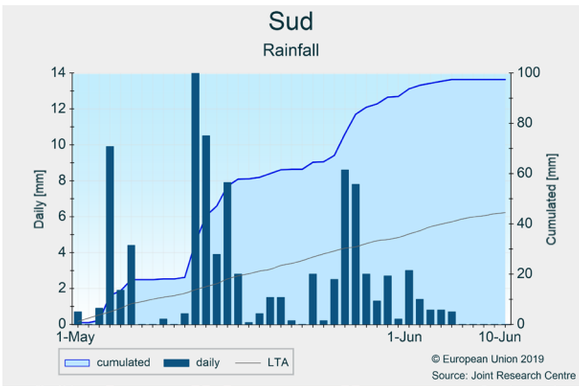
Cool weather prolonged yield formation for winter cereals but slowed growth of summer crops. Winter cereal yield forecasts remain well above the 5-year average.

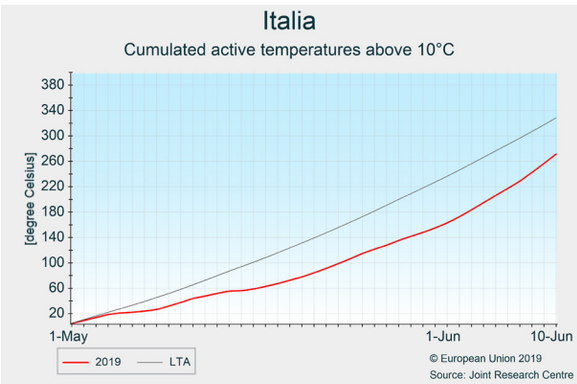
In May, wet weather conditions were observed in most of the Italian peninsula. Intense precipitation was recorded in *Emilia Romagna,* where local floods affected pasture and fodder crop fields. Unusual hail events and intense rains were observed along the Adriatic coast and in *Campania*. Temperatures were cool (2-4 °C below the LTA) throughout the peninsula, especially in southern regions. Since the start of June, temperatures and precipitation have followed seasonal values.

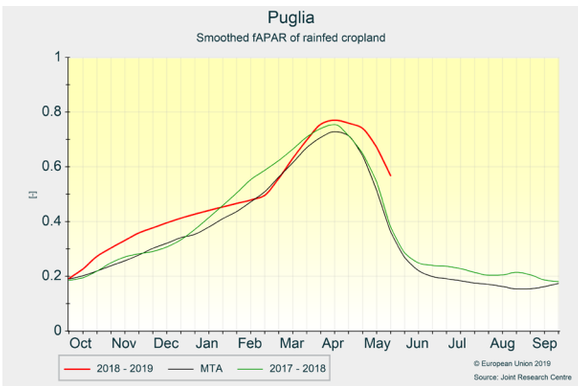
In southern Italy, the growth of already delayed winter crops slowed further, thus extending the grain-filling period. This favoured yield formation. Winter crops in the main producing regions are now ending the grain-filling phase. The expected increase in temperatures next week should favour drying of the grain.

In central and northern Italy, winter crops are in good shape following flowering and are now in full grain filling. In the Po valley, the cold weather did not favour the development of summer crops that were already delayed due to late sowings. Maize and soybean remain underdeveloped compared to an average year, but so far without serious concerns about final yields.









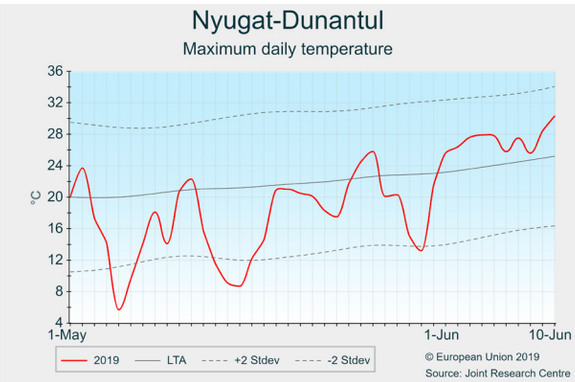
Hungary

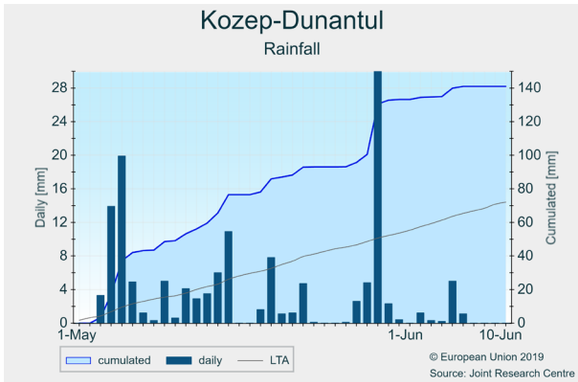
Rainy and cool periods in May

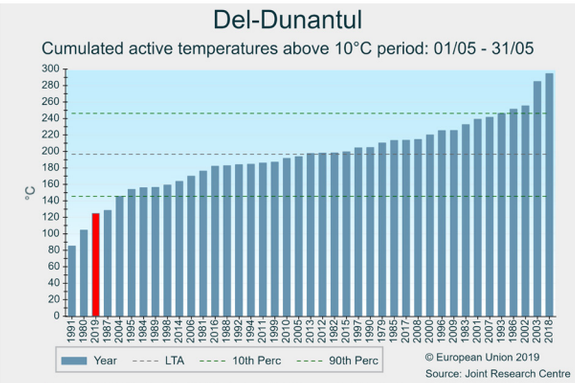
Rainfall in early May favourably increased the soil moisture content before the flowering of winter cereals, but later increased the possibility of fungal infections and weed pressure. Summer crops are mostly underdeveloped and undergrown due to a delayed sowing campaign and delayed crop development because of low temperatures.

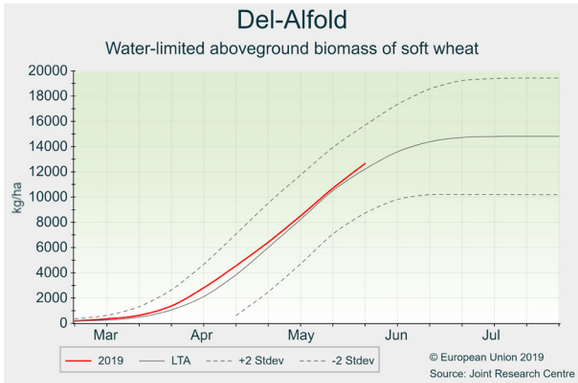
Hungary experienced extraordinarily low daily temperatures in the first 2 dekads of May, resulting in a 2-4 °C negative thermal anomaly, especially in the western region. From 20 May onwards, daily temperatures fluctuated close to or above the LTA, but maxima exceeded 30 °C only for a few days. Frequent and abundant rainfall was recorded in May. The precipitation sum for May was mostly double or triple the average. From early June, however, the rainfall tendency decreased. Dry soil conditions in April, and later rainy and cold weather in the first half of May, hampered the sowing and early development of summer crops; as a result, decreased areas are expected for maize, sunflower and soybean.

The phenological development of late-sown summer crops was delayed by low temperatures; consequently these crop stands are now underdeveloped. After the spring drought, water supply for winter crops became adequate in May. Rapeseed and winter cereals partially recovered, boosting crop growth and improving yield expectations. The lower daily temperatures favourably lengthened the early grain-filling period for winter cereals. At the same time, the wet conditions increased pest and disease pressure and reduced the efficiency of weed control. The yield forecast for winter cereals and rapeseed was revised slightly upwards, while the outlook for summer crops corresponds to the trend.









Romania

Yield outlook to average following abundant rains

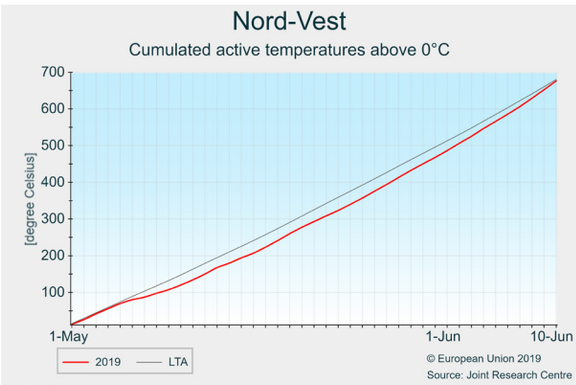
Abundant rainfall kept soil moisture content above average levels, ensuring optimal water supply for the grain filling of winter crops, but increasing pest pressure and potentially reducing grain quality. Summer crops are in good shape in the main producing regions.

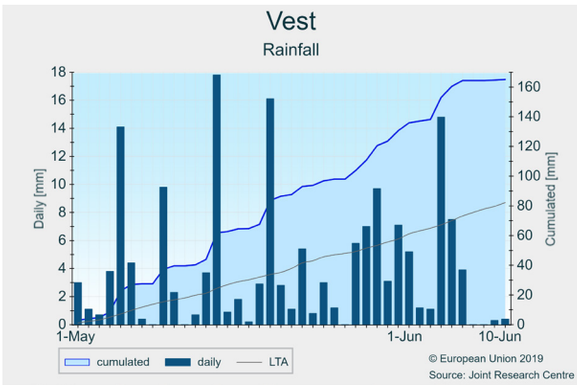
The first half of May was much cooler than usual, especially in western and central Romania; consequently, crop development slowed in these regions. After 20 May, above-average temperatures prevailed and winter and summer crops were able to catch up. Only a few (1-4) hot days (T_{max} > 30 °C) occurred, primarily in western and southern areas.

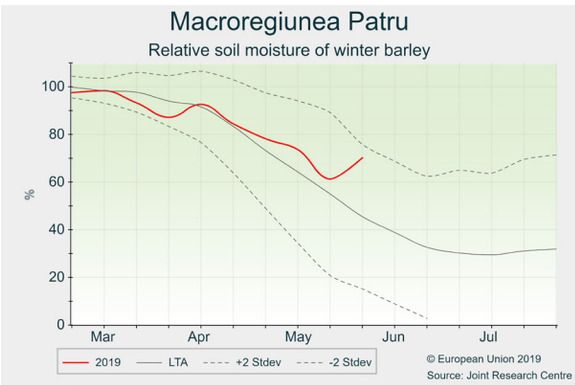
Rainfall was substantial. In most regions, precipitation totals exceeded the average by 25-150 mm, keeping soil moisture content at a favourably high level to ensure optimal water supply for the grain filling of winter crops. However, in some areas of *Macroregiunea Patru* and *Sud-Est*, rainfall remained around average, leading to below-optimal crop water supply due to the preceding period of dry weather.

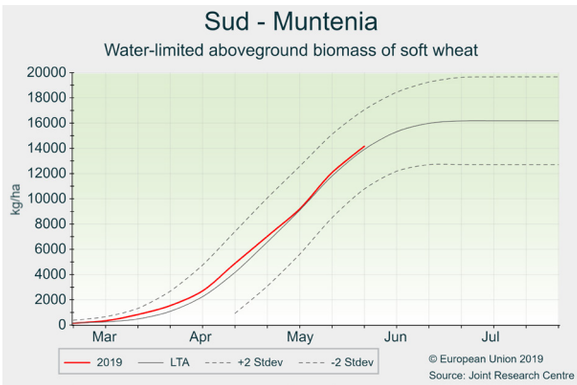
The reproductive phase of winter crops, which is crucial for yield formation, was not shortened thanks to close-to-average thermal conditions overall. According to our crop model simulations, biomass level is close to average, but remains below average in south-eastern parts of the country due to the limited water supply. Satellite images confirm this negative anomaly. A downside of the abundant rainfall is increased pest pressure and a potential reduction in grain quality.

The yield forecast for winter crops is close to the 5-year average. The development and growth of summer crops is seasonal and the current soil moisture content provides a promising start to this summer.









Bulgaria

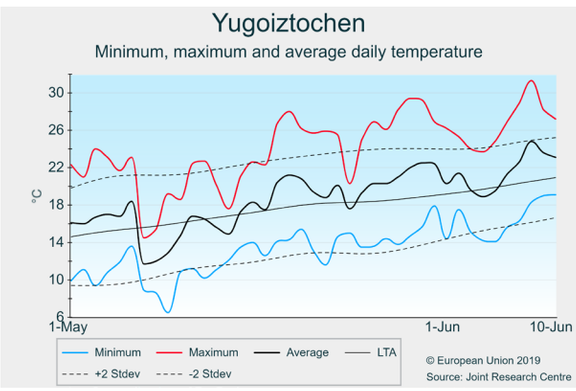
Beneficial rain during grain filling of winter crops

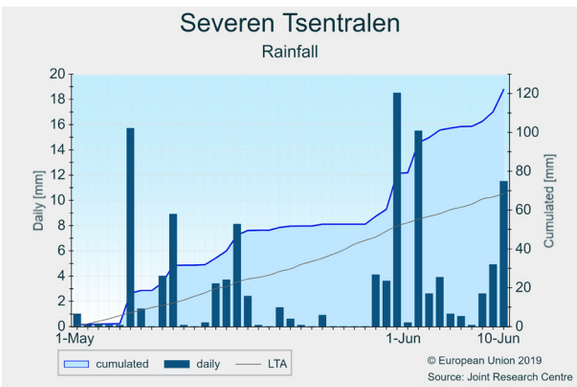
Abundant rainfall provided adequate water supply and supported an improved yield outlook for winter crops. Daily temperatures remained within a normal range. Summer crops are also benefiting from favourable soil moisture conditions and presenting above-average development and growth.

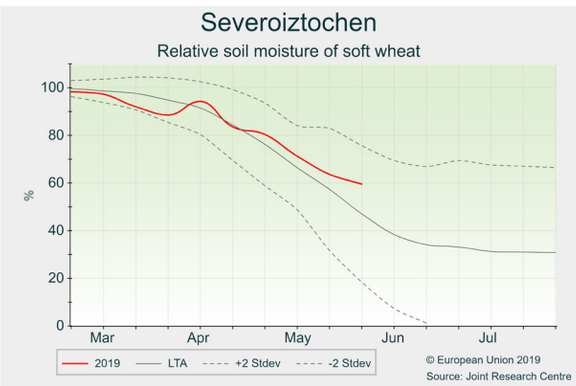
Close-to-average thermal conditions prevailed in Bulgaria, considering the review period as a whole (1 May-10 June). Temperatures during the first half of May were somewhat below average, while above-average temperatures prevailed from late May onwards. Rain was above average and particularly abundant in the first dekad of May and the first dekad of June. Cumulative rainfall exceeded the LTA by 40-110 % in northern and eastern parts of the country, while south-western regions (*Yugozapaden* and *Yuzhen Tsentralen*) experienced close-to-average precipitation levels.

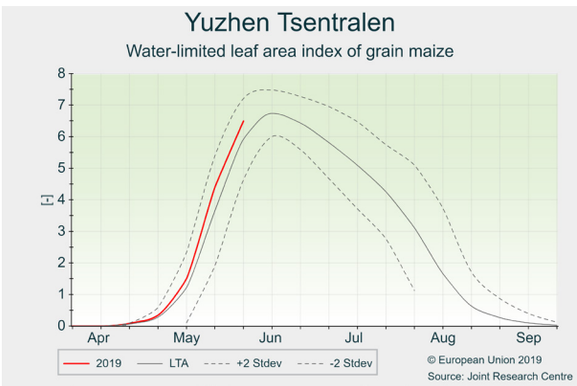
The rain maintained soil moisture levels, or even increased them to above-seasonal values, in most parts of Bulgaria. These conditions favoured adequate water supply during the grain-filling period for winter cereals, but the wet weather increased the likelihood of pests and diseases. In some parts of *Yuzhen Tsentralen* and *Severoiztochen*, water supply remained less than optimal until mid May, due to below-average precipitation earlier this spring. For the country as a whole, our model simulations show above-average biomass accumulation and yield formation for winter cereals, and our yield forecasts were revised slightly upwards.

The development of summer crops is seasonal or advanced. Our crop simulation results show above-average leaf area development and biomass accumulation. Consequently, yield expectations are positive and exceeding the 5-year average, albeit below last year's record levels.









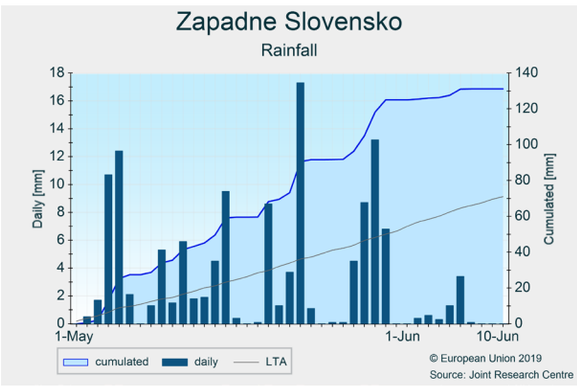
Czechia, Austria and Slovakia

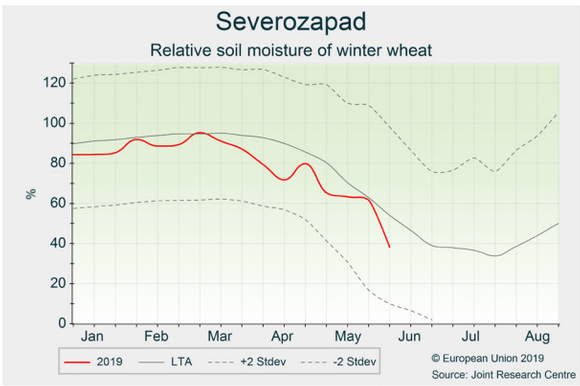
Improved soil moisture conditions

Above-average rainfall, accompanied by a cold weather anomaly in May, reduced soil moisture deficits, especially in the most drought-affected regions in central and western Czechia. The winter crop yield outlook has not changed substantially.

An unusually cold weather anomaly in May, when average temperatures dropped by at least 2 °C (regionally more than 3 °C) below the LTA, was followed by a warm start to June. The cold weather anomaly was accompanied by abundant rainfall. In western Slovakia and north-eastern Austria, rainfall cumulates in May exceeded the LTA by more than 100 %. The rest of Austria, the eastern half of Czechia and eastern Slovakia saw rainfall anomalies up to 80 % above the LTA. Seasonal rainfall cumulates were recorded in western Czechia. The first dekad of June brought some additional rainfall in Czechia (except the western part) and in north-eastern Austria.

The cold weather anomaly in May caused a delay to summer crop development. Winter crops are still advanced due to the preceding warm weather conditions. The recent rainfall improved the soft wheat yield outlook in Slovakia. Rainfall in central and western Czechia contributed to a reduction in moisture deficit in upper soil layers, which is highly relevant for summer crops. However, our soft wheat yield forecast for Czechia remains unchanged due to the preceding drought conditions, which substantially limited the yield potential.





Denmark and Sweden

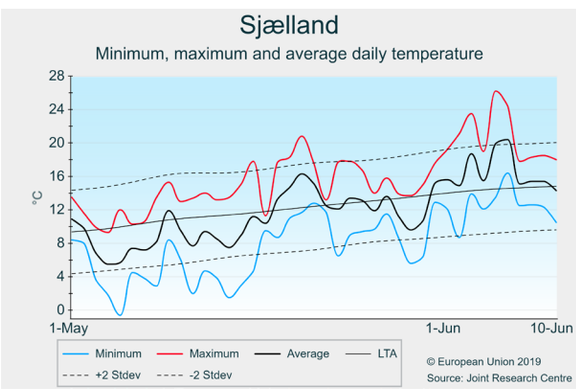
A positive outlook for winter and spring cereals

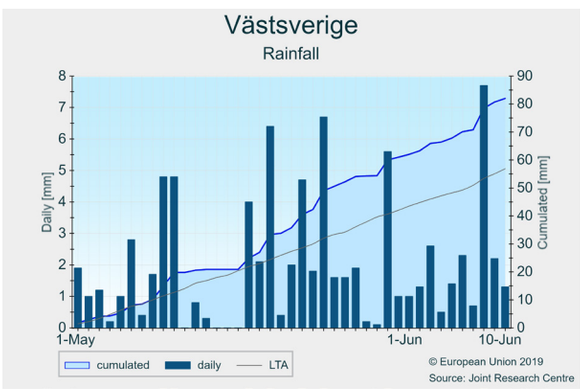
Rainfall was close to the average for the analysis period and allowed spring crops to recover from the rain deficit observed in April. The yield forecast for winter cereals, rapeseed and spring barley is above the 5-year average.

Cumulative rainfall corresponded to the seasonal average for the analysis period in Denmark. Most of Sweden received 50 % more rainfall than the average. Temperatures remained below average until mid May, lowering water demand following a long dry period in April. After mid May, temperatures rose to above average, and only a few days at the end of May recorded a temperature below the seasonal average.

During the analysis period weather conditions have been favourable for crop growth, and particularly for spring cereals to recover from the dry conditions in April. Cumulative rainfall since autumn is close to average; although groundwater levels have not been fully restored after last year's drought, the rainfall observed provided enough water for winter crops and spring cereals, while the long rain deficit observed in the previous analysis period reduced disease pressure.

Yield forecasts for winter crops and rapeseed are maintained and above the 5-year average, while yield forecasts for spring crops are higher than last month. Summer crop yields are forecast using the trend, as the season is just starting.





Estonia, Lithuania, Latvia and Finland

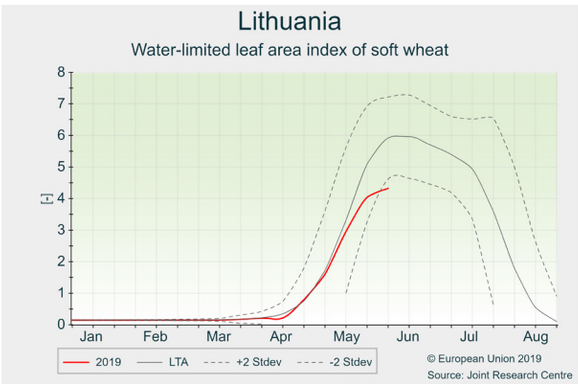
Restored soil water levels improved crop conditions

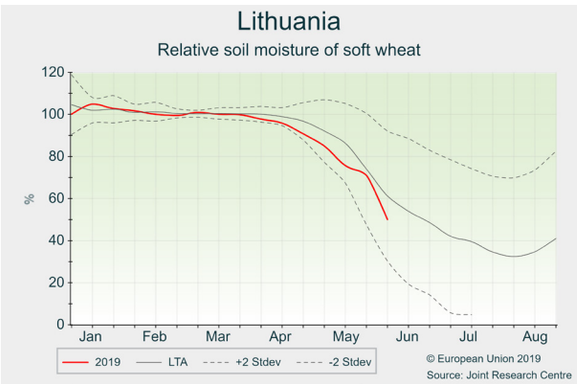
Spring crops are progressing well and soil water conditions have improved, but more rain is needed in Lithuania and Latvia to maintain the yield potential of winter crops.

In Finland and the Baltic countries, colder-than-usual temperatures prevailed in the first 2 dekads of May. A few night frosts occurred, without major consequences. After this, temperatures remained mainly above average levels. Cumulative radiation was overall slightly below average at the end of the review period.

In Lithuania and Latvia, after the drier-than-usual conditions in April, rainfall increased in May, resulting in close-to-average cumulative values at the end of the review period. Precipitation was abundant in Estonia and Finland, resulting in above-average cumulates. High precipitation in Finland during May slowed spring crop sowing in eastern and northern regions, and sowing is expected to continue until the end of the first dekad of June.

The rainfall in May largely compensated for April's low soil moisture levels and crop conditions improved, although soil water levels remained below average for winter cereals in Lithuania and Latvia. Our crop model simulations show generally close-to-average biomass accumulation, but below-average leaf area development for winter crops in the Baltic countries. Crop indicators for spring crops are all positive. Cereals are in good condition, with spring crops in vegetative growth and winter crops in the heading stage. Sugar beet planting was satisfactory and crops emerged well. Yield forecasts mostly remain close to the 5-year average but were revised downwards for winter crops in the Baltic countries.





Belgium, Luxembourg and the Netherlands

Crops in fair condition

Winter crops recovered well from the dry April thanks to mild temperatures and well-distributed rain. Summer crops present large variations in development but are generally somewhat behind. Our yield forecasts remain slightly above the 5-year average.

The distinctly colder-than-usual period that had started at the end of April continued until mid May, after which temperatures fluctuated around the average, and then, after the end of May, further increased to above-average levels. Maximum temperatures reached 30°C in some regions on 1 or 2 days in early June, but remained well below this level during the rest of the review period. Overall, the period as a whole was slightly colder than usual.

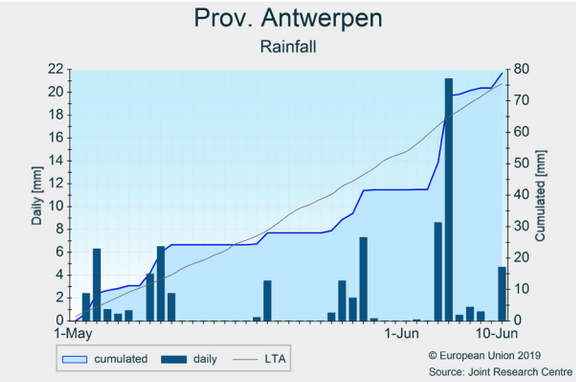
Rainfall was fairly well distributed, mostly over frequent small events, except in the beginning of June when some heavy thunderstorms brought more abundant rain (partially in the form of hail), especially in the coastal regions. For the period as a whole, rainfall was at or just above the LTA in most regions, but remained somewhat below the LTA in central- and north-eastern parts of the Netherlands.

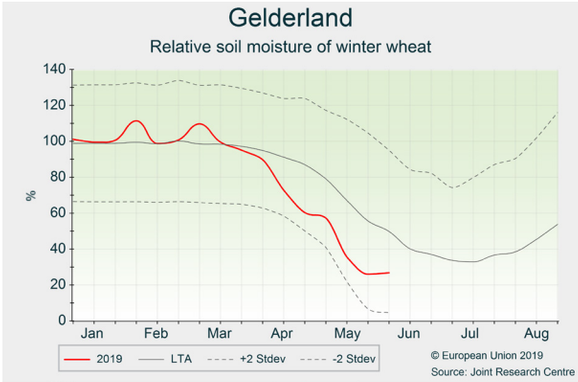
Winter cereals are still slightly advanced in development and generally recovered well from the dry conditions in April. Low soil water content remained a concern until the end of May, but it is now close to the LTA in most regions, except in eastern and north-eastern parts of the Netherlands, where they remain well below average.

Sugar beet, potatoes and maize are generally somewhat behind in development, but with large variations (often even within fields) depending on soil moisture conditions around sowing, sowing depth and sowing date. As a rule of thumb, canopies should be closed before the longest day to avoid losses in yield potential, and this might not be achieved in all regions.

Relatively high pest and disease pressure is a concern in both winter and summer crops.

Our yield forecasts for both winter and summer crops have remained practically unchanged, mostly close to the 5-year average.





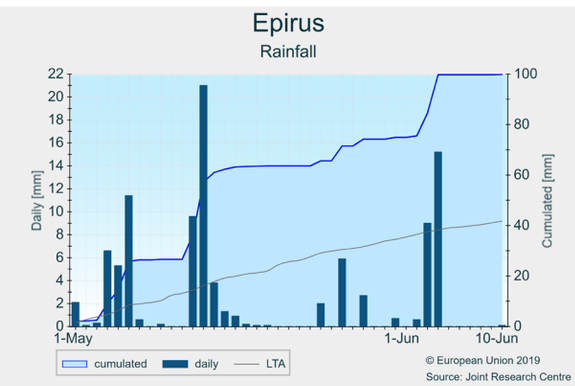
Greece and Cyprus

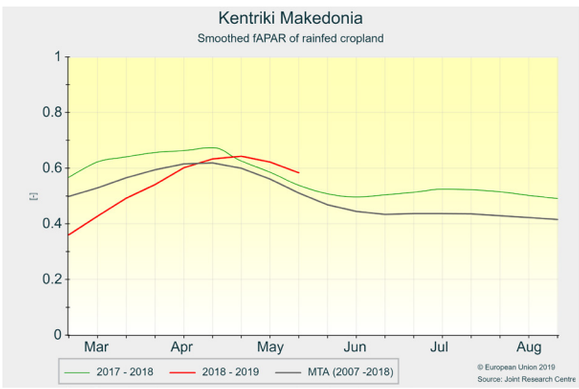
Improved outlook for winter crops in Greece

The west and extreme north-east of Greece received abundant rainfall, while it was drier in the centre and south. Temperatures within normal range. Northern provinces may achieve average winter crop yields at best, while above-average yields are expected in other regions. In Cyprus, the season has concluded with excellent harvest conditions.

Abundant rainfall was recorded in May in the west and extreme north-east of Greece, while it was drier than usual in most other areas. Temperatures were slightly cooler than usual, limiting excessive evaporation. In the west, regular rainfall together with cooler temperatures provided good conditions for an extended grain-filling phase. Remote-sensing-based fAPAR levels for *Dytiki Makedonia* indicate an improvement in crop conditions. Similarly, crop status has recovered in the western part of *Kentriki Makedonia*, but crop status in eastern parts is in many cases compromised due to strongly accelerated development and early senescence after a very late onset this year (e.g. *Serres)*, reducing the length of the grain-filling period. This region has probably suffered most from the dry conditions this season. Overall, northern regions of Greece may at best reach average yield levels, while most other regions are expected to do better than average, for example *Thessalia,* despite the reporting of fungal diseases in an area with excessive rainfall (*Magnesia*). In the south and centre, the abundant winter and spring rainfall was still sufficient to preserve good crop conditions and to extend the grain-filling phase longer than usual.

Cyprus concluded an excellent crop season with dry conditions at harvest.





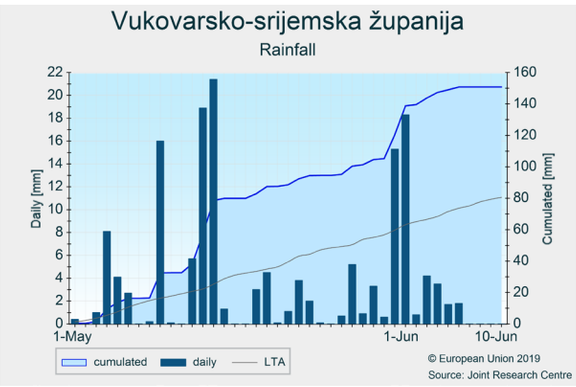
Croatia and Slovenia

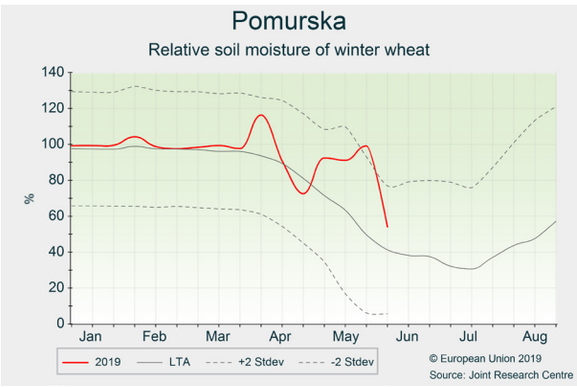
No benefits from cold and wet weather

Cold and wet weather anomaly in May contributed to delayed sowing and poor establishment of summer crops. Wet conditions also affected winter crops, which are approaching ripening, mainly through increased disease pressure. Nevertheless, the yield outlook for most winter crops remains higher than last year.

May was substantially colder than usual, with temperature anomalies down to 3 °C below the LTA. In most important agricultural areas, rainfall cumulates during the analysis period exceeded 150 mm. The high number of rainy days in May resulted in below-average global radiation levels. Temperatures increased to above-average values during the first dekad of June. During the same period, rainfall was largely absent in Slovenia and western Croatia, whereas eastern Croatia recorded up to 30 mm of rainfall.

The cold and wet weather anomaly in May caused delays to sowing and provided poor conditions for the establishment of summer crops in many agricultural regions. Winter crops were affected by increased disease pressure and locally also by waterlogging. Yield forecasts for winter crops have therefore been revised slightly downwards. The recent warm and dry weather at the beginning of June has generally improved field conditions, especially for summer crops. As it is too soon to evaluate the impacts (both negative and positive) of wet conditions in May on summer crops, our yield forecast remains in line with the long-term trend.





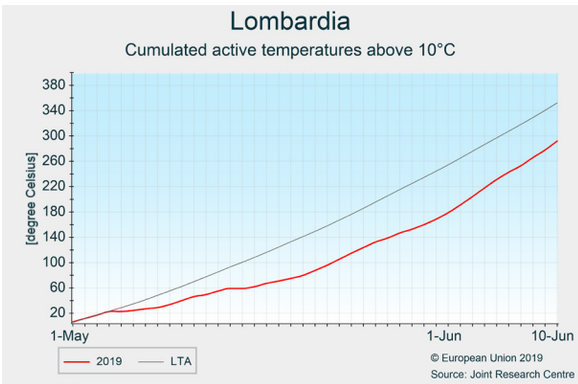
4.2. European Union — rice-producing countries

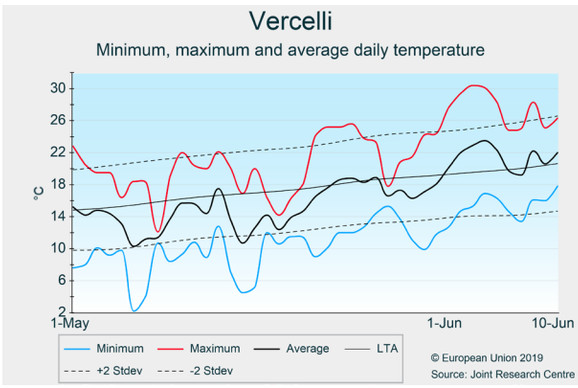
The beginning of the rice campaign in Europe was characterised by lower-than-usual temperatures and variable rainfall events. Weather conditions locally led to deceleration in the initial stages of crop development, or forced farmers to postpone field preparatory works. However, no relevant crop growth limitations due to abiotic stress were observed. Overall, average to above-average values for crop biomass accumulation were recorded by remote sensing and crop model simulation indicators at the end of the analysis period. Rice crop phenology is currently between germination and the initial stages of tillering. Our forecasts are mainly based on the historical trends and are in line with the 5-year average for Bulgaria, France, Hungary, Portugal and Spain, and above the 5-year average for Greece, Italy and Romania.

Italy

Cool and wet weather hampered sowings

Weather conditions at the beginning of April were favourable for the sowing of rice, which profited from the dry and warm weather. The subsequent rainy and cold period hampered field activities and proved unfavourable for germination and emergence. Fields with no or shallow water protection suffered most from the adverse weather conditions. In the first half of May, sowing continued in fits and starts. From mid May onwards, precipitation intensity and frequency eased and weather conditions became more seasonal, with increasing temperatures. Sowing ended around the end of May, with delay compared to a 'normal' year. At the time of analysis, our model shows average crop development just past emergence. The increased temperature in June, and the positive thermal anomalies expected in the coming weeks, should move crop development and biomass accumulation close to (long-term) average conditions. The yield forecast is based on the trend and remains above the 5-year average. It should be noted that the last 5 years saw yields significantly below the previous period in the time series.

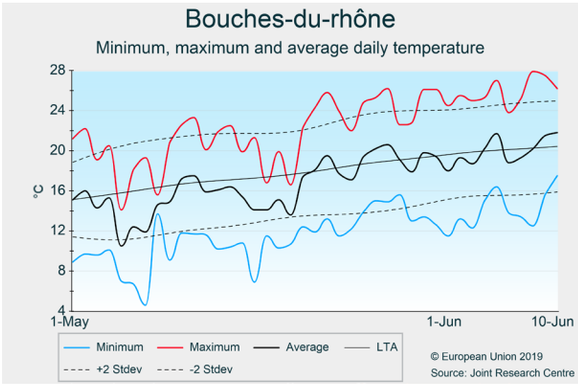


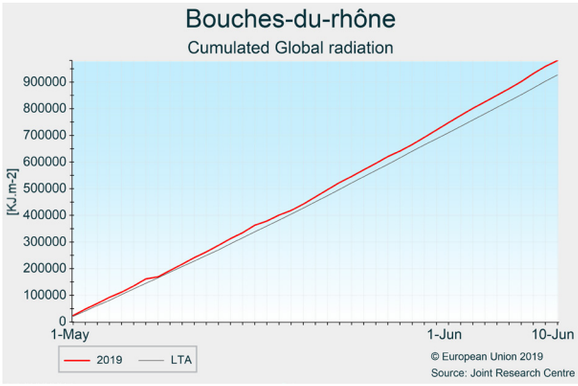


France

Unfavourable weather conditions delay start to the season

Temperatures remained below the LTA in the *Camargue* until 20 May, delaying growth. During the first dekad of May, 3 days with average temperatures below 12 °C (minimum temperature for rice growth) were recorded. During the same period, it was particularly windy; an average daily wind speed of over 40 km/h was recorded on 5 May. This may have led to abiotic stress on already germinated fields, or disturbed seedbeds on recently sown fields, resulting in variations in plant density. Since the last dekad of May, conditions have been more favourable; temperatures were close to average and radiation was above average. The yield forecast is based on the trend as most of the yield variability depends on temperatures and radiation during the coming months.



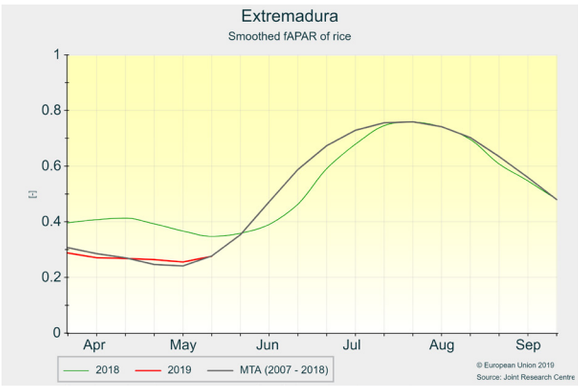


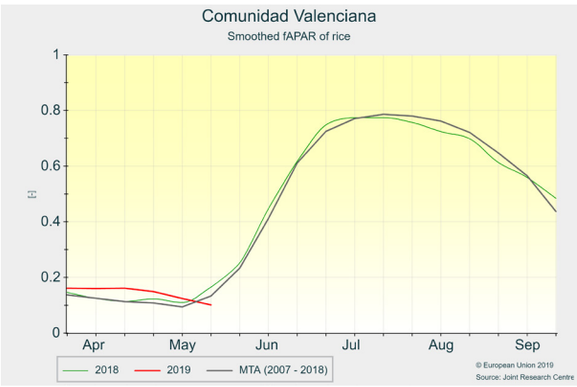
Spain and Portugal

Mostly average crop development; *Comunidad Valenciana* and Portugal delayed

Temperatures in the Iberian peninsula were warmer than usual in the south and west (mainly 0-2 °C, locally up to 2-4 °C) and cooler than usual in the north-east (0-2 °C). From 5 to 9 June, the average temperature fell everywhere, especially in western regions. Rainfall was very low or absent in the south. In all rice-growing areas of the peninsula, rainfall was less than average, apart from north-eastern areas. Rice sowing went smoothly in all regions, although in Andalucía earlier preparatory works were delayed by rainfall in April. In Aragón, the rice-growing region with the latest seeding, rice paddies are only now prepared. Currently, the rice areas in Extremadura and Cataluña are the most advanced as depicted by the remote-sensing-based fAPAR indicator; their development conditions are in line with the LTA.

The main rice-growing area in Andalucía (Sevilla) seems to be developing in line with the norm, although it is early to tell, while the rice area in Comunidad Valenciana appears delayed compared to other years. This region had heavy rainfall around 20 April, and since then temperatures have been slightly cooler than average. Slight delays in crop development are also expected in the Portuguese rice areas. Similar to 2017, the current drought conditions raise concerns about the irrigation campaign, especially in the driest areas such as in the Guadiana basin, where water reservoirs are already at low levels ([4]) and where irrigation limitations may be declared. The persistent dry conditions may also have an impact on the extent of the rice areas sown in these regions.

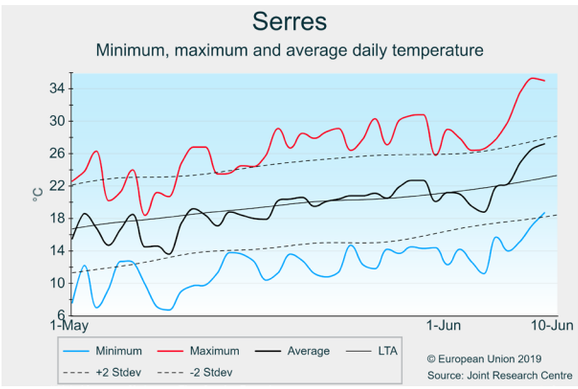


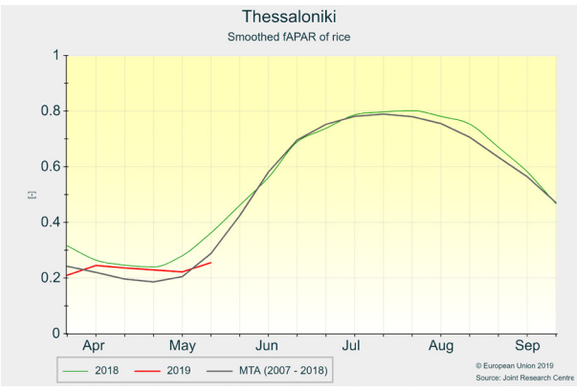


Greece

Difficult start for rice

Rice sown in the area of *Sérres* in the first dekad of April initially emerged well and reached higher-than-usual levels in remote-sensing-based fAPAR values. However, it experienced weakened development due to alternating rainfall, radiation deficit and lower-than-usual temperatures until the third dekad of May. In *Thessaloníki* and *Sérres*, the minimum temperatures reached by the end of the first dekad of May were 9 °C and 7 °C, respectively, which has delayed rice germination and early growth. Consequently, by mid to end May the initial advantage in crop development was consumed and rice was following more normal crop development, although the crops have been stressed in the juvenile period. Similarly to *Sérres*, crop development for rice in *Thessaloníki* has changed from overperforming to underperforming, as shown by fAPAR. Crop development in *Thessaloníki* has been more strongly compromised than in *Sérres*, partly due to the natural phenological delay in this area. Nevertheless, despite initial difficulties, the yield outlook is positive, as there is a high margin for recovery at this stage and the short-term thermal conditions are forecast as being favourable.



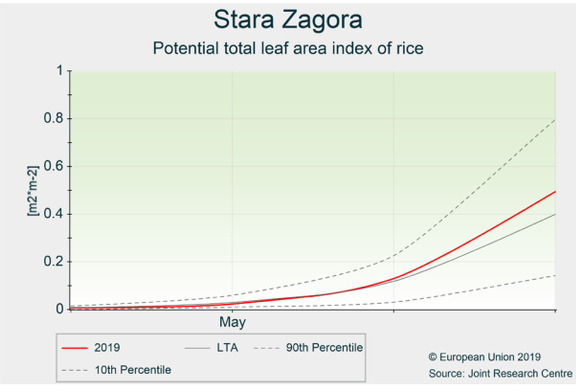


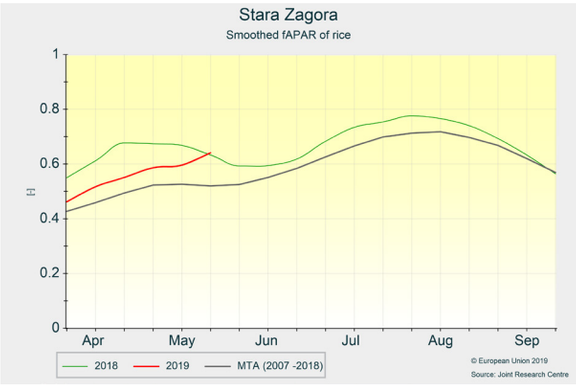
([4]) www.embalses.net, accessed on 14 June 2019.

Bulgaria

Rainfall and low temperatures delayed early sowing

Sowing conditions in the rice-cultivating regions of Bulgaria (*Plovdiv*, *Pazardzhik*, *Stara Zagora*) were characterised by frequent rainfall events and below-average daily temperatures, in particular during the period 6-15 May, which generally led to delays in early sowings of rice. By the end of May, 25 % less area had been sown with respect to the previous year ([5]). By contrast, normal and late sowings were subject to more favourable conditions; for these areas, remote sensing and crop model simulations depict above (long-term) average values for leaf area development and biomass accumulation. In mid June, the rice crop was approaching the beginning of tillering. Our forecast based on scenario analysis reveals similarities between the ongoing season and 2007, as well as 2017. The yield forecast is slightly above the last 5-year average.

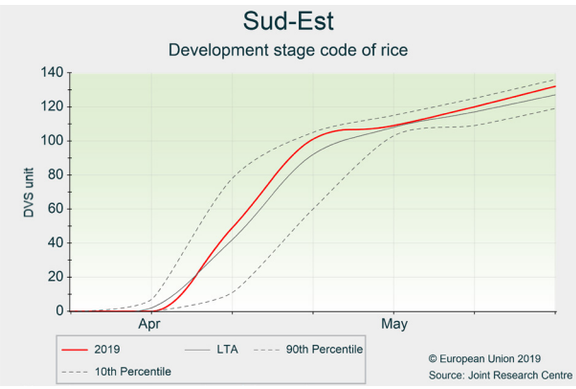


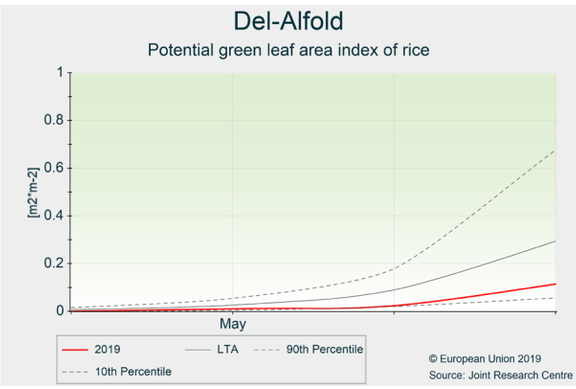


Hungary and Romania

Suboptimal weather conditions

In April, moderate rainfall and generally close-to-average or above-average temperatures allowed a good pace of rice sowing in **Hungary** (*Észak-Alföld* and *Dél-Alföld*) and south-western rice-producing regions in **Romania** (*Macroregiunea Patru*). Later, unusually wet and unfavourably cold weather conditions hampered the sowing campaign in May, delaying emergence and early development stages. Fortunately, no frost events occurred in the rice-producing regions during this part of the season. Rice crop establishment appears weak in Hungary and south-western Romania, due to below-average temperatures and low irradiation levels in May. Our crop model simulations are confirming this unfavourable scenario, as crop development is considerably hindered and crop growth can be characterised by low leaf area indices and below-average biomass accumulation so far. The main rice-producing regions in eastern Romania (*Sud-Est*) experienced milder weather problems; consequently our crop model indicators recorded close-to-average levels for crop growth and development. Current analysis indicates below-average yield expectations, especially in Hungary. However, crop recovery is expected if meteorological conditions are more favourable over the summer.





([5]) Bulgarian Ministry of Agriculture, Food and Forestry: 'Operational analysis for basic crops' (Bulletin No 22/2019), http://www.mzh.government.bg/bg/statistika-i-analizi/ikonomicheski-pazarni-analizi/tekushi-operativni-analizi-na-osnovni-zemedelski-kulturi/, accessed 9 June 2019.

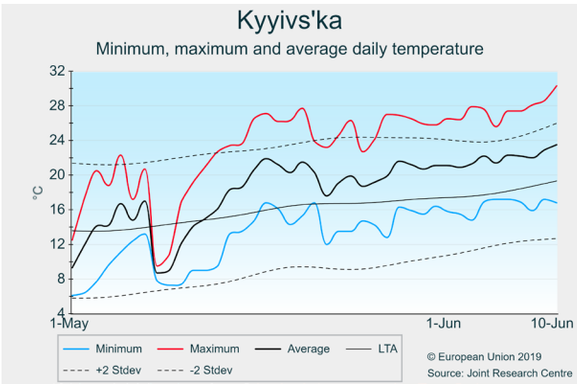
4.3. Black Sea area

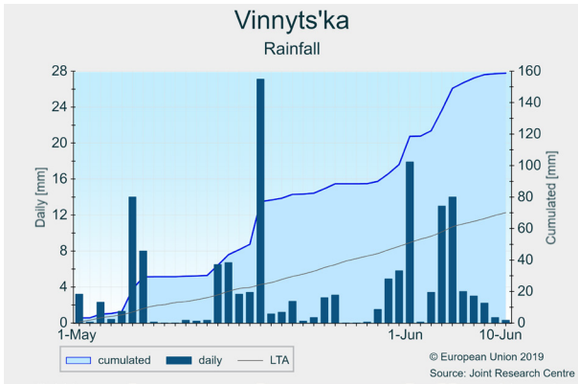
Ukraine

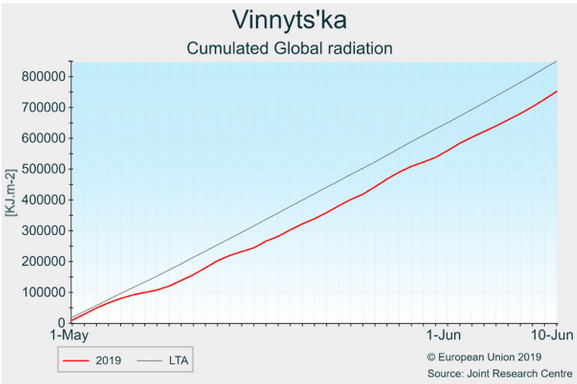
Expectations slightly lowered by abundant rainfall and warm temperatures

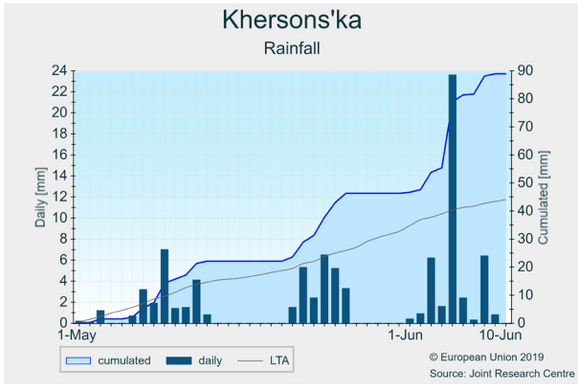
The western oblasts experienced rainy and humid weather in May. Temperatures, already largely above average, started to rise exceptionally from 10 June onwards. The humid weather in the western oblasts was not favourable for winter crops. The delayed summer crop sowings combined with warm temperatures are expected to slightly shorten the grain-filling period.

In the current analysis period, the western oblasts received twice the average amount of rain and global radiation was 10-20 % below average. Temperatures remained largely above seasonal values. The abundant rain and low radiation in the west increased disease pressure and reduced photosynthetic activity. Therefore, a slight decrease is expected in yields for winter cereals. The rainfall partly delayed summer crop sowing campaigns. Soybean is impacted most, while maize sowing has been delayed to a lesser extent. Temperatures, higher than average for the analysis period, are not favourable for winter crops and are likely to result in decreased grain weight. Temperatures are currently rising to about 25 °C throughout the country; this will particularly affect the latest sown wheat. The winter cereal harvest is starting in the south, but the recent abundant rainfall will delay the harvest of the most advanced winter cereals by a few days (e.g. in *Khersons'ka*). Early sown summer crops are in good condition and benefited from the abundant rainfall. The delays in sowing soybean and grain maize may affect yield later in the season, as this increases the probability that those crops will be exposed to warm temperatures or low soil moisture. The yield forecast for winter cereals is slightly below the record high, given the conditions observed during this analysis period. Summer crop yield is forecast using the trend as the season has just started.









Turkey

Mixed but overall favourable season

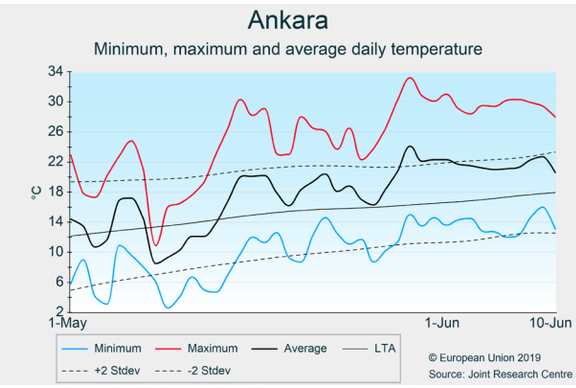
The winter cereal season is nearly ending, with conditions of crops varying from favourable to poor. The overall outlook remains positive, with yield expectations above the 5-year average.

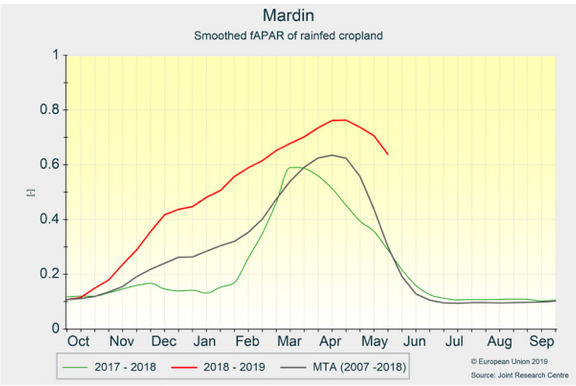
In most regions, the average temperature has been rising to 4-6 °C above the LTA since 15 May — with a sharp increase at the beginning of June. A heatwave, with maximum temperatures consistently above 35 °C, affected south-eastern regions in June. Precipitation was seasonal in most agricultural regions. Nonetheless, wet conditions prevailed along the Black Sea coast, and south-eastern regions were dry.

The outlook for winter crops is mixed. In the Anatolian regions, crop biomass is favourable. Accelerated development has led to cereals being at the end of flowering (e.g. *Kayseri*) or in the grain-filling phase (e.g. *Ankara*). In these regions, yields could further increase if the rains expected next week do occur.

The outlook for winter crops is reduced in the south-eastern regions of *Sanliurfa* and *Gaziantep*, due to the excessive spring rains and the recent heatwave that occurred during grain filling. By contrast, a very positive season is developing in *Mardin* and *Diyarbkir*. However, should very high temperatures persist, these could affect grain filling and reduce crop yield expectations.

The summer crop season is still in the early stages of vegetative growth, as sowings were delayed due to the abundant rains.





4.4. European Russia and Belarus

European Russia

Milder weather needed to sustain positive yield expectations for winter wheat

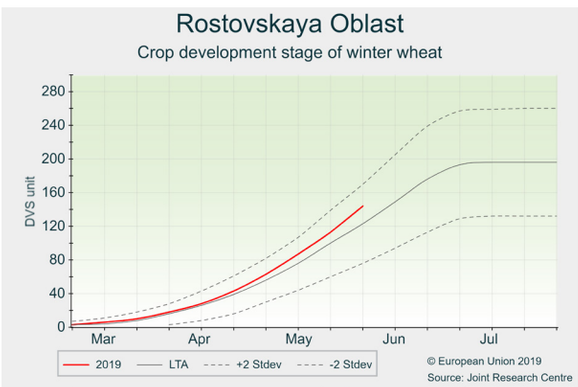
Warmer-than-usual weather has accelerated crop development. Frequent and abundant rainfall provided adequate water supply to the main wheat producing regions until late May, but has since decreased. Both winter and spring crops are generally in good shape, but milder temperatures and more precipitation are needed to sustain the positive yield expectations.

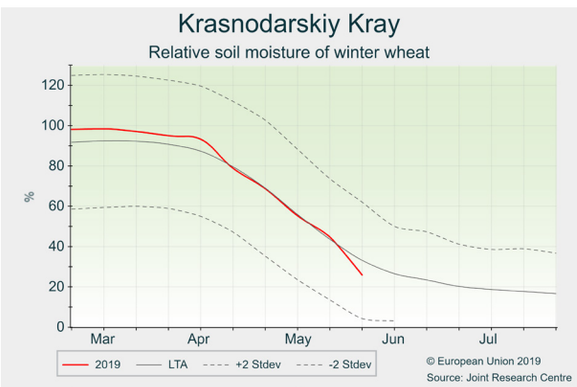
Significantly above-average daily temperatures dominated in most of European Russia, resulting in a 1.5-3.5 °C positive thermal anomaly for the period as a whole, which in several regions has been among the warmest for the past 40 years. In southern Russia, daily maxima since the last dekad of May have frequently exceeded 30 °C.

In most regions, precipitation totals reached or exceeded the LTA, but the western part of the Central okrug and areas between the Black Sea and the Caspian Sea remained drier than usual.

Crop development of winter cereals was accelerated by the warm weather, unfavourably shortening the flowering and early grain-filling periods. Soil moisture content decreased rapidly in May due to increased crop water demands. Crop water supply was nevertheless adequate in May, but decreased to below-average level in numerous regions of southern Russia during early June. On balance, there is positive biomass accumulation and green leaf area for winter wheat in the country's main crop-producing southern and western regions, although crop development is weaker in the Volga okrug. Remote-sensing observations also suggest considerable yield potential for winter wheat this season.

Overall, the spring sowing campaign finished early; excessive rainfall caused some delay in northern parts of the Volga okrug and in western parts of the North West okrug. Early development of spring and summer crops is seasonal in northern and eastern regions, but advanced by 5-10 days elsewhere. Water supply has been adequate so far and our simulation models and remote-sensing observations suggest above-average biomass accumulation and canopy expansion.



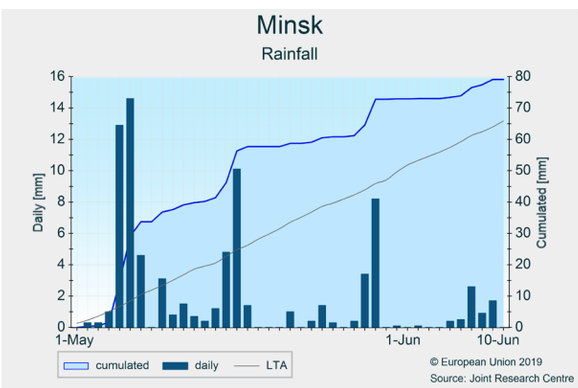


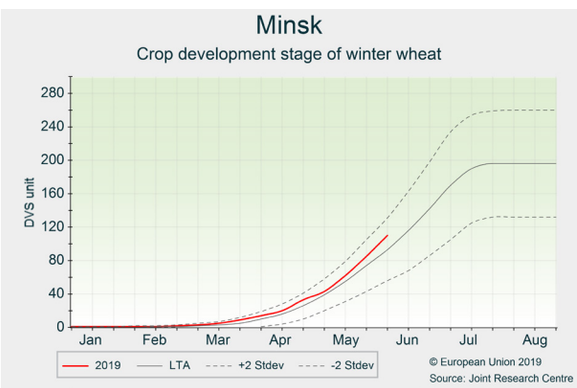
Belarus

Favourable outlook

Rainfall at the beginning of May alleviated dry soil conditions, confirming a positive yield outlook.

Weather conditions over the analysis period were favourable for crops. After a very dry April, abundant precipitation during the first dekad of May alleviated dry soil conditions. The colder-than-usual first dekad of May was followed by temperatures above the LTA, which prevailed until the first dekad of June. Winter crops are advanced, and winter cereals are in ear-emergence and flowering stages. The development of spring and summer crops is progressing well. The positive yield outlook is maintained.





4.5. Maghreb

Morocco, Algeria and Tunisia

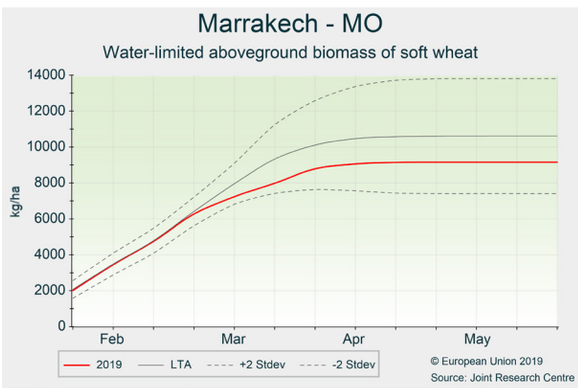
Mixed (negative to positive) yield outlook for cereals

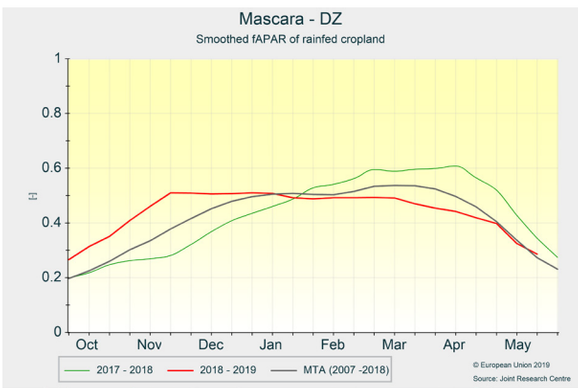
A negative-to-positive gradient of rainfall supply and distribution influenced crop performance. In Morocco, the regions of Tensif, Centre and Oriental were impacted by drought. In Algeria, unfavourable conditions in western regions were more than compensated by favourable conditions in the east. Crops in Tunisia performed well.

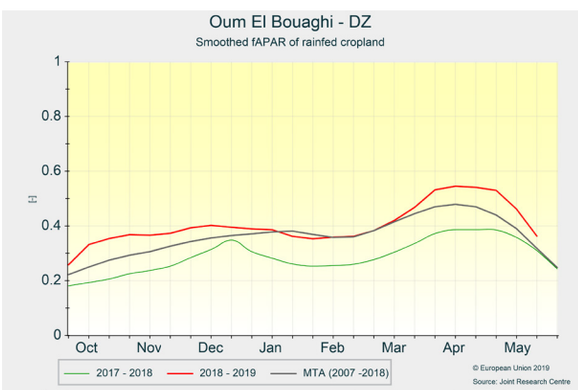
An unbalanced distribution of and shortfall in precipitation affected cereal cultivation in **Morocco** during the 2018-2019 campaign. Abundant rain in autumn led to advanced crop development and above-average biomass accumulation. However, below-average precipitation in the following months did not sufficiently sustain crops, exposing cereals to drought during flowering and grain filling. Rain events in late March and at the beginning of April arrived too late and did not trigger any crop recovery. The agricultural areas of *Tensif*, *Centre* and *Oriental* were the most affected by drought. The agricultural districts of *Rabat* and *Tanger* (in north-western Morocco, responsible for nearly 20 % of national cereal production) received rainfall in February and performed well. The harvesting period in the country is coming to an end.

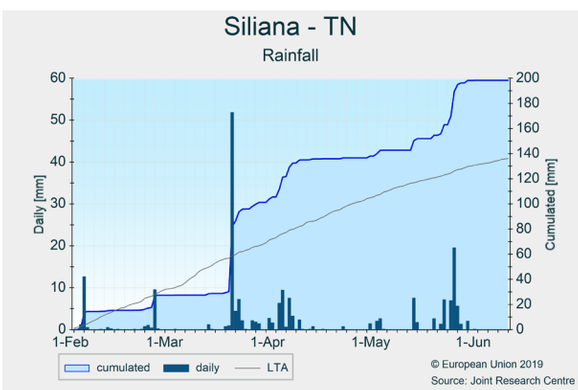
In **Algeria**, north-western regions such as *Mascara*, *Sidi Bel Abbes* and *Tlemcen* recorded below-average seasonal rainfall (mostly concentrated in October and January) and above-average temperatures, which were particularly high during the second dekad of April. In contrast, north-eastern regions (from *Setif* and *Batna* eastwards) recorded average to above-average precipitation and mild temperature conditions throughout the season. On balance, at national level the above-average crop performance in eastern Algeria is expected to more than compensate for the negative performance in some of the western regions. The cereal campaign in Algeria is now finishing and harvesting is advanced.

Cereal production regions in northern **Tunisia** experienced frequent and abundant rainfall events in May and June. Temperature sums (T_{base} = 0 °C) cumulated in the 1 May-10 June period were somewhat below the LTA. Remote-sensing indicators clearly suggest above-average biomass accumulation in all the main agricultural districts of *Jendouba, Beja, Bizerte, Nabeul* (North Tunisia) and *Le Kef, Siliana, Mahdia, Sidi Bouz* (central Tunisia). Harvesting of cereals in Tunisia is at an advanced stage.







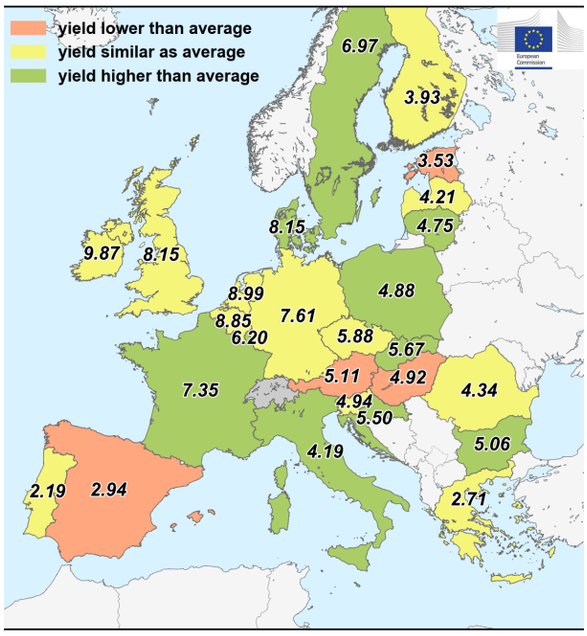


5. Crop yield forecasts

Country	TOTAL WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.71	5.42	**5.88**	+3.0	+8.5
AT	5.49	4.67	**5.11**	-6.8	+9.4
BE	8.51	8.44	**8.85**	+4.0	+4.8
BG	4.73	4.82	**5.06**	+7.0	+5.0
CY	-	-	**-**	-	-
CZ	6.09	5.39	**5.88**	-3.5	+9.0
DE	7.75	6.67	**7.61**	-1.8	+14
DK	7.58	6.23	**8.15**	+7.5	+31
EE	3.75	2.91	**3.53**	-5.9	+21
ES	3.12	3.90	**2.94**	-5.9	-25
FI	3.83	2.78	**3.93**	+2.5	+41
FR	6.90	6.84	**7.35**	+6.5	+7.4
GR	2.69	2.48	**2.71**	+0.9	+9.2
HR	5.23	5.38	**5.50**	+5.1	+2.2
HU	5.15	5.10	**4.92**	-4.4	-3.4
IE	9.86	8.8	**9.87**	+0.1	+13
IT	3.95	3.81	**4.19**	+6.1	+10
LT	4.54	3.67	**4.75**	+4.6	+29
LU	5.80	6.05	**6.20**	+7.0	+2.6
LV	4.20	3.43	**4.21**	+0.3	+23
MT	-	-	**-**	-	-
NL	8.85	8.64	**8.99**	+1.6	+4.0
PL	4.59	4.06	**4.88**	+6.2	+20
PT	2.13	2.32	**2.19**	+2.7	-5.8
RO	4.20	4.79	**4.34**	+3.3	-10
SE	6.42	4.34	**6.97**	+8.6	+61
SI	5.00	4.38	**4.94**	-1.3	+13
SK	5.25	4.77	**5.67**	+8.1	+19
UK	8.28	7.76	**8.15**	-1.6	+4.9

Total wheat - yield forecast 2019

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



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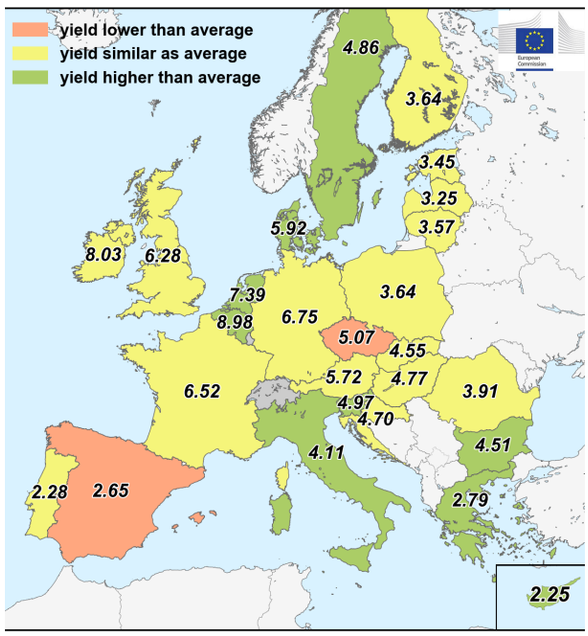
Country	TOTAL BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.86	4.60	**4.92**	+1.2	+6.9
AT	5.62	4.99	**5.72**	+1.8	+15
BE	8.20	7.78	**8.98**	+9.5	+15
BG	4.22	4.25	**4.51**	+6.9	+6.2
CY	1.43	1.81	**2.25**	+58	+24
CZ	5.38	4.95	**5.07**	-5.8	+2.6
DE	6.77	5.77	**6.75**	-0.3	+17
DK	5.53	4.38	**5.92**	+7.1	+35
EE	3.38	2.49	**3.45**	+2.1	+38
ES	2.87	3.51	**2.65**	-7.8	-25
FI	3.63	3.30	**3.64**	+0.3	+10
FR	6.37	6.33	**6.52**	+2.4	+3.0
GR	2.61	2.64	**2.79**	+7.0	+5.5
HR	4.52	4.53	**4.70**	+4.0	+3.6
HU	4.85	4.67	**4.77**	-1.7	+2.1
IE	7.89	6.61	**8.03**	+1.8	+21
IT	3.92	4.05	**4.11**	+5.0	+1.6
LT	3.48	2.74	**3.57**	+2.5	+30
LU	-	-	**-**	-	-
LV	3.24	2.58	**3.25**	+0.4	+26
MT	-	-	**-**	-	-
NL	6.96	6.86	**7.39**	+6.1	+7.6
PL	3.67	3.12	**3.64**	-0.7	+17
PT	2.22	2.48	**2.28**	+2.6	-8.1
RO	3.84	4.60	**3.91**	+1.9	-15
SE	4.59	3.04	**4.86**	+5.9	+60
SI	4.64	4.20	**4.97**	+7.0	+19
SK	4.67	3.98	**4.55**	-2.6	+14
UK	6.18	5.72	**6.28**	+1.6	+9.7

Total barley - yield forecast 2019

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



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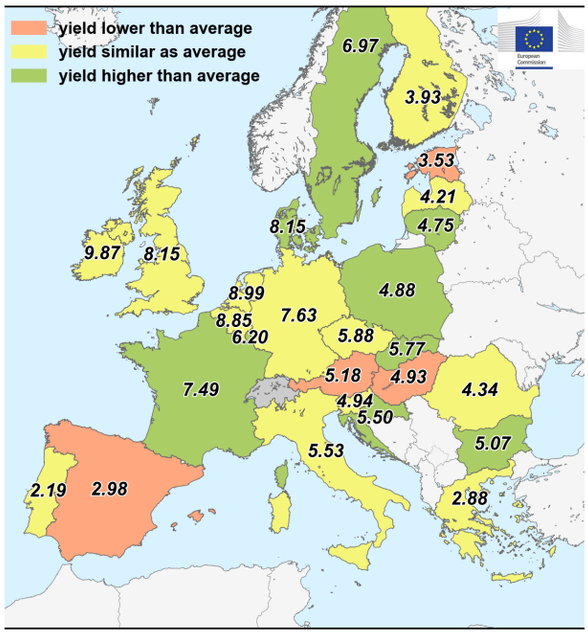
Country	SOFT WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.94	5.62	**6.10**	+2.7	+8.6
AT	5.55	4.71	**5.18**	-6.8	+10
BE	8.51	8.44	**8.85**	+4.0	+4.8
BG	4.73	4.83	**5.07**	+7.1	+5.1
CY	-	-	**-**	-	-
CZ	6.09	5.39	**5.88**	-3.5	+9.0
DE	7.77	6.69	**7.63**	-1.8	+14
DK	7.58	6.23	**8.15**	+7.5	+31
EE	3.75	2.91	**3.53**	-5.9	+21
ES	3.22	3.98	**2.98**	-7.3	-25
FI	3.83	2.78	**3.93**	+2.5	+41
FR	7.02	6.98	**7.49**	+6.6	+7.4
GR	2.80	2.51	**2.88**	+2.7	+15
HR	5.23	5.38	**5.50**	+5.1	+2.2
HU	5.16	5.11	**4.93**	-4.6	-3.7
IE	9.86	8.77	**9.87**	+0.1	+13
IT	5.44	5.13	**5.53**	+1.7	+7.8
LT	4.54	3.67	**4.75**	+4.6	+29
LU	5.80	6.05	**6.20**	+7.0	+2.6
LV	4.20	3.43	**4.21**	+0.3	+23
MT	-	-	**-**	-	-
NL	8.85	8.64	**8.99**	+1.6	+4.0
PL	4.59	4.06	**4.88**	+6.2	+20
PT	2.13	2.32	**2.19**	+2.7	-5.8
RO	4.20	4.79	**4.34**	+3.3	-10
SE	6.42	4.34	**6.97**	+8.6	+61
SI	5.00	4.38	**4.94**	-1.3	+13
SK	5.30	4.77	**5.77**	+8.9	+21
UK	8.28	7.76	**8.15**	-1.6	+4.9

Soft wheat - yield forecast 2019

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



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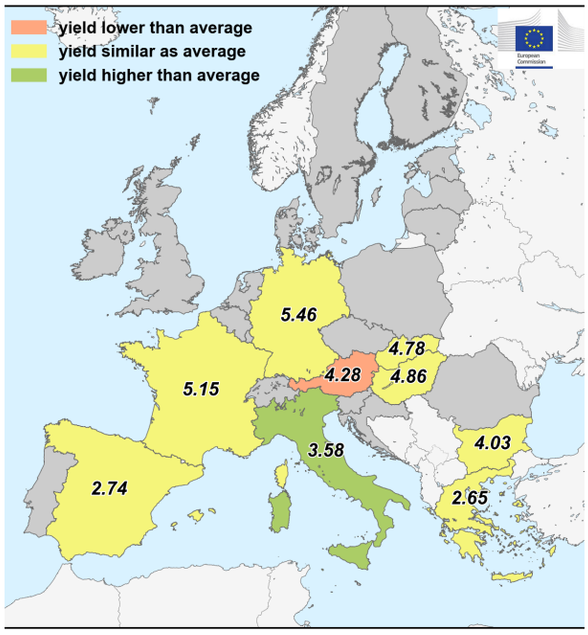
Country	DURUM WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.46	3.54	**3.62**	+4.6	+2.2
AT	4.57	4.17	**4.28**	-6.3	+2.6
BE	-	-	**-**	-	-
BG	3.88	4.01	**4.03**	+4.0	+0.6
CY	-	-	**-**	-	-
CZ	-	-	**-**	-	-
DE	5.25	4.57	**5.46**	+4.0	+19
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	2.69	3.54	**2.74**	+1.8	-23
FI	-	-	**-**	-	-
FR	5.13	5.04	**5.15**	+0.3	+2.1
GR	2.64	2.47	**2.65**	+0.4	+6.9
HR	-	-	**-**	-	-
HU	4.80	4.70	**4.86**	+1.2	+3.3
IE	-	-	**-**	-	-
IT	3.34	3.24	**3.58**	+7.3	+11
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	-	-	**-**	-	-
RO	-	-	**-**	-	-
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	4.63	4.82	**4.78**	+3.1	-0.8
UK	-	-	**-**	-	-

Durum wheat - yield forecast 2019

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



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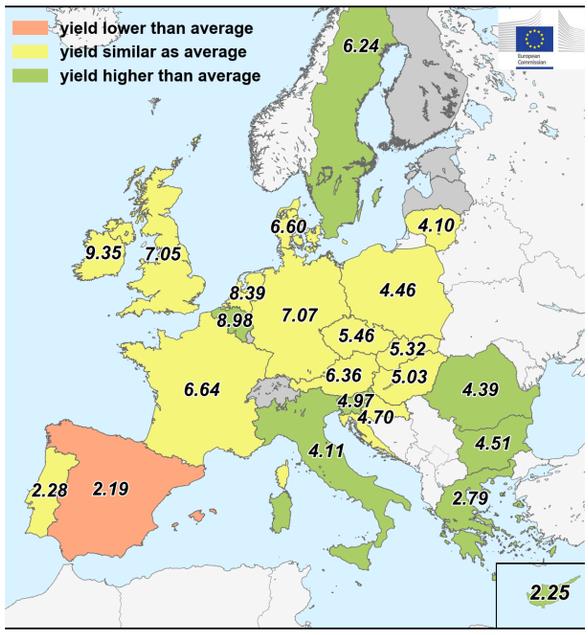
Country	WINTER BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.79	5.50	**5.96**	+3.0	+8.4
AT	6.31	5.77	**6.36**	+0.8	+10
BE	8.20	7.78	**8.98**	+9.5	+15
BG	4.22	4.25	**4.51**	+6.9	+6.2
CY	1.43	1.81	**2.25**	+58	+24
CZ	5.63	4.98	**5.46**	-3.0	+10
DE	7.18	6.06	**7.07**	-1.6	+17
DK	6.40	5.25	**6.60**	+3.2	+26
EE	-	-	**-**	-	-
ES	2.30	2.94	**2.19**	-4.9	-26
FI	-	-	**-**	-	-
FR	6.50	6.35	**6.64**	+2.2	+4.5
GR	2.61	2.64	**2.79**	+7.0	+5.5
HR	4.52	4.53	**4.70**	+4.0	+3.6
HU	5.09	4.92	**5.03**	-1.2	+2.3
IE	9.22	8.80	**9.35**	+1.5	+6.3
IT	3.92	4.05	**4.11**	+5.0	+1.6
LT	3.97	3.43	**4.10**	+3.3	+20
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	8.12	7.83	**8.39**	+3.4	+7
PL	4.32	3.78	**4.46**	+3.1	+18
PT	2.22	2.48	**2.28**	+2.6	-8.1
RO	4.22	5.12	**4.39**	+4.1	-14
SE	5.75	3.74	**6.24**	+8.4	+67
SI	4.64	4.20	**4.97**	+7.0	+19
SK	5.23	4.75	**5.32**	+1.5	+12
UK	7.03	6.79	**7.05**	+0.2	+3.9

Winter barley - yield forecast 2019

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

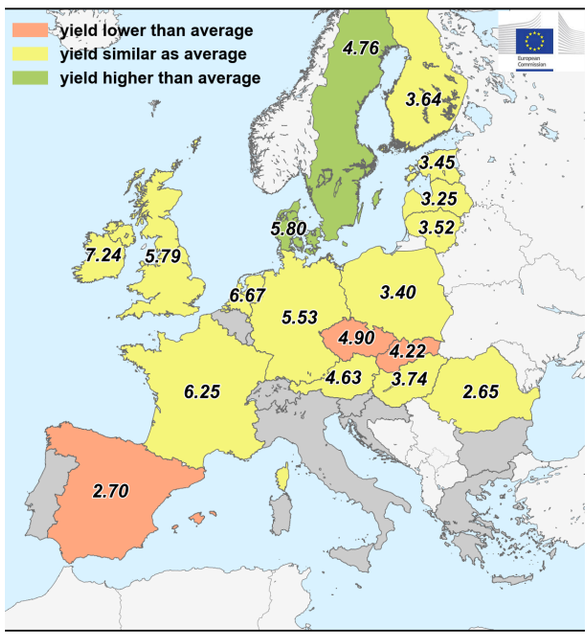


MARS Bulletin Vol. 27 No.6 (2019)

Country	SPRING BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.16	3.99	**4.14**	-0.5	+3.9
AT	4.53	3.44	**4.63**	+2.4	+35
BE	-	-	**-**	-	-
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	5.28	4.93	**4.90**	-7.2	-0.7
DE	5.38	4.95	**5.53**	+2.9	+12
DK	5.36	4.28	**5.80**	+8.2	+36
EE	3.38	2.49	**3.45**	+2.1	+38
ES	2.96	3.59	**2.70**	-8.8	-25
FI	3.63	3.30	**3.64**	+0.3	+10
FR	6.01	6.27	**6.25**	+3.9	-0.5
GR	-	-	**-**	-	-
HR	-	-	**-**	-	-
HU	3.87	2.69	**3.74**	-3.2	+39
IE	7.22	5.62	**7.24**	+0.3	+29
IT	-	-	**-**	-	-
LT	3.46	2.72	**3.52**	+1.7	+30
LU	-	-	**-**	-	-
LV	3.24	2.58	**3.25**	+0.4	+26
MT	-	-	**-**	-	-
NL	6.57	6.58	**6.67**	+1.5	+1.5
PL	3.48	2.95	**3.40**	-2.5	+15
PT	-	-	**-**	-	-
RO	2.65	2.56	**2.65**	+0.0	+3.5
SE	4.53	3.01	**4.76**	+5.0	+58
SI	-	-	**-**	-	-
SK	4.47	3.63	**4.22**	-5.7	+16
UK	5.66	5.17	**5.79**	+2.2	+12

Spring barley - yield forecast 2019

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

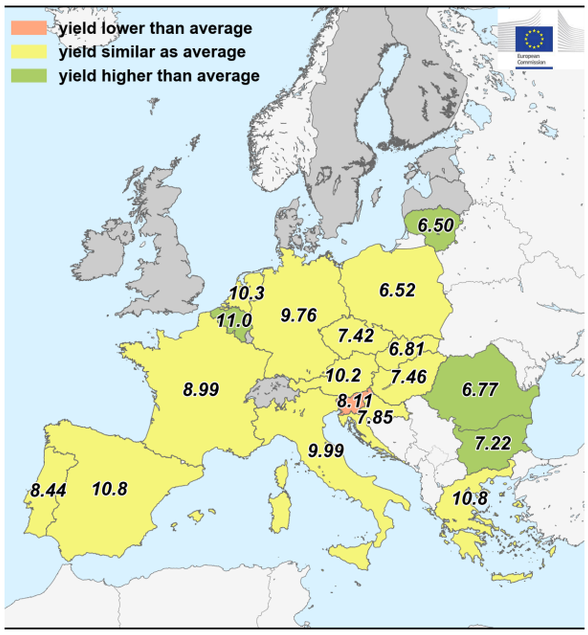


MARS Bulletin Vol. 27 No.6 (2019)

Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	7.62	8.35	**8.05**	+5.7	-3.6
AT	10.2	10.2	**10.2**	+0.7	+0.8
BE	10.5	8.23	**11.0**	+4.8	+33
BG	6.54	7.82	**7.22**	+10	-7.8
CY	-	-	**-**	-	-
CZ	7.39	5.98	**7.42**	+0.4	+24
DE	9.62	8.14	**9.76**	+1.4	+20
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	11.2	10.8	**10.8**	-3.6	-0.3
FI	-	-	**-**	-	-
FR	9.18	8.90	**8.99**	-2.0	+1.0
GR	10.4	9.84	**10.8**	+4.0	+9.6
HR	7.68	9.13	**7.85**	+2.2	-14
HU	7.46	8.44	**7.46**	+0.0	-12
IE	-	-	**-**	-	-
IT	10.3	9.87	**9.99**	-2.6	+1.2
LT	6.05	6.54	**6.50**	+7.3	-0.7
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	9.92	7.76	**10.3**	+3.7	+33
PL	6.31	5.99	**6.52**	+3.4	+9.0
PT	8.33	8.24	**8.44**	+1.3	+2.4
RO	5.18	7.79	**6.77**	+31	-13
SE	-	-	**-**	-	-
SI	8.80	9.45	**8.11**	-7.8	-14
SK	6.93	8.49	**6.81**	-1.8	-20
UK	-	-	**-**	-	-

Grain maize - yield forecast 2019

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



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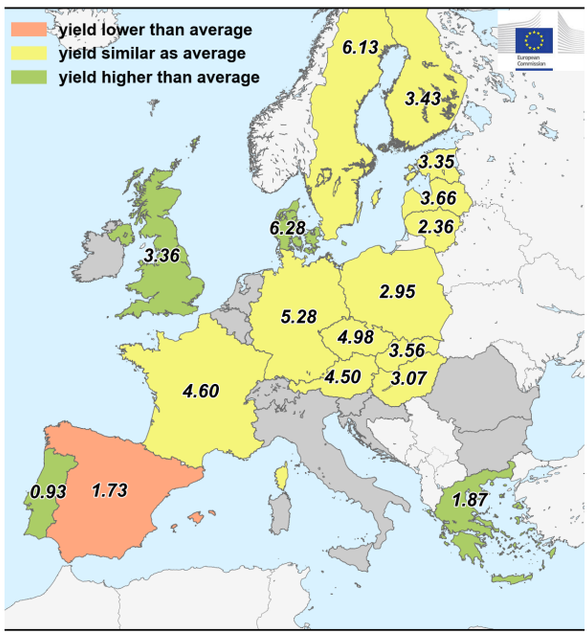
Country	RYE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.79	3.24	**3.84**	+1.4	+19
AT	4.48	4.36	**4.50**	+0.2	+3.2
BE	-	-	**-**	-	-
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	4.93	4.74	**4.98**	+0.9	+5.1
DE	5.31	4.30	**5.28**	-0.6	+23
DK	5.92	5.20	**6.28**	+5.9	+21
EE	3.30	2.72	**3.35**	+1.7	+23
ES	2.05	2.85	**1.73**	-16	-39
FI	3.36	2.58	**3.43**	+2.0	+33
FR	4.55	4.59	**4.60**	+0.9	+0.1
GR	1.70	1.77	**1.87**	+9.6	+5.5
HR	-	-	**-**	-	-
HU	3.02	3.26	**3.07**	+1.8	-5.8
IE	-	-	**-**	-	-
IT	-	-	**-**	-	-
LT	2.41	2.07	**2.36**	-2.3	+14
LU	-	-	**-**	-	-
LV	3.79	3.76	**3.66**	-3.6	-2.8
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	2.88	2.42	**2.95**	+2.4	+22
PT	0.89	0.93	**0.93**	+4.1	-0.3
RO	-	-	**-**	-	-
SE	6.07	4.53	**6.13**	+1.1	+35
SI	-	-	**-**	-	-
SK	3.59	3.49	**3.56**	-0.8	+1.9
UK	2.59	3.05	**3.36**	+30	+10

Rye - yield forecast 2019

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



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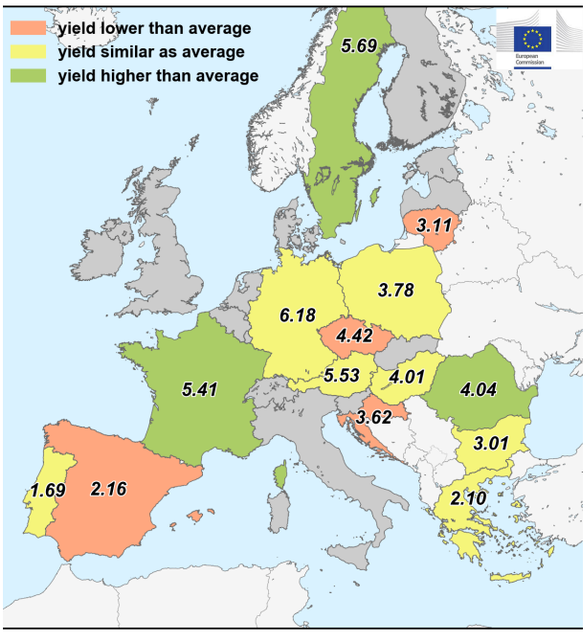
Country	TRITICALE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.13	3.76	**4.23**	+2.6	+13
AT	5.43	4.91	**5.53**	+1.7	+13
BE	-	-	**-**	-	-
BG	3.03	2.66	**3.01**	-0.9	+13
CY	-	-	**-**	-	-
CZ	4.82	4.55	**4.42**	-8.3	-2.8
DE	6.23	5.41	**6.18**	-0.8	+14
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	2.35	3.08	**2.16**	-8.1	-30
FI	-	-	**-**	-	-
FR	5.00	4.87	**5.41**	+8.1	+11
GR	2.13	2.11	**2.10**	-1.4	-0.8
HR	3.86	3.66	**3.62**	-6.3	-1.2
HU	3.96	3.76	**4.01**	+1.2	+6.8
IE	-	-	**-**	-	-
IT	-	-	**-**	-	-
LT	3.35	2.69	**3.11**	-7.3	+16
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	3.65	3.17	**3.78**	+3.5	+19
PT	1.68	1.80	**1.69**	+0.5	-6.2
RO	3.85	4.44	**4.04**	+5.0	-9.0
SE	5.46	3.38	**5.69**	+4.1	+68
SI	-	-	**-**	-	-
SK	-	-	**-**	-	-
UK	-	-	**-**	-	-

Triticale - yield forecast 2019

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



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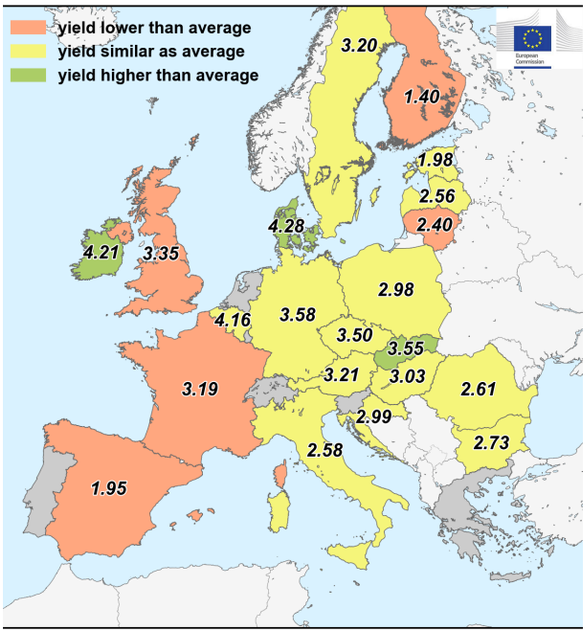
Country	RAPE AND TURNIP RAPE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.24	2.89	**3.14**	-3.0	+8.8
AT	3.27	2.98	**3.21**	-1.9	+7.6
BE	4.12	3.79	**4.16**	+1.0	+9.9
BG	2.75	2.58	**2.73**	-0.8	+6.0
CY	-	-	**-**	-	-
CZ	3.43	3.43	**3.50**	+1.9	+2.1
DE	3.64	2.99	**3.58**	-1.5	+20
DK	3.89	3.43	**4.28**	+10	+25
EE	2.02	1.56	**1.98**	-2.4	+26
ES	2.13	2.26	**1.95**	-8.8	-14
FI	1.50	1.33	**1.40**	-7.0	+5
FR	3.43	3.06	**3.19**	-7.0	+4.2
GR	-	-	**-**	-	-
HR	2.88	2.83	**2.99**	+3.6	+5.5
HU	3.13	3.02	**3.03**	-3.3	+0.3
IE	3.92	3.98	**4.21**	+7.3	+5.8
IT	2.55	2.72	**2.58**	+1.2	-5.0
LT	2.52	2.11	**2.40**	-4.9	+14
LU	-	-	**-**	-	-
LV	2.56	1.90	**2.56**	-0.1	+35
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	2.90	2.56	**2.98**	+2.7	+16
PT	-	-	**-**	-	-
RO	2.66	2.55	**2.61**	-2.0	+2.5
SE	3.13	2.24	**3.20**	+2.4	+43
SI	-	-	**-**	-	-
SK	3.12	3.11	**3.55**	+14	+14
UK	3.61	3.45	**3.35**	-7.1	-2.9

Rapeseed - yield forecast 2019

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



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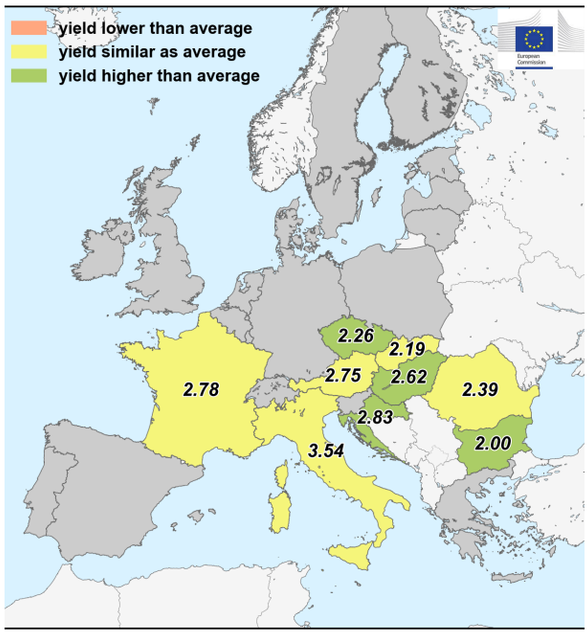
Country	SOYBEAN (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	2.90	2.94	**2.92**	+0.9	-0.6
AT	2.81	2.86	**2.75**	-2.2	-4.0
BE	-	-	**-**	-	-
BG	1.41	1.92	**2.00**	+42	+4.2
CY	-	-	**-**	-	-
CZ	2.09	1.65	**2.26**	+8.4	+37
DE	-	-	**-**	-	-
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	-	-	**-**	-	-
FI	-	-	**-**	-	-
FR	2.70	2.60	**2.78**	+3.2	+7.0
GR	-	-	**-**	-	-
HR	2.65	2.89	**2.83**	+6.7	-2.0
HU	2.46	2.35	**2.62**	+6.7	+12
IE	-	-	**-**	-	-
IT	3.60	3.53	**3.54**	-1.6	+0.3
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	-	-	**-**	-	-
RO	2.38	2.78	**2.39**	+0.7	-14
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	2.20	2.38	**2.19**	-0.7	-8.1
UK	-	-	**-**	-	-

Soybean - yield forecast 2019

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



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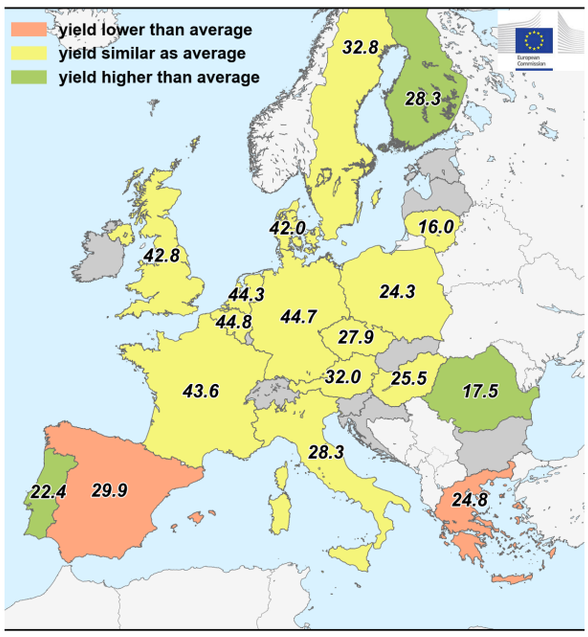
Country	POTATO (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	33.8	30.6	**34.9**	+3.2	+14
AT	31.0	29.4	**32.0**	+3.2	+9.0
BE	43.4	32.6	**44.8**	+3.0	+37
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	27.3	25.5	**27.9**	+2.3	+9.4
DE	43.5	35.4	**44.7**	+2.7	+26
DK	40.8	34.8	**42.0**	+2.8	+21
EE	-	-	**-**	-	-
ES	31.3	29.8	**29.9**	-4.4	+0.4
FI	27.1	28.1	**28.3**	+4.4	+0.9
FR	42.4	39.4	**43.6**	+2.6	+11
GR	27.2	28.8	**24.8**	-8.7	-14
HR	-	-	**-**	-	-
HU	24.6	22.8	**25.5**	+3.8	+12
IE	-	-	**-**	-	-
IT	27.9	28.9	**28.3**	+1.7	-2.0
LT	16.0	15.5	**16.0**	+0.5	+3.4
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	42.6	36.6	**44.3**	+4.0	+21
PL	24.8	22.3	**24.3**	-1.8	+9.0
PT	20.3	21.1	**22.4**	+10	+6.1
RO	16.2	17.7	**17.5**	+7.8	-1.2
SE	34.0	30.3	**32.8**	-3.4	+8.5
SI	-	-	**-**	-	-
SK	-	-	**-**	-	-
UK	42.8	41.6	**42.8**	+0.0	+3.0

Potato - yield forecast 2019

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



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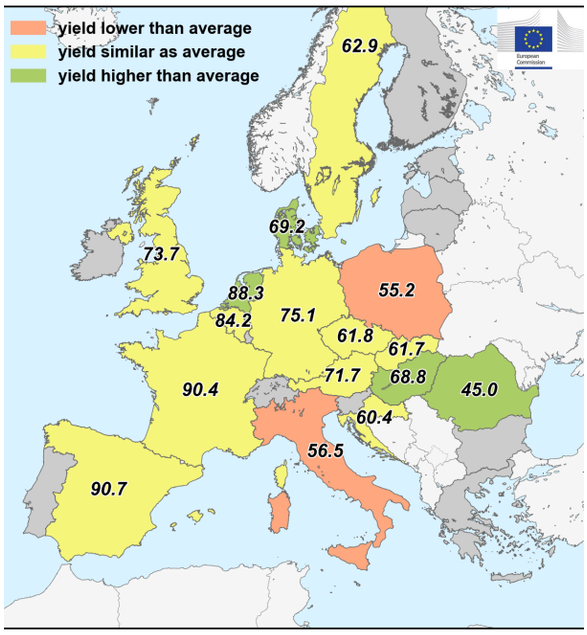
Country	SUGAR BEETS (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	75.4	68.2	**75.7**	+0.5	+11
AT	73.9	68.8	**71.7**	-3.0	+4.2
BE	83.7	82.8	**84.2**	+0.6	+1.6
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	64.4	57.5	**61.8**	-3.9	+7.5
DE	75.0	63.3	**75.1**	+0.2	+19
DK	65.9	61.5	**69.2**	+5.0	+13
EE	-	-	**-**	-	-
ES	91.3	86.7	**90.7**	-0.7	+4.6
FI	-	-	**-**	-	-
FR	88.6	81.6	**90.4**	+2.0	+11
GR	-	-	**-**	-	-
HR	62.6	54.8	**60.4**	-3.6	+10
HU	64.0	59.3	**68.8**	+7.5	+16
IE	-	-	**-**	-	-
IT	62.2	64.0	**56.5**	-9.2	-12
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	83.8	76.4	**88.3**	+5.3	+16
PL	58.4	50.7	**55.2**	-5.5	+8.9
PT	-	-	**-**	-	-
RO	41.1	38.5	**45.0**	+9.4	+17
SE	64.0	55.3	**62.9**	-1.7	+14
SI	-	-	**-**	-	-
SK	60.4	59.9	**61.7**	+2.3	+3.1
UK	73.5	69.3	**73.7**	+0.3	+6.4

Sugar beet - yield forecast 2019

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



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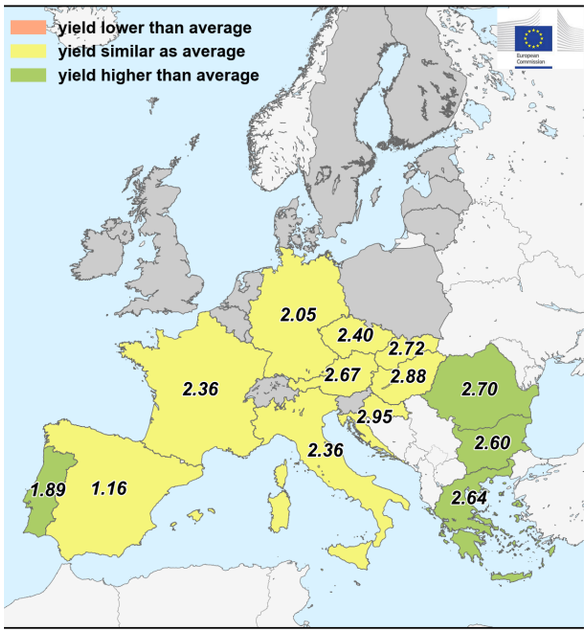
Country	SUNFLOWER (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	2.20	2.42	**2.37**	+7.8	-1.7
AT	2.64	2.80	**2.67**	+1.2	-4.8
BE	-	-	**-**	-	-
BG	2.29	2.44	**2.60**	+14	+6.5
CY	-	-	**-**	-	-
CZ	2.40	2.36	**2.40**	+0.2	+1.9
DE	2.07	1.82	**2.05**	-1.4	+12
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	1.16	1.34	**1.16**	+0.4	-13
FI	-	-	**-**	-	-
FR	2.31	2.25	**2.36**	+2.0	+4.8
GR	2.53	2.43	**2.64**	+4.1	+8.5
HR	2.88	2.99	**2.95**	+2.4	-1.3
HU	2.82	2.96	**2.88**	+2.0	-2.8
IE	-	-	**-**	-	-
IT	2.32	2.40	**2.36**	+1.7	-1.6
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	1.37	1.79	**1.89**	+38	+5.9
RO	2.33	2.80	**2.70**	+16	-3.8
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	2.67	2.93	**2.72**	+2.1	-7.1
UK	-	-	**-**	-	-

Sunflower - yield forecast 2019

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



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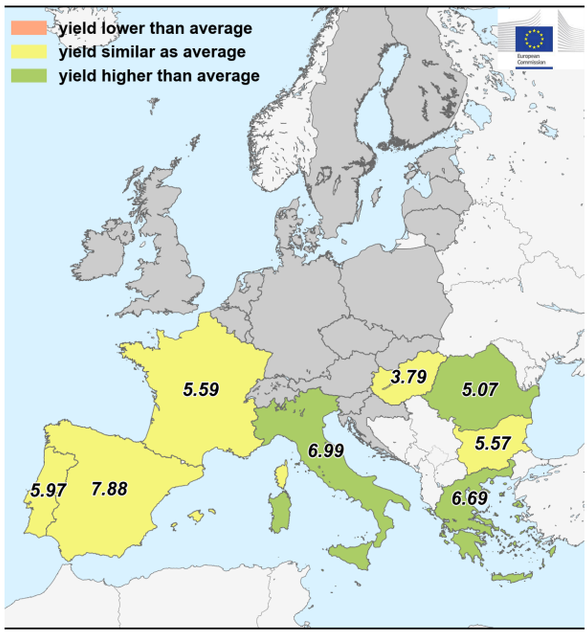
Country	RICE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	6.70	6.80	**6.97**	+4.1	+2.5
AT	-	-	**-**	-	-
BE	-	-	**-**	-	-
BG	5.42	5.76	**5.57**	+2.8	-3.2
CY	-	-	**-**	-	-
CZ	-	-	**-**	-	-
DE	-	-	**-**	-	-
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	7.74	7.89	**7.88**	+1.9	-0.1
FI	-	-	**-**	-	-
FR	5.54	5.48	**5.59**	+0.8	+1.9
GR	6.35	5.80	**6.69**	+5.3	+15
HR	-	-	**-**	-	-
HU	3.77	3.96	**3.79**	+0.7	-4.2
IE	-	-	**-**	-	-
IT	6.62	6.83	**6.99**	+5.6	+2.3
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	5.93	5.47	**5.97**	+0.6	+9.1
RO	4.46	5.31	**5.07**	+14	-4.6
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	-	-	**-**	-	-
UK	-	-	**-**	-	-

Rice - yield forecast 2019

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



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

Sources: 2014-2019 data come from DG Agriculture and Rural Development short-term outlook data (dated May 2019, received on 3.6.2019), Eurostat Eurobase (last update: 4.6.2019) and EES (last update: 15.11.2017).
2019 yields come from MARS Crop Yield Forecasting System (output up to 10.6.2019).

Country	WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	3.71	3.71	**3.75**	+0.9	+0.9
DZ	1.55	NA	**1.85**	+20	NA
MA	1.94	2.16	**1.50**	-23	-31
TN	1.75	1.75	**2.08**	+19	+19
TR	2.71	2.74	**2.99**	+10	+8.9
UA	3.98	3.73	**4.10**	+2.9	+10

Country	BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	3.35	3.40	**3.48**	+3.7	+2.2
DZ	1.25	NA	**1.41**	+13	NA
MA	1.23	1.45	**0.88**	-28	-39
TN	0.80	0.60	**0.79**	-0.9	+32
TR	2.63	2.67	**2.81**	+7.0	+5.3
UA	3.10	2.96	**3.22**	+3.6	+8.6

Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	5.22	5.00	**5.85**	+12	+17
DZ	-	-	**-**	-	-
MA	-	-	**-**	-	-
TN	-	-	**-**	-	-
TR	9.34	9.64	**9.56**	+2.3	-0.9
UA	6.37	7.84	**7.11**	+12	-9.3

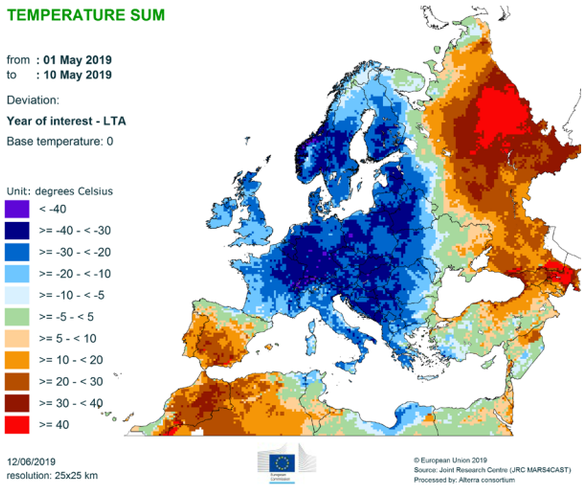
Country	SOYBEAN (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	-	-	**-**	-	-
DZ	-	-	**-**	-	-
MA	-	-	**-**	-	-
TN	-	-	**-**	-	-
TR	4.35	4.26	**4.57**	+4.9	+7.2
UA	2.17	2.58	**2.38**	+9.8	-7.7

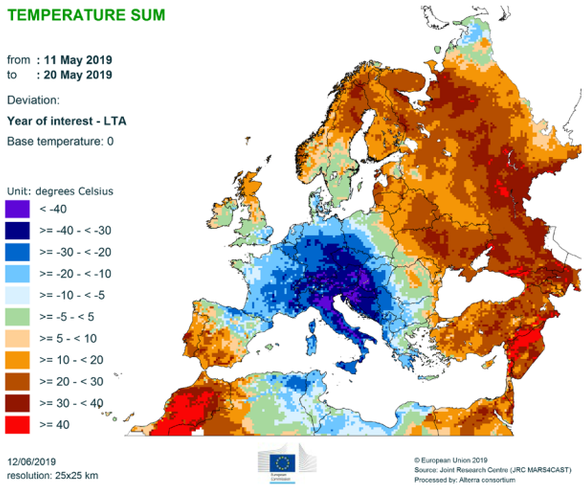
Note: Yields are forecast for crops with more than 10 000 ha per country.

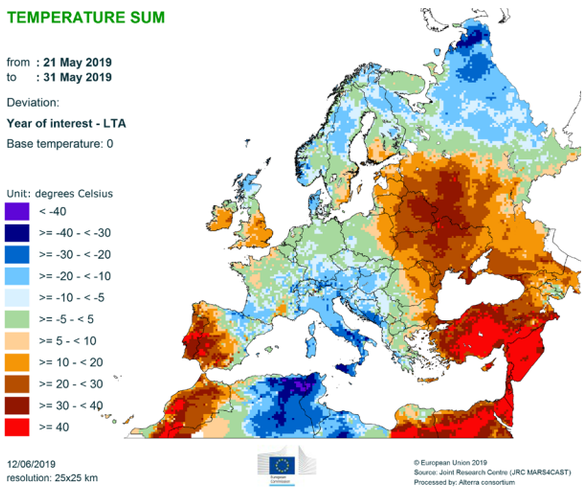
Sources: 2014-2019 data come from DG Agriculture short-term outlook data (dated April 2019, received on 3.5.2019), Eurostat Eurobase (last update: 2.5.2019) and EES (last update: 15.11.2017).
2014-2018 data come from USDA, DSASI-MADR Algeria, INRA Maroc, CNCT Tunisie, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 2.5.2019), State Statistics Service of Ukraine, FAO and PSD online.
2019 yields come from MARS Crop Yield Forecasting System (output up to 10.5.2019).
NA = Data not available.

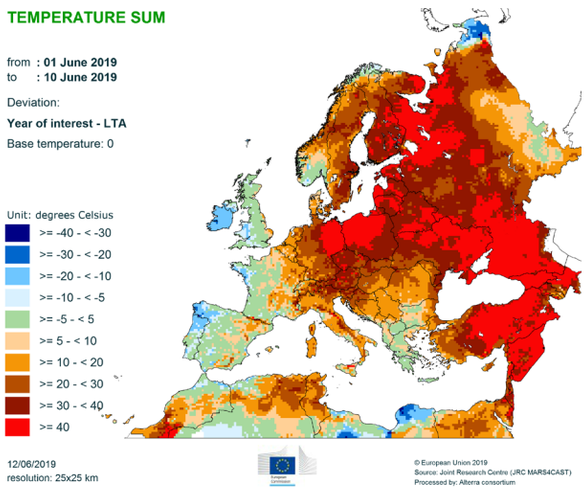
6. Atlas

Temperature regime

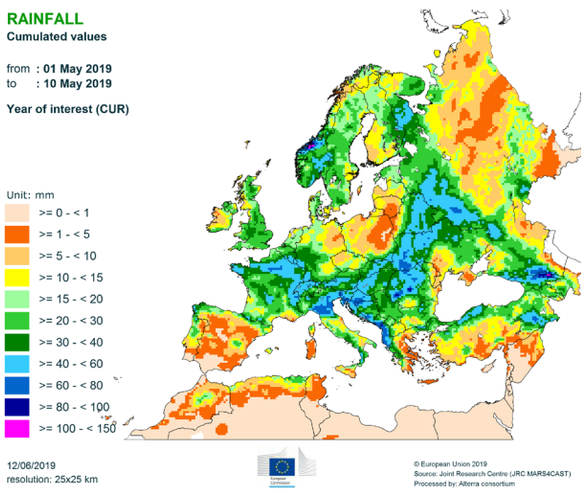


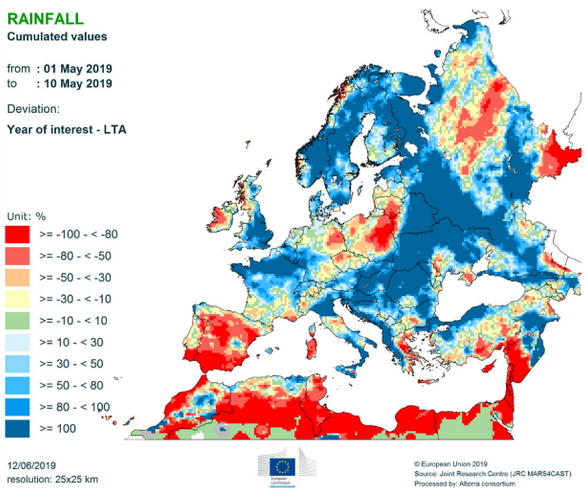


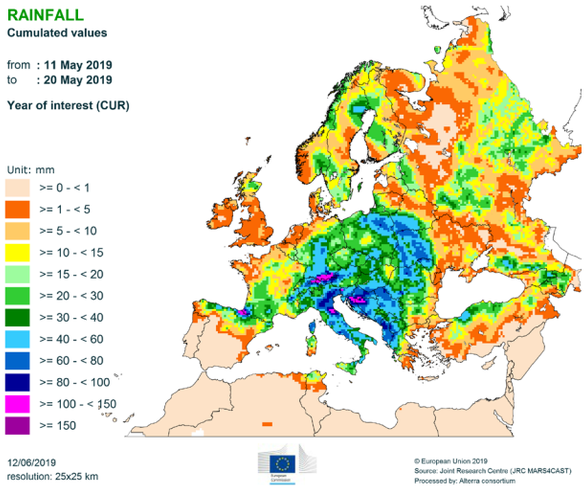


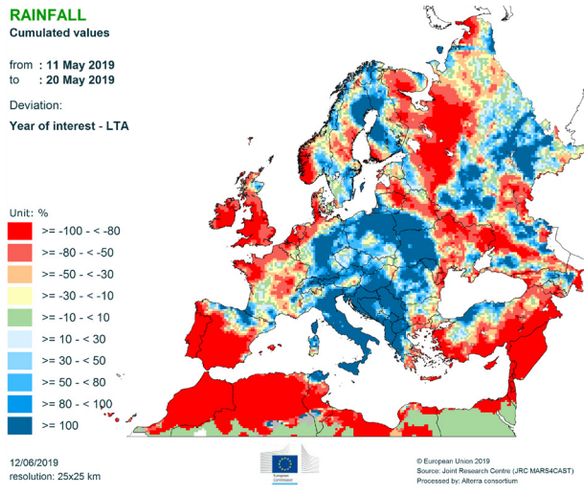


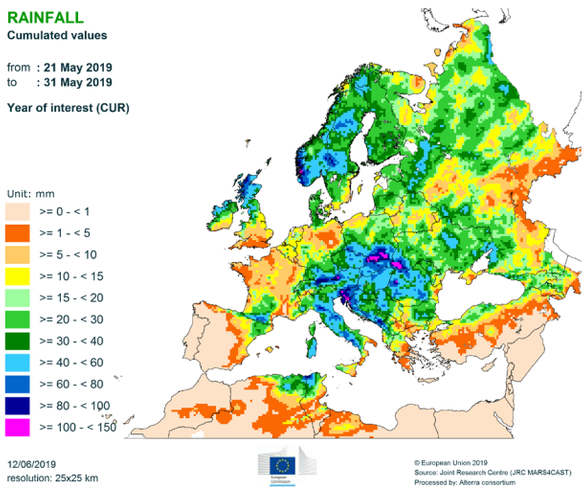
Precipitation

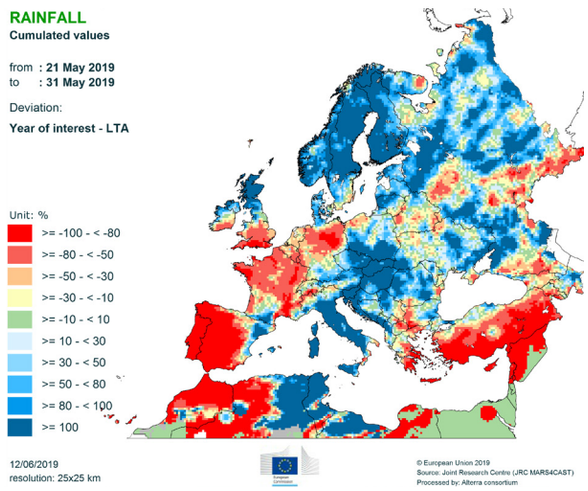


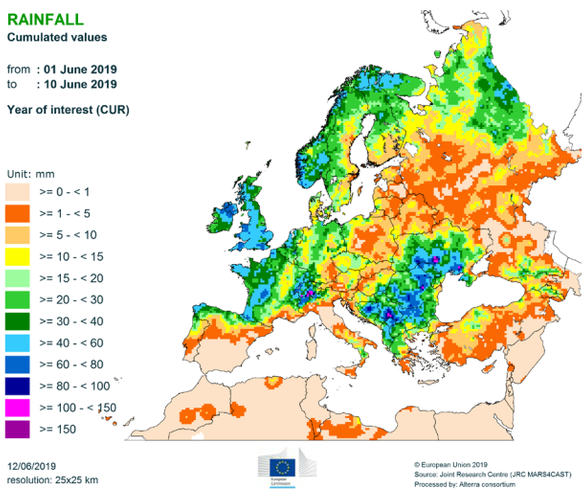


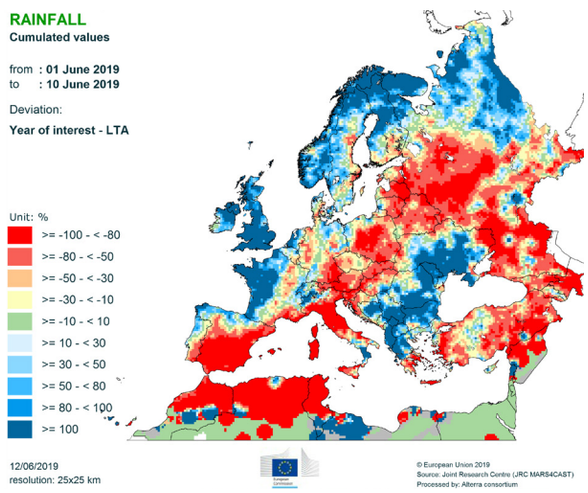

RAINFALL
Cumulated values
from : 11 May 2019
to : 20 May 2019
Year of interest (CUR)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
>= 100 - < 150
>= 150
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 11 May 2019
to : 20 May 2019
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

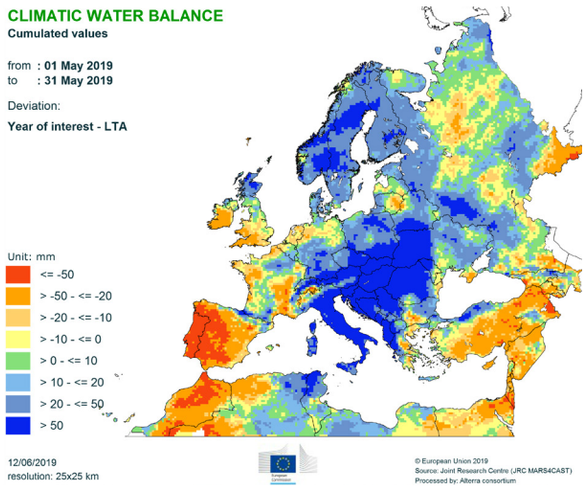

RAINFALL
Cumulated values
from : 21 May 2019
to : 31 May 2019
Year of interest (CUR)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
>= 100 - < 150
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

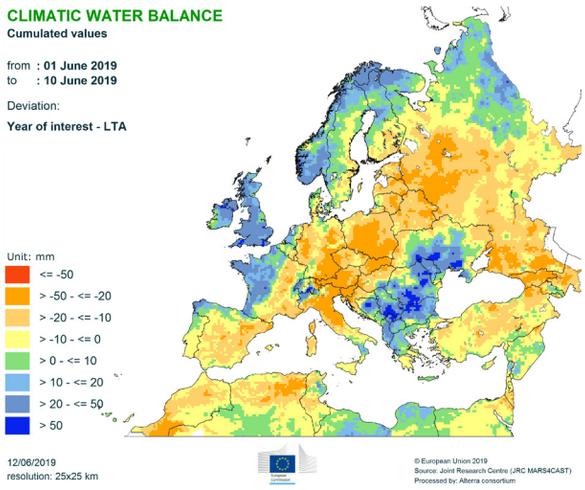

RAINFALL
Cumulated values
from : 21 May 2019
to : 31 May 2019
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 01 June 2019
to : 10 June 2019
Year of interest (CUR)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
>= 100 - < 150
>= 150
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

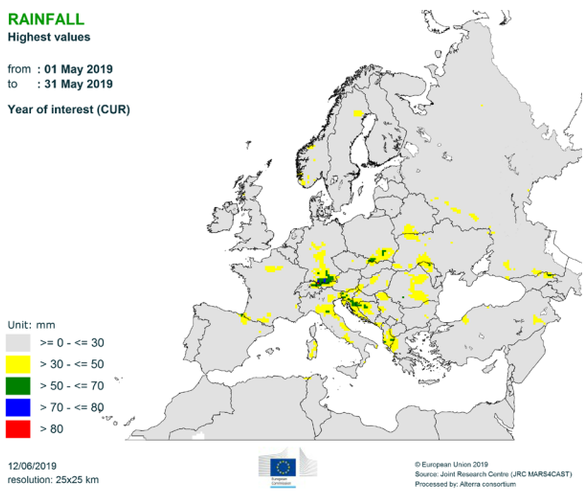

RAINFALL
Cumulated values
from : 01 June 2019
to : 10 June 2019
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

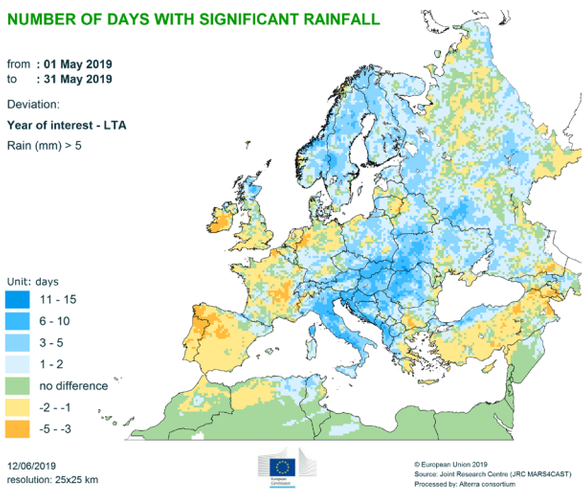
Climatic water balance

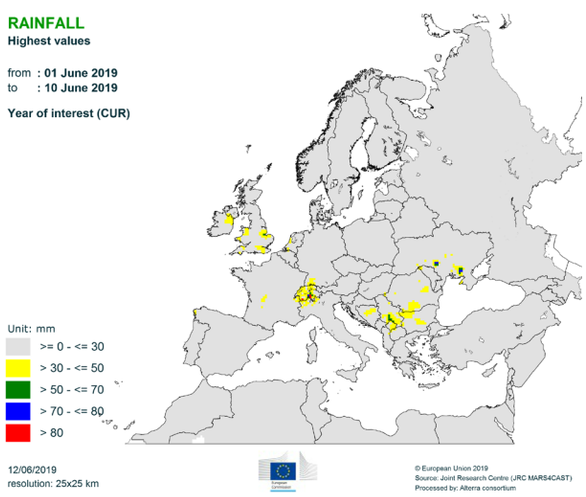


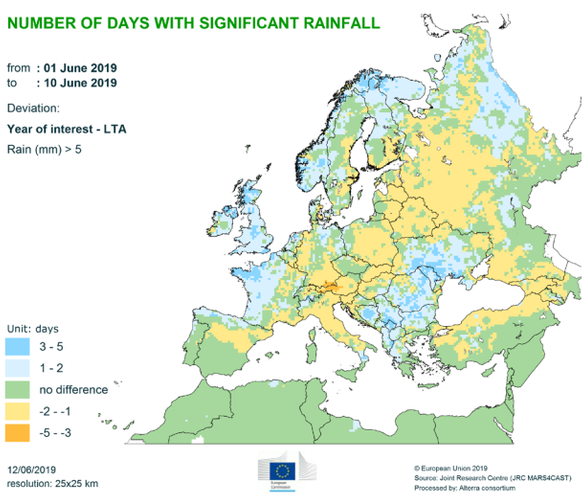


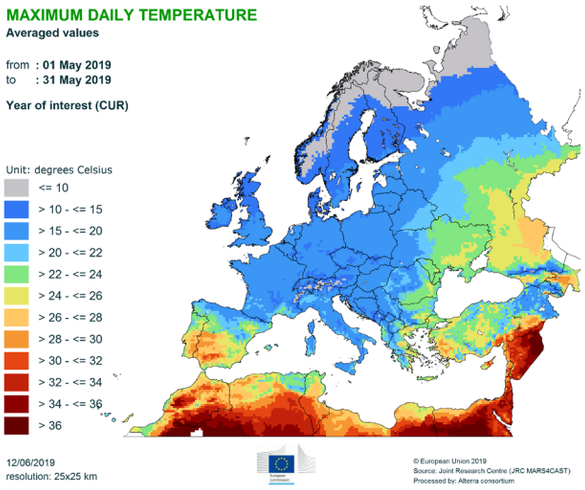
Weather events

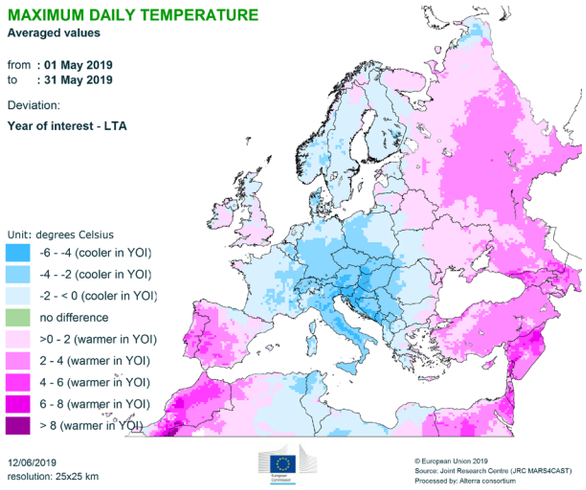


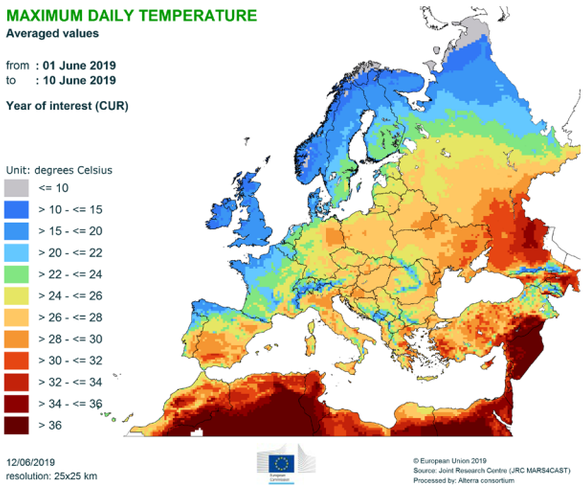


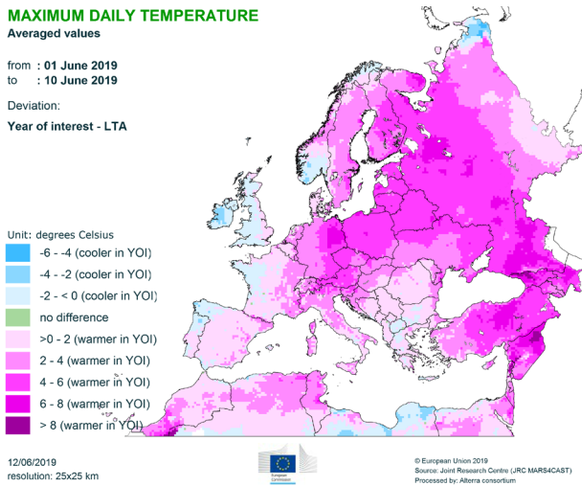


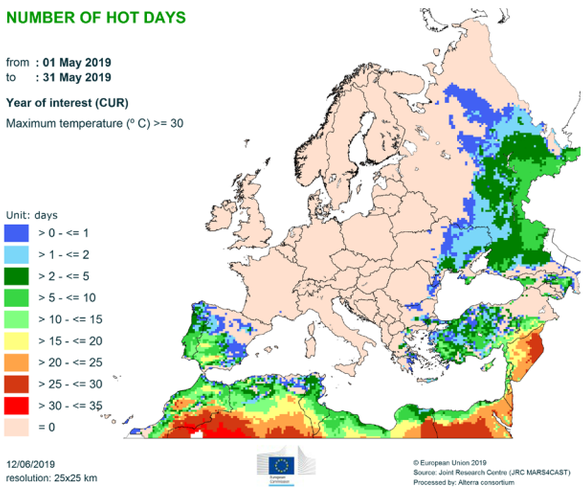


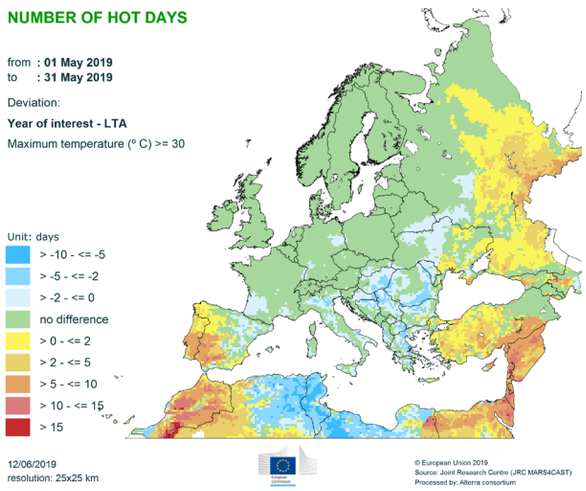

MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 May 2019
to : 31 May 2019
Year of interest (CUR)
Unit: degrees Celsius
<= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 22
> 22 - <= 24
> 24 - <= 26
> 26 - <= 28
> 28 - <= 30
> 30 - <= 32
> 32 - <= 34
> 34 - <= 36
> 36
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

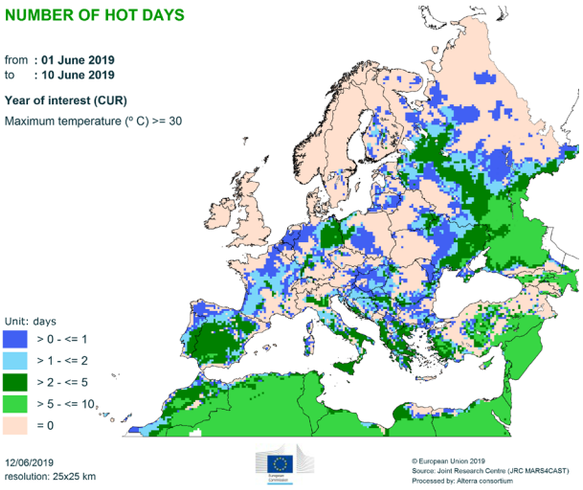

MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 May 2019
to : 31 May 2019
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

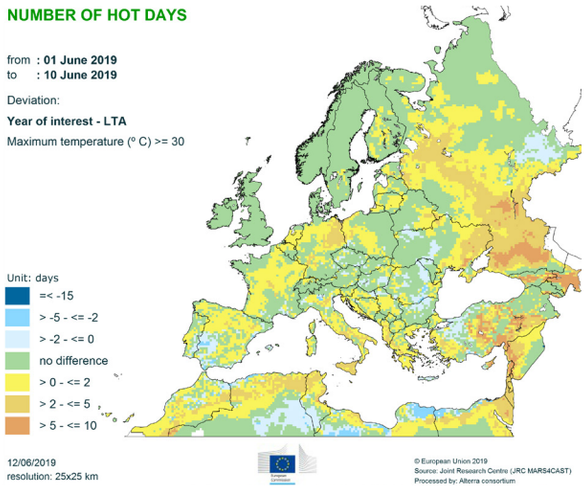

MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2019
to : 10 June 2019
Year of interest (CUR)
Unit: degrees Celsius
<= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 22
> 22 - <= 24
> 24 - <= 26
> 26 - <= 28
> 28 - <= 30
> 30 - <= 32
> 32 - <= 34
> 34 - <= 36
> 36
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2019
to : 10 June 2019
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

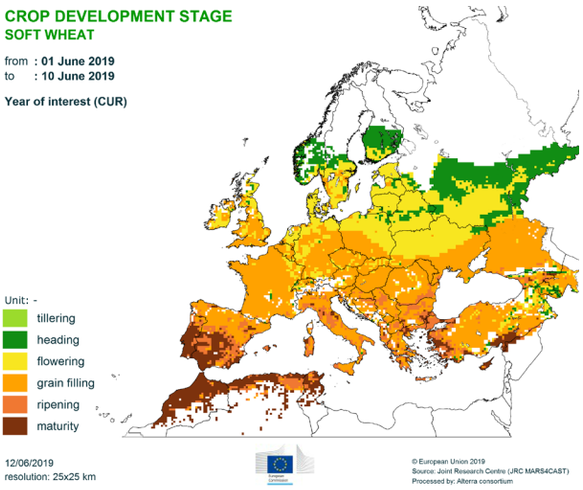

NUMBER OF HOT DAYS
from : 01 May 2019
to : 31 May 2019
Year of interest (CUR)
Maximum temperature (° C) >= 30
Unit: days
> 0 - <= 1
> 1 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 30
> 30 - <= 35
= 0
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

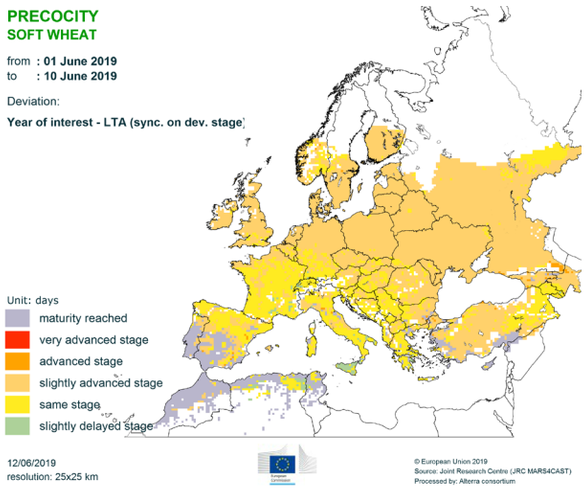

NUMBER OF HOT DAYS
from : 01 May 2019
to : 31 May 2019
Deviation:
Year of interest - LTA
Maximum temperature (° C) >= 30
Unit: days
> -10 - <= -5
> -5 - <= -2
> -2 - <= 0
no difference
> 0 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15
12/06/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

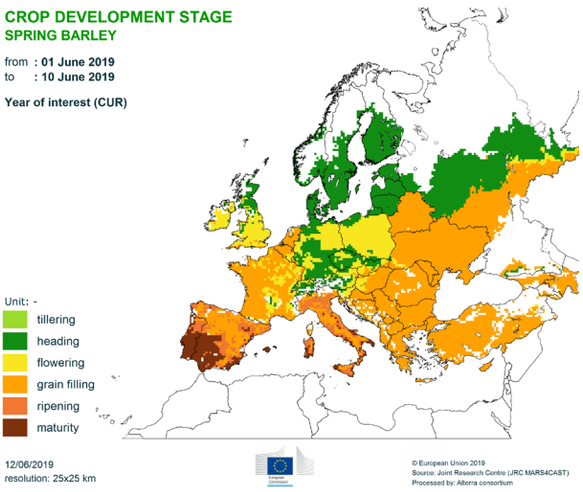


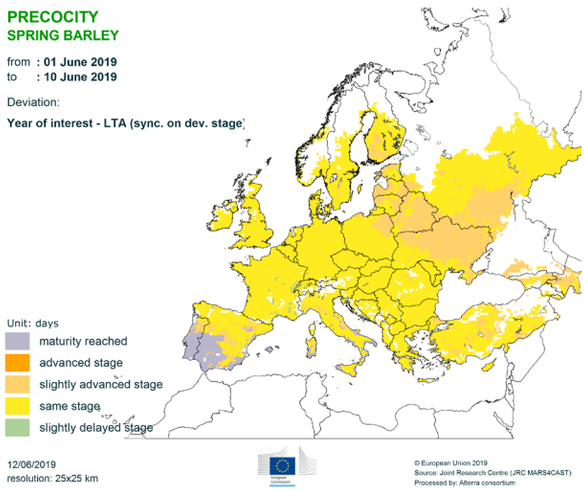


Crop development stages and precocity





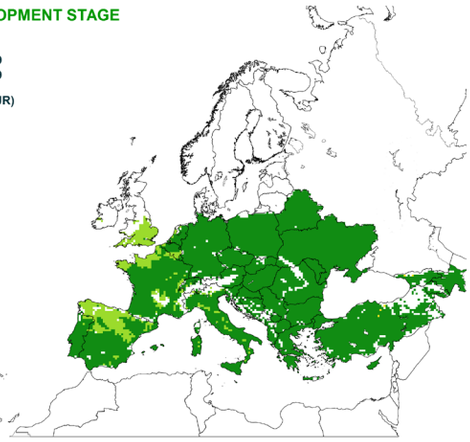




CROP DEVELOPMENT STAGE
GRAIN MAIZE

from : **01 June 2019**
to : **10 June 2019**

Year of interest (CUR)



Unit: -
- emergence
- vegetative
- flowering

12/06/2019
resolution: 25x25 km

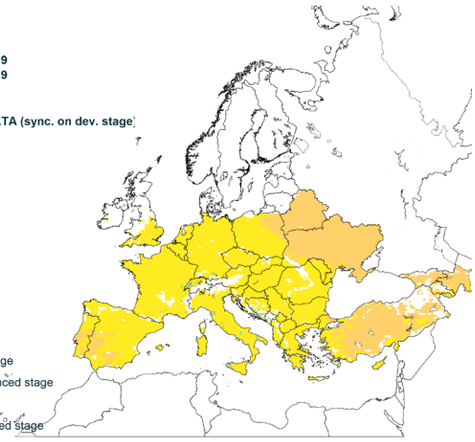
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

PRECOCITY
GRAIN MAIZE

from : **01 June 2019**
to : **10 June 2019**

Deviation:

Year of interest - LTA (sync. on dev. stage)



Unit: days
- advanced stage
- slightly advanced stage
- same stage
- slightly delayed stage

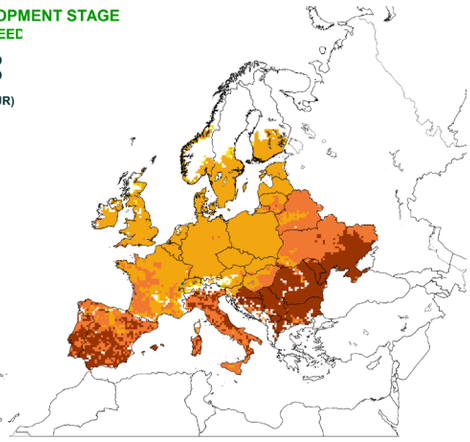
12/06/2019
resolution: 25x25 km

© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

CROP DEVELOPMENT STAGE
WINTER RAPESEED

from : **01 June 2019**
to : **10 June 2019**

Year of interest (CUR)



Unit: -
- vegetative
- flowering
- grain filling
- ripening
- maturity

12/06/2019
resolution: 25x25 km

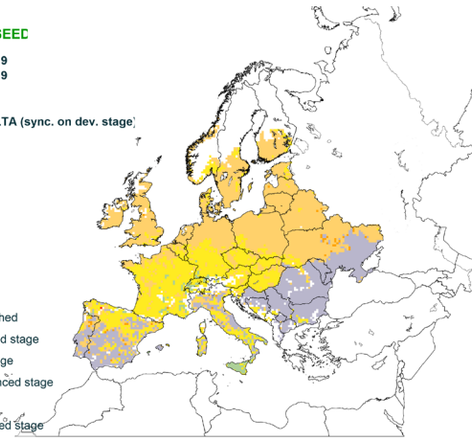
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

PRECOCITY
WINTER RAPESEED

from : **01 June 2019**
to : **10 June 2019**

Deviation:

Year of interest - LTA (sync. on dev. stage)



Unit: days
- maturity reached
- very advanced stage
- advanced stage
- slightly advanced stage
- same stage
- slightly delayed stage

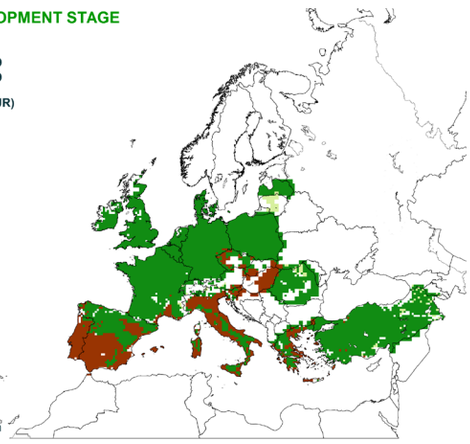
12/06/2019
resolution: 25x25 km

© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

CROP DEVELOPMENT STAGE
SUGAR BEET

from : **01 June 2019**
to : **10 June 2019**

Year of interest (CUR)



Unit: -
- emergence
- vegetative
- yield formation

12/06/2019
resolution: 25x25 km

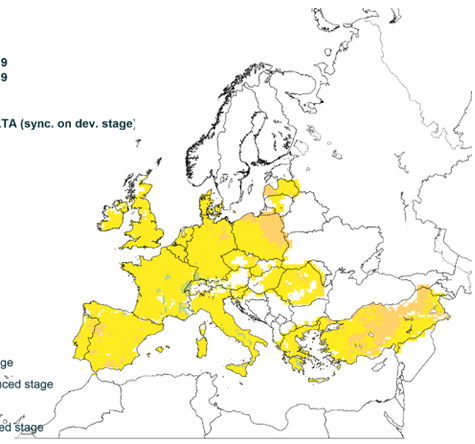
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

PRECOCITY
SUGAR BEET

from : **01 June 2019**
to : **10 June 2019**

Deviation:

Year of interest - LTA (sync. on dev. stage)

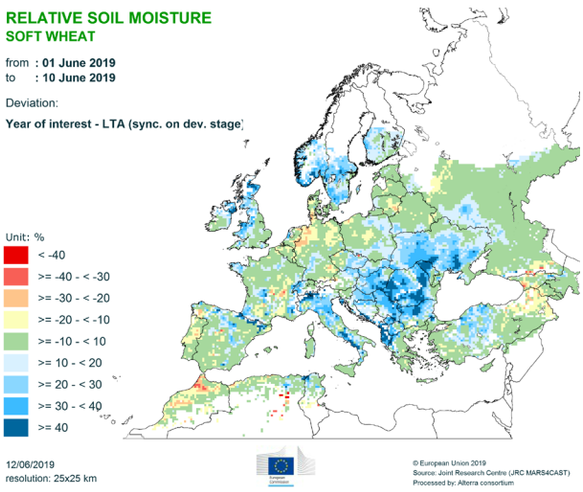


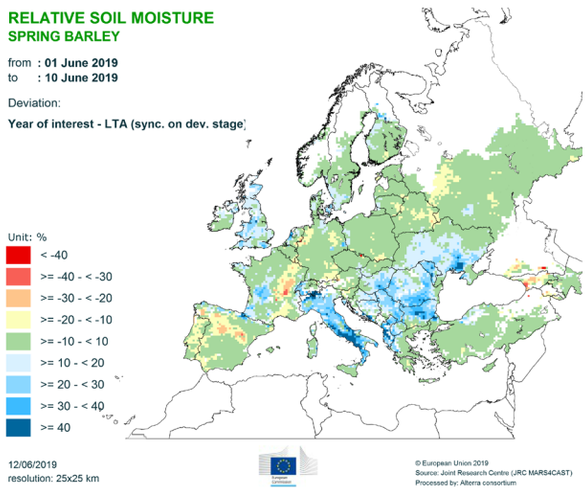
Unit: days
- advanced stage
- slightly advanced stage
- same stage
- slightly delayed stage

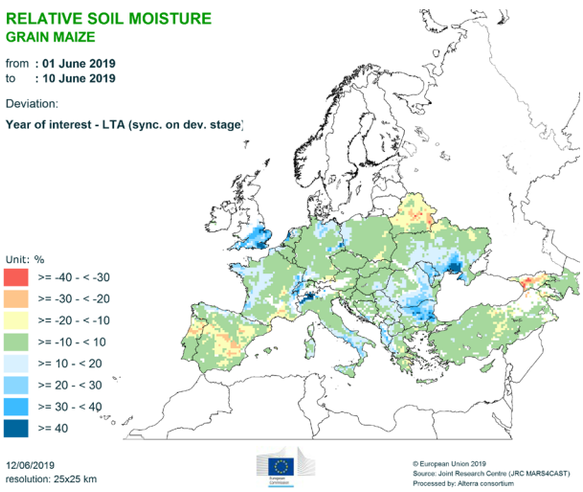
12/06/2019
resolution: 25x25 km

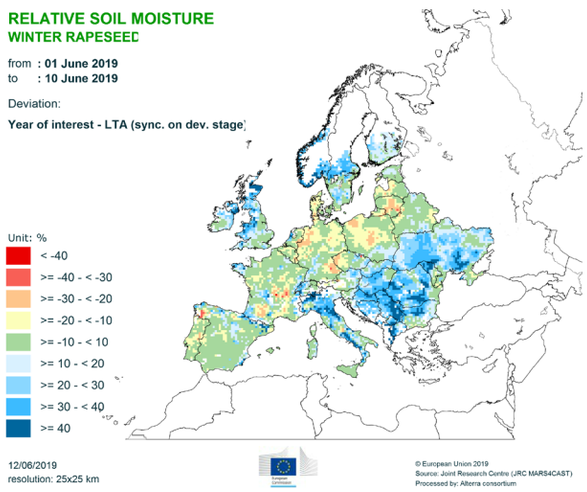
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

Relative soil moisture

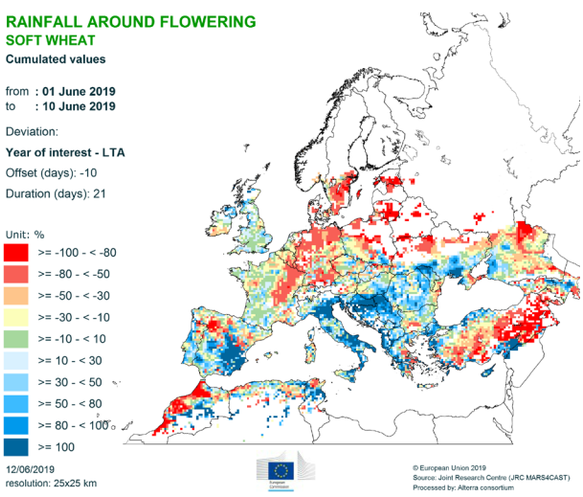


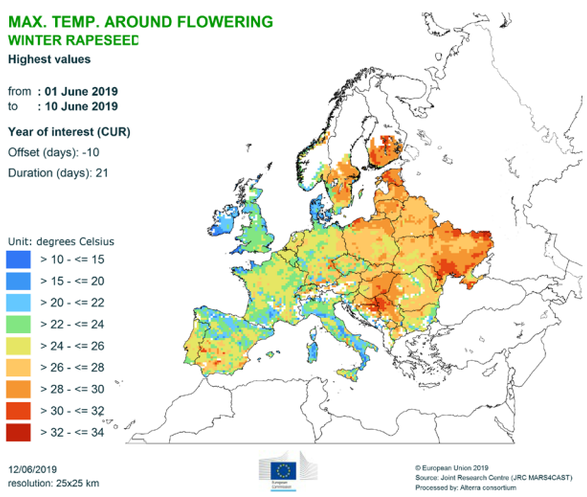


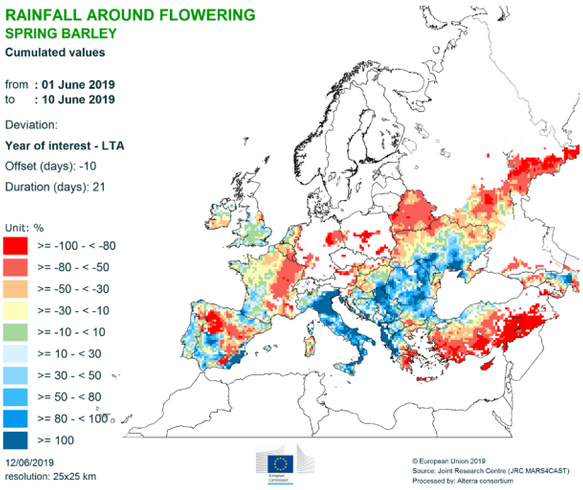


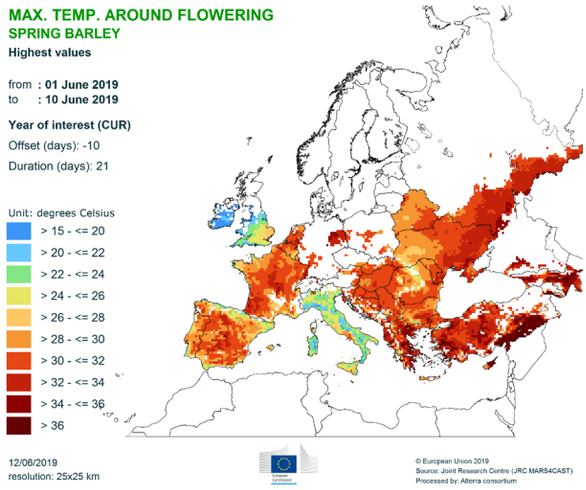


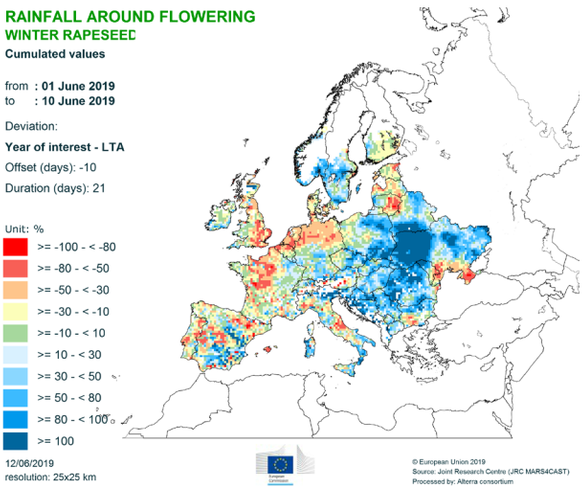
Precipitation and temperatures around flowering

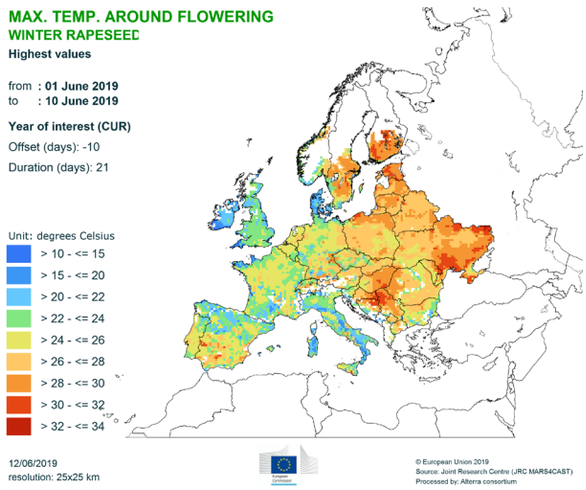




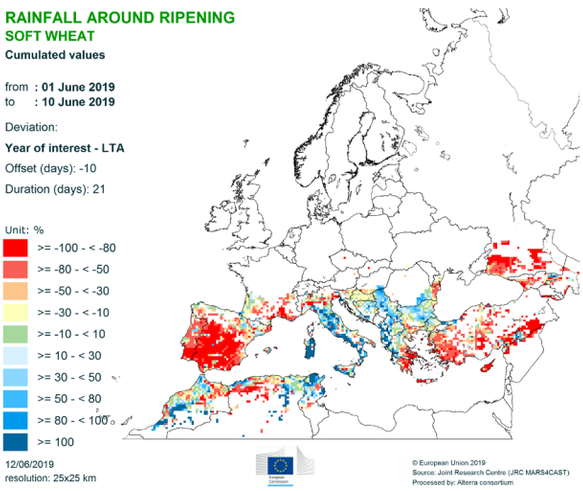


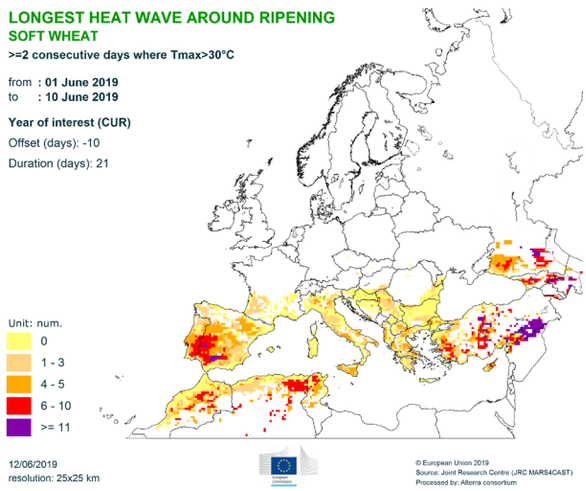


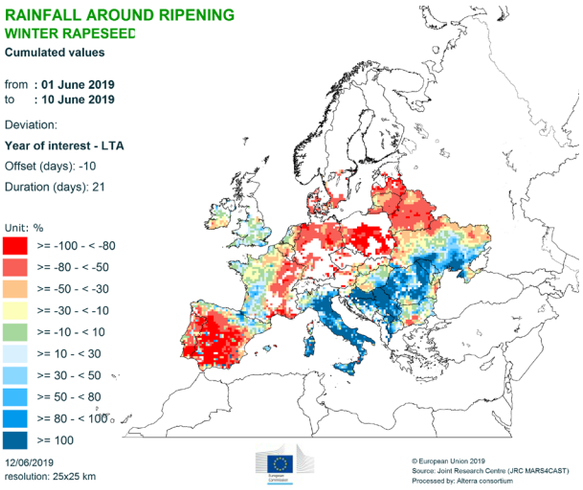


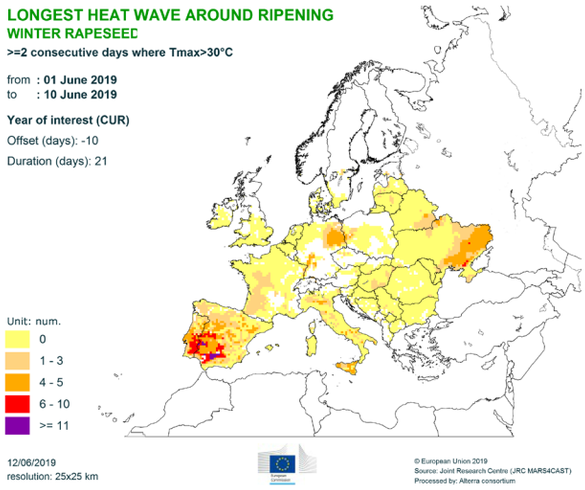


Precipitation and longest heatwave around ripening

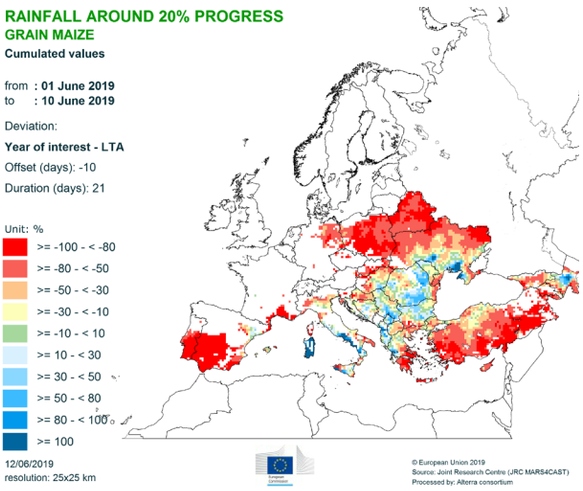


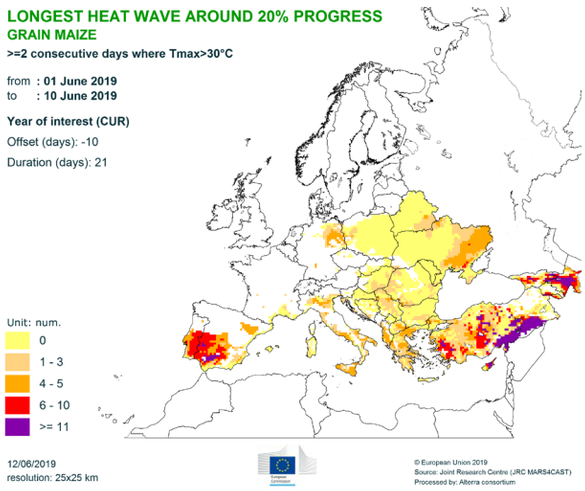






Maize: precipitation and temperatures around crop development





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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, harvest-ing update, sowing update	Vol. 27 No 11
16 Dec	Agromet analysis	Vol. 27 No 12

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Analysis and reports
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MARS stands for Monitoring Agricultural Resources

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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