Issued: 21 June 2021
JRC MARS Bulletin Vol. 29 No 6

European Commission

JRC MARS Bulletin
Crop monitoring in Europe
June 2021

Improved yield outlook for EU winter crops

At EU level, the yield forecasts for all winter crops and spring barley were revised upwards. The yield outlook for soft wheat, barley, rye and rapeseed is now firmly above the 5-year average. Expectations are mixed for summer crops.

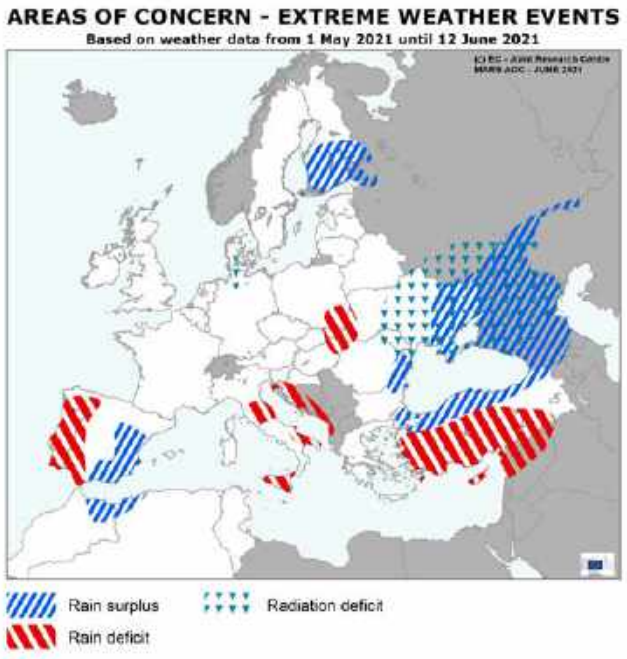
In large parts of Europe, distinctly cooler-than-usual temperatures, as reported in the May bulletin, gradually gave way to average or above-average values. The warmer temperatures, combined with adequate moisture supply, accelerated biomass accumulation and phenological development of winter crops and spring cereals, thus improving the yield outlook. So far, summer crops benefited much less from these improvements.

Continued cooler-than-usual temperatures in central Europe prolonged the delay in winter crops, but helped to avoid water stress during a period of scarce precipitation.

Rain deficits in central Italy and Portugal had limited negative impacts on the winter crops in advanced stages of development, whereas rainfall surpluses in south-western Spain and the southern Black Sea region had predominantly beneficial effects on crops.

Overly wet conditions in the Baltic region and in southern and eastern Ukraine led to increased pressure from pests and diseases and hampered field activities. Furthermore, in Ukraine, and in northern Germany/southern Denmark, reduced radiation around the flowering stage of winter cereals decreased yield potential.

Contents:



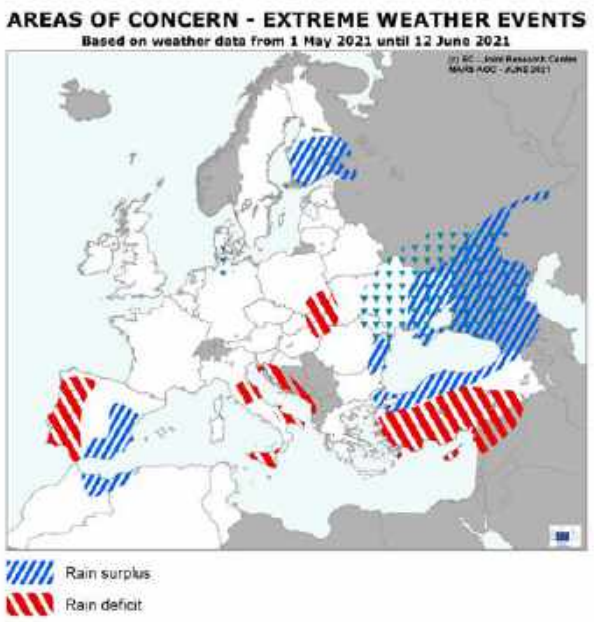
Crop	Yield t/ha				
	Avg 5yrs	May Bulletin	MARS 2021 forecasts	%21/5yrs	% Diff May
Total cereals	5.33	5.56	**5.63**	+ 5.5	+ 1.3
Total wheat	5.47	5.70	**5.79**	+ 5.8	+ 1.6
Soft wheat	5.69	5.91	**6.01**	+ 5.6	+ 1.7
Durum wheat	3.49	3.56	**3.57**	+ 2.2	+ 0.3
Total barley	4.77	4.89	**4.97**	+ 4.0	+ 1.6
Spring barley	4.12	4.17	**4.28**	+ 3.9	+ 2.6
Winter barley	5.63	5.89	**5.90**	+ 4.9	+ 0.2
Grain maize	7.75	7.81	**7.84**	+ 1.2	+ 0.4
Rye	3.83	4.05	**4.07**	+ 6.3	+ 0.5
Triticale	4.07	4.17	**4.18**	+ 2.7	+ 0.2
Rape and turnip rape	3.06	3.21	**3.23**	+ 5.6	+ 0.6
Potato	33.0	34.0	**34.5**	+ 4.8	+ 1.5
Sugar beet	73.6	75.5	**73.6**	– 0.1	– 2.6
Sunflower	2.27	2.21	**2.20**	– 3.4	– 0.5
Soybean	2.93	2.99	**2.98**	+ 1.8	– 0.3

Issued: 21 June 2021

Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern



Large parts of Europe experienced near-average weather conditions during the review period. The distinctly cooler-than-usual temperatures at the beginning of May (as reported in the May Bulletin) gradually gave way to average or above-average values, with the exception of southern-central and south-eastern Europe, where temperatures remained slightly below the long-term average (LTA). In western Europe, the warmer temperatures accelerated phenological development of winter crops and spring cereals; after being slightly delayed, these now present average (France) to slightly advanced stages (Germany). Such recovery is not yet observed in the British Isles, where they remain slightly behind. In central Europe, the continued cooler-than-usual temperatures maintained the delay in crop development, but on the positive side reduced crop water demand during a period of scarce precipitation (eastern Slovakia, eastern Hungary, southern Poland).

Rain deficit is also observed in central Italy and in Portugal, so far with limited negative impact on winter crops due to their advanced stages.

In south-western Spain, a rainfall surplus had a positive impact on the final part of the winter crop season. Favourable abundant precipitation is also observed in the southern Black Sea region (western Romania and northern Turkey).

Conversely, overly wet conditions in the Baltic region and in southern and eastern Ukraine are causing increased pressure from pests and diseases, while in Finland the abundant precipitation delayed the spring cereal sowings. Furthermore, in Ukraine and in northern Germany/southern Denmark, the reduced radiation in May – during the early reproductive stages of winter crops – decreased the yield potential.

Unusually wet conditions in Morocco and dry conditions in south-eastern Turkey are having no impact on crops, as the growing season has already ended there.

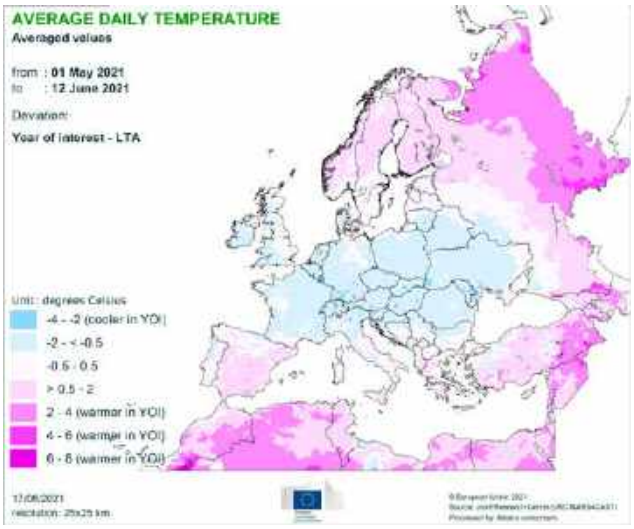
1.2. Meteorological review (1 May until 12 June 2021)

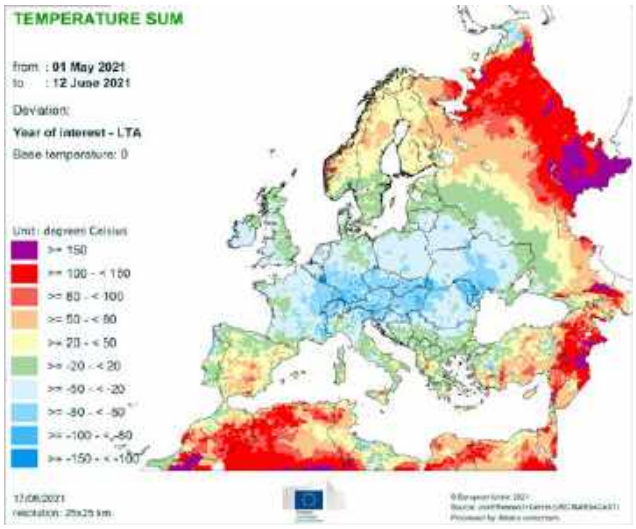
Slightly colder-than-usual conditions were observed in most of central and eastern Europe, with daily mean temperature anomalies (with respect to the LTA) mainly from -2 °C to -0.5 °C. These patterns also triggered lower-than-usual cumulative temperatures (threshold at 0 °C), especially in a zonal band stretching from eastern France to Ukraine (with anomalies from -80 °Cd to -50 °Cd).

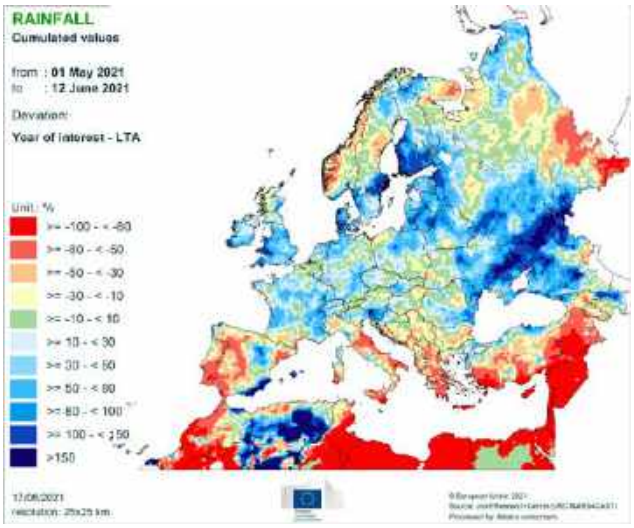
Slightly warmer-than-usual conditions were recorded in most of Spain, the Scandinavian Peninsula, European Russia and Turkey. Daily mean temperature anomalies were from +0.5 °C to +2 °C; however, higher values (mostly from +2 °C to +4 °C, locally up to +6 °C), were observed in large areas of Turkey and European Russia.

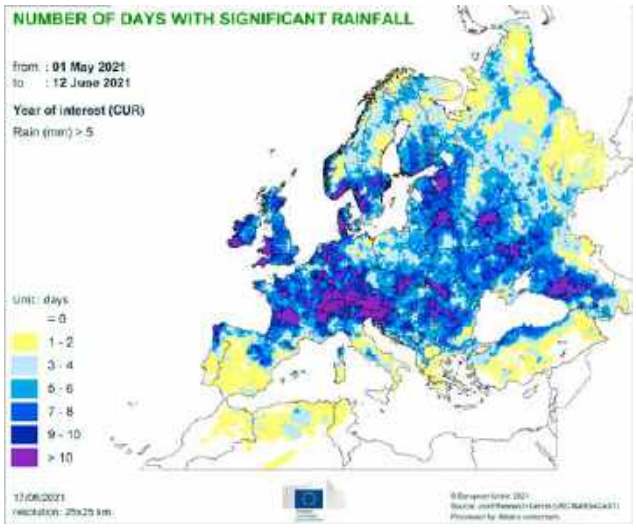
Wetter-than-usual conditions were recorded in large regions of central, northern and eastern Europe, with positive anomalies in total cumulative precipitation (during the review period) mostly from +30% to +100%. More pronounced anomalies, from +100% to +150% (locally even higher), were observed in southern Finland, southern Sweden, Denmark, Wales, eastern Ukraine and the neighbouring areas in European Russia, the easternmost part of the Alps, along the Black Sea coast of Romania, and along the Mediterranean coast of Spain.

Drier-than-usual conditions were mainly observed in southern Portugal and Spain, large areas of western and south-eastern Spain (mostly *Catalunya*), Italy, Greece, North Macedonia, Turkey and European Russia. Anomalies in total cumulative precipitation were from -80% to -50%, although more distinct anomalies (up to -100%) were observed in Turkey and locally in the other areas.









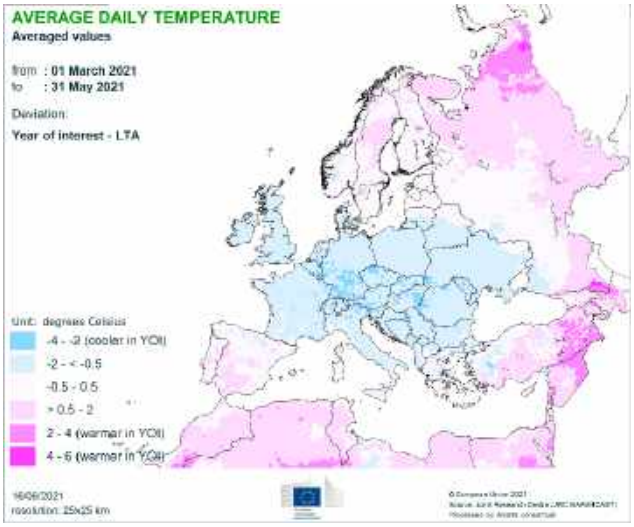
1.3. Spring review (March, April, May)

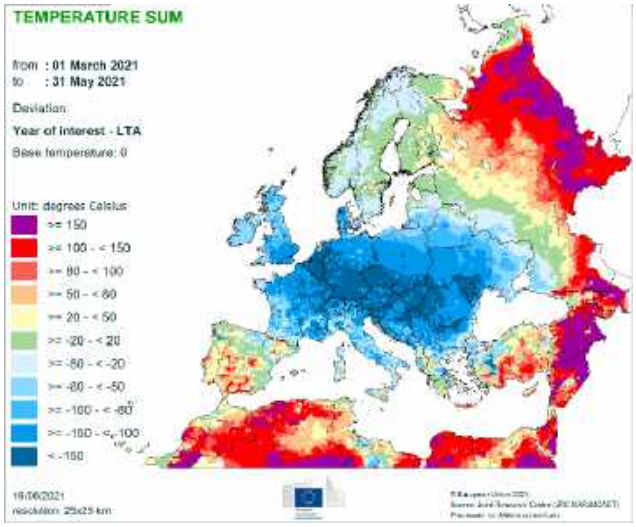
Slightly colder-than-usual conditions were observed in most of Europe, with daily mean temperature anomalies (with respect to the LTA) from -2 °C to -0.5 °C. The entire spring was dominated by an unusual sequence of cold spells that resulted in April 2021 being among the three coldest Aprils in our historical archive (starting in 1979) in central and north-western Europe. These colder-than-usual weather conditions are also reflected in large negative anomalies in cumulative temperature (threshold at 0 °C), with values mostly from -150 °C to -100 °C, and below -150 °C in a large belt extending from the Netherlands towards Ukraine. An exceptionally high number of cold days (more than 80% above the LTA) was also recorded in large parts of Europe.

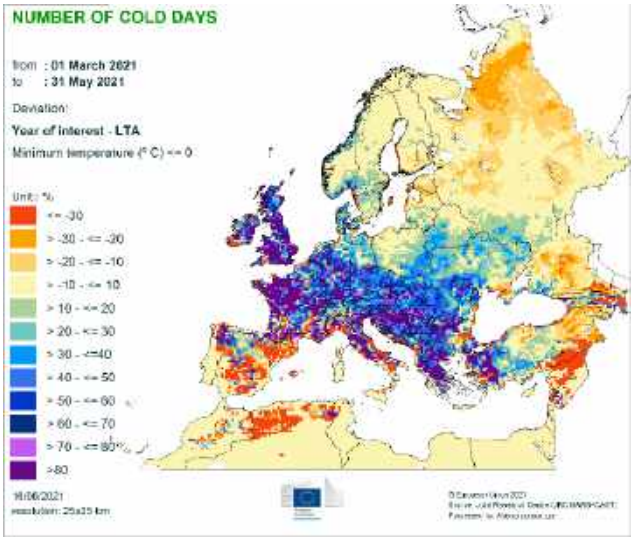
Slightly warmer-than-usual conditions were observed in large areas in Spain and Portugal, Sweden, Turkey and European Russia. Daily mean temperature anomalies in those regions were mainly from +0.5 °C to +2 °C (locally up to +4 °C). In European Russia and Turkey, these weather conditions are reflected in very pronounced positive anomalies in cumulative temperature (threshold at 0 °C), mostly between +100 °C and +150 °C but even higher in some areas.

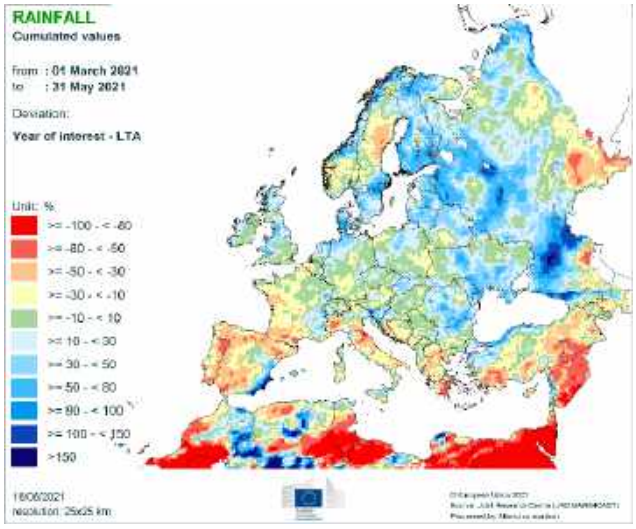
Wetter-than-usual conditions were recorded in many areas in northern and eastern Europe, as well as in European Russia. Anomalies in total spring precipitation were mostly from +30% to +80%. More pronounced anomalies (exceeding +150%) were observed along the Mediterranean coast of Spain and in large areas of European Russia.

Drier-than-usual conditions were observed in large areas of the Iberian Peninsula, western France, Italy, Greece, Turkey and Sweden. Anomalies in total spring precipitation in these regions were mainly from -50% to -30%, but from -80% to -50% in some smaller areas.









1.4. Weather forecast (19-25 June)

Weather conditions will be mainly determined by a large-scale atmospheric pattern, characterised by an African ridge expanding through the central Mediterranean, constrained by two troughs evolving over central and northern Europe and south-eastern Europe, respectively.

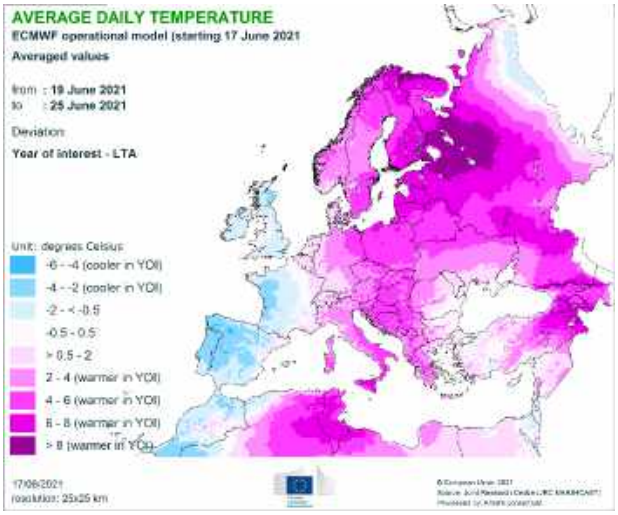
Warmer-than-usual conditions are expected in all European regions east of France, with daily mean temperature anomalies (with respect to the LTA) mainly from +2 °C to +6 °C. In a large region covering the Baltic countries, part of Finland, and European Russia, higher temperature anomalies (from +6 °C to +8 °C and above) are forecast. In all these regions, maximum temperatures will exceed 30 °C for at least one day. In Italy, large regions of south-eastern Europe, Russia and Turkey, daily maximum temperatures will remain above 30 °C for almost the entire forecast period.

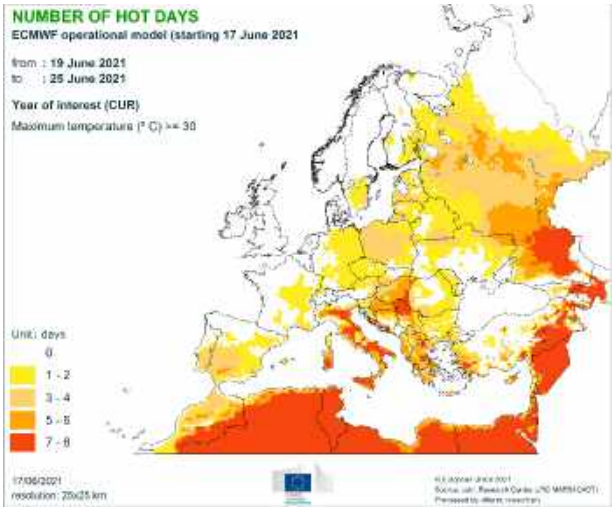
Colder-than-usual conditions are forecast in a large region of the Iberian Peninsula and western France. In these regions, daily mean temperature anomalies from -4 °C to -2 °C are forecast.

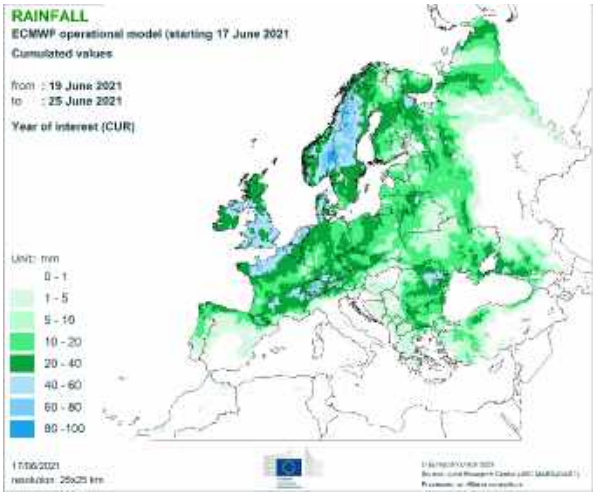
Wet conditions, with accumulated precipitation mainly between **10 mm and 60 mm** (locally up to 100 mm) are expected in most of Europe, except in large areas of the Iberian Peninsula, Italy, south-eastern Europe, European Russia and Turkey, where **dry conditions** are forecast.

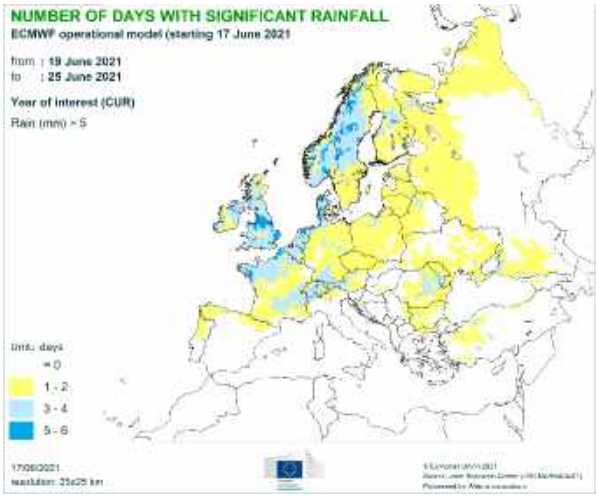
Long-range weather forecast for July, August and September points to likely to occur warmer-than-usual conditions in the Euro-Mediterranean region (extremely likely over Turkey).

.



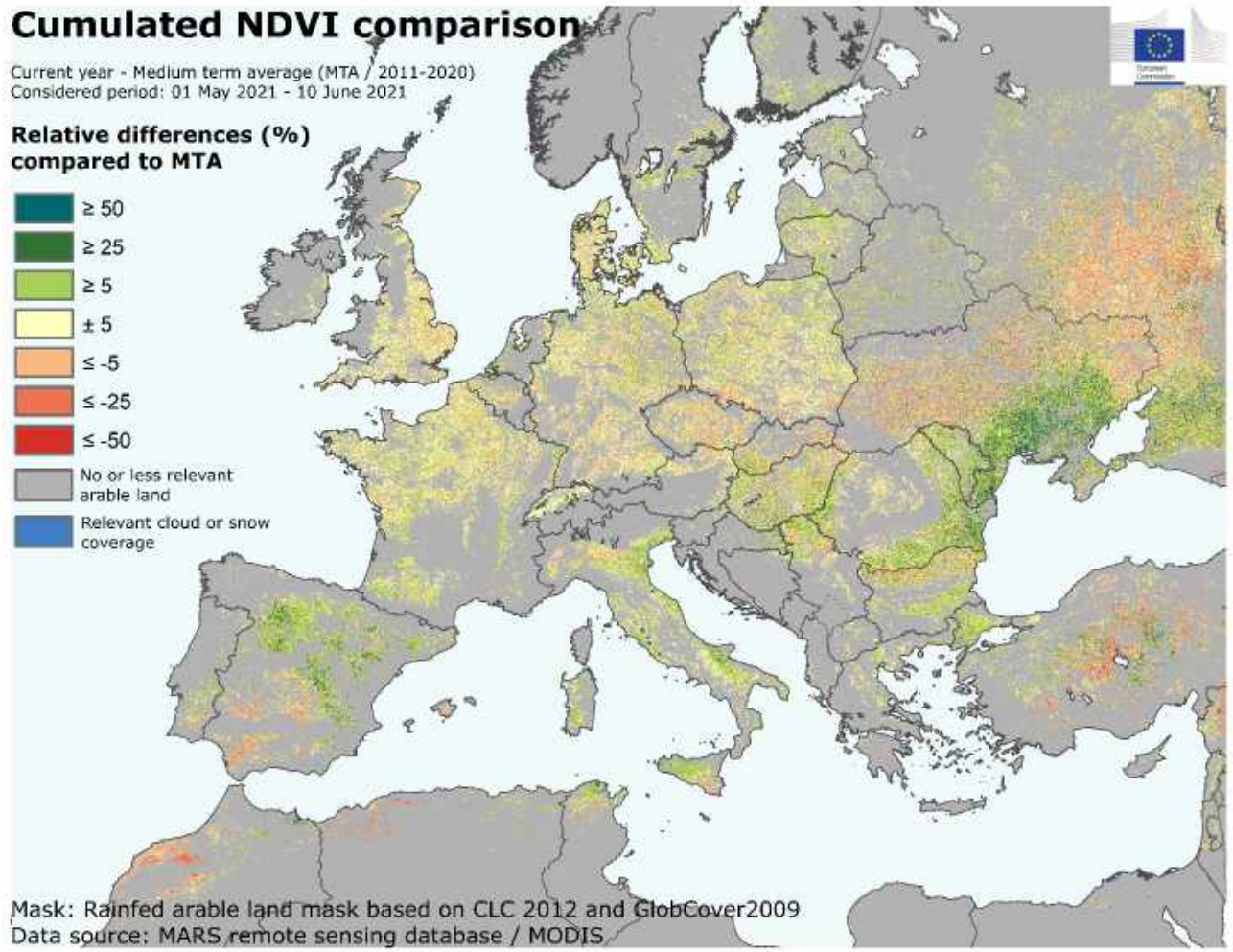






2. Remote sensing – observed canopy conditions

Favourable but delayed biomass accumulation

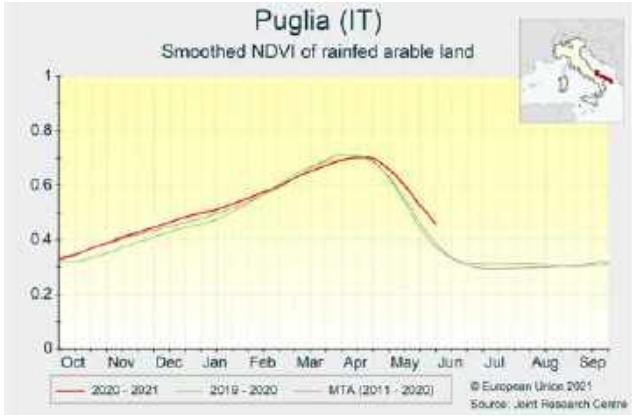


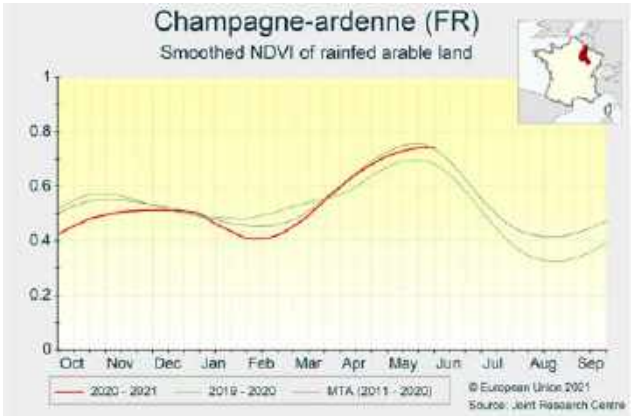
The map displays the differences between the Normalized Difference Vegetation Index (NDVI) cumulated from 1 May to 10 June 2021 and the medium-term average (MTA, 2011-2020) for the same period. Positive anomalies (in green) reflect above-average canopy density or early crop development while negative anomalies (in red) reflect below-average biomass accumulation or late crop development

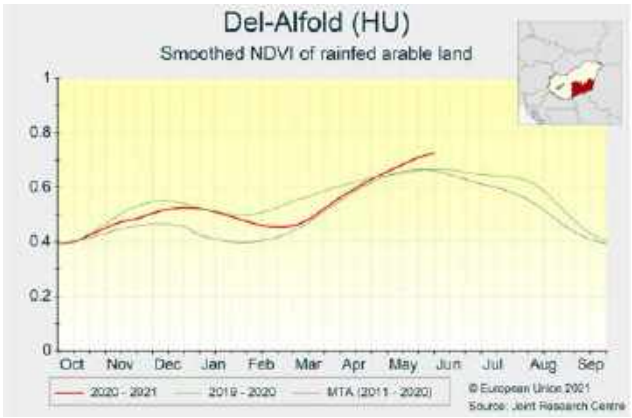
The map above predominately displays winter crop conditions, as biomass accumulation for summer crops has just started and is contributing little to NDVI values. Positive anomalies prevail in southern Europe, where crops benefited from a long grain-filling period and are entering maturity with some delay with respect to an average season. In northern and central Europe, crop biomass accumulation is still ongoing under average to slightly delayed conditions, due to cold temperatures registered during spring.

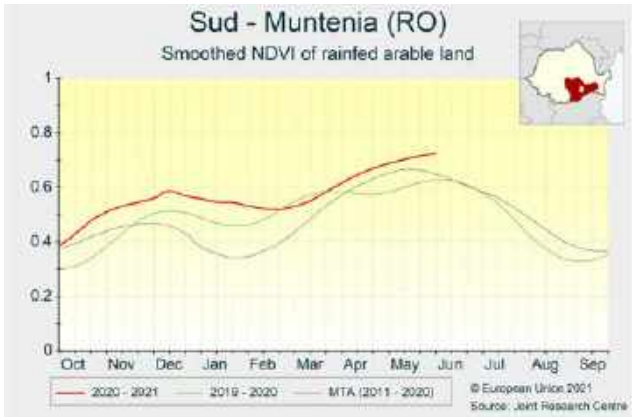
In **Spain**, winter crops show favourable biomass accumulation and crops are now in grain filling, 20 days later than usual (e.g. *Castilla Y León)*. Yield expectations are positive, but below last year´s level. In **southern Italy**, winter cereals are reaching maturity with delay with respect to an average season, as a result of cold weather during spring (e.g. *Puglia*). These persistent mild temperatures prevented early senescence due to a dry May. In **France**, after a dry April, crops benefited from abundant precipitation that arrived in May. The NDVI profile for *Champagne-Ardenne* displays average conditions for winter crops, which are now approaching delayed flowering. Summer crops are developing slowly, as a consequence of lower-than-usual temperatures. In the northern regions of **Germany** and **Poland**, cereals are close to flowering (e.g. *Brandenburg*), with average biomass accumulation. Persistent and well distributed rainfall provided adequate water supply. In central Europe (including **Slovakia**, **Czechia**, **Austria**, **southern Germany** and **southern Poland**), apart from some high

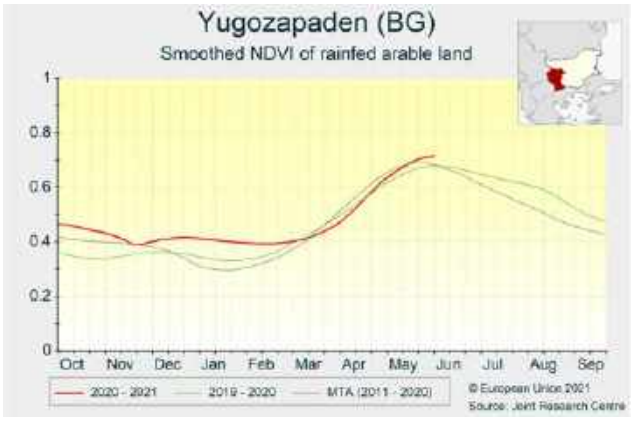
values registered around 10 May, temperatures remained below average and delayed crop stages are still evident. In **Hungary**, the thermal conditions observed were closer to average, and overall crop biomass accumulation is above to well above average (e.g. *Del-Alfold*). In **Romania**, lower-than-average temperatures and favourable precipitation led to excellent biomass accumulation, but development is delayed (e.g. *Sud-Muntenia*). In **Bulgaria**, the beginning of May was very hot and dry and contributed to accelerating crop development. The rain events in late May mitigated the dry spell, but further precipitation is needed to sustain crop development during flowering, which is just beginning (e.g. *Yugozapaden*). The map displays very positive anomalies (in green) in southern **Ukraine**, where conditions are similar to those described for Romania. In the north-west of the country, despite delayed stages, crop growth is proceeding fairly well, sustained by May precipitation. Hot and dry conditions further hampered crops in central **Turkey**, while lower temperatures have favoured biomass accumulation in north-western regions. In the **United Kingdom**, rains finally arrived in May. Vegetative development of winter crops is progressing quite slowly due to persistent cold weather, but temperatures have started to increase in June. The NDVI profile indicates cumulative biomass close to average (e.g. *Bedfordshire and Hertfordshire*).

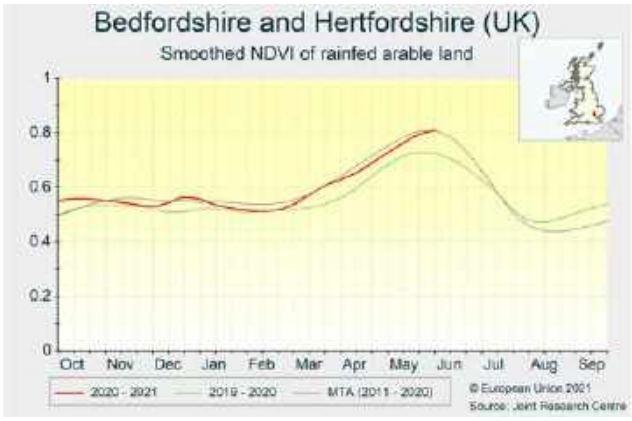








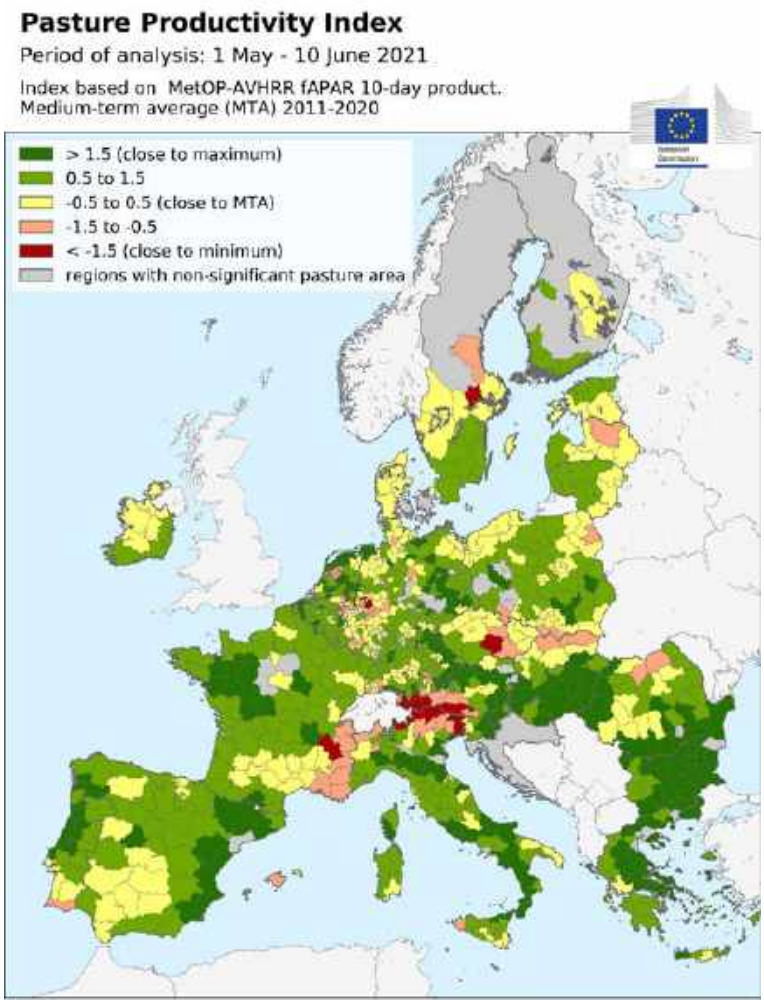

Yugozapaden (BG)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2020 - 2021
2019 - 2020
MTA (2011 - 2020)
© European Union 2021
Source: Joint Research Centre


Bedfordshire and Hertfordshire (UK)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2020 - 2021
2019 - 2020
MTA (2011 - 2020)
© European Union 2021
Source: Joint Research Centre

3. Pastures in Europe – regional monitoring

Warmer temperatures and abundant rainfall improved pasture productivity

Pastures in most parts of Europe benefited from abundant rainfall and increasing (but not too hot) temperatures, as reflected in accelerated biomass accumulation. As temperatures increased, plant-water requirements also increased and more rain will now be welcomed in most regions.



Methodological note: The map above presents the pasture productivity index (PPI) [1] for the period from 1 May to 10 June 2021. Positive PPI values indicate above-average biomass accumulation during this period (shades of green), whereas negative PPI values indicate below-average seasonal biomass accumulation (shades of red). The PPI is based on the variations of the fAPAR [2] signal around the temporally integrated average. Graphs for selected regions at the end of this section show fAPAR development along the season, as compared to the MTA and last year (2020).

In large parts of Europe, below-average temperatures continued to prevail until the end of May. However, temperature limitations to grass growth became less relevant as spring advanced, and disappeared in June when temperatures increased above the LTA in most of Europe, yet without reaching damaging levels. In most regions, the increase in water requirements associated with the increasing temperatures was covered by

(1) PPI, the relative index of pasture productivity, is an indicator of biomass formation based on the integration of the fAPAR remote sensing product of pasture areas (at NUTS level 3) over a period of interest. The index shows the relative position of the current season within the historical series from 2011 to 2020, also referred to as the medium-term average (MTA).

(2) fAPAR: the fraction of solar radiation absorbed by green (live) leaves for the purpose of photosynthetic activity. The fAPAR depends on the canopy structure, optical properties of vegetation, atmospheric conditions and angular configuration.

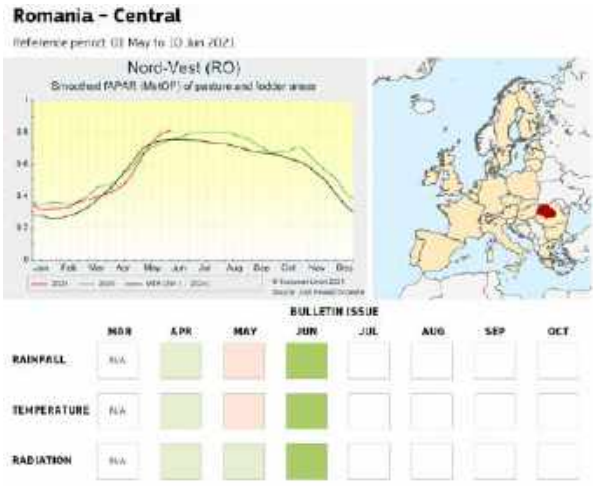
abundant rainfall. The resulting favourable conditions for grass growth are well reflected in the predominance of average to above-average PPI values as shown in the map above, for the period 1 May to 10 June. The gradual improvement in conditions for pastures (and associated increase in biomass accumulation) is reflected in many of the fAPAR profiles in the graphs below.

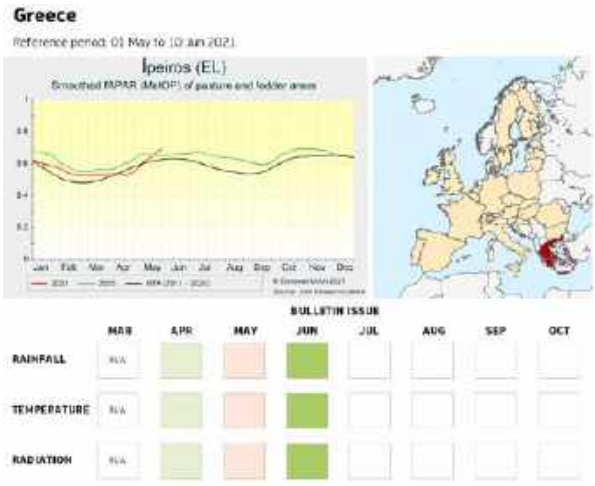
Spatial variation in PPI in the northern half of Europe is mainly attributed to variations in temperature and radiation. For example, conditions in **northern Germany** show an average fAPAR profile for *Schleswig Holstein*. Frequent rainfall events occurred, but canopy development and biomass accumulation were constrained due to low temperatures and below-average radiation; clouds may also have affected the fAPAR curves. Conditions are currently more favourable with the start of warmer weather. In **southern Germany**, the situation is comparable to the north but the impact is less visible in the fAPAR profiles; by contrast, some regions are thriving. The delay in development due to the low temperatures is clearly visible (e.g. *Tübingen*), but grass development is now gaining momentum. The lower radiation deficit may explain the generally better performance in the south than in the north.

In several regions, for example **Poland** and the **Benelux** countries, conditions were favourable for grassland productivity. However, frequent and abundant rainfall in May caused delays to cutting, drying out and collection of cut grass (as it was very difficult to find an optimal weather window), and lowered the nutritional quality of the grass.

In southern Europe, in the **mainland Greece** regions of West Macedonia, Thessaly, Central Macedonia, Central Greece and Epirus, grazing areas benefited from above-average well distributed rainfall, combined with slightly above-average temperatures. Although cumulative rainfall was below the LTA in Crete and the South Aegean islands, rainfall events were well distributed. Nevertheless, grazing land would benefit from more rainy days.

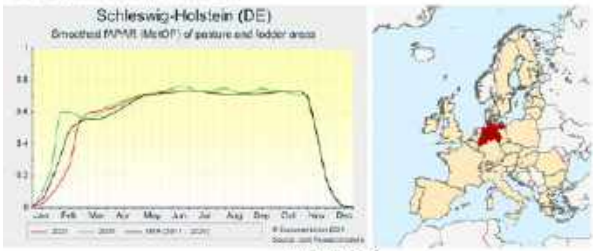
Italy saw a recovery in biomass growth in May, up to above-average levels in most of the Italian pastoral and forage areas. The steep recovery is mostly attributed to the abundant rainfall that occurred in May, while rainfall in June was below average. More rain is therefore needed soon to sustain the current (positive) rates of biomass accumulation. In the pastoral areas of northern Italy (i.e. *Valle d'Aosta*, *Bolzano*, *Trento*), temperature supply during the review period was markedly below average (temperature sums (T_{base} 5 °C) -20% compared to the LTA). Together with the direct interference from clouds on the fAPAR observations, and (at higher altitudes) the effects of delayed regrowth due to a longer lasting snow cover than in previous years) this resulted in below-average values there, as well as in other Alpine and peri-Alpine regions





Germany - North

Reference period: 01 May to 10 Jun 2021

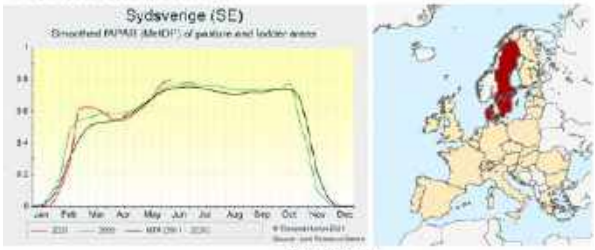


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

Denmark and Sverige

Reference period: 01 May to 10 Jun 2021

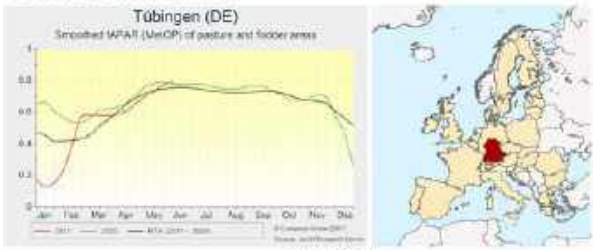


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

Germany - South

Reference period: 01 May to 10 Jun 2021

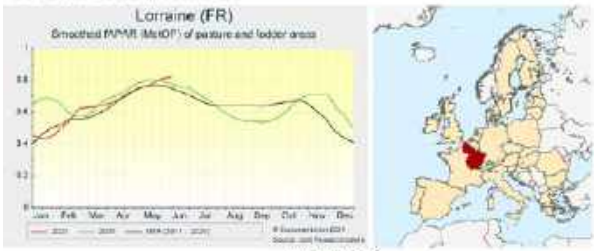


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

France - East

Reference period: 01 May to 10 Jun 2021

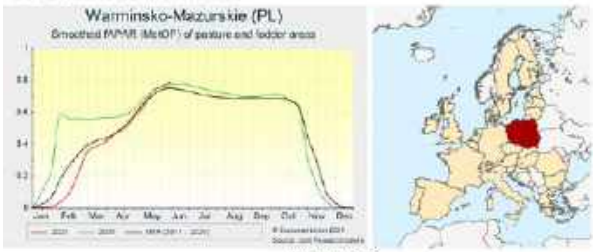


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

Poland

Reference period: 01 May to 10 Jun 2021

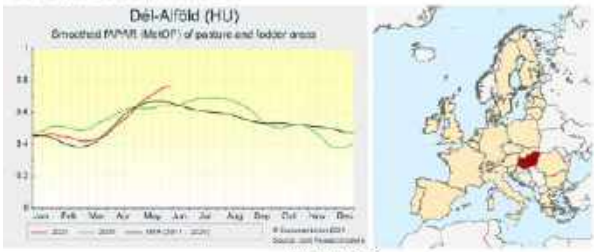


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

Hungary

Reference period: 01 May to 10 Jun 2021



BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL	N/A							
TEMPERATURE	N/A							
RADIATION	N/A							

4. Country analysis

4.1. European Union

France

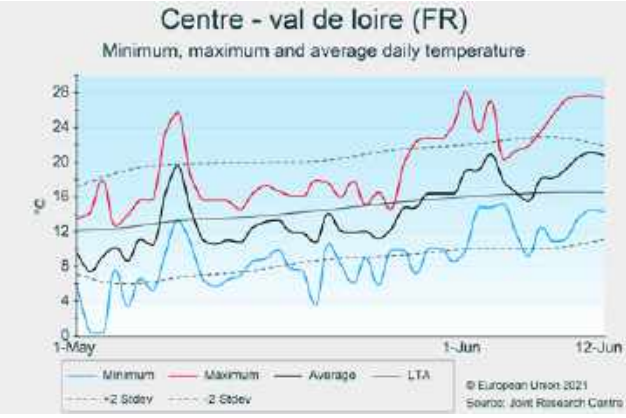
A poor outlook for winter crops but fair start for most summer crops

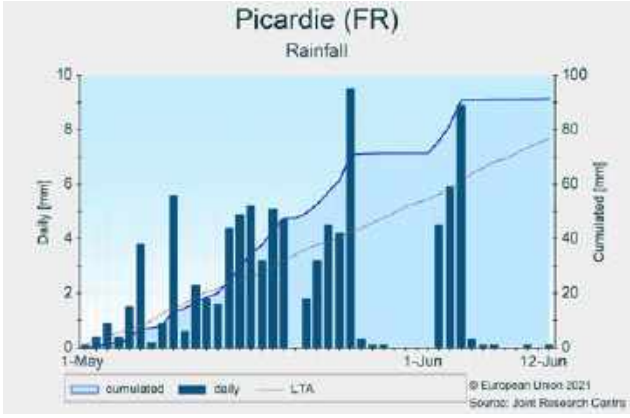
The analysis period was favourable for winter crops: the rain came on time and the colder-than-usual temperatures also had a beneficial impact. However, this cold weather slightly delayed the development of summer crops. Yield forecasts for sugar beet and potatoes were revised downward given the impact of the cold spell in early April.

Colder-than-usual temperatures prevailed in May, ranging from 2 °C to 2.5 °C below the LTA in eastern regions, and 1.5 °C below the LTA in western regions. Warmer temperatures have been observed since the beginning of June, oscillating above the LTA but without exceeding 30 °C. Cumulative rainfall was 10-50% above the LTA, except in *Midi-Pyrénées*, *Languedoc-Roussillon* and *Nord-Pas de Calai*s where precipitation was close to seasonal levels.

While dry weather prevailed prior to the review period, limiting disease pressure on winter cereals, the rainfall observed during the current analysis period has been favourable to most arable crops. The colder-than usual temperatures were favourable to winter crops, prolonging the vegetative period for winter wheat and barley, which is usually correlated with a higher number of grains per plant, having a positive impact on yields. Conditions during flowering, at the end of May, were mostly favourable, with no excessive rainfall and average global radiation. Conversely, the above-average temperatures observed in early June are expected to slightly reduce grain weight, but conditions remain favourable overall. The yield forecasts for soft wheat and winter barley were revised upward, given the prevailing beneficial agrometeorological conditions. Yield forecasts for durum wheat and rapeseed had already been revised downward last month and these are maintained given the succession of unfavourable conditions since the start of the cropping season. Weather conditions allowed rapeseed to compensate for the impact of the cold spell, which had already been taken into account last month.

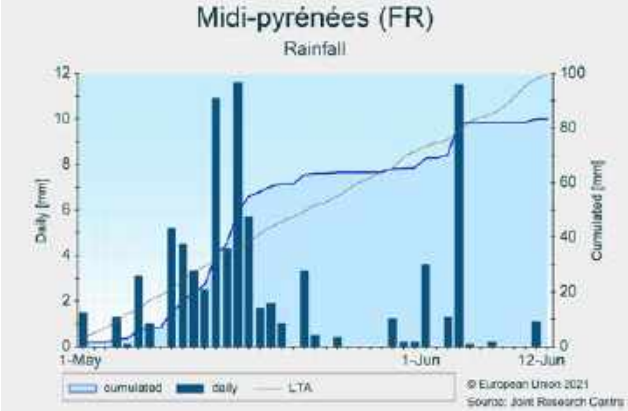
While summer crop sowings were advanced compared with the 5-year average thanks to the dry weather observed in April, their growth was delayed due to the cold temperatures in May and is now aligned with the 5-year average[3]. Yields of grain maize, sunflowers and soybean are still forecast at the trend level. The yield forecasts for sugar beet and potatoes were revised downward given the impact of the cold spell observed at the start of the season.





[3] https://cereobs.franceagrimer.fr/cereobs-sp/#/publications


Centre - val de loire (FR)
fAPARs (MetOP) of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
2021
MTA
© European Union 2021
Source: Joint Research Centre


Midi-pyrénées (FR)
Rainfall
Daily [mm]
Cumulated [mm]
12
10
8
6
4
2
0
100
80
60
40
20
0
1-May
1-Jun
12-Jun
cumulated
daily
LTA
© European Union 2021
Source: Joint Research Centre

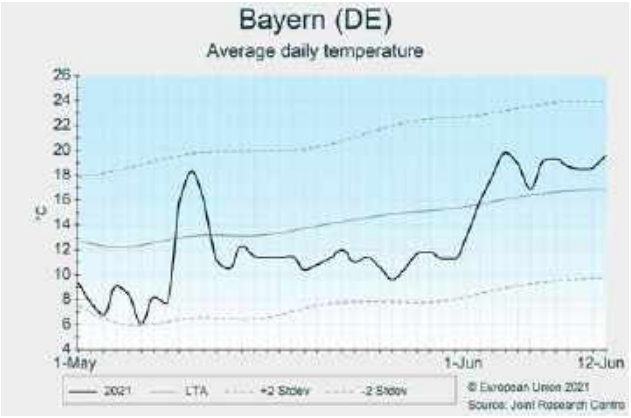
Germany

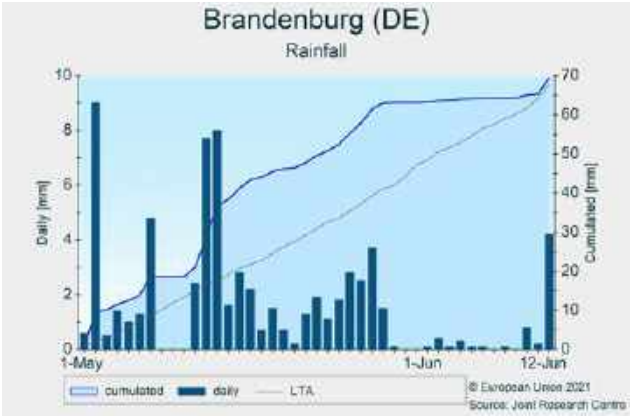
Adequate soil moisture sustains crop growth

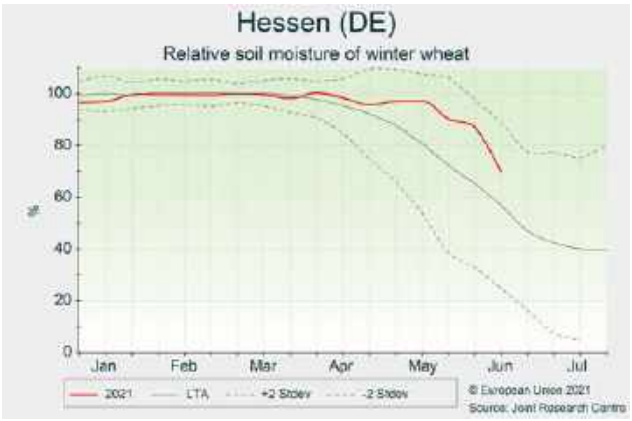
The warm conditions in June reduced the delay in crop development observed since April. Winter wheat is now entering the sensitive stage of flowering, while winter barley is nearing the end of this stage. Flowering of rapeseed has ended everywhere. Summer crops are still delayed in development and biomass accumulation. Forecasts are confirmed to be well above the 5-year average at country level. All yield forecasts are now using our crop model simulation outputs as a basis.

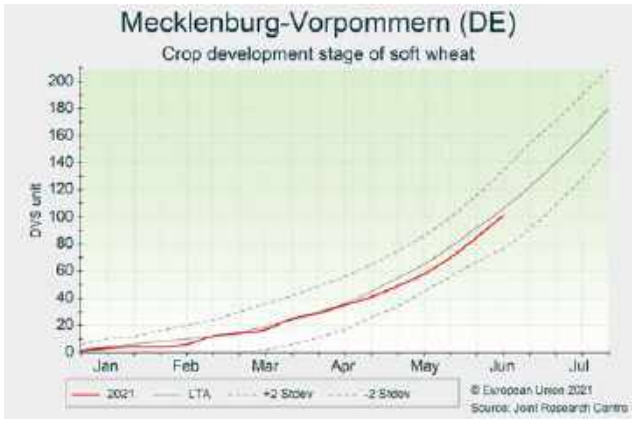
As in most countries in Western Europe, the month of May was colder and rainier than usual. This cold anomaly was markedly stronger in the south than in the north. Average temperatures remained almost consistently below the LTA for the whole month, except for somewhat warmer days around 10 May. Temperature sums thus show a deficit, which is not yet fully compensated by the warmer weather that set in at the beginning of June. However, and especially in eastern Germany, the change in weather regime to sunnier and drier conditions accelerated crop growth in the first dekad of June. According to our crop model simulations, this reduced the development delay observed since April to less than a dekad. In the south, we can still observe a somewhat greater delay in development. Also in the south, heavy thunderstorms and hail locally caused damages and flooding. Summer crops, particularly grain maize, that had been generally delayed, have accelerated considerably in growth since the beginning of June. While most summer crops are now close to their expected stages of development, they are still lagging behind in biomass accumulation and leaf area expansion, especially sugar beet and potatoes.

The northern, central (e.g. *Hessen*), and southern regions of Germany received 10-50% more precipitation than usual, while *Sachsen-Anhalt*, *Brandenburg* and *Mecklenburg-Vorpommern* were exposed to a moderate rain deficit (10%) compared to the LTA during the review period. The decrease towards average values in simulated soil moisture content under winter cereals has been most pronounced in *Brandenburg* and *Mecklenburg-Vorpommern*, on predominantly sandier soils. Due to the overcast weather and frequent precipitation, there is a moderate radiation deficit across the country, somewhat more pronounced in *Schleswig-Holstein*. In southern Germany, the beneficial rain in May and the locally torrential rains in early June should sustain crop growth. However, the frequent precipitation in conjunction with warm temperatures has caused high disease pressure. Winter cereals are yet to enter the most sensitive stages. Yield uncertainty remains considerably high, although the first part of the cycle allows for good yields. Summer crops are more affected by the delay in development and the lower-than-usual biomass accumulation, but are generally forecast above the 5-year average.






Hessen (DE)
Relative soil moisture of winter wheat
%
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
Jul
2021
LTA
+2 Stdev
-2 Stdev
© European Union 2021
Source: Joint Research Centre


Mecklenburg-Vorpommern (DE)
Crop development stage of soft wheat
DVS unit
200
180
160
140
120
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
Jul
2021
LTA
+2 Stdev
-2 Stdev
© European Union 2021
Source: Joint Research Centre

Poland

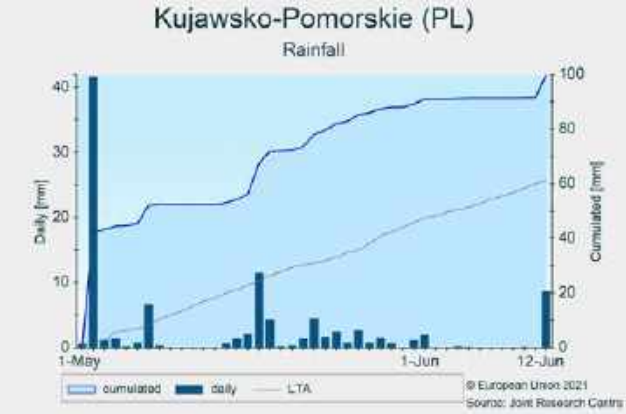
Crops delayed due to cold and wet May

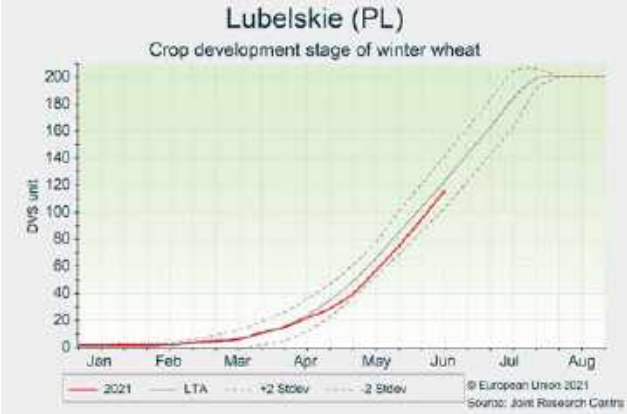
Cold conditions continued in May, resulting in a slowing down of winter crop development and biomass accumulation. The cold also delayed the emergence of summer crops. The condition of winter crops is generally good, and positive yield potential is maintained, while the outlook for maize is slightly reduced due to prolonged and uneven emergence.

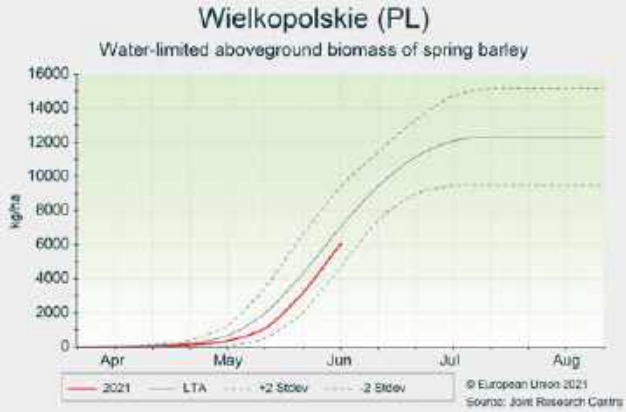
Colder-than-usual conditions predominated in May, except for the second dekad when temperatures were above average. Cumulative precipitation in May was significantly above average in most of the country, except for the south-eastern and *Zachodniopomorskie* regions (around average precipitation sums). The increasing temperatures during the first dekad of June, in combination with significantly below-average rainfall in most of the country, resulted in decreasing topsoil moisture levels, especially on lighter soils.

Winter and spring crops are generally in good condition. Following the cold spring period, crops are delayed in development and biomass accumulation is below average. Winter wheat is delayed by approximately 10 days. Warmer temperatures in mid-May and June were favourable for crop development, helping biomass accumulation to catch up. We maintain a positive outlook for winter and spring crops. However, higher temperatures in June and scarcity of rain has triggered topsoil moisture deficits. If this develops further during the flowering and grain-filling stages of winter and spring cereals, it could substantially reduce yield potentials. Therefore, sufficient rainfall is badly needed during the coming days for adequate yield formation.

The early development of summer crops was slowed down by prolonged cold temperatures after sowing. The cold, wet and windy May was not favourable for the emergence and early development of maize. For this reason, our forecast for grain maize has been slightly reduced. If soil moisture conditions are favourable during the coming weeks there is still potential for improvement.







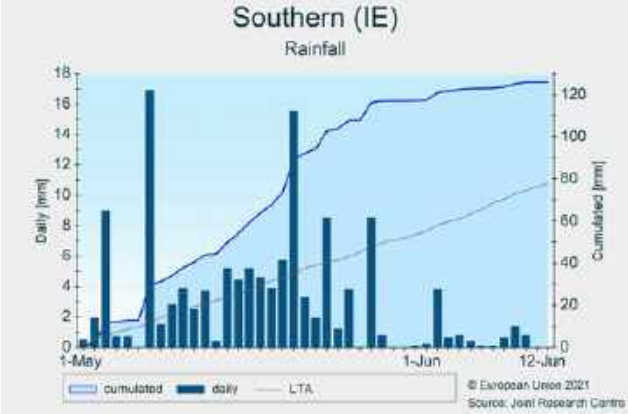
Ireland

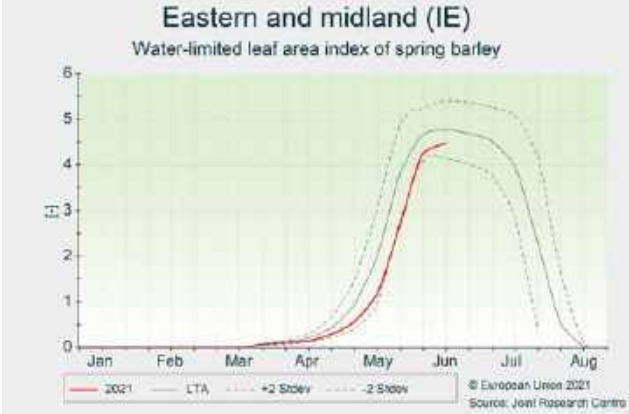
Crops are in good condition

Cold weather slowed down crop development but crops are in good condition and under adequate water supply. The warmer temperatures at the end of the review period helped crops to partially recover growth. The yield outlook remains positive for winter and spring crops.

The review period was characterised by below-average temperatures, with the exception of a few days at the end of the second dekad of May and from the end of May until the end of the review period, when temperatures exceeded the LTA. Frost was still occurring around 6 May.
Rainfall was abundant and frequent, with cumulative values above the average. Radiation was close to or slightly below average.

Crop development is close to seasonal values or slightly delayed for winter and spring crops. Winter wheat has reached the flag leaf stage and started heading. Spring cereals have entered the flag leaf phase. Due to the wet conditions, diseases have started to appear. However, crops appear to be in good condition overall. Water supply was adequate in all regions for winter and spring crops. According to our models, leaf area partially recovered with respect to the April period, reaching close-to-average values, but biomass accumulation remains delayed for spring barley and to a minor extent for winter cereals.
The yield forecasts remain close to those of the May Bulletin and above the 5-year average.





Spain and Portugal

Return of rainfall beneficial to grain filling in winter and spring cereals

Rainfall in May and the beginning of June benefited winter crops and spring cereals during grain filling. Conditions for the development of summer crops continue to be favourable, especially in the northern part of the peninsula.

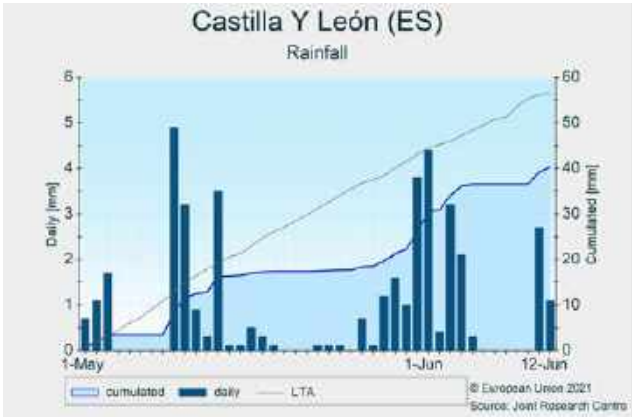
As mentioned in the May Bulletin, rainfall was a key element to watch during this period. In the northern and central parts of the peninsula, which includes the main grain-producing regions, it was mostly below the LTA values when considering the review period as a whole.

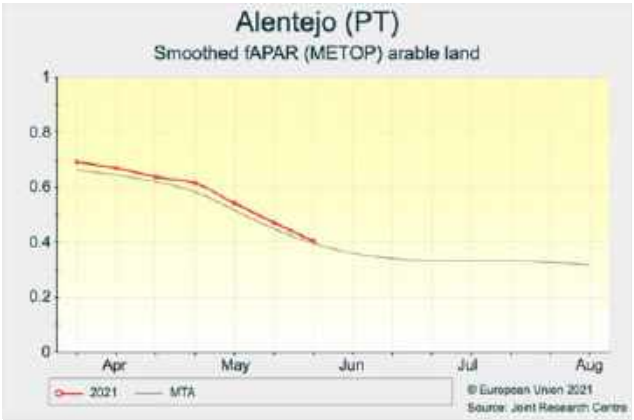
However, serious water constraints that would lead to early leaf senescence and a substantial yield penalty for winter crops and spring cereals, were not materialised[4], thanks to significant rainfall at the beginning and end of May and at the beginning of June. Southern areas had comparatively less regular and more intense rainfall, but overall satisfying too. Temperatures continued to follow the LTA with some warmer and colder days; this alternance has been more pronounced in the southern regions such as *Alentejo* in Portugal.

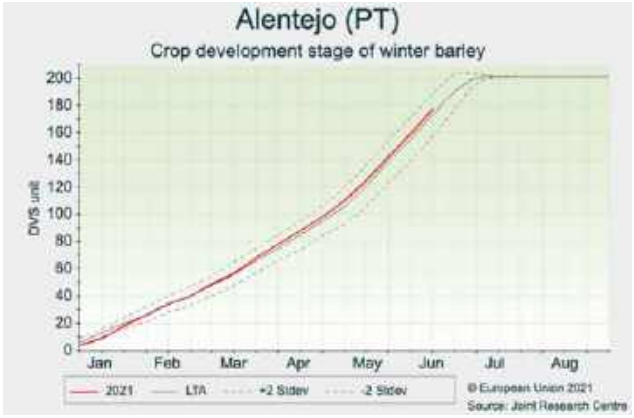
As a consequence of these fair conditions, only mild water stress was experienced and grain filling continued at a normal pace. Our yield forecasts for winter crops remains unchanged, while our forecast for spring barley has been revised upward. All of these forecasts are now above the 5-year average, but below last year's top record harvest.

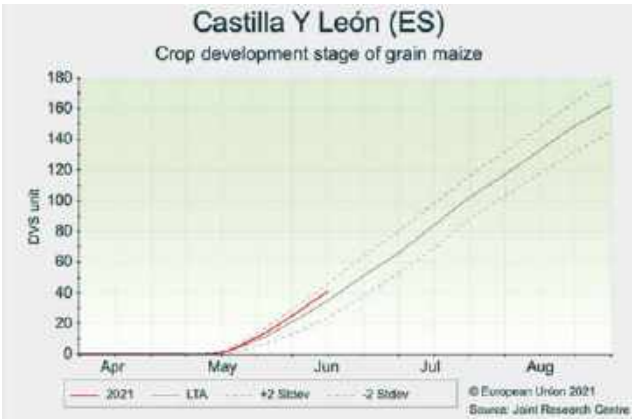
The forecast for rapeseed remains close to the 5-year average. Sunflowers, although delayed, are still progressing under overall favourable conditions. Maize development is advanced compared with last year in the northern regions.

Water reservoirs in Spain are estimated at 59% of their full capacity (www.embalses.net), below the 2019 lower levels and well below the 10-year average of 72%; this is especially a concern in *Extremadura, Andalucia* and *Murcia*.









[4] Green leaf area development in Castilla y León is well illustrated by the NDVI profile in section 2 (page 7).

Italy

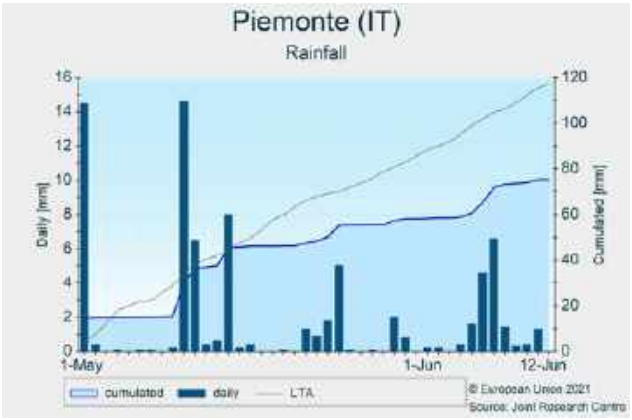
Dry and hot June affects soft wheat yield expectations

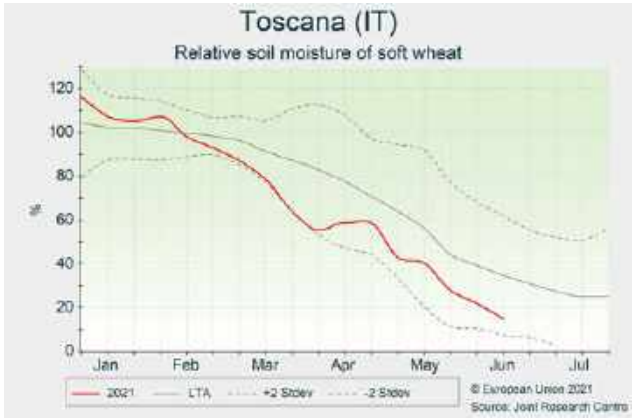
Due to the cold spring but also the current arrival of hot conditions, the yield forecast for soft wheat is decreased, while it is maintained for durum wheat and barley. For maize, the forecast is positive despite the difficult spring, whereas forecasts for soybean and sunflowers are still based on historical trends.

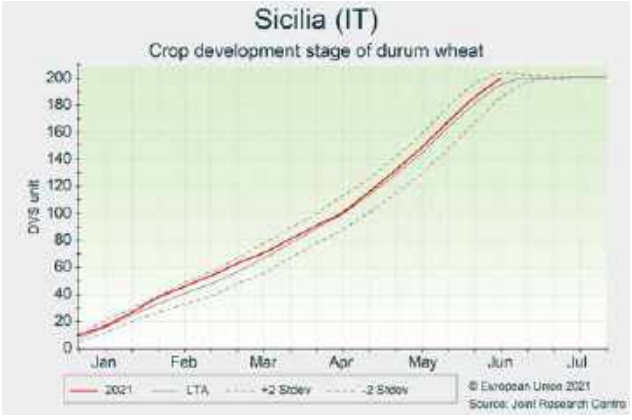
In northern Italy, May was cooler than usual, while temperatures increased in June and more hot days are expected in the next 10 days. Precipitation was average to abundant (north-eastern regions), with the exception of *Piemonte* and eastern *Emilia Romagna* where precipitation was scarce (only 60% of the LTA). Winter crops are in early grain filling. Notably, soft wheat – already in sub-optimal conditions due to the cold spring – could be further impacted by the incoming hot weather which will accelerate crop senescence and reduce the time for yield formation. Maize is still delayed in development, with sub-optimal biomass accumulation, especially in *Piemonte,* but it is recovering to good shape almost everywhere thanks to the increased temperatures.

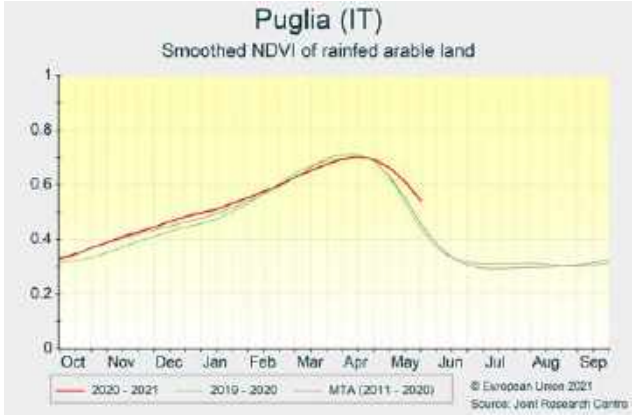
In central Italy, drier-than-usual conditions were observed in the *Marche* and *Umbria* regions, with a deficit of 75 mm (< 50%) compared to the LTA. Average to slightly below-average temperatures prevented excessive soil moisture depletion. Durum wheat is at the end of grain filling, while soft wheat and sunflowers are still delayed; the former could suffer from the expected dry and hot spell.

In southern Italy, weather was dry and hotter than usual along the Adriatic coast (e.g. *Puglia*) and in *Sicilia,* while along the Tyrrhenian coast, temperatures and precipitation (50 mm) were around average. In *Sicilia,* the durum wheat season is closing under optimal conditions; in *Puglia* and *Basilicata,* favourable weather during grain filling is allowing for average to fair yield expectations.









Hungary

Positive outlook for winter crops, but concerns regarding summer crops

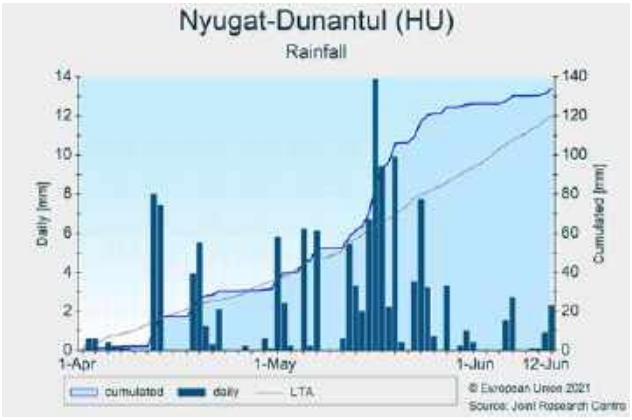
For most of spring this year, considerably colder than usual thermal conditions delayed plant development and reduced crop growth, negatively impacting mostly summer crops. However, winter crops benefited from the absence of heat waves and sufficient water supply during May.

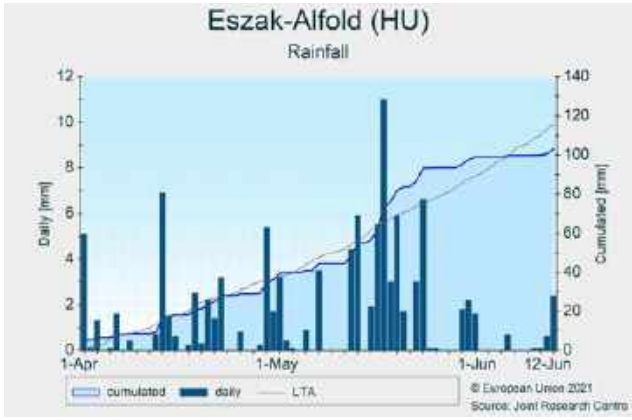
Average temperatures for the reporting period (1 May – 12 June) were among the lowest in our records (since 1979). Temperatures remained 1.5 to 2.5 degrees below the LTA. Only during the last week did temperatures return to normal. Nationwide cumulative rainfall for the reporting period (77 mm) is equal to the LTA, but the spatial distribution was unequal. The western and central regions of Hungary received 10%-45% more than usual precipitation, while some areas along the southern and north-eastern border were exposed to a moderate rain deficit (10-35%) compared to the LTA. The concern regarding water deficit, raised during the past months, has been nonetheless alleviated as the cumulative rainfall sufficiently filled the soil water reservoir across the country.

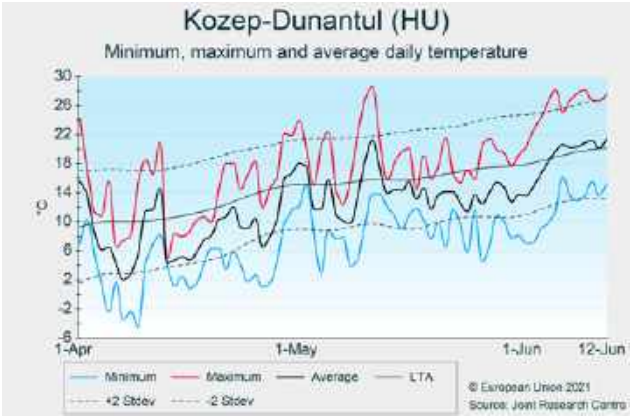
Overall, the crop development of winter crops is delayed by one or two weeks depending on the region. The cold weather also delayed early growth and leaf area expansion of summer crops, especially for grain maize. However, the favourable soil moisture conditions combined with upcoming warm temperatures have positive effects on crop growth.

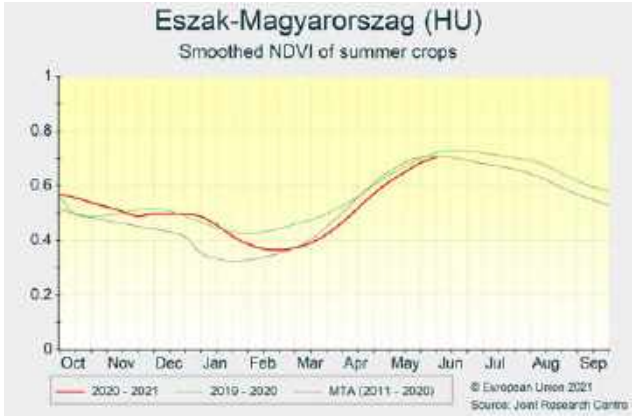
Rapeseed finished flowering at the end of May and is currently in the stage of grain filling/storage organ formation. Rapeseed is in a good shape thanks to the wet weather of April and May. Winter cereals arrived at the heading and flowering stages in late May or early June in most of the country due to the cold weather and reduced growth speed. To a lesser extent than for rapeseed, the wet weather of the past months contributed to maintaining a higher-than-normal yield potential for winter cereals. Summer crops were more affected by the cold weather during their early growth stages, remaining currently around leaf development stage. The wet weather also increased the weed and pest pressure on the summer crop fields. Since the beginning of June, the dry conditions have been fostering field access at a critical stage for fertilization.

As a consequence, the yield forecasts for winter cereals and rapeseed were revised upward, while forecasts for summer crops were revised slightly downward.







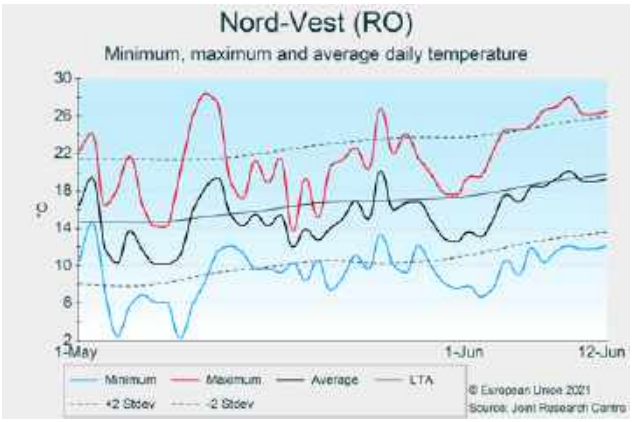


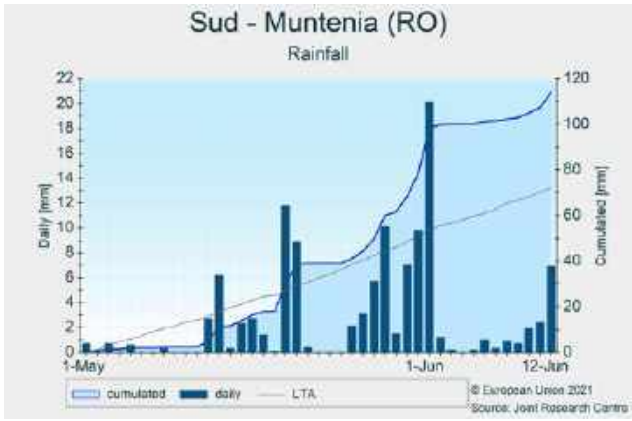
Romania

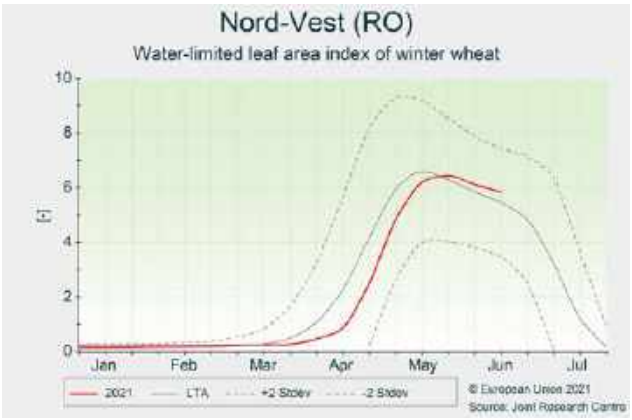
Winter soft wheat yield outlook well above the 5-year average

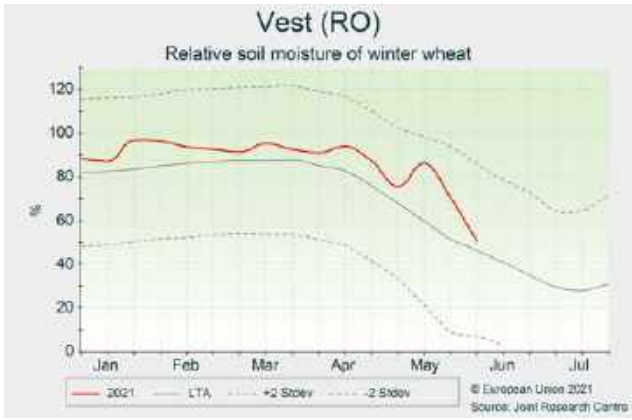
With slightly colder-than-usual temperatures, weather was mostly favourable for the growth and development of winter crops. The yield outlook for winter soft wheat has been revised upwards. Summer crops are slightly delayed, but generally in good condition.

Large parts of Romania experienced substantial drops in temperature at the beginning and the end of May, making the period as a whole colder than seasonal (2 °C below the LTA). Rainfall anomalies were spatially quite diverse: a deficit was recorded in the western and north-eastern regions (20% - 50% below the LTA), while a surplus was measured in the eastern, southern and central parts of the country (up to 80% above the LTA in south-eastern Romania). The rainfall deficit regionally intensified agricultural drought in the western part of *Banat* region and locally in *Moldova* region, while soil moisture reserves are at satisfactory levels in the rest of the country. The cold weather slowed down the development of winter and spring crops. Winter soft wheat is slightly delayed but has reached grain filling in major parts of the country, except in the central north where the flowering stage still prevails. Winter cereals – especially soft wheat – are progressing well, albeit slower than usual. The mostly favourable conditions during flowering increased the yield potential of winter soft wheat. Consequently, we have increased the crop yield outlook with respect to the previous Bulletin. For summer crops, which are still at an early stage of development, the crop yield outlook remains in line with the long-term trend despite the cold start to the season.









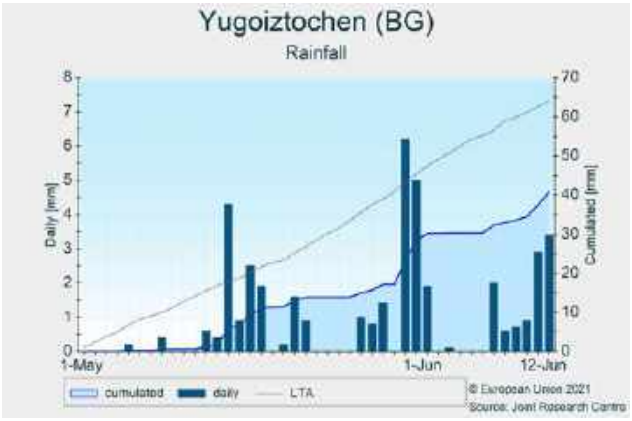
Bulgaria

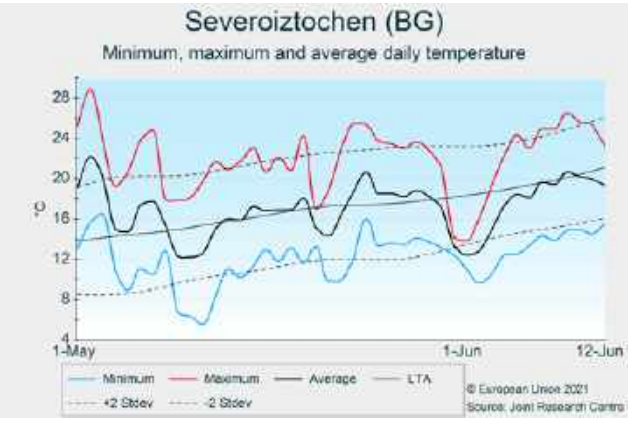
Continued positive crop yield outlook for winter cereals

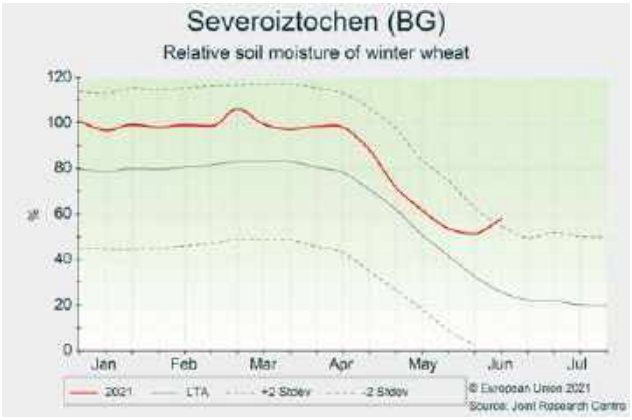
Winter crops are progressing well, despite the rainfall deficit recorded in south-eastern Bulgaria. The crop yield outlook for winter crops remains well above the 5-year average. Spring crops are delayed due to the cold weather in April and at the beginning of June.

Overall average temperatures since 1 May were interrupted by a short cold weather episode at the beginning of June. Rainfall cumulates reached above-average values in north-eastern Bulgaria, while a precipitation deficit was recorded elsewhere. The strongest deficit prevailed in south-eastern Bulgaria, where less than 40 mm of rainfall was recorded. Soil moisture is at satisfactory levels in the northern part of the country, and even in the south-east, soil moisture levels are close to the LTA, despite the rainfall deficit.

Winter crops are generally progressing well; their phenological development is in line with the LTA. Winter soft wheat has already reached the ripening phase in the south of the country, while the grain-filling phase prevails in northern regions of Bulgaria. Therefore, despite the rainfall deficit in south-eastern Bulgaria, the yield outlook for winter crops remains well above the 5-year average. Spring crops are slightly delayed in development, especially due to the cold weather at the beginning of June, but the yield outlook is in line with the long-term trend.







Austria, Czechia, and Slovakia

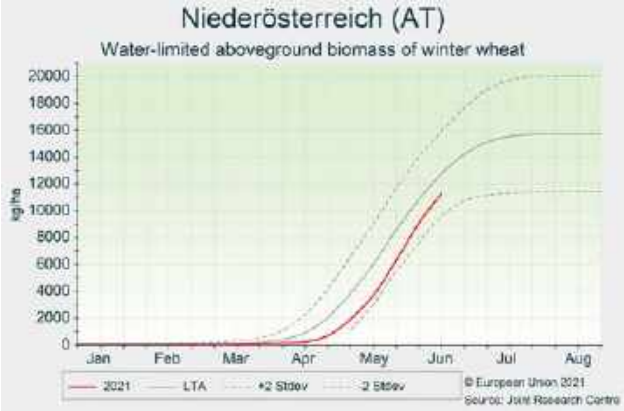
Improved soil moisture conditions allow for good winter crop yield expectations

May rains and higher June temperatures improved conditions for winter crops and allowed positive yield expectations to be maintained. Cold spring substantially slowed early development of maize.

An unusually cold weather anomaly during the first dekad of May (when average temperatures dropped by 2-3 °C) was followed by a brief warming during the second dekad of May, after which temperatures remained below the LTA until the end of the month. The beginning of June was characterised by above-average temperatures (with maxima exceeding 26 °C). Cumulative precipitation for the review period was significantly above average in Czechia and western Slovakia, while it was around average in the main grain-producing regions of Austria. Frequent rain events, mainly during the first two dekads of May (in Austria during the second dekad of May), considerably recharged soil water reserves. Global radiation was below the LTA.

Winter and spring crops are in good condition. After the predominantly cold spring, crops are delayed in development and biomass accumulation is below average. However, the warmer temperatures in June have favoured acceleration in crop development and growth. Below-average rainfall at the end of May and beginning of June, in combination with rising temperatures, resulted in topsoil moisture depletion; nevertheless, soil moisture conditions are currently adequate for crops.

The early development of summer crops slowed down due to the cold May. Our model indicates that phenological development and biomass accumulation are below the seasonal average. The prolonged cold conditions during spring resulted in a deteriorated yield outlook for soybean in Austria. Since maize is still at an early stage of development, we are basing our yield forecast on the long-term trend. The yield outlook for winter and spring crops has not changed substantially.



Denmark and Sweden

Cold weather and adequate crop water supply

Substantial rainfall maintained soil moisture above the average. Adequate water supply and the warmer temperatures at the end of the period helped to recover growth. Weather conditions were favourable to maintaining yield potential for winter and spring crops.

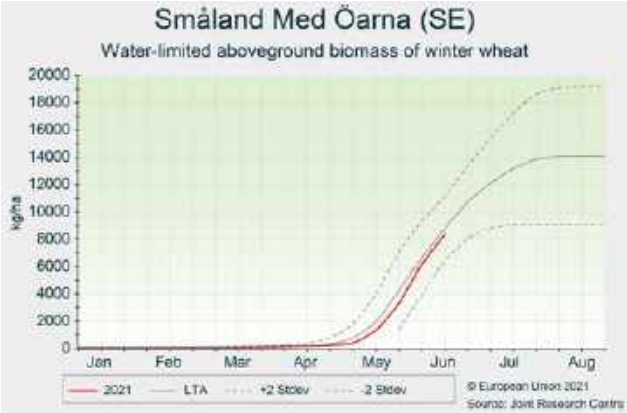
Temperatures remained below the average for most of the period, and increased to above seasonal values for a few days during the second dekad of May and during the first dekad of June.

Rainfall was frequent and abundant, but markedly decreased by the end of May, avoiding prolonged excessive soil moisture levels. Radiation levels were below the average in both countries.

Humid weather increased disease pressure but crops are in good condition. The increased temperatures at the end of the period accelerated crop development which, according to our models, is currently close to seasonal values.

The adequate water supply and the recent increased temperatures helped to partially recuperate the delay in growth. Yield potential for winter and spring crops is maintained. Favourable conditions in the coming weeks will make it possible to further recover growth and reach above-average values. Model indicators show average growth and development for potatoes and sugar beet. The abundant rainfall of May caused a delay in maize sowings, and variable germination.

The yield outlook for both winter and summer crops is positive, and slightly increased with respect to the forecast of the previous Bulletin.



Finland, Lithuania, Latvia and Estonia

Overly wet conditions affected sowings in Finland

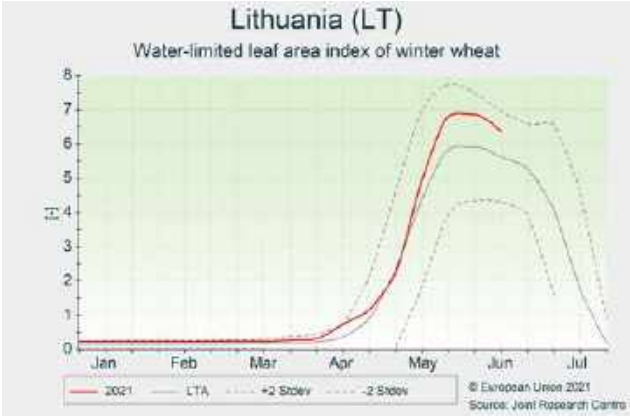
Wet conditions characterised the period. Overall conditions are good and the yield outlook remains higher than average, particularly for winter crops. In Finland excessive rainfall delayed spring sowings with a possible negative impact on spring barley yields.

Temperatures were below average in the Baltic countries and close to normal values in Finland. Average temperatures were unusually warm during the second dekad of May and the first dekad of June.

Rainfall exceeded the average in all countries and was particularly high during the last two weeks of May in Finland. The period was the wettest in our records for Finland. Radiation deficits were registered in the Baltic countries and Finland.

Crops are in good condition in all countries. According to our models, the development of winter and spring crops is close to the seasonal values. Crop indicators are generally positive, particularly for winter crops. Pest and disease pressure were low but are expected to increase with the wet weather and the increased temperatures of the first dekad of June. In the Baltic countries the negative impact of wet conditions was reported for spring cereals, which were sown later and suffered from the excess moisture. However, the extent of the impact is unclear and crops may still recover. In Finland heavy rains delayed sowings and the window has been extended until the first dekad of June with a possible negative effect on yields. In Finland rainfall affected the germination of spring cereals which was uneven in many areas and in some places re-sowing was needed. However, early sown crops look good.

Yield forecasts remain positive despite the possible negative impact on spring barley yields in Finland.



Belgium, Luxembourg and the Netherlands

Improved yield outlook for winter cereals

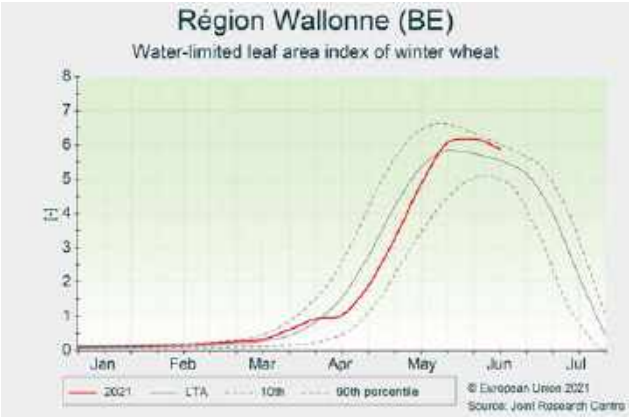
Favourable temperatures after 9 May and abundant rain until the 25th, followed by more settled weather in June, improved the yield outlook for winter cereals. However, summer crops remain underdeveloped, with constrained yield potential. The yield forecasts for all crops remain above the 5-year average.

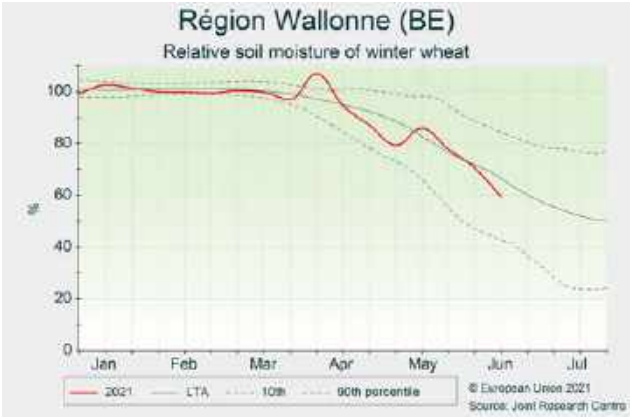
Below-average temperatures continued to prevail until the end of May. However, cold anomalies since 10 May were relatively small (generally less than 2°C compared to the LTA), and – mild – frost events were confined to the first days of May. June, so far, has been warmer than usual. The highest temperatures occurred on 1 and 3 June with daily maxima reaching 25°C to 29°C.

Rainfall events were frequent – almost daily – until 25 May. Since then, dry and sunny conditions have prevailed, interrupted by a few days of (locally heavy) showers around 3 June. Considering the review period as a whole, rainfall was close to the LTA in most of Belgium and southern Netherlands, and 20 mm to 40 mm above the LTA in Luxembourg and the rest of the Netherlands. Radiation was close to the LTA.

These weather conditions have been favourable for crop growth. While winter crops' phenological development remains behind compared to an average season, leaf area development has caught up and soil water contents are well above critical levels. This will help to sustain adequate growth during the coming weeks and avoid stress during the sensitive period around flowering, which is currently being reached. Spring cereals are also in good condition. Summer crops, especially maize and sugar beet, remain underdeveloped, with negative effects on their yield potential.

Our yield forecasts for winter crops have been revised slightly upward and are now firmly above the 5-year average. The yield forecasts for summer crops were maintained or revised slightly downward, below the historical trend but above the 5-year average.





Greece and Cyprus

Winter crop yields revised downward; average yield outlook for summer crops

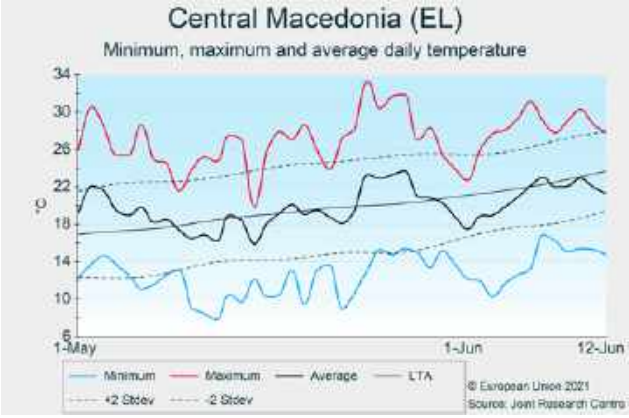
During the period under review, the JRC MARS crop monitoring system indicates average levels of biomass accumulation for almost all the cultivated summer crops. This was the consequence of temperatures following long-term average values and well-distributed rainfall across the agricultural areas in Greece mainland.

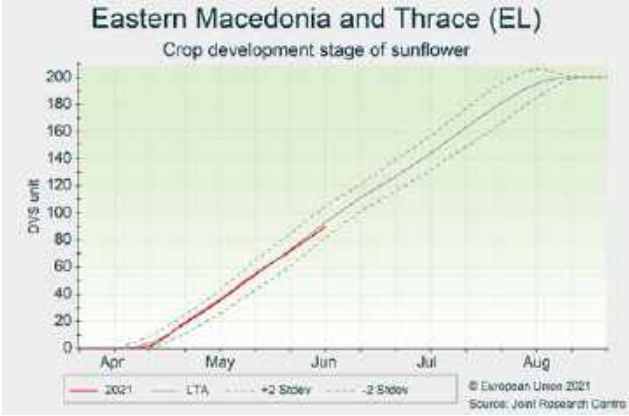
In the *Macedonian regions* and *Thessaly*, average daily temperatures were in the optimal range from 16°C to 23°C during the whole review period (1 May – 10 June). Also, crop model simulations confirm that the development of summer crops in Greece is following the progress of an average season. Potential yield biomass simulated by the crop model provides outputs showing above-average biomass accumulation for potatoes. Simulations of sunflowers indicate expected development from the vegetative towards the flowering stages.

Greek farmers are harvesting winter crops south-to-north in the main cereal cultivation areas of Greece. Farmers completed the barley harvest in all the regions and collected all the winter crops grown in southern *Thessaly*. Rainy days from 7 to 10 June most likely did not hamper the harvest operations of wheat in the northern plain of *Thessaly*[5]. In the Macedonian regions, wheat harvest is planned for the second half of June.

As highlighted in the outlooks of April and May, crop development was hampered by unfavourable weather events: above average temperatures during dormancy, a cold spell in early spring, and a heatwave coupled with dry conditions in mid-spring. Subsequent analysis, considering the integrated effects of impacts throughout the season, has led to further reductions of the yield forecasts for winter crops in Greece and Cyprus, which are now below the 5-year average.

Our yield forecasts for Greece are following the long-term trend for summer crops.





[5] https://www.larissanet.gr/2021/06/08/archisan-t-alonia-ston-thessaliko-kampo/

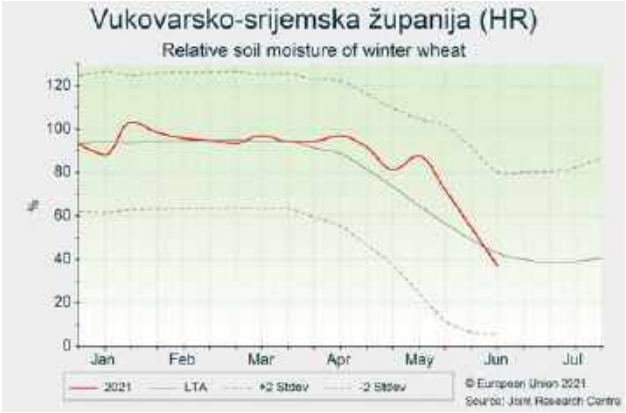
Slovenia and Croatia

Abundant rainfall and cold weather in Slovenia

Abundant rainfall conditions in Slovenia, often co-occurring with the flowering stage, have slightly lowered the crop yield potential of winter soft wheat. In Croatia, with generally more favourable weather conditions in the eastern part of the country, the winter crop yield outlook remains stable and above the 5-year average.

The analysis period was characterised by abundant rainfall in Slovenia, with more than 250 mm (locally even above 400 mm) recorded in the western part. Regionally, this caused soil saturation and water logging that partially occurred around the flowering stage of winter soft wheat. By contrast, a mild rainfall deficit was recorded in eastern and southern Croatia (eastern parts of *Kontinentalna Hrvatska* and southern parts of *Jadranska Hrvatska* regions). The period saw colder-than-usual weather conditions, with temperature anomalies generally down to 2 °C below the LTA. This especially affected spring crops, which are slightly delayed in development. Despite the mild rainfall deficit, soil moisture levels in *Kontinentalna Hrvatska* are at satisfactory levels, providing overall good conditions for winter and spring crops. A mild soil moisture deficit prevails in *Jadranska Hrvatska.*

Due to the overly wet and cold weather, the yield forecast for winter soft wheat was revised slightly downward in Slovenia; however, it remains just above the 5-year average. In Croatia, the yield forecast remains largely unchanged with respect to the May Bulletin, slightly above the 5-year average. The crop yield outlook for spring crops remains in line with the long-term trend.



4.2. European Union – rice-producing countries

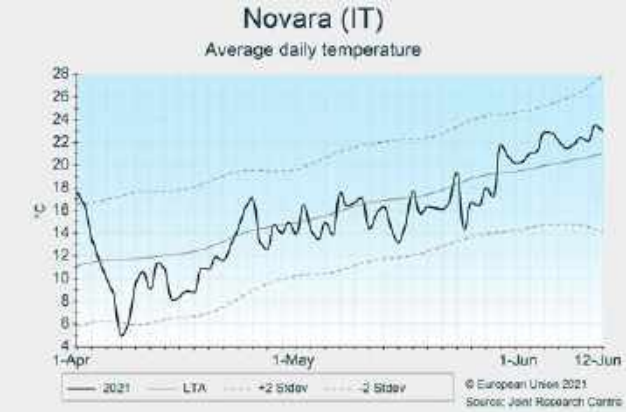
A regular to favourable start to the rice campaign in Europe

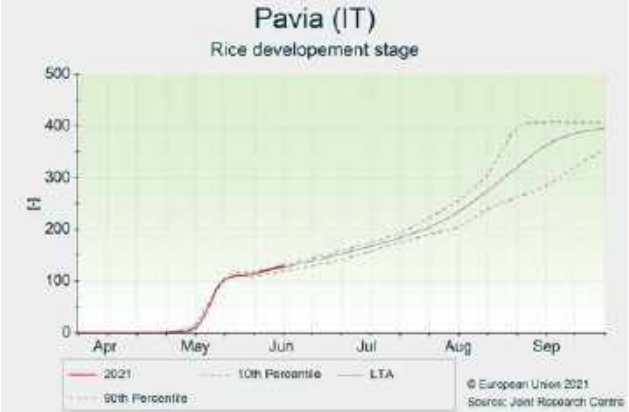
The start to the rice campaign in Europe was marked by colder-than-usual temperatures in the growing regions of Italy, France, Romania and Hungary, and by overall seasonal meteorological conditions in the Iberian Peninsula, Greece and Bulgaria. Rice sowing was generally accomplished within the usual window and without any serious constraint, but it was slightly delayed (by nearly 10 days) in northern Italy and Thessaloniki (Greece). A general increase in temperatures since the second half of May has favoured rice growth and development, except in Romania where more persistent lower-than-usual-temperatures have moderately constrained biomass accumulation in the early stages of crop growth. Currently, phenological development of rice in Europe is reaching the end of the tillering stage. Our forecast for rice yield in Europe is 6.96 t/ha, which corresponds to 3.1% above the 5-year average.

Italy

Average start to the rice season

In northern Italy, rice field preparation in April proceeded without concerns in all rice districts, thanks to colder-than-usual and moderately wet weather conditions. Sowing started around the end of April, slightly delayed compared with an average season. Most sowings were completed by mid-May, but rice emergence was delayed due to cooler-than-usual temperatures in the second half of the month (e.g. Novara). Dry-seeded rice was favoured by well-distributed precipitation, which, although scarcer than usual, ensured enough humidity for proper germination and emergence. In June, with the steady increase in temperatures, biomass accumulation and phenological development accelerated. Currently, crop development is in line with the LTA (e.g. Pavia) or slightly advanced. There are no significant concerns in any of the main rice-growing regions. The yield forecast is based on trend analysis and is set above the 5-year avera

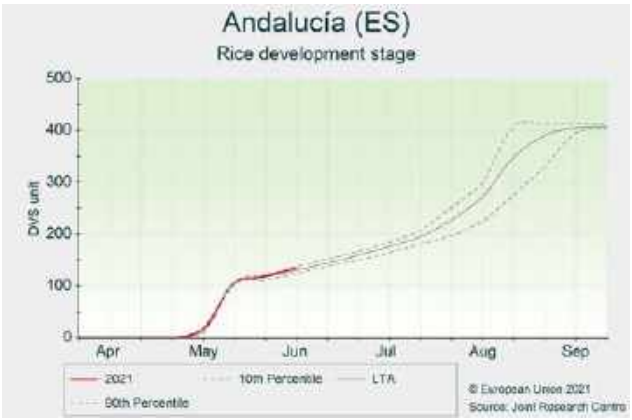


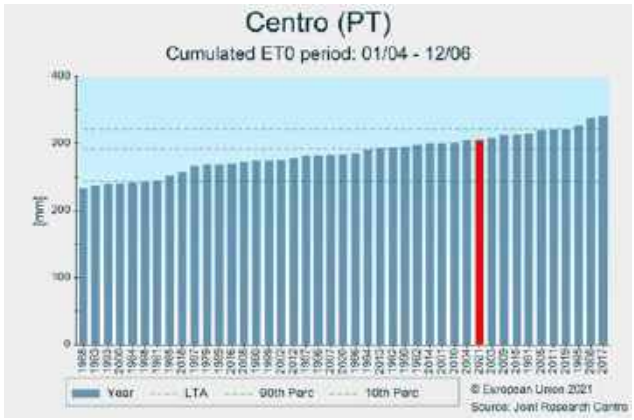


Spain and Portugal

Favourable conditions overall for the rice campaign

Sowing conditions for rice in the Iberian Peninsula were favourable, with optimum temperatures and radiation. Similar conditions were registered during crop emergence, with temperatures close to the LTA. Growth and development during early vegetative stages have been in line with an average season in southern Spain (e.g. *Sevilla* and *Murcia*) and Portugal, but slightly delayed in eastern Spain (e.g. *Aragon* and *Cataluña*). In *Comunidad Valenciana*, cooler-than-usual conditions in May constrained biomass growth. More generally, biomass accumulation for rice in eastern Spain has been slightly lower than last year. The outlook for this season's crop is slightly above the 5-year average for both countries.

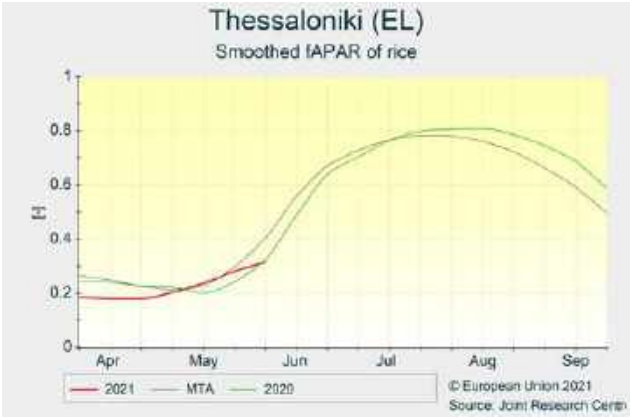




Greece

Seasonal conditions for rice in Greece

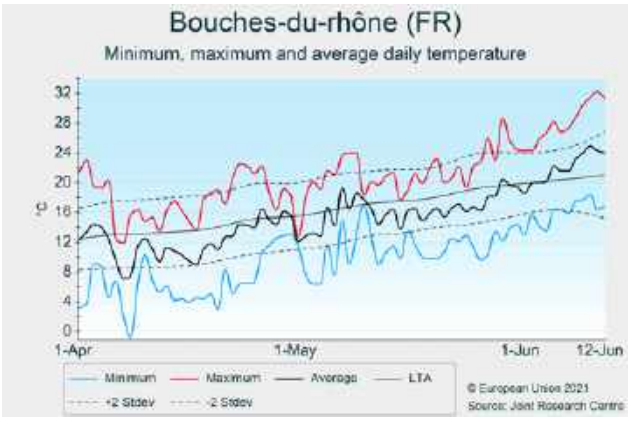
In rice-producing areas of the *Serres* plain and in *Aetolia-Acarnania*, rice sowing occurred on time and under favourable meteorological conditions. However, on the *Thessaloniki* plain, farmers were only able to sow rice after 15 May, about 10 days later than usual, due to delays in water supply from the collective irrigation system. In general, favourable meteorological conditions benefited the subsequent stages of crop germination and early tillering. At the end of May, high wind speed events caused substantial waves of water in the rice cultivation areas of *Thessaloniki*. This may have led to unevenly distributed seed germination. fAPAR profiles indicate around average biomass accumulation in May and early June. Rice crops are currently around the tillering phenological stage. Our forecast for rice in Greece is in line with the 5-year average.

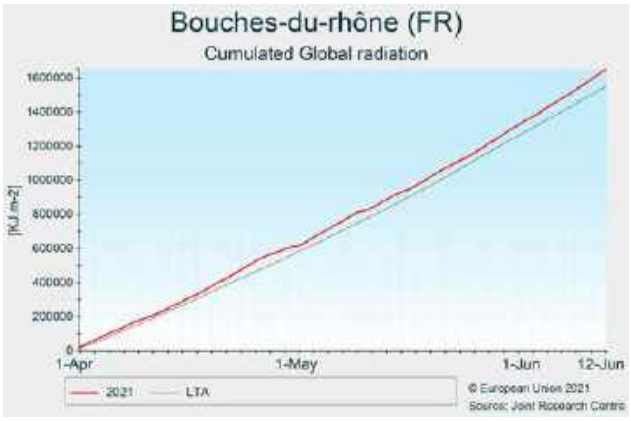


France

A suboptimal start to the season

While global radiation remained above the LTA from 20 April to 10 June (the usual sowing window), temperatures have not been favourable for a good start to the season. Average temperatures remained below the LTA in the Camargue from the end of April until the end of May. While the minimum sowing requirements were met from 20 April to 15 May (daily average temperature above 12 °C), the colder-than-usual temperatures that persisted until the end of May delayed crop development. Since the beginning of June, temperatures have been much warmer, allowing rice to catch up. Overall, this is a suboptimal start to the season. However, depending on conditions during the following months, good yields can still be attained and thus the yield forecast is based on the historical trend.



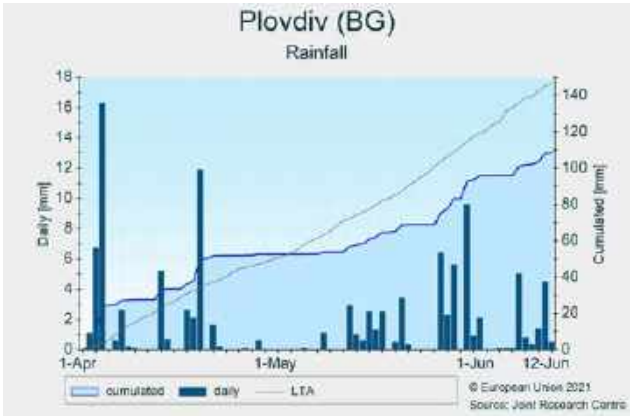


Bulgaria

Positive start to the season for rice

Sowing conditions in the rice-cultivating regions of Bulgaria (Pazardzhik, Plovdiv and *Stara Zagora*) were characterised *by* seasonal daily temperatures, and by below-average rainfall cumulates (from -25% to -15%). The period from 20 April to 15 May was hotter and drier than usual – especially in *Pazardzhik* and *Plovdiv* – but without any impact on crop development. The climatic conditions during the start of the season allowed for a normal rice-sowing campaign, which started in the second dekad of April. This was followed by good progress in crop emergence. No extreme weather events, nor advanced or delayed crop growth, have been registered so far. Remote sensing depicts above-average biomass accumulation. Rice model simulations suggest that the crop is approaching the tillering stage. Scenario analysis reveals that a positive start to the season tends to be conducive to above-average yields. Our forecast is therefore above the 5-year average

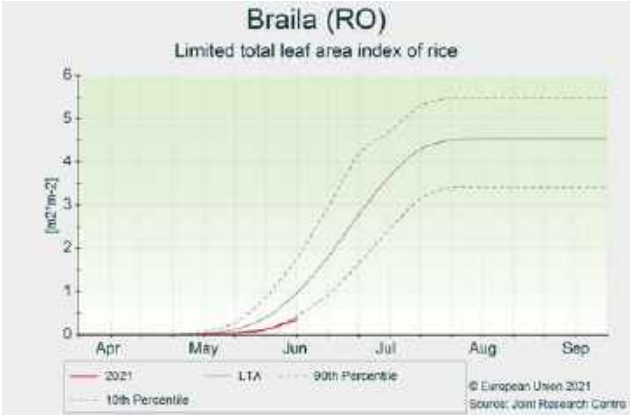
.

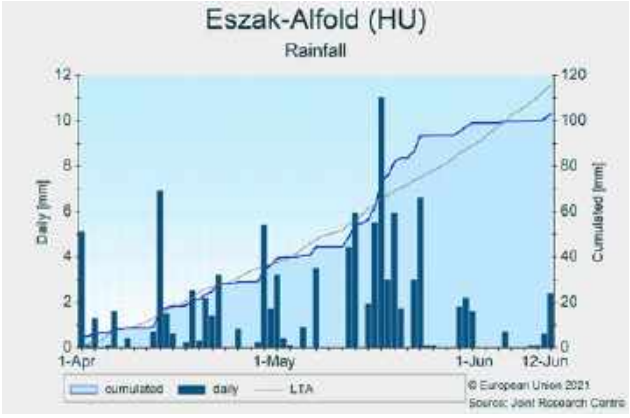


Romania and Hungary

Cold and wet start to the rice campaign

Main rice-growing regions in Romania and Hungary have experienced colder-than-usual weather conditions since the beginning of April. Rainfall was generally above the LTA in Romania, with cumulates between 10% and 80% above the LTA in *Olt*, *Braila* and *Ialomita*. Rainfall in Hungary (*Eszak*-Alfold) was in line with the LTA. Prevailing unfavourable weather conditions, with lower-than-usual temperatures, hampered sprouting and early crop growth in Romania. This is confirmed by our simulations, which show well below-average leaf area and biomass accumulation for Romania, whereas in Hungary biomass accumulation is around average. However, rice growth and yield expectations could still recover if more favourable meteorological conditions prevail during summer. Our current yield outlook therefore remains in line with the historical trend.





4.3. United Kingdom

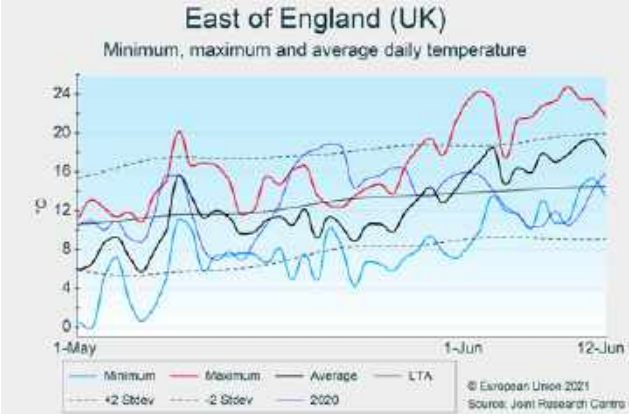
Good growing conditions, but high disease pressure

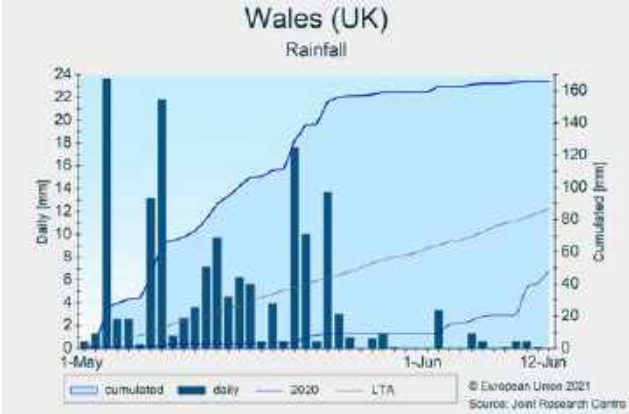
In England and Wales, heavy rainfall occurred during the review period, and temperatures gradually changed from below to above the LTA. While winter and spring cereals, in their vegetative stages, benefited from these meteorological conditions, pressure from pest and diseases may have increased.

The country experienced a high volume of rainfall during the review period. After an extremely dry and cold month of April, May was particularly wet, especially in western parts of the country. In Wales, it was the wettest May in our database (since 1979), with rain up to 270% of the LTA. In England, the rain surplus was between 70% and 200% of the LTA. In contrast, Scotland experienced a rain deficit, of up to 50%. Temperatures were near the LTA for the reporting period as a whole. It was colder than average until the last week of May, and temperatures rose above average at the beginning of June. Despite the wet weather, cumulative radiation during the reporting period was slightly higher than average.

In the last days of May, winter cereals reached the end of the vegetative stage, and they have benefited from the favourable meteorological conditions since then. Concerns in April regarding water stress during the vegetative phase were alleviated by abundant rain. The cold period further increased the delay in crop growth and development, to a total of 1 to 2 weeks. Overall, winter crops are in good condition but the current delays may result in a yield penalty. Spring barley is growing well. However, due to the heavy rainfall in May, the potential for pest and disease pressure on winter and spring cereals increased, which may affect the final outlook.

The yield forecasts for winter cereals were slightly reduced, while the forecast for spring barley was maintained at the historical trend.





4.4. Black Sea Area

Ukraine

Adverse weather conditions jeopardise high wheat yield potential

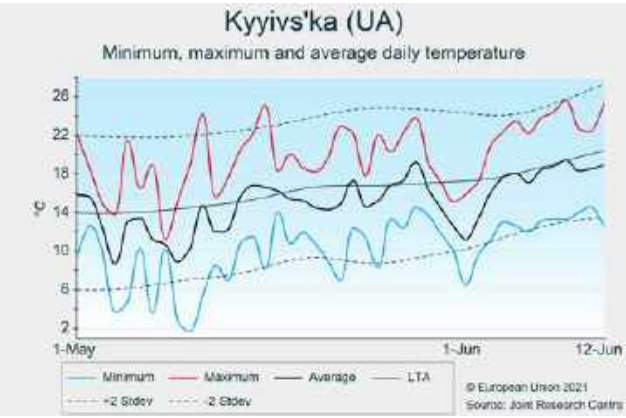
Heavy rainfall and a distinct radiation deficit since the end of May have affected most of southern and eastern Ukraine. While weather conditions until then were favourable, and most crops are in good condition, this specific event could potentially reduce an outlook which was particularly positive.

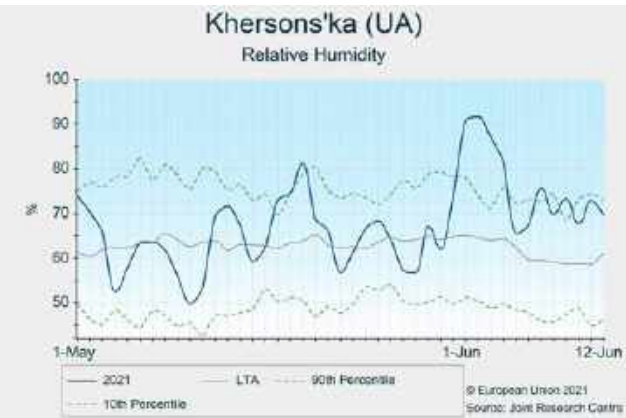
The analysis period was marked by adverse weather conditions starting on 29 May. A cold snap triggered stormy weather in southern and eastern oblasts, with heavy rainfall, locally strong winds and hail, relative humidity above 90% for 2 days in a row, and a significant radiation deficit. Such weather conditions have been observed in the oblasts of *Khersons'ka, Zaporiz'ka, Dnipropetrovs'ka, Donets'ka, Kharkivs'ka* and *Luhans'k*a, some of the main wheat-producing regions.

Crops were in good condition at the end of May, and yields for most winter crops would have been forecast at record levels. The weather conditions observed since then have created great uncertainty concerning winter wheat. Wheat grain quality will certainly be negatively impacted by the heavy rainfall. In addition, some of the wheat was still at the flowering stage, as the prevailing colder-than-usual temperatures had delayed crop development. The high pressure from fusarium head blight associated with the exceptionally wet weather during this period also creates great uncertainty concerning the impacts on winter wheat yield.

For winter barley, which is mainly cultivated outside the impacted area, the yield is still forecast close to the top record. Spring barley can benefit from the rainfall observed and still has time to recover. Therefore, a record barley yield can still be foreseen. Winter rapeseed may also suffer from the continuing stormy weather, with heavy rainfall expected in the western oblasts. No significant impacts are expected on summer crops (soybean, grain maize and sunflowers): the stormy and humid weather will increase disease pressure and create waterlogging, but these crops still have time to catch up later in the summer and will benefit from the high soil moisture reserves.

For more information on crop conditions in Ukraine, please consult the June 2021 issue of the JRC MARS Bulletin on Ukraine.





Turkey

Dry spell affects winter crops

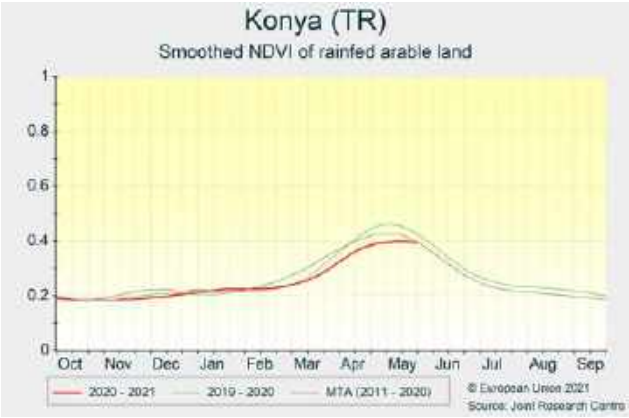
Winter crop forecasts are revised downward and remain clearly below last year's high values. The yield forecast for barley is slightly below the 5-year average, while for durum wheat it is around average and for soft wheat it is slightly above the 5-year average. The yield forecasts for summer crops are above the 5-year average, but still based on trend analysis.

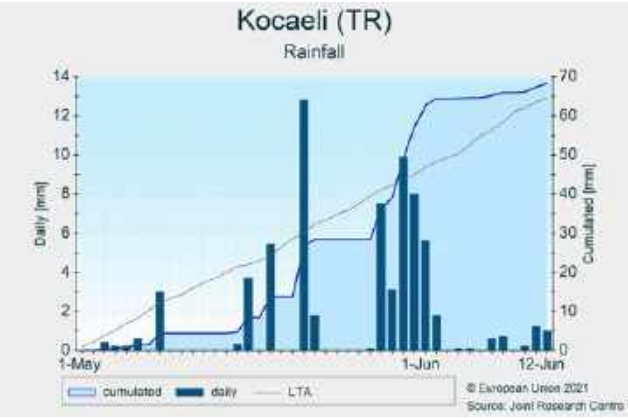
In the central Anatolian regions (e.g. *Ankara*, *Konya*, *Kayseri*), the dry spell recorded since the beginning of April ended in late May, when little (< 30 mm) but well distributed rainfall occurred. Temperatures were slightly above average, and maximum temperatures exceeded 30 °C on only a few days. Winter crops reached the flowering stage in May with sub-optimal biomass accumulation (e.g. NDVI profile for *Konya*), and the following grain-filling period was soon shortened by the dry conditions which accelerated crop senescence. Maize and sugar beet are developing at the usual rate, thanks to irrigation; however, the water level in reservoirs is low and rain is needed to ensure water availability for the summer season.

In the western Anatolian (e.g. *Manisa* and *Bursa*) and the Black Sea regions (e.g. *Kocaeli, Samsun*), winter crops have received sufficient rainfall and soft wheat development is proceeding favourably, compensating for the unfavourable conditions in central Anatolia.

In the south-eastern regions (e.g. *Sanliurfa*, *Gaziantep*), the weather was dry, with less than 10 mm of rainfall since 1 May (i.e. less than 80% of the average), and hot, with average temperatures up to +4°C above the LTA. The use of irrigation and the anticipated cycle, a legacy of the warm winter, prevented a potential yield decrease due to the high temperatures, as crops were already ripening. The harvest of winter crops started towards the end of May.

In the Aegean regions (e.g. *Hatay*, *Adana*), despite the enduring dry conditions, summer crops are developing in good shape, mostly because of sufficient irrigation.





4.5. European Russia and Belarus

European Russia

Substantial rains improved yield outlook for winter cereals

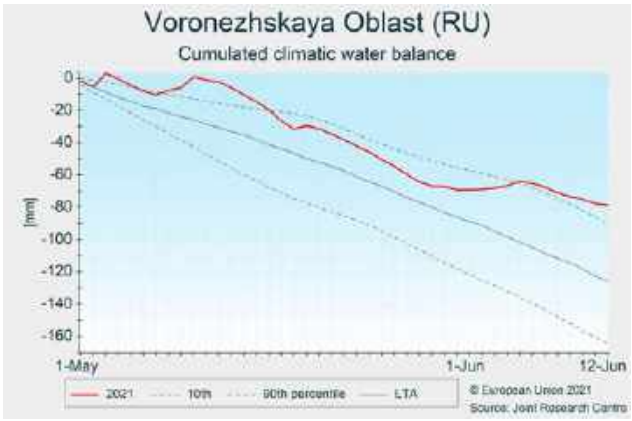
In south-western Russia, abundant and frequent rainfall continued during the review period; this relieved concerns for winter cereal yields but may negatively affect grain quality. The predominately dry and warmer-than-usual temperatures in the Volga okrug were unfavourable for an optimal start to the spring wheat season.

Abundant rainfall continued in most of the winter cereal areas, especially in the Central, Southern and North Caucasian okrugs. During the review period (1 May to 12 June), cumulative precipitation was around 40% above the LTA in the Central and North Caucasian okrugs, and 70% above the LTA in the Southern okrug. The resulting high soil moisture levels have created promising conditions for winter crop yields, but excess humidity could lead to deterioration in grain quality.

In May, temperatures were on average slightly above the LTA in south-western Russia, but with strong fluctuations. Since early June, temperatures have dropped and daily maxima have rarely exceeded 25 °C, which is favourable for the grain-filling stage of winter crops. In the Volga okrug, significantly above-average temperatures (+3 °C compared with the LTA) prevailed throughout the review period.

Remote sensing images still show an improvement in the condition of crops in the Southern and North Caucasian okrugs. Meanwhile, biomass accumulation in parts of the Central and Volga okrugs remains below average, mainly because of the damage caused by the cold spell that occurred around mid-March.

The dry weather in the eastern parts of European Russia allowed good progress with the sowing campaign for spring crops during the review period. Field works are mostly completed. However, the accumulated water deficit from the previous months, combined with several weeks of warm temperatures, are raising concerns for spring wheat, since the dry topsoil conditions are expected to lead to sub-optimal germination.



Belarus

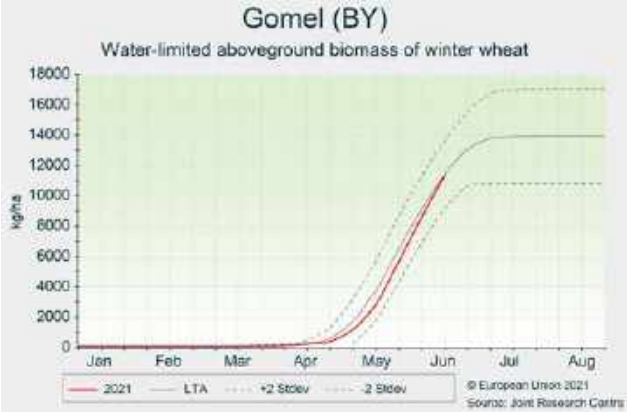
Good conditions for winter and summer crops

Around-average temperatures and frequent rainfall events created favourable conditions for sowing and early development of summer crops. These conditions also sustained the yield formation of winter crops. We maintain our positive yield expectations.

After the colder-than-usual first dekad of May, temperatures oscillated around the average. Cumulative precipitation for the review period was significantly above average, mainly due to frequent rainfall events in May. Soil moisture conditions were generally favourable for crops, but excessive soil moisture conditions after intense May rains may have impaired field operations. Global radiation was below average.

Our model simulations indicate that phenological development of winter wheat is still slightly delayed, because of cold weather at the end of April and beginning of May. However, biomass accumulation has gained momentum due to warmer temperatures in May and early June and is currently approaching average values. Winter crops are about to begin flowering under favourable agrometeorological conditions.

Conditions were also generally favourable for sowing operations completed at the end of May, and for early development of maize. Our model indicates average crop development and biomass accumulation for maize. We maintain our positive yield outlook for winter wheat and maize.



4.6. Maghreb

Morocco, Algeria and Tunisia

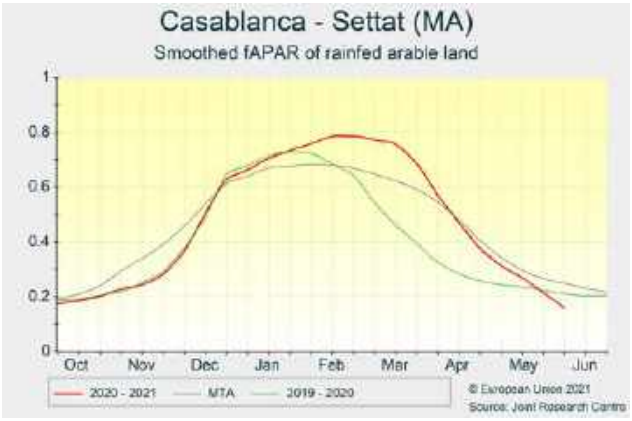
Negative outlook for cereals in Algeria, very positive expectations in Morocco

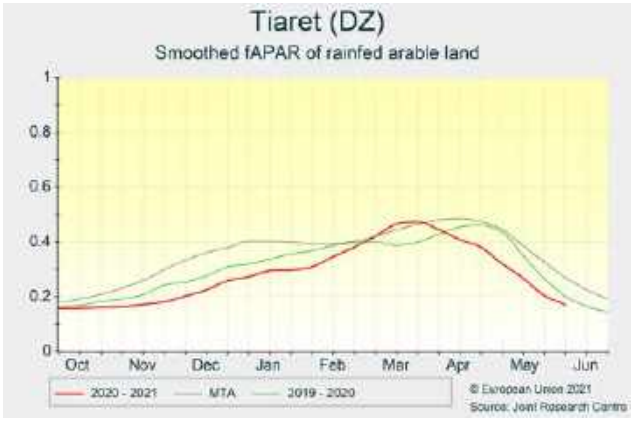
A very positive growing season is drawing to a close in Morocco. The combined effect of a seasonal drought and hot temperatures accelerated grain-filling in the central-eastern regions of Algeria, worsening an already unfavourable campaign. In Tunisia productivity is still uncertain for barley in some inland regions as it will largely depend on the share of fields that were irrigated.

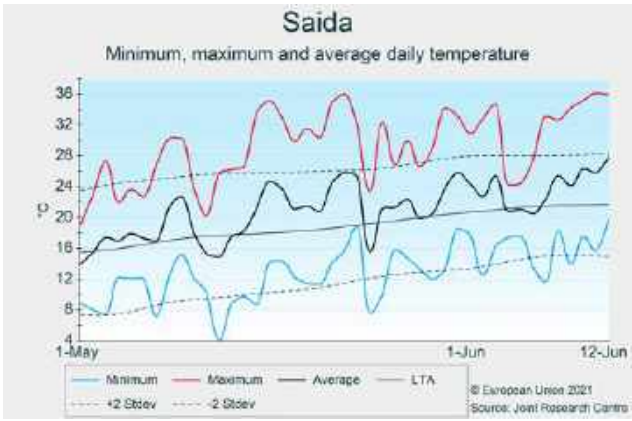
The winter crop campaign is concluded in **Morocco** and the outlook for cereals remains very positive for both wheat and barley. Frequent and evenly distributed rainfall was timely this season, especially in January. This sustained crop growth and development during the most vulnerable phases of the cycle, i.e. flowering and grain filling. The period under review (1 May – 12 June) mainly involved the final part of harvesting. Our forecasts for this country are well above the 5-year average.

Rainfall shortages and warmer-than-usual weather conditions prevailed in **Algeria** across the review period (1 May – 10 June), further deteriorating crop conditions. Almost all the north-western and central regions (e.g. *Relizane*, *Tissemsilt*, *Ain-Defla*, *Medea*, *Mascara* and *Mostagamen*) registered cumulative rainfall from -30% to -80% below the LTA (-20 mm to -5 mm) and temperature sums (T_{base} 10°C) 20%-40% above the long-term reference. Our yield forecasts for Algeria are well below the 5-year average for both wheat and barley.

In **Tunisia**, seasonal conditions prevailed in terms of water supply and temperatures in the main coastal and inland agricultural areas. The only exceptions to this are the regions of *Kasserine* and *Kairouan*. Barley may have benefitted from irrigation in these regions, but analyses of satellite indicators suggest below average accumulation of biomass. A margin of uncertainty therefore persists for final productivity. Overall, our forecasts for the country are around the last 5-year average.

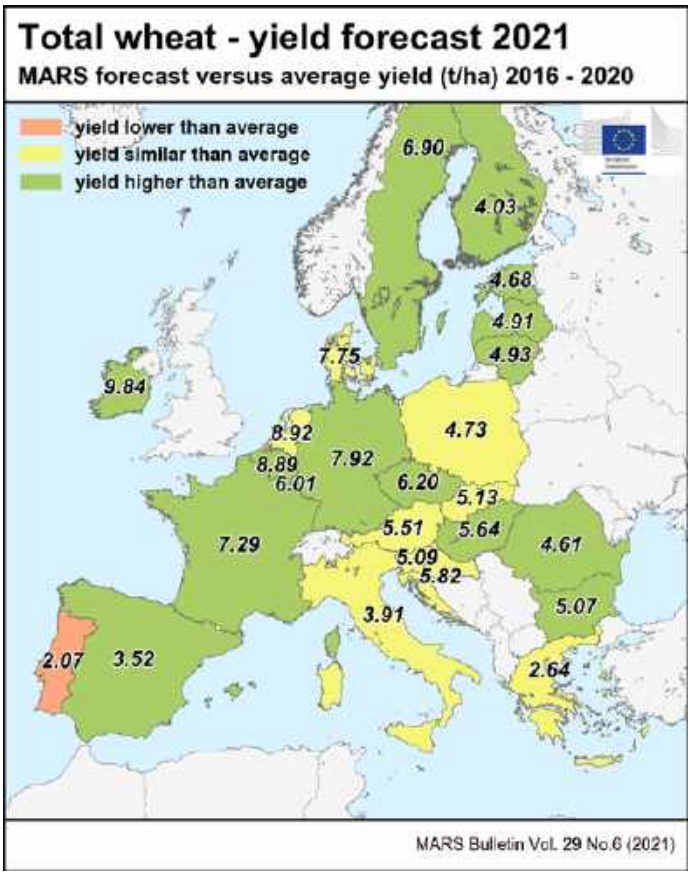




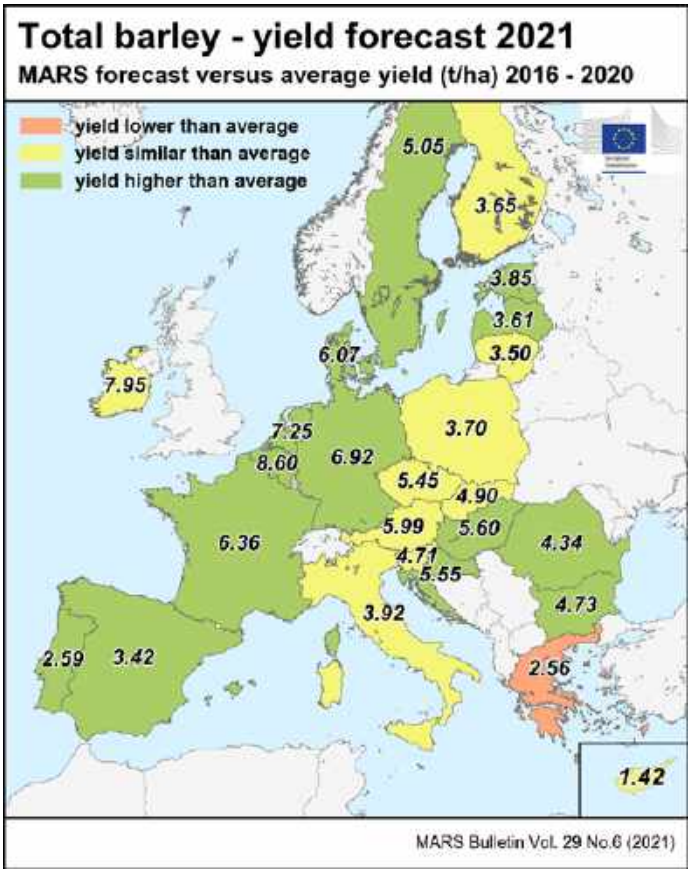


5. Crop yield forecasts

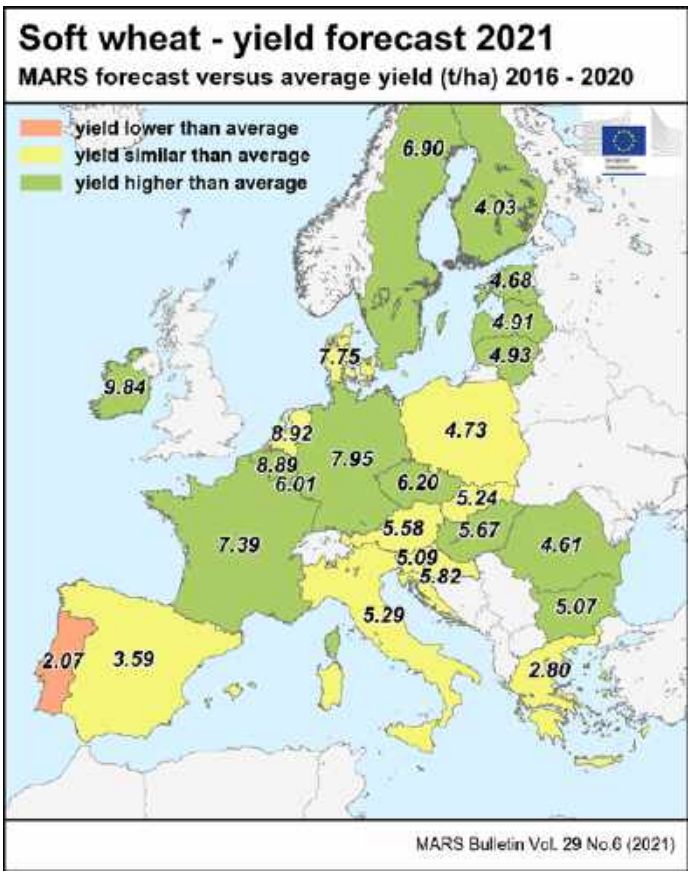
Country	Total wheat (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	5.47	5.50	**5.79**	+5.8	+5.3
AT	5.50	5.96	**5.51**	+0.3	−7.5
BE	8.39	9.00	**8.89**	+6.0	−1.3
BG	4.80	3.93	**5.07**	+5.6	+29
CY	—	—	—	—	—
CZ	5.89	6.14	**6.20**	+5.3	+0.9
DE	7.43	7.82	**7.92**	+6.6	+1.3
DK	7.68	8.19	**7.75**	+0.9	−5.4
EE	4.01	5.00	**4.68**	+17	−6.5
EL	2.70	2.54	**2.64**	−2.1	+4.1
ES	3.37	4.16	**3.52**	+4.5	−15
FI	3.76	3.41	**4.03**	+7.2	+18
FR	6.78	6.73	**7.29**	+7.5	+8.3
HR	5.68	6.00	**5.82**	+2.5	−2.9
HU	5.31	5.37	**5.64**	+6.2	+5.1
IE	9.45	8.35	**9.84**	+4.1	+18
IT	3.92	3.83	**3.91**	−0.3	+2.1
LT	4.53	5.39	**4.93**	+8.9	−8.6
LU	5.70	5.97	**6.01**	+5.4	+0.7
LV	4.57	5.34	**4.91**	+7.4	−8.1
MT	—	—	—	—	—
NL	8.81	8.62	**8.92**	+1.2	+3.4
PL	4.55	4.90	**4.73**	+3.8	−3.5
PT	2.21	2.03	**2.07**	−6.7	+1.9
RO	4.27	2.99	**4.61**	+8.0	+54
SE	6.53	7.15	**6.90**	+5.5	−3.6
SI	4.98	5.04	**5.09**	+2.2	+0.9
SK	5.15	5.51	**5.13**	−0.5	−6.9



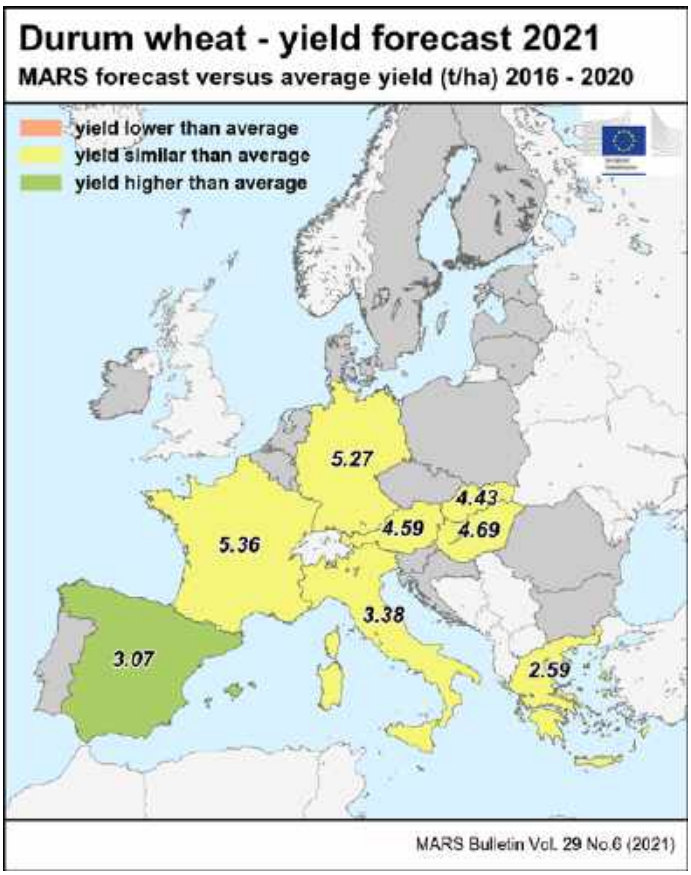
Country	Total barley (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	4.77	4.88	**4.97**	+4.0	+1.8
AT	5.85	6.45	**5.99**	+2.3	−7.2
BE	7.76	7.65	**8.60**	+11	+12
BG	4.47	4.23	**4.73**	+6.0	+12
CY	1.44	2.16	**1.42**	−1.5	−34
CZ	5.34	5.47	**5.45**	+2.2	−0.4
DE	6.53	6.51	**6.92**	+6.0	+6.2
DK	5.67	6.44	**6.07**	+7.1	−5.7
EE	3.39	4.04	**3.85**	+14	−4.8
EL	2.68	2.54	**2.56**	−4.4	+0.8
ES	3.22	3.97	**3.42**	+6.2	−14
FI	3.74	3.52	**3.65**	−2.4	+3.7
FR	6.09	5.32	**6.36**	+4.3	+20
HR	4.90	5.08	**5.55**	+13	+9.3
HU	5.23	5.52	**5.60**	+7.0	+1.4
IE	7.77	7.42	**7.95**	+2.4	+7.2
IT	4.05	4.14	**3.92**	−3.1	−5.4
LT	3.39	4.29	**3.50**	+3.4	−18
LU	—	—	—	—	—
LV	3.18	3.66	**3.61**	+14	−1.3
MT	—	—	—	—	—
NL	6.83	6.44	**7.25**	+6.1	+13
PL	3.64	3.92	**3.70**	+1.6	−5.7
PT	2.49	2.65	**2.59**	+4.2	−2.3
RO	3.83	2.56	**4.34**	+13	+70
SE	4.66	5.19	**5.05**	+8.4	−2.6
SI	4.66	4.71	**4.71**	+0.9	+0.0
SK	4.74	5.19	**4.90**	+3.3	−5.6



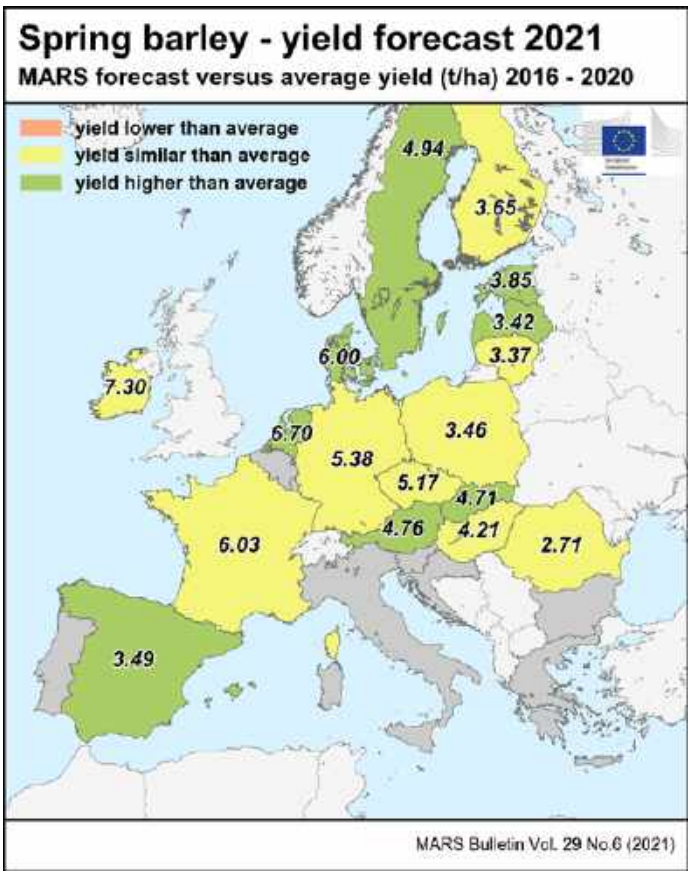
Country	Soft wheat (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	5.69	5.71	**6.01**	+ 5.6	+ 5.4
AT	5.56	6.03	**5.58**	+ 0.3	– 7.5
BE	8.39	9.00	**8.89**	+ 6.0	– 1.3
BG	4.80	3.93	**5.07**	+ 5.6	+ 29
CY	—	—	—	—	—
CZ	5.89	6.14	**6.20**	+ 5.3	+ 0.9
DE	7.46	7.86	**7.95**	+ 6.7	+ 1.2
DK	7.68	8.19	**7.75**	+ 0.9	– 5.4
EE	4.01	5.00	**4.68**	+ 17	– 6.5
EL	2.85	2.61	**2.80**	– 1.7	+ 7.2
ES	3.49	4.29	**3.59**	+ 2.9	– 16
FI	3.76	3.41	**4.03**	+ 7.2	+ 18
FR	6.88	6.82	**7.39**	+ 7.4	+ 8.3
HR	5.68	6.00	**5.82**	+ 2.5	– 2.9
HU	5.34	5.40	**5.67**	+ 6.2	+ 5.0
IE	9.45	8.35	**9.84**	+ 4.1	+ 18
IT	5.37	5.33	**5.29**	– 1.6	– 0.8
LT	4.53	5.39	**4.93**	+ 8.9	– 8.6
LU	5.70	5.97	**6.01**	+ 5.4	+ 0.7
LV	4.57	5.34	**4.91**	+ 7.4	– 8.1
MT	—	—	—	—	—
NL	8.81	8.62	**8.92**	+ 1.2	+ 3.4
PL	4.55	4.90	**4.73**	+ 3.8	– 3.5
PT	2.21	2.03	**2.07**	– 6.7	+ 1.9
RO	4.27	2.99	**4.61**	+ 8.0	+ 54
SE	6.53	7.15	**6.90**	+ 5.5	– 3.6
SI	4.98	5.04	**5.09**	+ 2.2	+ 0.9
SK	5.22	5.55	**5.24**	+ 0.4	– 5.6



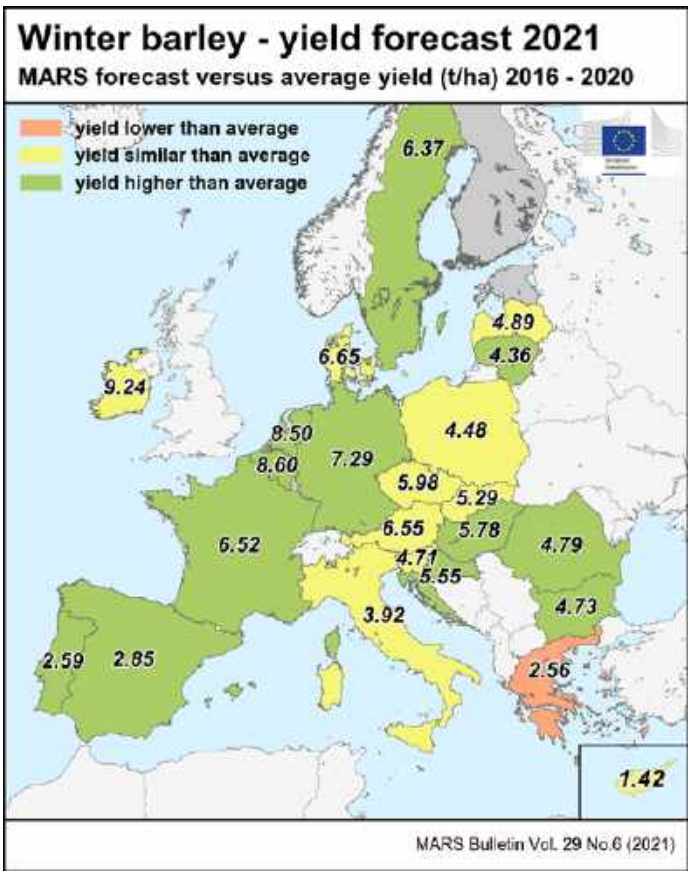
Country	Durum wheat (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	3.49	3.46	**3.57**	+ 2.2	+ 3.3
AT	4.61	4.80	**4.59**	– 0.4	– 4.4
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	—	—	—	—	—
DE	5.17	5.29	**5.27**	+ 2.1	– 0.3
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.65	2.51	**2.59**	– 2.2	+ 2.9
ES	2.80	3.26	**3.07**	+ 9.5	– 5.9
FI	—	—	—	—	—
FR	5.19	5.11	**5.36**	+ 3.4	+ 5.0
HR	—	—	—	—	—
HU	4.66	4.41	**4.69**	+ 0.7	+ 6.4
IE	—	—	—	—	—
IT	3.33	3.21	**3.38**	+ 1.5	+ 5.2
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	—	—	—	—	—
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	4.56	5.11	**4.43**	– 3.0	– 13



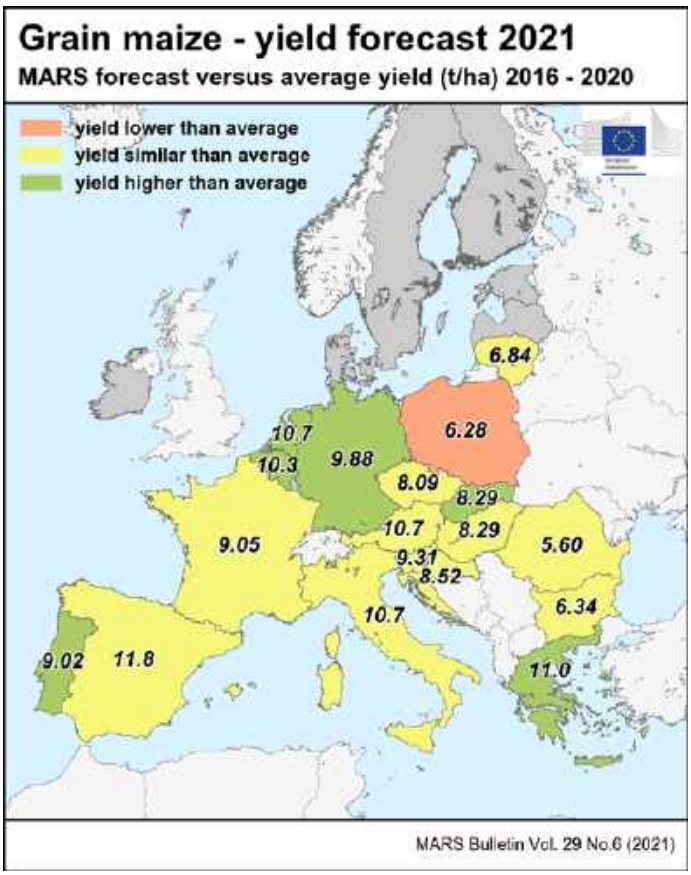
Country	Spring barley (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	4.12	4.50	**4.28**	+3.9	−4.9
AT	4.36	4.90	**4.76**	+9.1	−2.9
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.11	5.15	**5.17**	+1.2	+0.5
DE	5.23	5.53	**5.38**	+2.9	−2.7
DK	5.53	6.34	**6.00**	+8.5	−5.4
EE	3.39	4.04	**3.85**	+14	−4.8
EL	—	—	—	—	—
ES	3.30	4.02	**3.49**	+5.7	−13
FI	3.74	3.52	**3.65**	−2.4	+3.7
FR	5.83	4.95	**6.03**	+3.5	+22
HR	—	—	—	—	—
HU	4.06	4.32	**4.21**	+3.6	−2.6
IE	7.14	7.11	**7.30**	+2.3	+2.7
IT	—	—	—	—	—
LT	3.33	4.23	**3.37**	+1.4	−20
LU	—	—	—	—	—
LV	3.08	3.42	**3.42**	+11	+0.0
MT	—	—	—	—	—
NL	6.36	6.10	**6.70**	+5.4	+9.9
PL	3.44	3.65	**3.46**	+0.5	−5.4
PT	—	—	—	—	—
RO	2.76	2.08	**2.71**	−1.8	+30
SE	4.57	5.08	**4.94**	+8.1	−2.8
SI	—	—	—	—	—
SK	4.46	4.91	**4.71**	+5.6	−3.9



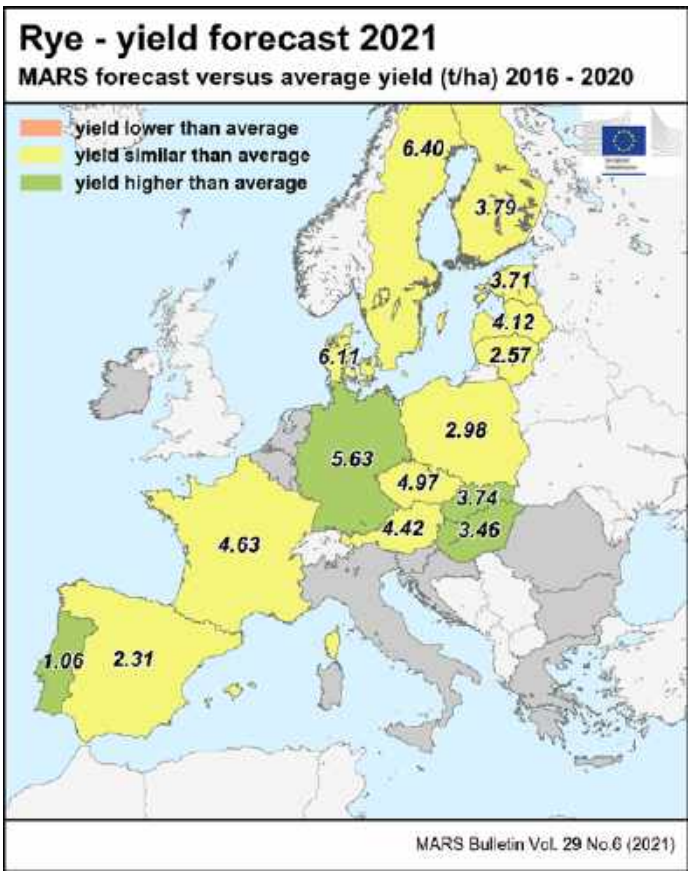
Country	Winter barley (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	5.63	5.40	**5.90**	+4.9	+9.4
AT	6.53	6.92	**6.55**	+0.2	−5.4
BE	7.76	7.65	**8.60**	+11	+12
BG	4.47	4.23	**4.73**	+6.0	+12
CY	1.44	2.16	**1.42**	−1.5	−34
CZ	5.81	6.09	**5.98**	+2.9	−1.8
DE	6.91	6.79	**7.29**	+5.5	+7.4
DK	6.50	7.09	**6.65**	+2.4	−6.1
EE	—	—	—	—	—
EL	2.68	2.54	**2.56**	−4.4	+0.8
ES	2.64	3.48	**2.85**	+7.7	−18
FI	—	—	—	—	—
FR	6.21	5.56	**6.52**	+5.0	+17
HR	4.90	5.08	**5.55**	+13	+9.3
HU	5.40	5.65	**5.78**	+6.9	+2.3
IE	8.90	8.28	**9.24**	+3.8	+12
IT	4.05	4.14	**3.92**	−3.1	−5.4
LT	4.14	4.63	**4.36**	+5.2	−5.8
LU	—	—	—	—	—
LV	4.83	5.55	**4.89**	+1.3	−12
MT	—	—	—	—	—
NL	8.06	7.46	**8.50**	+5.4	+14
PL	4.40	4.73	**4.48**	+1.8	−5.4
PT	2.49	2.65	**2.59**	+4.2	−2.3
RO	4.13	2.65	**4.79**	+16	+81
SE	6.00	6.54	**6.37**	+6.2	−2.6
SI	4.66	4.71	**4.71**	+0.9	+0.0
SK	5.33	5.65	**5.29**	−0.7	−6.3



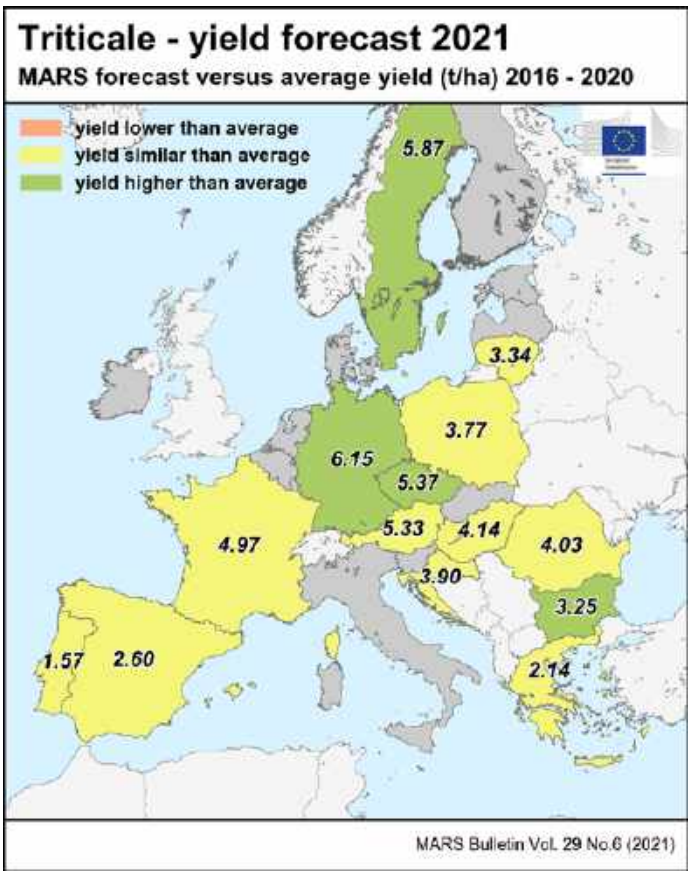
Country	Grain maize (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	7.75	7.28	**7.84**	+ 1.2	+ 7.7
AT	10.6	11.3	**10.7**	+ 0.7	– 6.0
BE	9.63	7.67	**10.3**	+ 7.0	+ 34
BG	6.36	5.10	**6.34**	– 0.4	+ 24
CY	—	—	—	—	—
CZ	8.09	9.46	**8.09**	+ 0.0	– 15
DE	9.29	9.25	**9.88**	+ 6.4	+ 6.9
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	10.3	9.89	**11.0**	+ 6.7	+ 11
ES	11.6	11.9	**11.8**	+ 1.8	– 0.4
FI	—	—	—	—	—
FR	8.72	7.98	**9.05**	+ 3.8	+ 13
HR	8.39	8.96	**8.52**	+ 1.5	– 4.9
HU	8.12	8.62	**8.29**	+ 2.1	– 3.8
IE	—	—	—	—	—
IT	10.3	11.2	**10.7**	+ 3.5	– 5.1
LT	6.83	6.95	**6.84**	+ 0.2	– 1.6
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	9.80	10.7	**10.7**	+ 9.5	+ 0.1
PL	6.59	7.10	**6.28**	– 4.8	– 12
PT	8.67	9.22	**9.02**	+ 4.1	– 2.1
RO	5.65	4.11	**5.60**	– 0.8	+ 36
SE	—	—	—	—	—
SI	9.23	10.8	**9.31**	+ 0.8	– 14
SK	7.58	8.58	**8.29**	+ 9.4	– 3.4



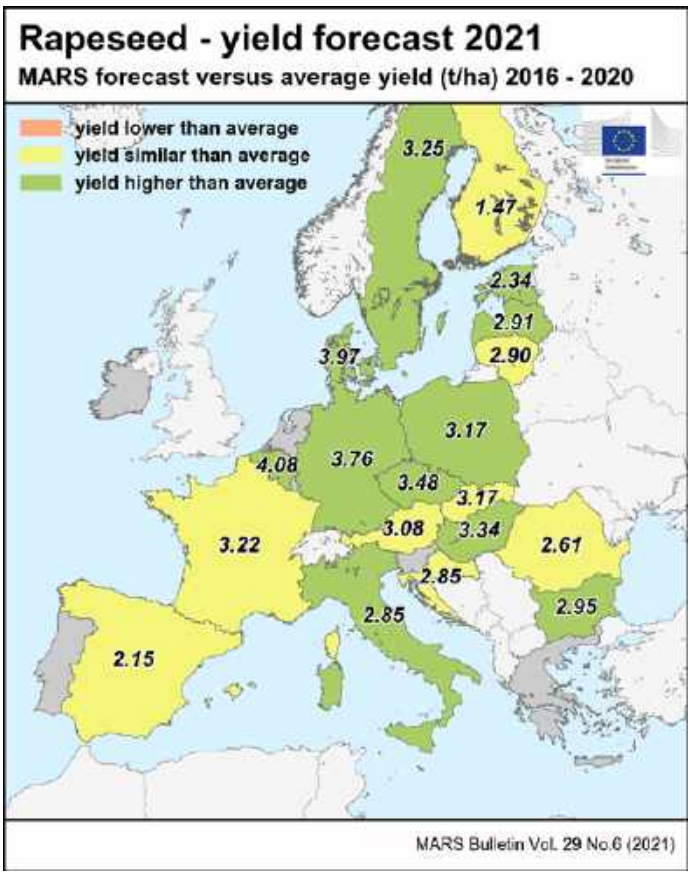
Country	Rye (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	3.83	4.19	**4.07**	+ 6.3	– 2.9
AT	4.60	5.13	**4.42**	– 3.9	– 14
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.06	5.48	**4.97**	– 1.8	– 9.3
DE	5.15	5.50	**5.63**	+ 9.3	+ 2.3
DK	5.98	6.14	**6.11**	+ 2.1	– 0.4
EE	3.62	3.81	**3.71**	+ 2.5	– 2.5
EL	—	—	—	—	—
ES	2.29	2.83	**2.31**	+ 0.8	– 19
FI	3.85	3.60	**3.79**	– 1.5	+ 5.2
FR	4.49	4.59	**4.63**	+ 3.1	+ 0.8
HR	—	—	—	—	—
HU	3.29	3.20	**3.46**	+ 5.2	+ 8.1
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	2.55	2.98	**2.57**	+ 0.4	– 14
LU	—	—	—	—	—
LV	4.15	4.32	**4.12**	– 0.8	– 4.6
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.87	3.25	**2.98**	+ 3.9	– 8.2
PT	1.01	1.17	**1.06**	+ 4.5	– 10
RO	—	—	—	—	—
SE	6.15	6.21	**6.40**	+ 4.0	+ 3.0
SI	—	—	—	—	—
SK	3.51	3.90	**3.74**	+ 6.5	– 4.1



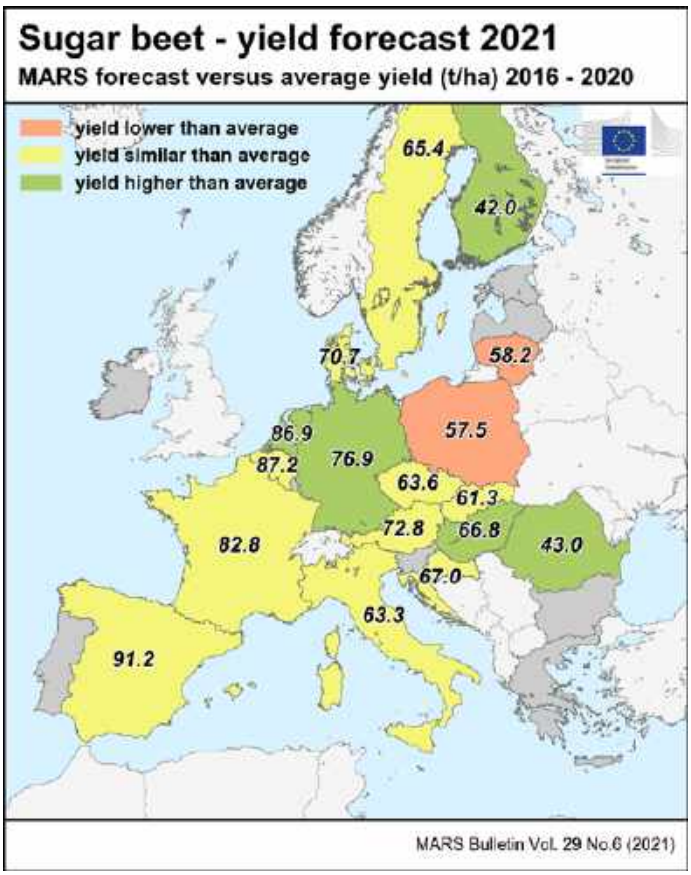
Country	Triticale (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	4.07	4.32	**4.18**	+2.7	-3.1
AT	5.48	5.87	**5.33**	-2.7	-9.3
BE	—	—	—	—	—
BG	2.94	2.91	**3.25**	+11	+12
CY	—	—	—	—	—
CZ	4.87	5.07	**5.37**	+10	+6.1
DE	5.91	5.98	**6.15**	+4.1	+2.9
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.22	2.07	**2.14**	-3.3	+3.7
ES	2.53	2.96	**2.60**	+2.8	-12
FI	—	—	—	—	—
FR	4.92	4.87	**4.97**	+0.9	+2.0
HR	4.00	4.35	**3.90**	-2.5	-11
HU	4.00	4.10	**4.14**	+3.5	+1.0
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	3.34	3.80	**3.34**	-0.1	-12
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.66	4.08	**3.77**	+2.9	-7.6
PT	1.62	1.37	**1.57**	-3.1	+15
RO	3.87	3.48	**4.03**	+3.9	+16
SE	5.60	6.04	**5.87**	+4.7	-2.9
SI	—	—	—	—	—
SK	—	—	—	—	—



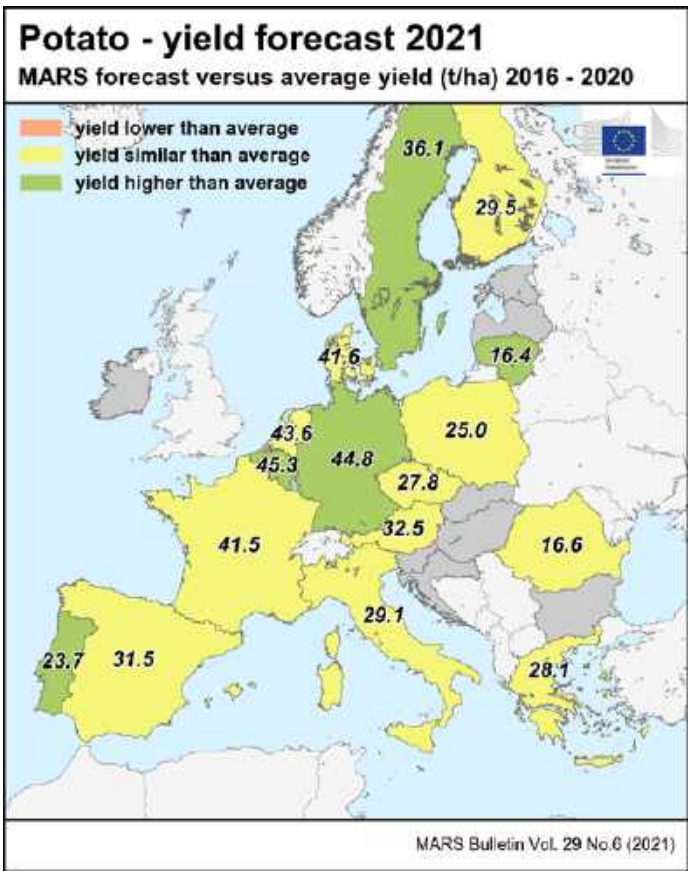
Country	Rape and turnip rape (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	3.06	3.16	**3.23**	+5.6	+2.2
AT	3.11	3.15	**3.08**	-1.1	-2.3
BE	3.77	3.80	**4.08**	+8.3	+7.5
BG	2.76	2.34	**2.95**	+6.8	+26
CY	—	—	—	—	—
CZ	3.25	3.38	**3.48**	+7.2	+2.9
DE	3.32	3.68	**3.76**	+13	+2.2
DK	3.81	3.84	**3.97**	+4.2	+3.4
EE	2.15	2.86	**2.34**	+8.5	-18
EL	—	—	—	—	—
ES	2.20	2.72	**2.15**	-2.1	-21
FI	1.46	1.27	**1.47**	+0.5	+16
FR	3.21	2.91	**3.22**	+0.3	+11
HR	2.82	2.87	**2.85**	+1.4	-0.5
HU	3.09	2.80	**3.34**	+8.2	+20
IE	—	—	—	—	—
IT	2.70	2.86	**2.85**	+5.7	-0.1
LT	2.85	3.41	**2.90**	+1.9	-15
LU	—	—	—	—	—
LV	2.74	3.08	**2.91**	+5.9	-5.7
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.87	3.40	**3.17**	+11	-6.7
PT	—	—	—	—	—
RO	2.56	2.13	**2.61**	+1.6	+22
SE	3.12	3.46	**3.25**	+4.3	-5.9
SI	—	—	—	—	—
SK	3.07	3.01	**3.17**	+3.4	+5.5



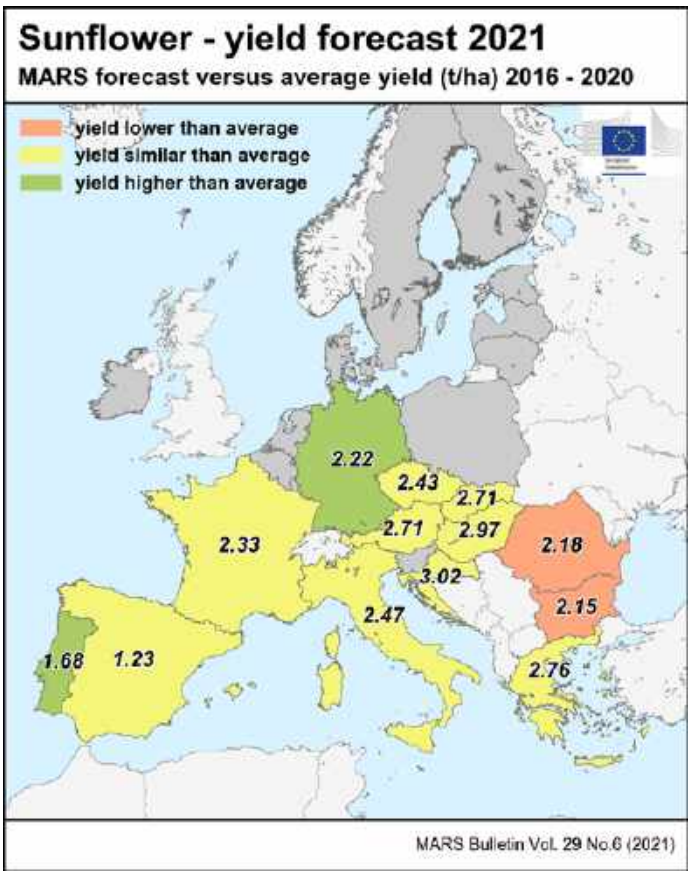
Country	Sugar beets (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	73.6	N/A	**73.6**	-0.1	N/A
AT	74.2	79.5	**72.8**	-1.9	-8.4
BE	84.8	84.4	**87.2**	+2.8	+3.2
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	63.1	61.5	**63.6**	+0.9	+3.4
DE	73.9	N/A	**76.9**	+4.1	N/A
DK	72.0	77.1	**70.7**	-1.9	-8.3
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	89.2	93.6	**91.2**	+2.2	-2.5
FI	39.2	38.5	**42.0**	+7.1	+9.1
FR	82.3	62.5	**82.8**	+0.6	+32
HR	66.3	73.8	**67.0**	+1.0	-9.3
HU	62.4	58.3	**66.8**	+7.1	+15
IE	—	—	—	—	—
IT	65.5	59.4	**63.3**	-3.4	+6.6
LT	62.3	68.1	**58.2**	-6.7	-15
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	82.9	82.1	**86.9**	+4.9	+5.8
PL	61.7	57.9	**57.5**	-6.8	-0.8
PT	—	—	—	—	—
RO	40.2	40.4	**43.0**	+7.0	+6.5
SE	64.9	68.0	**65.4**	+0.8	-3.9
SI	—	—	—	—	—
SK	60.6	60.4	**61.3**	+1.2	+1.5



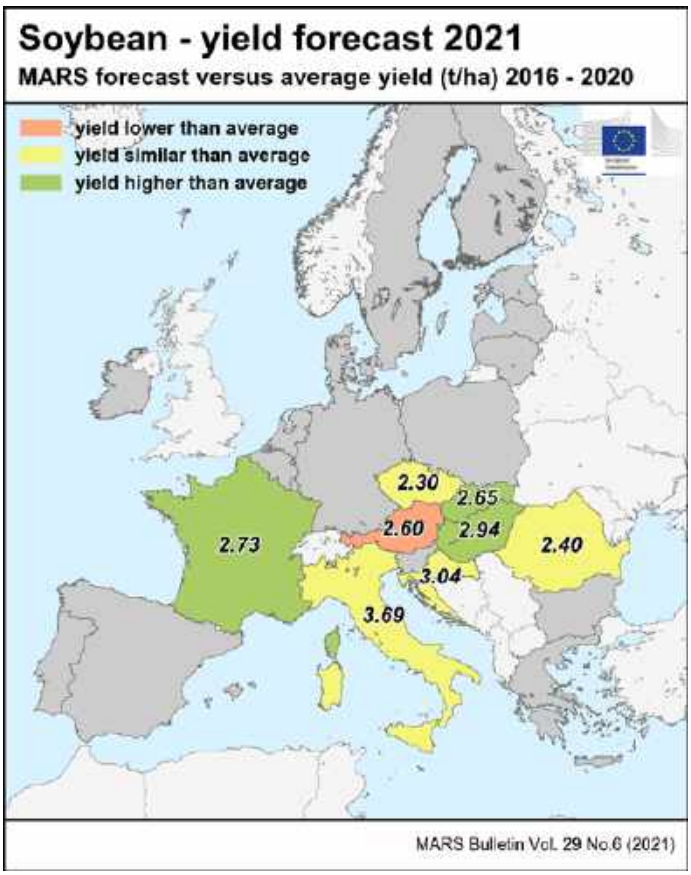
Country	Potato (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	33.0	33.3	**34.5**	+4.8	+3.6
AT	32.3	36.5	**32.5**	+0.4	-11
BE	40.1	40.8	**45.3**	+13	+11
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	28.3	29.2	**27.8**	-1.5	-4.6
DE	41.5	42.0	**44.8**	+8.1	+6.7
DK	41.6	44.0	**41.6**	+0.0	-5.6
EE	—	—	—	—	—
EL	28.4	29.9	**28.1**	-0.8	-5.9
ES	31.7	32.0	**31.5**	-0.7	-1.6
FI	28.6	30.2	**29.5**	+3.0	-2.4
FR	40.5	38.8	**41.5**	+2.5	+6.9
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	29.1	30.3	**29.1**	+0.1	-4.0
LT	15.5	15.7	**16.4**	+5.7	+4.3
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	42.0	42.7	**43.6**	+3.7	+2.1
PL	25.7	25.2	**25.0**	-2.4	-0.8
PT	21.6	23.5	**23.7**	+10	+1.1
RO	16.2	16.2	**16.6**	+2.0	+2.2
SE	34.5	36.3	**36.1**	+4.5	-0.7
SI	—	—	—	—	—
SK	—	—	—	—	—



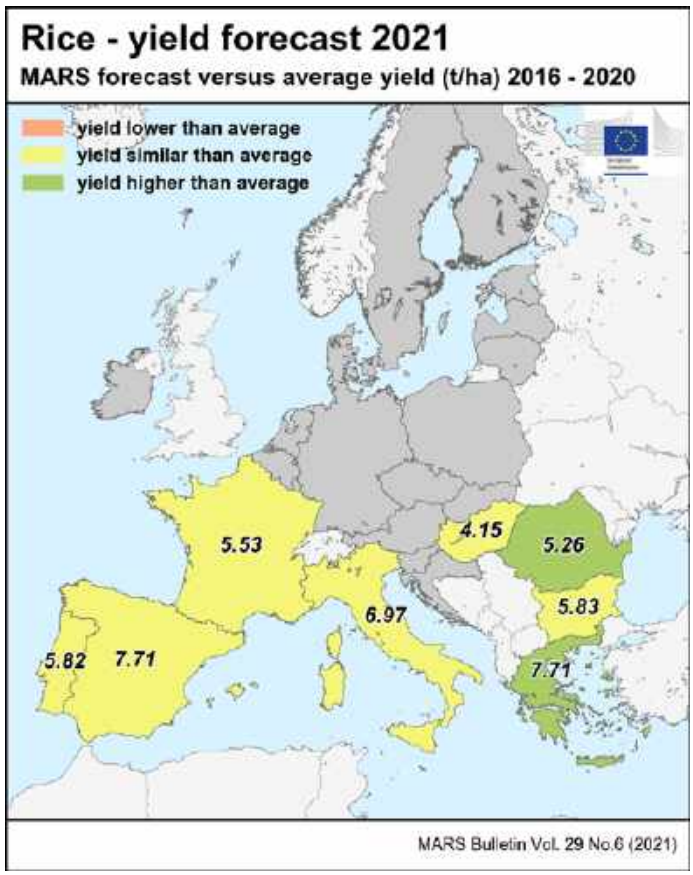
Country	Sunflower (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	2.27	2.00	**2.20**	- 3.4	+ 10
AT	2.74	2.39	**2.71**	- 1.2	+ 13
BE	—	—	—	—	—
BG	2.28	2.10	**2.15**	- 6.0	+ 2.4
CY	—	—	—	—	—
CZ	2.52	2.58	**2.43**	- 3.8	- 6.0
DE	2.09	2.21	**2.22**	+ 6.1	+ 0.3
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.72	2.52	**2.76**	+ 1.3	+ 9.3
ES	1.21	1.35	**1.23**	+ 2.1	- 8.5
FI	—	—	—	—	—
FR	2.27	2.07	**2.33**	+ 2.3	+ 12
HR	2.98	3.10	**3.02**	+ 1.3	- 2.6
HU	2.93	2.75	**2.97**	+ 1.5	+ 7.9
IE	—	—	—	—	—
IT	2.41	2.43	**2.47**	+ 2.4	+ 1.7
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	1.61	1.77	**1.68**	+ 4.2	- 5.3
RO	2.46	1.70	**2.18**	- 12	+ 28
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.72	2.53	**2.71**	- 0.6	+ 6.7



Country	Soybean (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	2.93	2.81	**2.98**	+ 1.8	+ 6.0
AT	2.97	2.96	**2.60**	- 12	- 12
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	2.24	2.33	**2.30**	+ 3.0	- 1.3
DE	—	—	—	—	—
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	—	—	—	—	—
FI	—	—	—	—	—
FR	2.56	2.25	**2.73**	+ 6.6	+ 21
HR	2.98	3.10	**3.04**	+ 1.9	- 2.0
HU	2.80	2.90	**2.94**	+ 4.9	+ 1.5
IE	—	—	—	—	—
IT	3.55	3.77	**3.69**	+ 4.0	- 2.1
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	2.35	1.85	**2.40**	+ 2.0	+ 30
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.45	2.53	**2.65**	+ 8.2	+ 4.8



Country	Rice (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	6.75	6.84	**6.96**	+ 3.1	+ 1.8
AT	—	—	—	—	—
BE	—	—	—	—	—
BG	5.70	5.70	**5.83**	+ 2.2	+ 2.2
CY	—	—	—	—	—
CZ	—	—	—	—	—
DE	—	—	—	—	—
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	6.55	7.54	**7.71**	+ 18	+ 2.3
ES	7.68	7.68	**7.71**	+ 0.3	+ 0.4
FI	—	—	—	—	—
FR	5.56	5.48	**5.53**	- 0.6	+ 0.8
HR	—	—	—	—	—
HU	4.15	3.85	**4.15**	+ 0.1	+ 7.8
IE	—	—	—	—	—
IT	6.72	6.81	**6.97**	+ 3.7	+ 2.3
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	5.64	5.29	**5.82**	+ 3.2	+ 10
RO	4.89	4.49	**5.26**	+ 7.4	+ 17
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	—	—	—	—	—



Country	Wheat (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	3.27	3.29	**3.58**	+ 9.5	+ 8.9
DZ	1.66	1.61	**1.17**	- 29	- 27
MA	1.70	0.91	**2.12**	+ 25	+ 133
TN	1.83	1.77	**1.89**	+ 3.6	+ 6.6
TR	2.80	2.97	**2.83**	+ 1.2	- 4.6
UA	4.00	3.80	**4.08**	+ 2.0	+ 7.4
UK	8.05	7.16	**8.00**	- 0.7	+ 12

Country	Barley (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	2.72	2.76	**3.49**	+ 28	+ 26
DZ	1.13	1.20	**0.85**	- 25	- 29
MA	1.06	0.43	**1.40**	+ 33	+ 225
TN	0.85	0.79	**1.06**	+ 25	+ 34
TR	2.66	2.65	**2.62**	- 1.7	- 1.3
UA	3.25	3.22	**3.44**	+ 5.9	+ 6.8
UK	6.11	5.91	**6.15**	+ 0.6	+ 4.0

Country	Grain maize (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	5.94	6.00	**5.79**	- 2.5	- 3.5
DZ	—	—	—	—	—
MA	—	—	—	—	—
TN	—	—	—	—	—
TR	9.42	9.41	**9.61**	+ 2.0	+ 2.1
UA	6.52	5.62	**7.13**	+ 9.2	+ 27
UK	—	—	—	—	—

Country	Soybean (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	—	—	—	—	—
DZ	—	—	—	—	—
MA	—	—	—	—	—
TN	—	—	—	—	—
TR	4.33	4.42	**4.62**	+ 6.6	+ 4.5
UA	2.25	2.05	**2.30**	+ 2.3	+ 12
UK	—	—	—	—	—

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

Sources: 2016-2020 data come from DG Agriculture and Rural Development short-term-outlook data (dated May 2021, received on 01.06.2021), Eurostat Eurobase (last update: 04.06.2021) and EES (last update: 15.11.2017).

Non-EU 2016-2020 data come from USDA, DSASI-MADR Algeria, INRA Maroc, ONICL Maroc, Ministère de l'agriculture des ressources hydrauliques et de la pêche Tunisie, MED-Amin baseline DB, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 04.06.2021), Ministry for Development of Economy, Trade and Agriculture of Ukraine, FAO and PSD-online.

2021 yields come from MARS Crop Yield Forecasting System (output up to 10.06.2021).

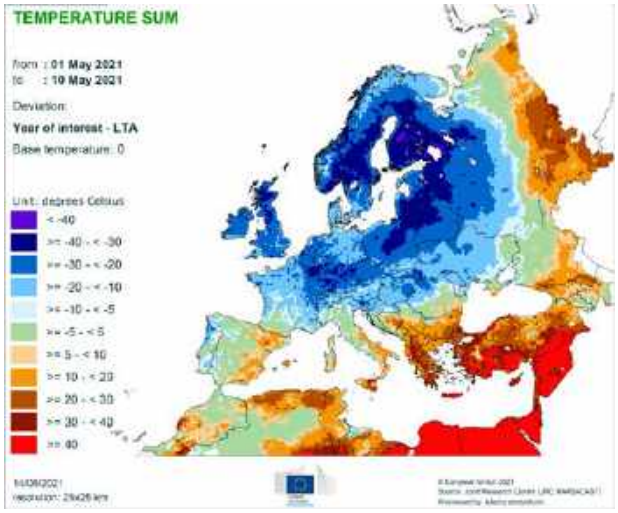
EU aggregate after 1.2.2020 is reported.

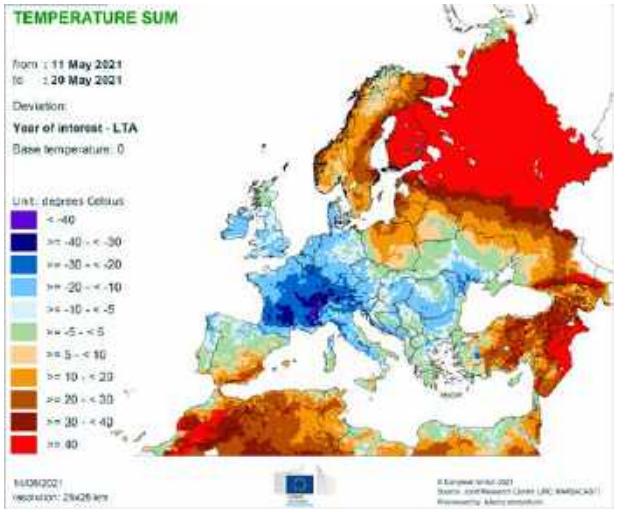
N/A = Data not available.

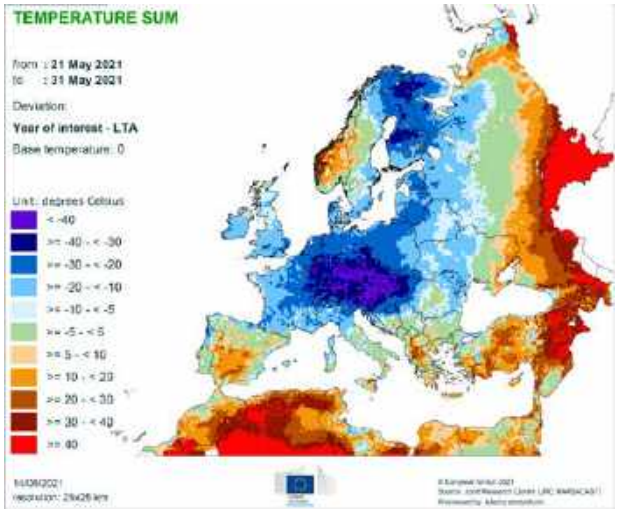
The column header '%21/5yrs' stands for the 2021 change with respect to the 5-year average(%). Similarly, '%21/20' stands for the 2021 change with respect to 2020(%).

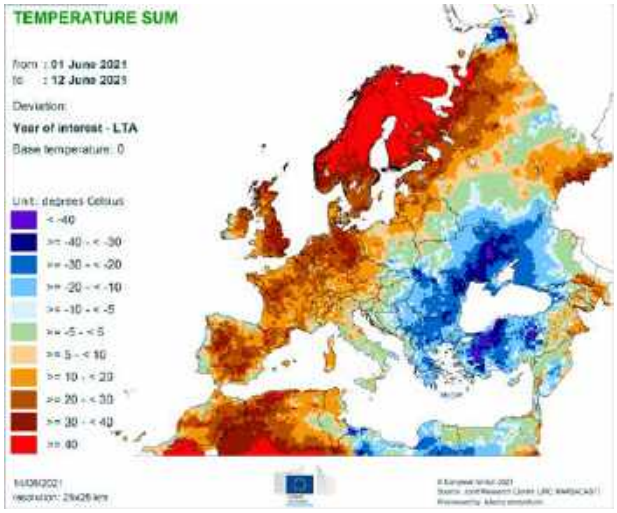
6. Atlas

Temperature regime

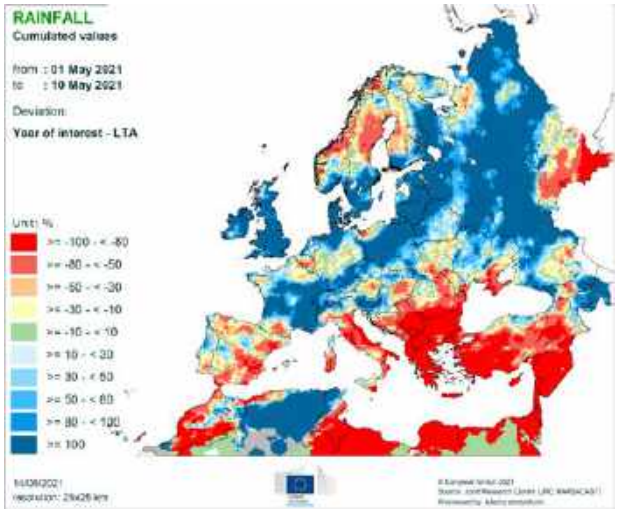


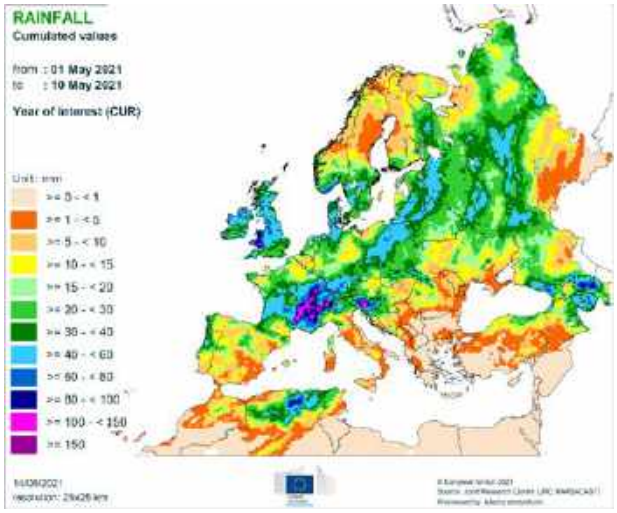


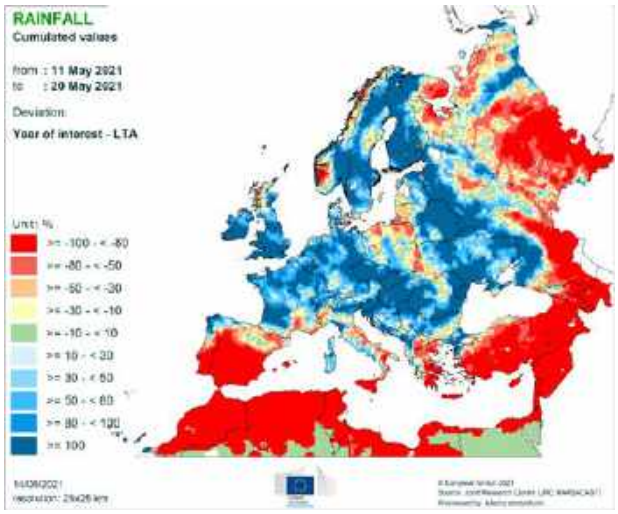


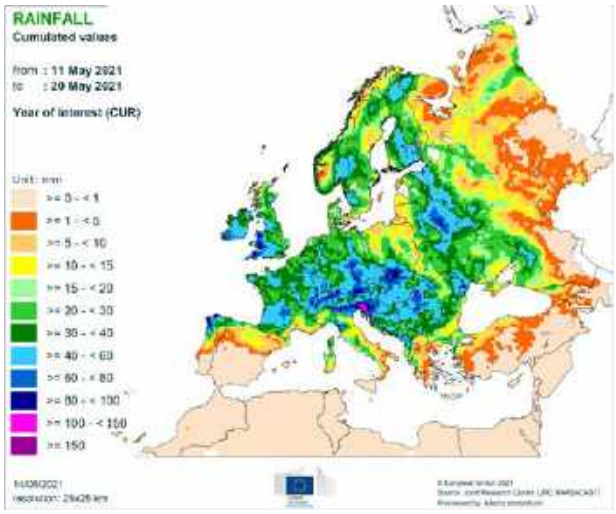


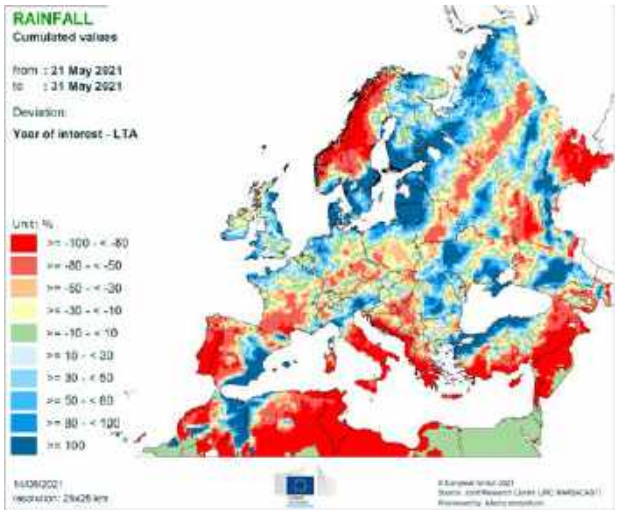
Precipitation

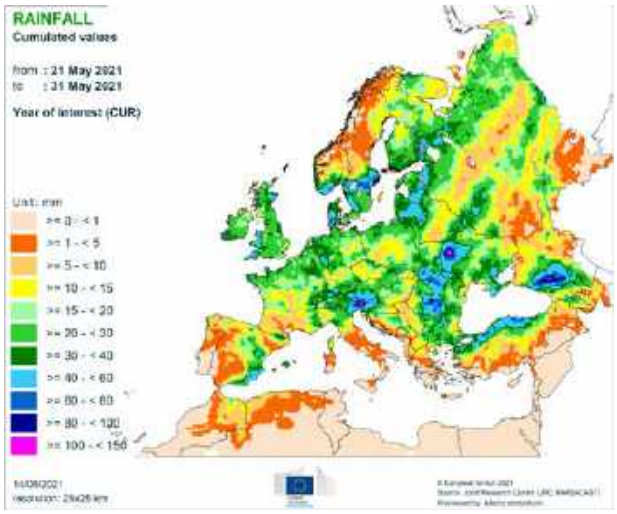


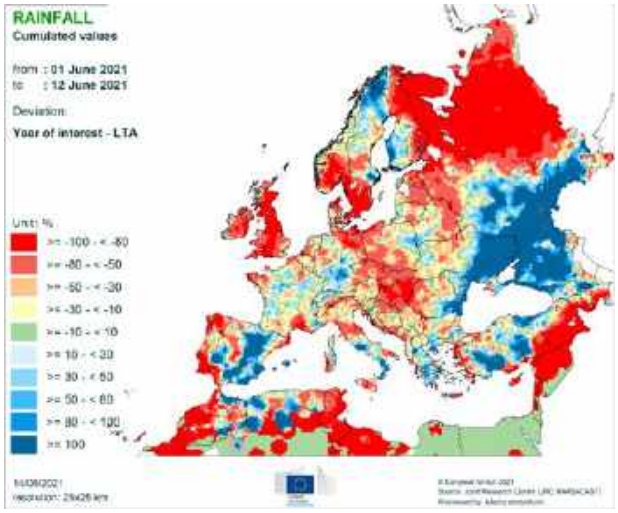


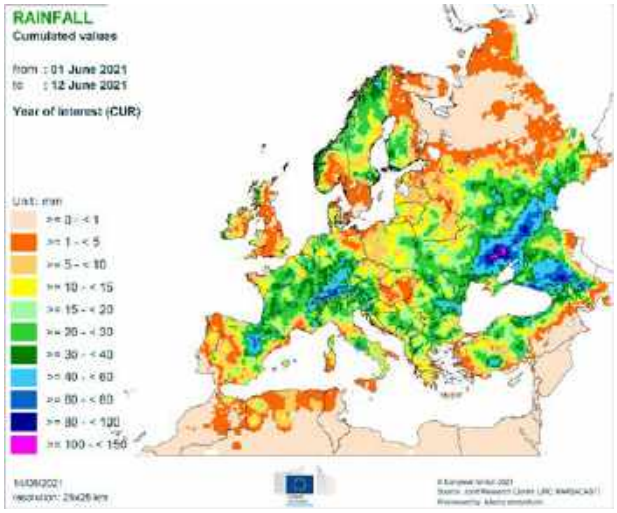




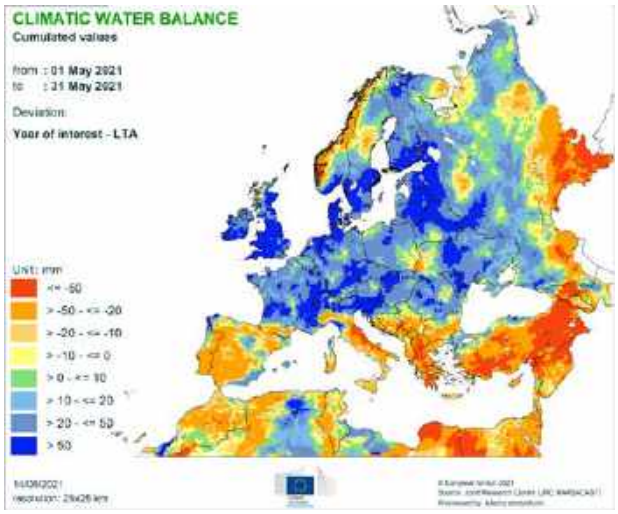


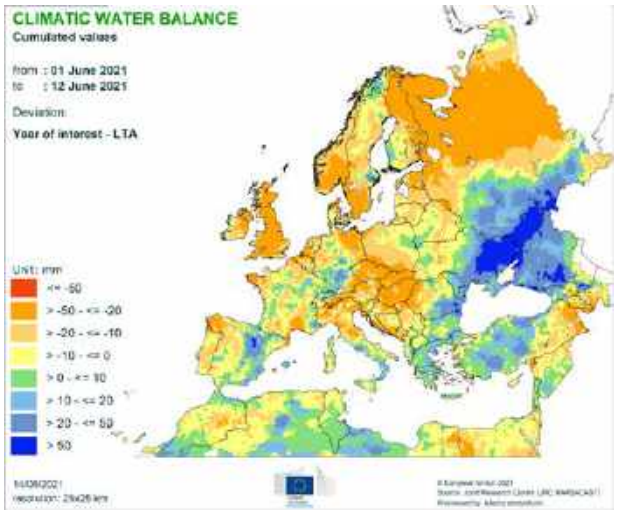




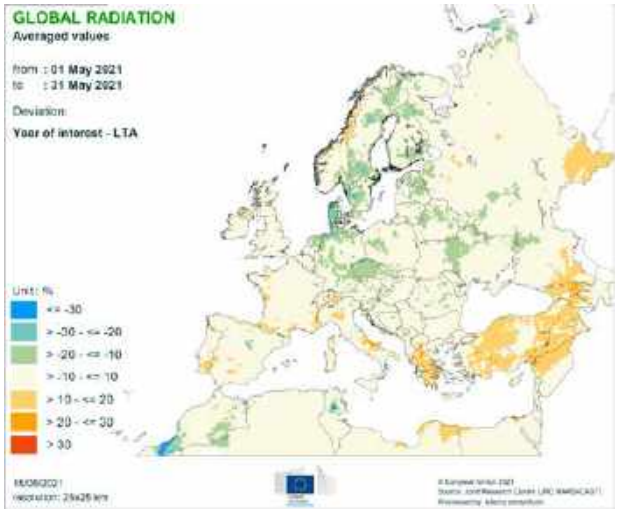


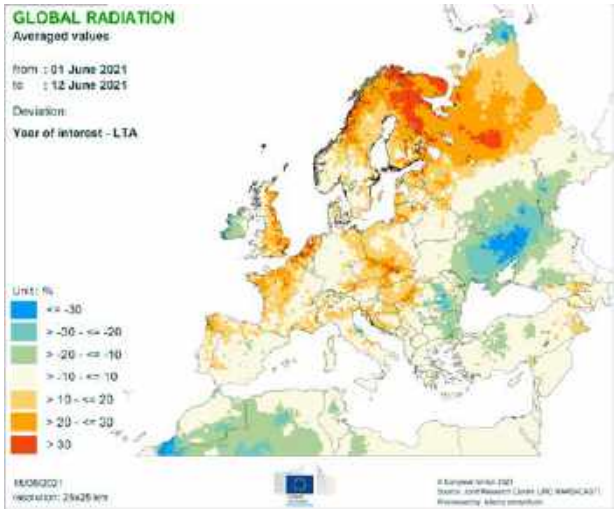
Climatic water balance



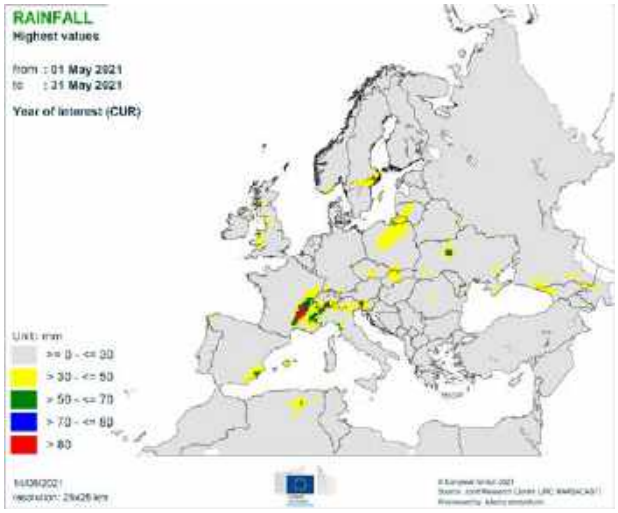


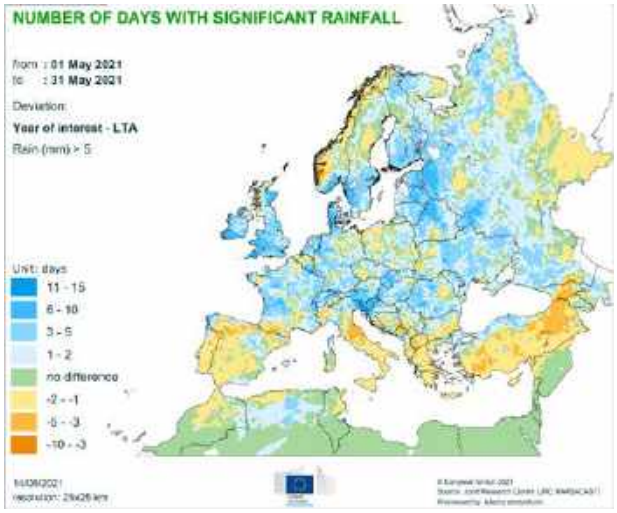
Global radiation

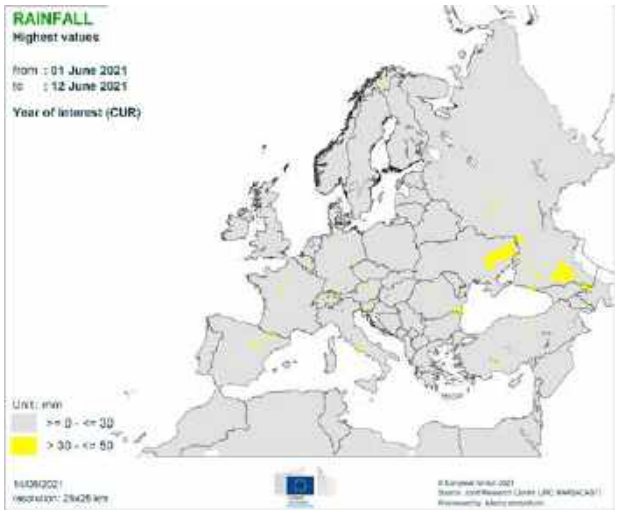


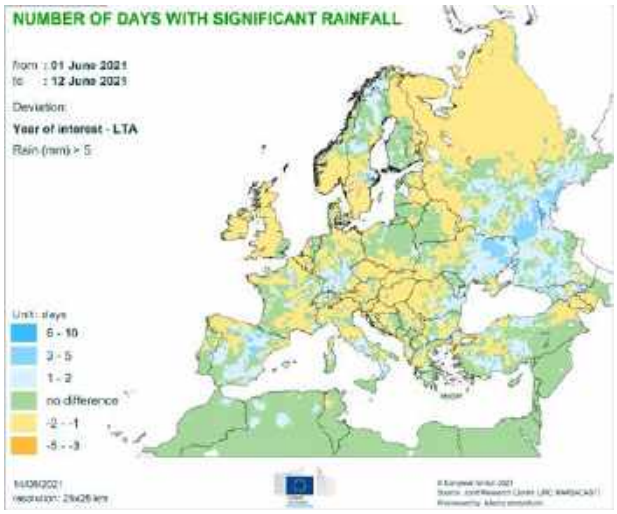


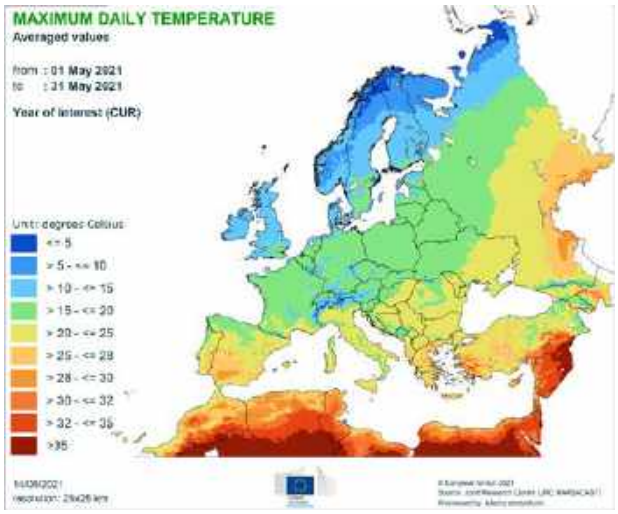
Weather events

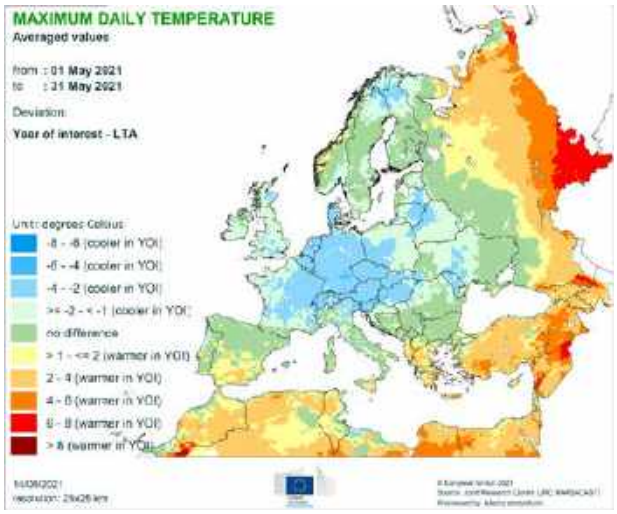


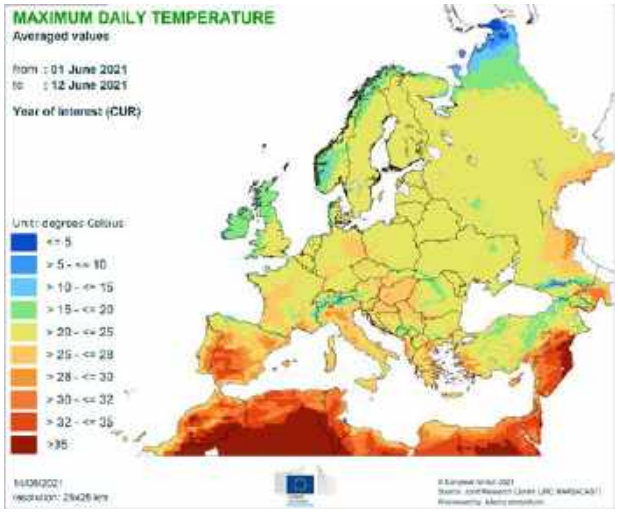


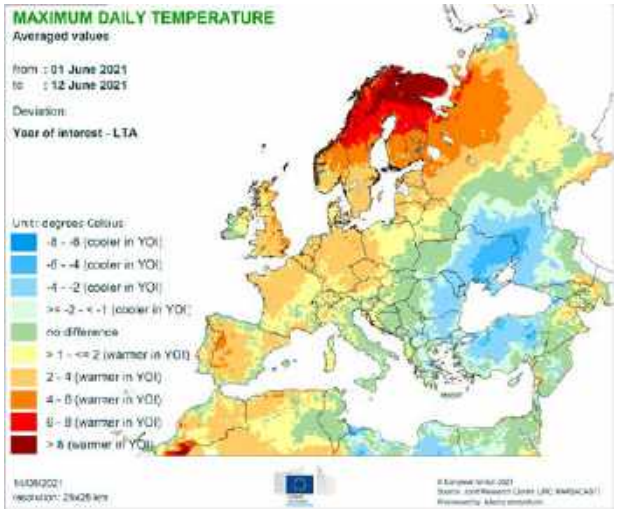


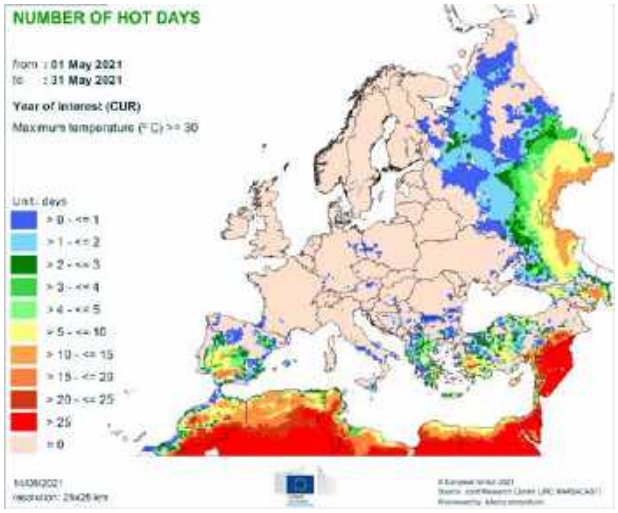


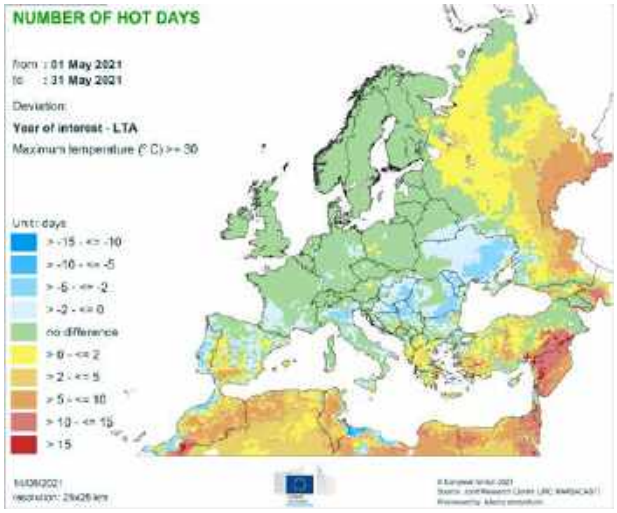


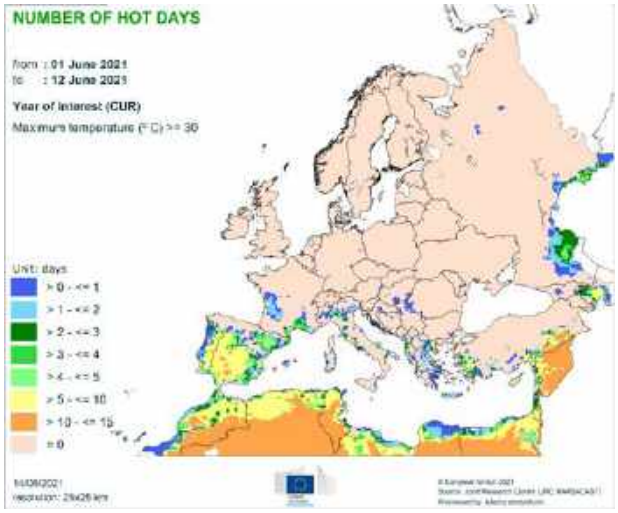


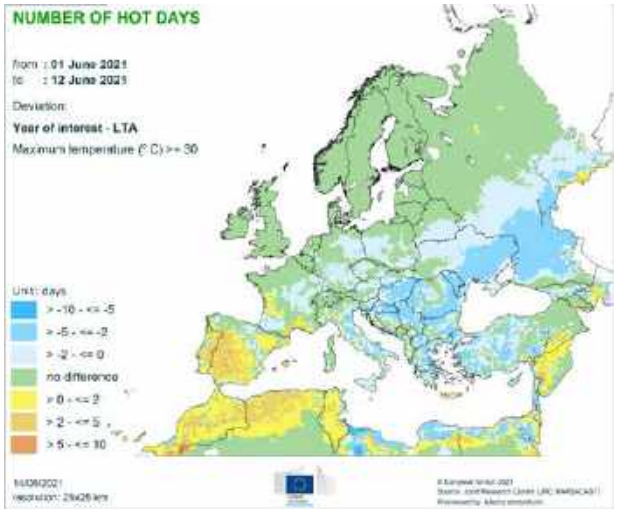

MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2021
to : 12 June 2021
Year of interest (CUR)
Unit: degree Celsius
<= 5
> 5 - <= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 28
> 28 - <= 30
> 30 - <= 32
> 32 - <= 35
>35


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2021
to : 12 June 2021
Deviation
Year of interest - LTA
Unit: degree Celsius
-8 - -6 (cooler in YOI)
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
>= -2 - < -1 (cooler in YOI)
no difference
> 1 - <= 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)

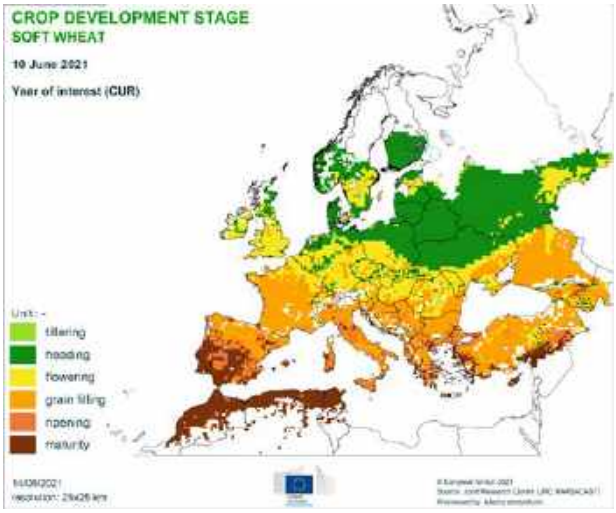

NUMBER OF HOT DAYS
from : 01 May 2021
to : 31 May 2021
Year of interest (CUR)
Maximum temperature (° C) >= 30
Unit: days
> 0 - <= 1
> 1 - <= 2
> 2 - <= 3
> 3 - <= 4
> 4 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25
= 0

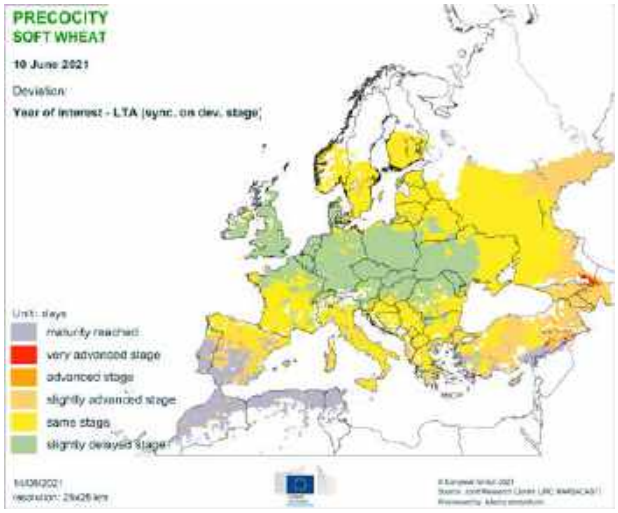

NUMBER OF HOT DAYS
from : 01 May 2021
to : 31 May 2021
Deviation
Year of interest - LTA
Maximum temperature (° C) >= 30
Unit: days
> -15 - <= -10
> -10 - <= -5
> -5 - <= -2
> -2 - <= 0
no difference
> 0 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15

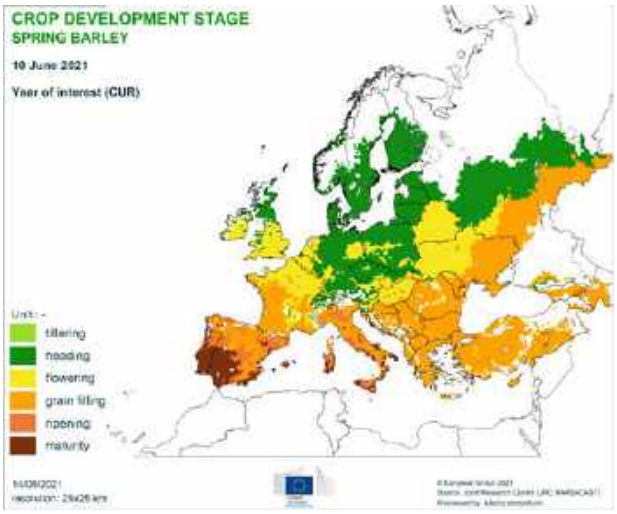

NUMBER OF HOT DAYS
from : 01 June 2021
to : 12 June 2021
Year of interest (CUR)
Maximum temperature (° C) >= 30
Unit: days
> 0 - <= 1
> 1 - <= 2
> 2 - <= 3
> 3 - <= 4
> 4 - <= 5
> 5 - <= 10
> 10 - <= 15
= 0

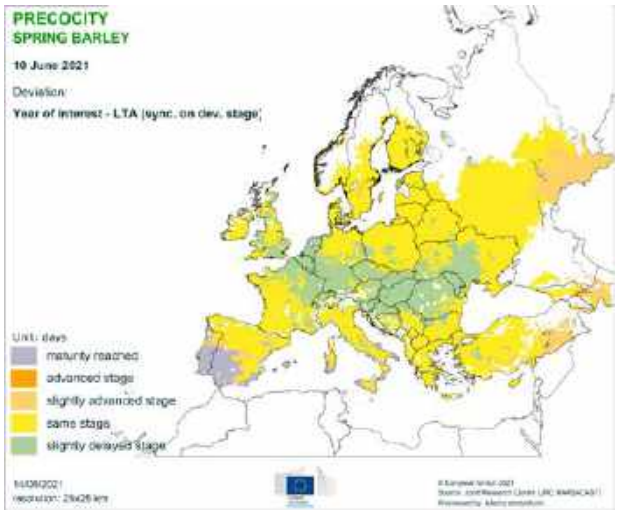

NUMBER OF HOT DAYS
from : 01 June 2021
to : 12 June 2021
Deviation
Year of interest - LTA
Maximum temperature (° C) >= 30
Unit: days
> -10 - <= -5
> -5 - <= -2
> -2 - <= 0
no difference
> 0 - <= 2
> 2 - <= 5
> 5 - <= 10

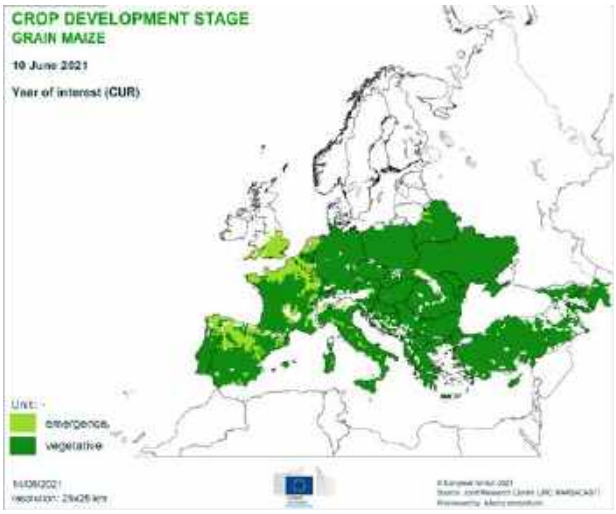
Crop development stages and precocity

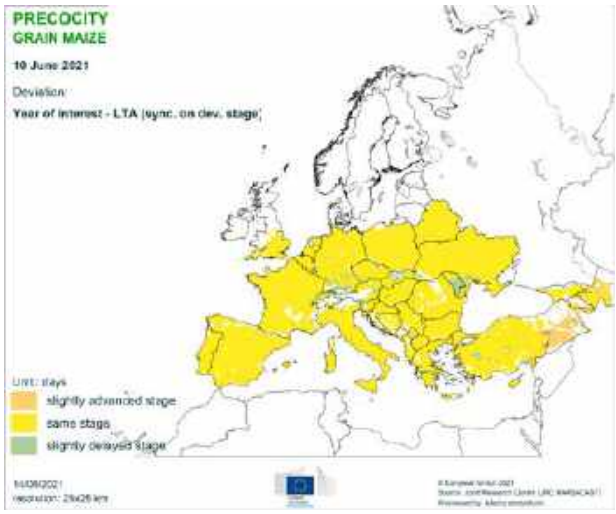


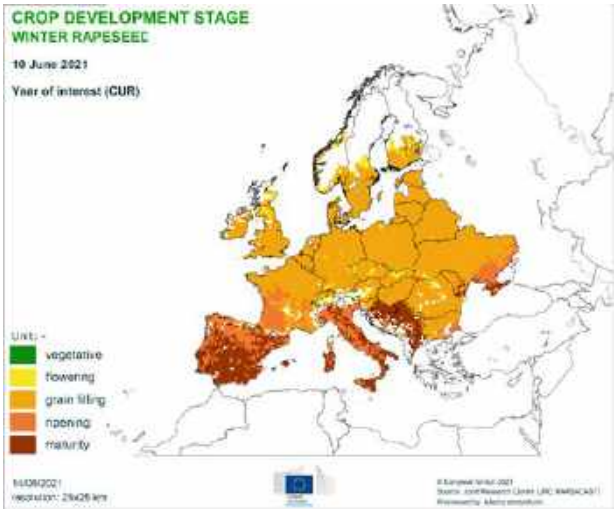


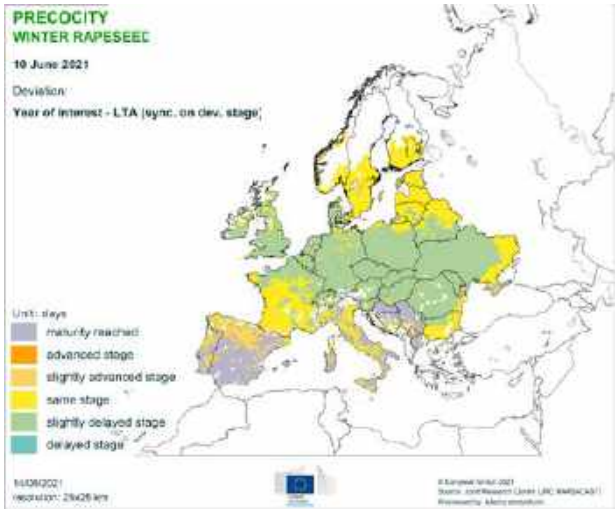


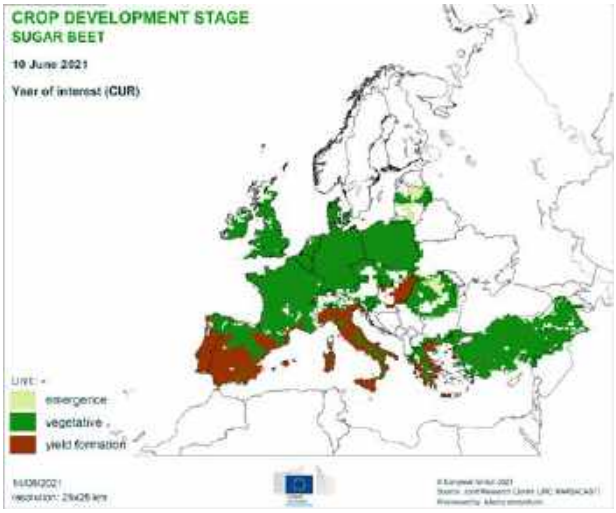


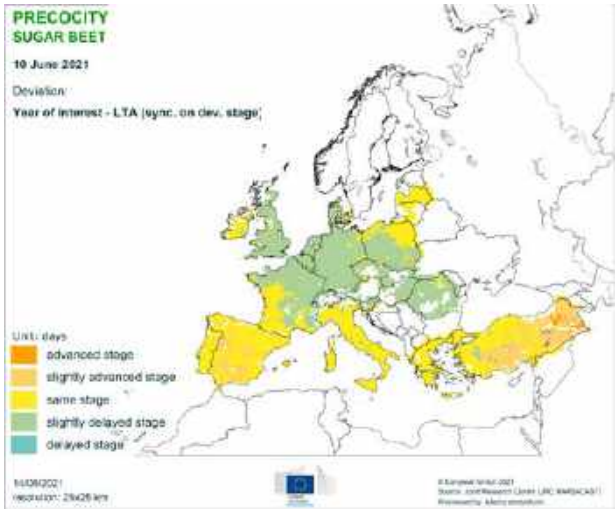




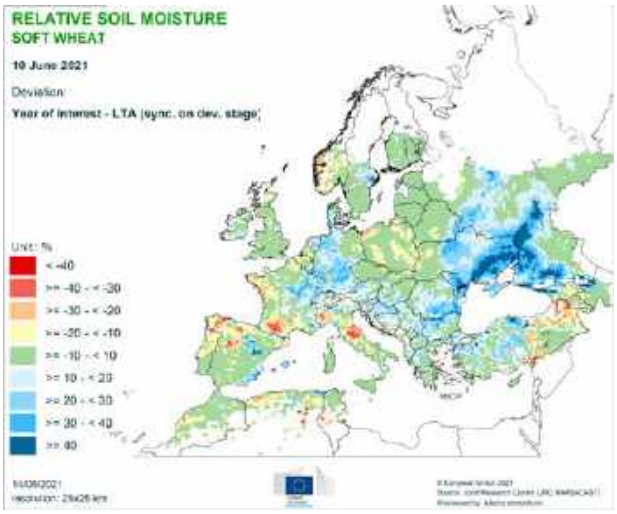


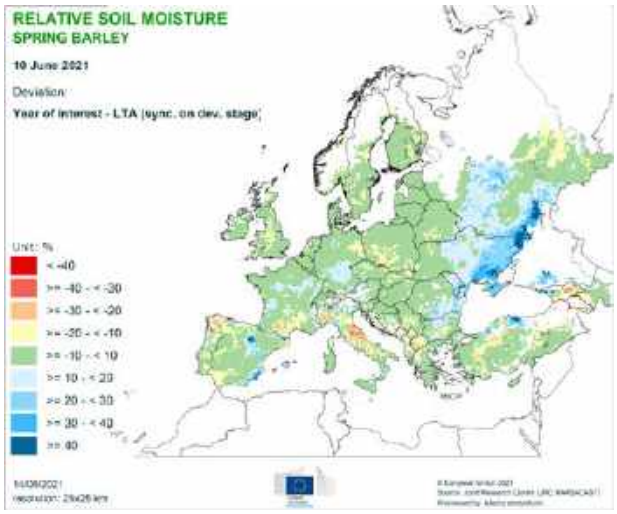


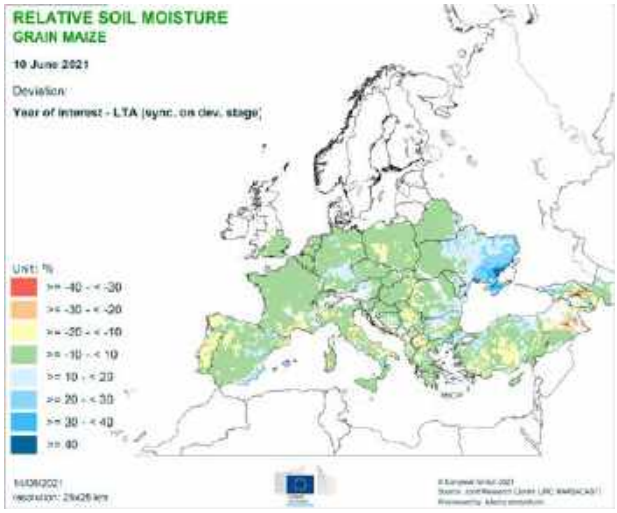


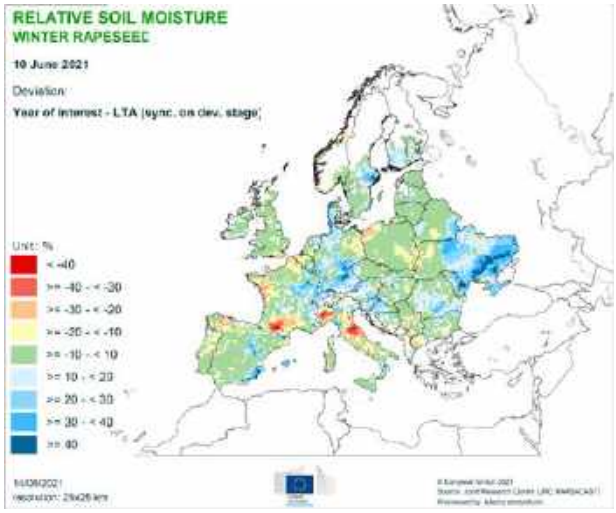


Relative soil moisture

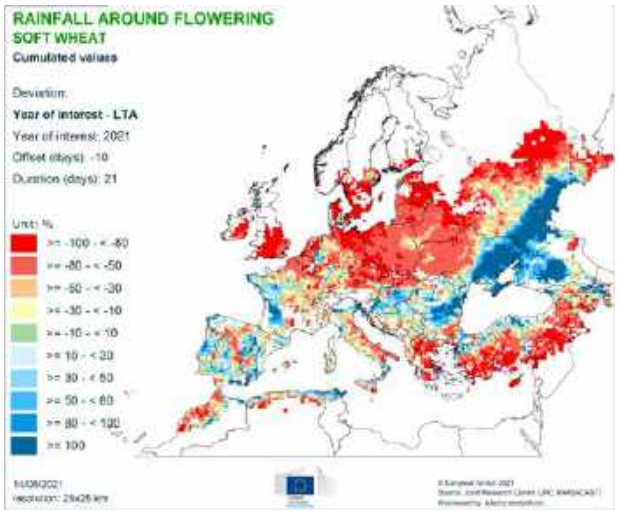


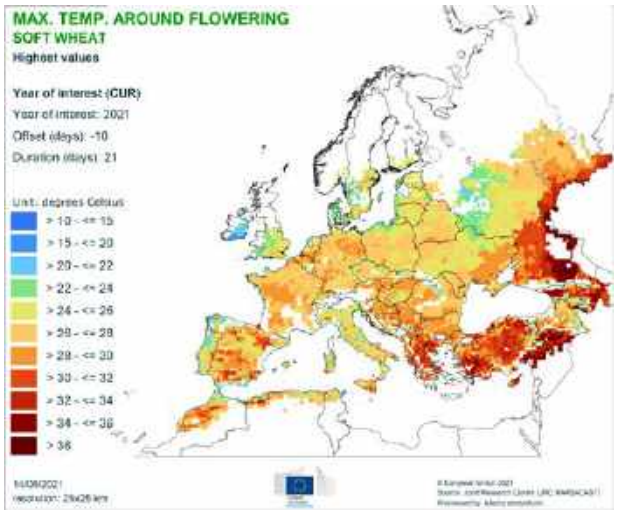


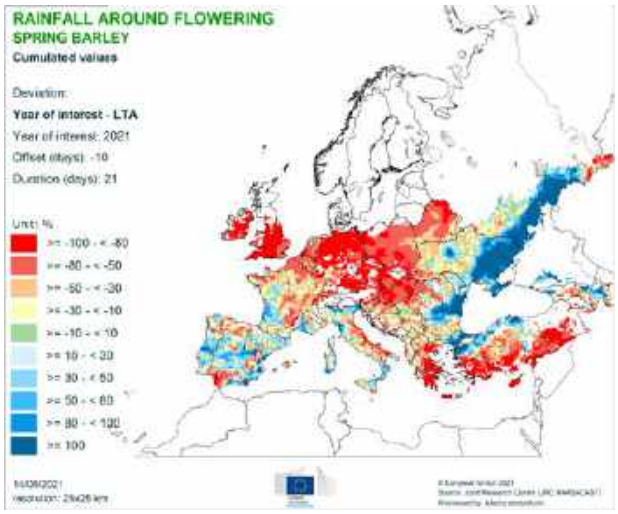


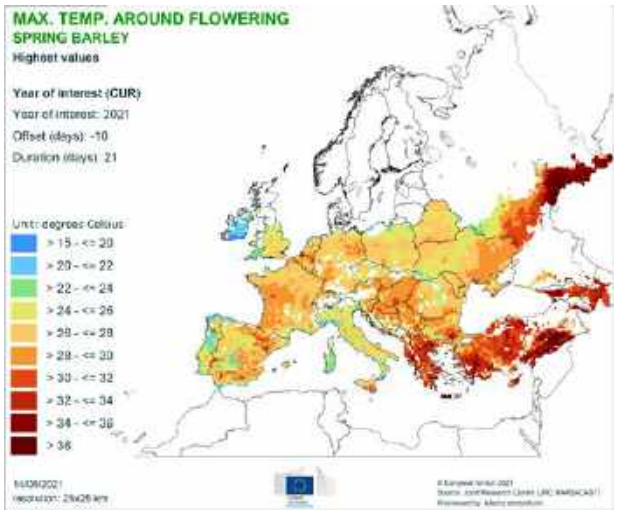


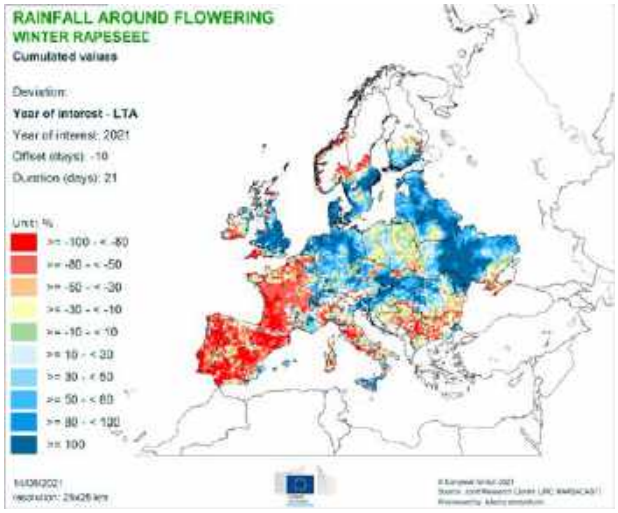
Precipitation and temperatures around flowering

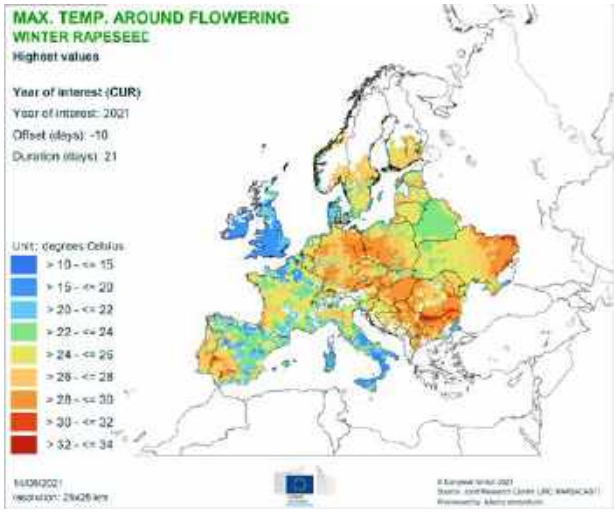




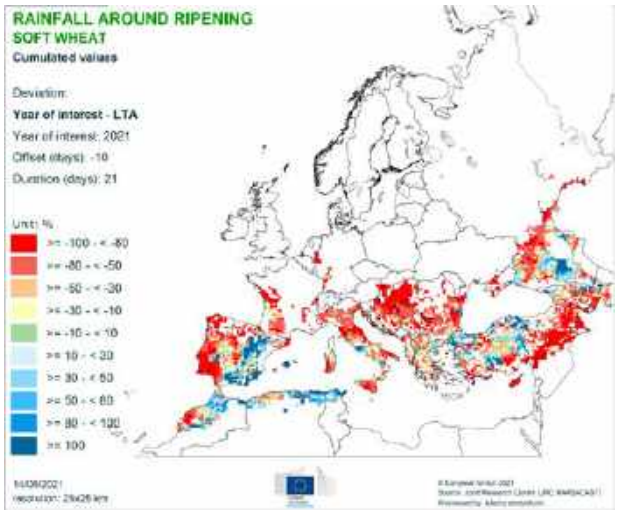


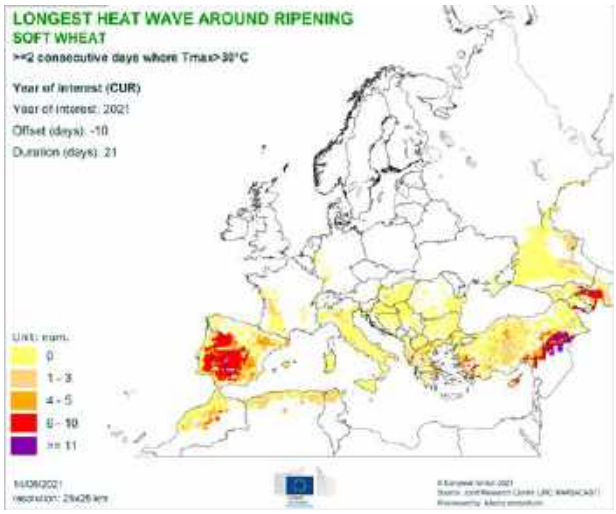


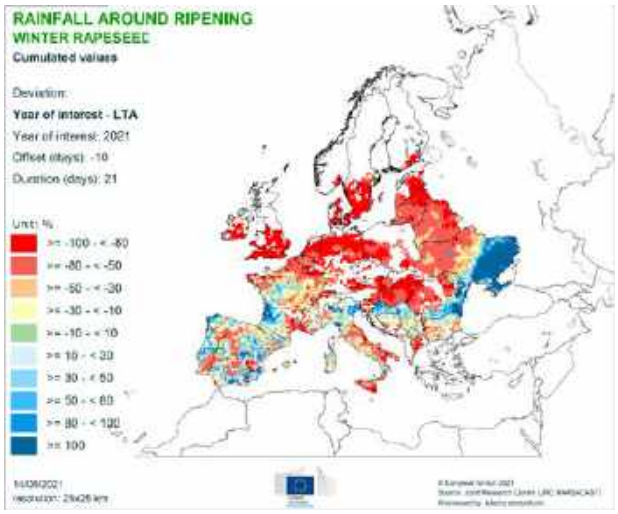


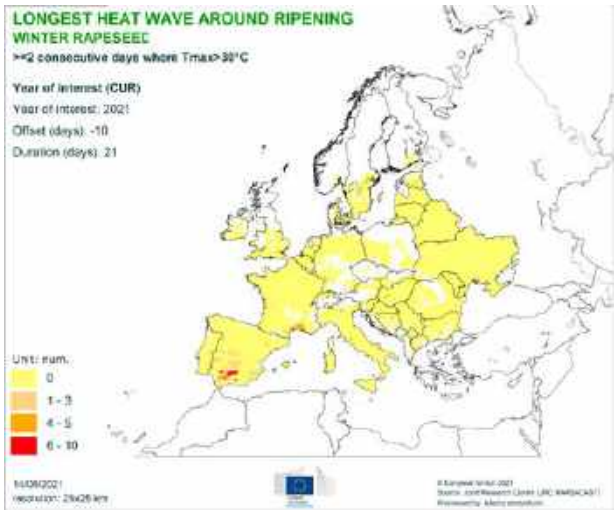


Precipitation and longest heat wave around ripening

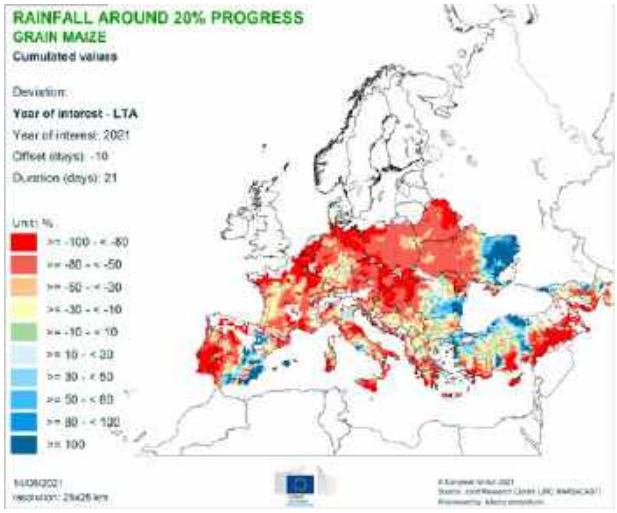


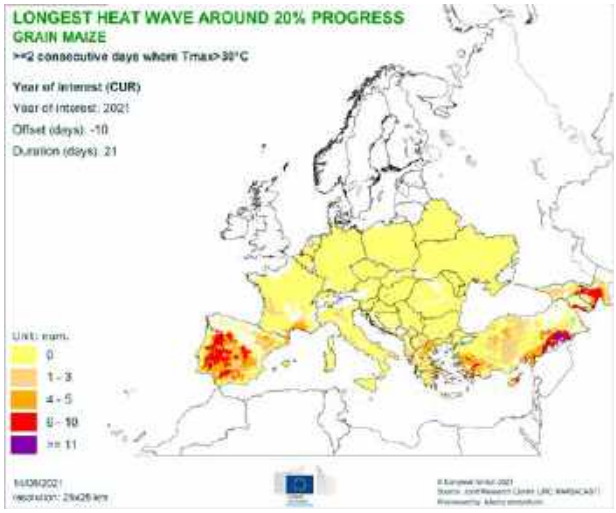






Maize: precipitation and temperatures around crop development





JRC MARS Bulletins 2021

Date	Publication	Reference
255 Jan	Agromet analysis	Vol. 29 No 1
22 Feb	Agromet analysis	Vol. 29 No 2
15 Mar	Agromet analysis, yield forecast	Vol. 29 No 3
26 Apr	Agromet analysis, remote sensing, pasture analysis, sowing conditions, yield forecast	Vol. 29 No 4
25 May	Agromet analysis, remote sensing, pasture analysis, sowing update, yield forecast	Vol. 29 No 5
21 Jun	Agromet analysis, remote sensing, pasture analysis, rice analysis, yield forecast	Vol. 29 No 6
26 Jul	Agromet analysis, remote sensing, pasture analysis, harvesting conditions, yield forecast	Vol. 29 No 7
23 Aug	Agromet analysis, remote sensing, pasture update, harvesting update, yield forecast	Vol. 29 No 8
20 Sep	Agromet analysis, remote sensing, pasture analysis, rice analysis, harvesting update, yield forecast	Vol. 29 No 9
25 Oct	Agromet analysis, pasture update, sowing conditions, harvesting update, yield forecast	Vol. 29 No 10
22 Nov	Agromet analysis, sowing update, harvesting update	Vol. 29 No 11
13 Dec	Agromet analysis	Vol. 29 No 12

The JRC MARS Bulletin – Crop monitoring in Europe is a JRC–European Commission publication from MARS4CAST (JRC Unit D5 – Directorate for Sustainable Resources)

JRC MARS Bulletins are available at https://ec.europa.eu/jrc/en/mars/bulletins

JRC MARS Explorer for regularly updated maps and graphs https://agri4cast.jrc.ec.europa.eu

Analysis and reports
B. Baruth, S. Bassu, W. Ben Aoun, I. Biavetti, A. Ceglar, I. Cerrani, Y. Chemin, M. Claverie, P. De Palma, D. Fumagalli, R. Lecerf, G. Manfron, L. Nisini, L. Panarello, G. Ronchetti, L. Seguini, A. Toreti, M. van den Berg, M. van der Velde, Z. Zajac, A. Zucchini

Reporting support
SeproTec, I. Biavetti, G. Mulhern

Edition
M. van den Berg, B. Baruth, S. Niemeyer, M. van der Velde

Data production
MARS4CAST (JRC Unit D5), WENR (NL), MeteoGroup (NL), VITO (BE)

Contact
JRC D5/MARS4CAST
JRCMARSBULLETIN@ec.europa.eu

Technical note
The long-term average (LTA) used within this Bulletin as a reference is calculated on the basis of weather data from 1991-2020.

Mission statement: As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

PDF: KJ-AW-21-006-EN-N ISSN 2443-8278 doi:10.2760/161051

Publications Office of the European Union