

JRC MARS Bulletin

Crop monitoring in Europe

April 2017

Fairly positive outlook for winter cereals

Sparse rainfall and a recent cold spell add to uncertainty

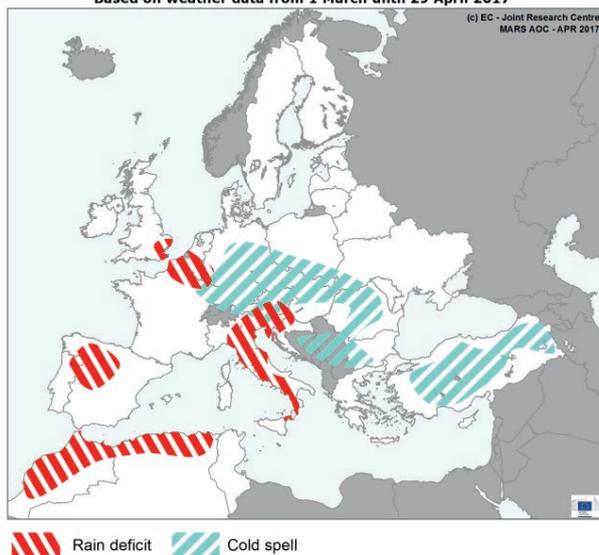
In most regions of Europe, continued mild weather conditions have been very favourable for winter crop growth and spring sowing activities. However, more rain is needed in several important crop-production areas to sustain good yields. A cold spell that set in at the end of the review period raises concerns for flowering rapeseed crops. Consequently, the yield forecasts have a high degree of uncertainty and are mainly based on historical trends or average values.

Sparse rainfall was registered in Belgium, western Germany, northern Spain, north-eastern France, north-eastern Italy, Luxembourg and the southern United Kingdom. Crop conditions are still good in most of these regions, but more rain is needed to sustain high yields.

Low minimum temperatures that set in after mid April (and are forecast to continue until the end of the month) are likely to affect flowering rapeseed in eastern France, western and southern Germany, the Czech Republic, Slovakia, Austria, Hungary, Slovenia, Romania and the Balkan region.

AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 March until 29 April 2017



Crop	Yield (t/ha)				
	Avg 5yrs	March Bulletin	MARS 2017 forecasts	% Diff 17/5yrs	% Diff March
TOTAL CEREALS	5.29	5.46	5.48	+ 3.5	+ 0.4
Total Wheat	5.60	5.76	5.79	+ 3.3	+ 0.5
<i>soft wheat</i>	5.84	6.02	6.05	+ 3.5	+ 0.5
<i>durum wheat</i>	3.32	3.37	3.39	+ 2.1	+ 0.6
Total Barley	4.82	4.89	4.90	+ 1.5	+ 0.2
<i>spring barley</i>	4.20	4.21	4.21	+ 0.3	+ 0.0
<i>winter barley</i>	5.68	5.81	5.82	+ 2.5	+ 0.2
Grain maize	6.90	7.12	7.13	+ 3.3	+ 0.1
Rye	3.89	3.79	3.78	- 2.7	- 0.3
Triticale	4.21	4.20	4.21	- 0.1	+ 0.2
Rape and turnip rape	3.26	3.29	3.27	+ 0.4	- 0.6
Potato	32.4	33.3	33.4	+ 3.0	+ 0.4
Sugar beet	71.6	74.2	74.2	+ 3.7	+ 0.0
Sunflower	1.94	2.10	2.10	+ 8.3	+ 0.0

Issued: 21 April 2017

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1. Agro-meteorological overview

1.1. Areas of concern

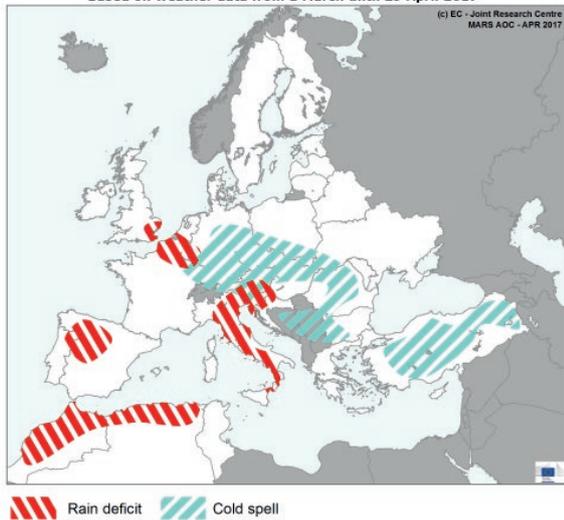
Crop growth conditions have been good in most of Europe. However, negative weather conditions associated with adverse impacts on crops are observed in several regions, which are represented in the right-hand map below. This 'winter crops' map reflects the impacts that have occurred since 1 March or are likely to occur in the coming days, until 29 April. The left-hand map depicts extreme weather conditions, some of which are responsible for the impacts in the second map.

During the period reviewed, sparse rainfall was registered in northern **Spain**, where the significant rainfall deficit is likely to affect winter crops in their most sensitive stages, unless sufficient rain occurs in the coming days. **Italy**, especially in north-eastern regions, is facing a strong rain deficit with one of the driest periods recorded in our meteorological time series; some rain is forecast for the coming 10 days, but its timing and intensity is still uncertain. Dry weather conditions were also registered in **Belgium, western**

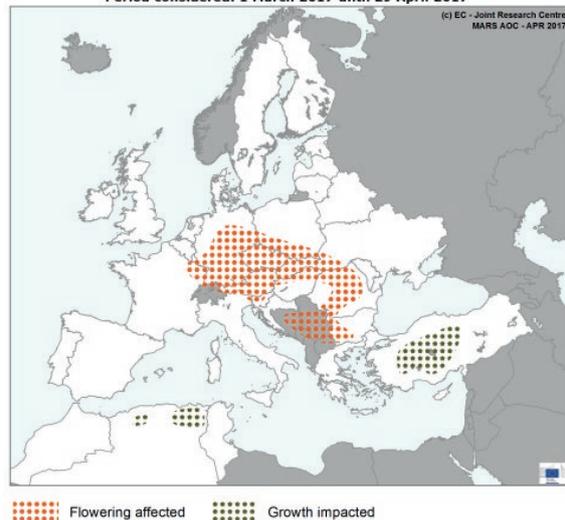
Germany, north-eastern France, Luxembourg and the southern United Kingdom. In all those regions, where crop conditions are still good, rain is needed to sustain biomass development.

Low minimum temperatures after mid April and forecast to continue until the end of the month are likely to affect rapeseed flowering in **eastern France, western and southern Germany, central Europe (Czech Republic, Slovakia, Austria, Hungary, Slovenia), Romania and the Balkan region**. Strong temperature oscillation — with several days with minimum temperatures below zero — is observed and forecast for **Turkey**, where winter crops regrowth in central regions was already greatly hampered by winter conditions and crop development is now further compromised by low temperatures. In **Algeria and Morocco**, there was a significant lack of precipitation in March and April, but winter crops growth is so far only affected in some regions of western and eastern Algeria.

AREAS OF CONCERN - EXTREME WEATHER EVENTS
Based on weather data from 1 March until 29 April 2017



AREAS OF CONCERN - WINTER CROPS
Period considered: 1 March 2017 until 29 April 2017



1.2. Agro-meteorological review (1 March–18 April)

Warmer-than-usual thermal conditions characterised most of Europe during the review period (1 March–18 April) as a whole. The period from 1 March until 10 April was particularly warm, with **positive temperature anomalies of 2 °C to 5 °C**, except in central and northern Scandinavia, the Iberian peninsula, southern Italy, eastern Turkey and the *Near Volga Okrug* of Russia. In several regions of Europe, this period was the warmest or among the warmest on our climatological archive for this time of the year.

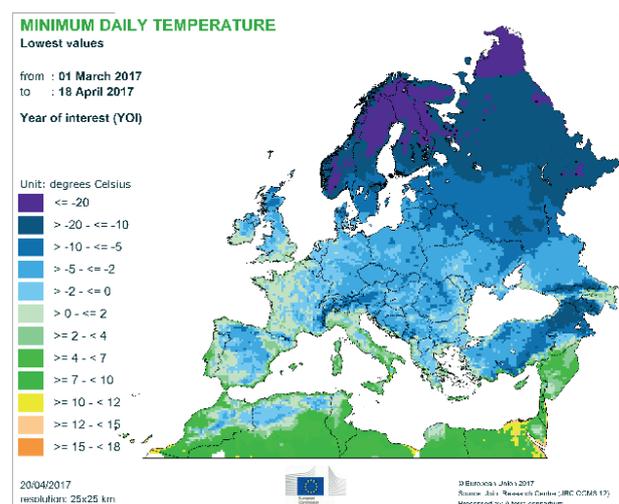
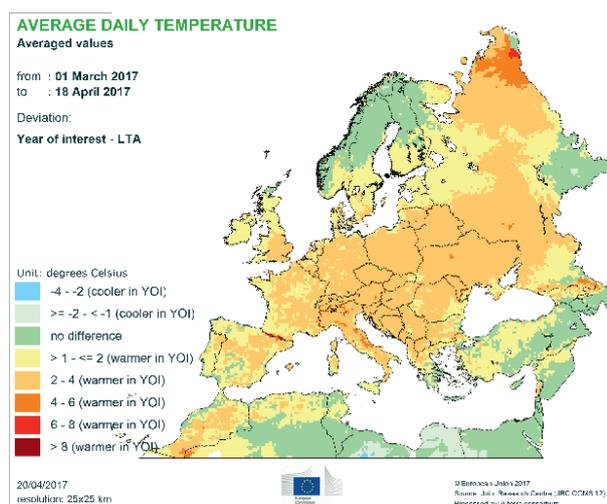
As a consequence, the temperature sum (Tbase = 0 °C) presents a large surplus (> 100 growing degree days compared to the long-term average (LTA)) in a large region extending from England and France to Italy, northern Greece and western Russia, but considerable parts of Algeria, Morocco, Portugal and Spain are also included.

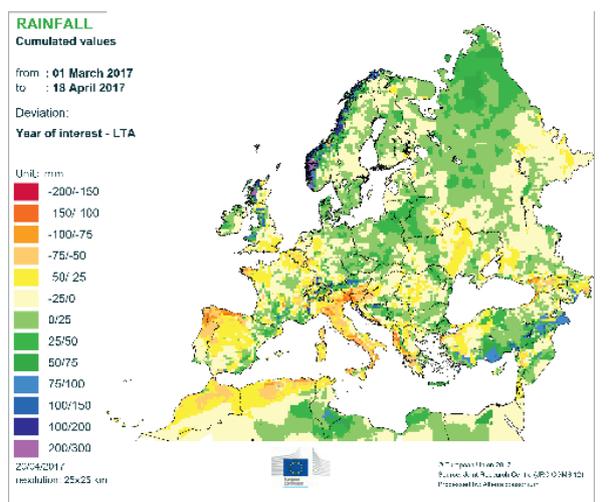
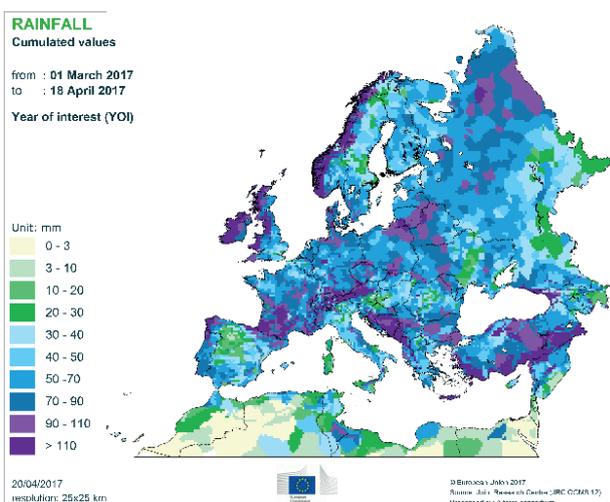
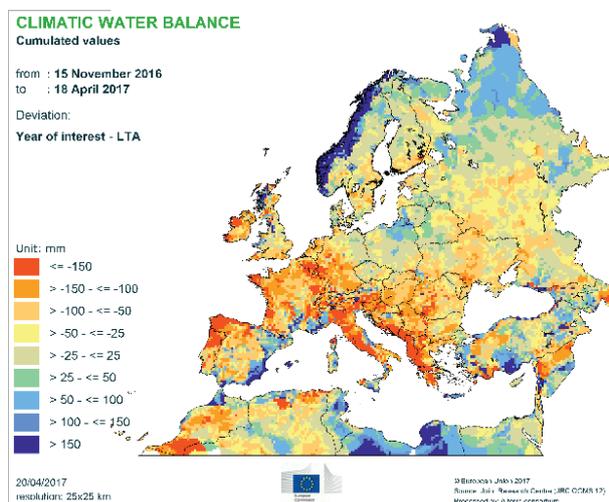
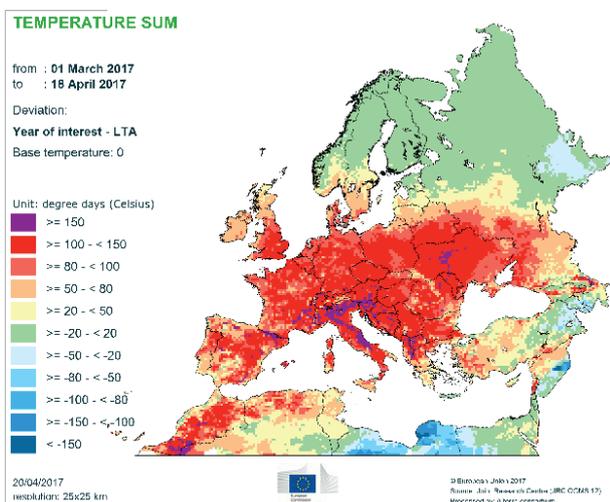
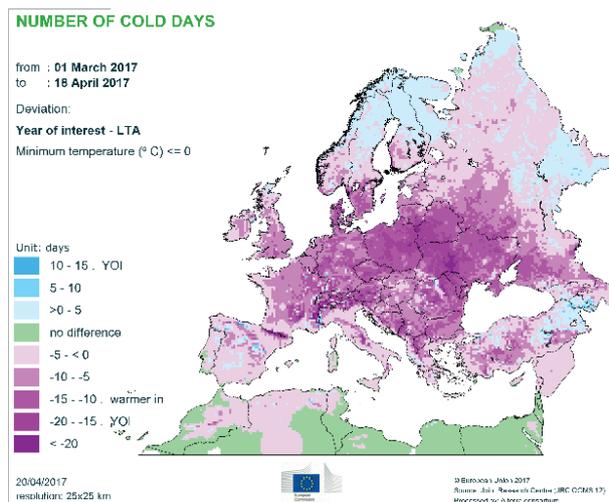
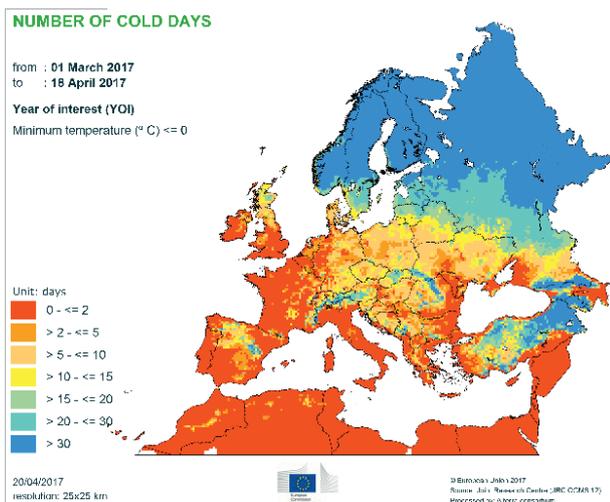
During the second decad of April, a severe Arctic cold-air intrusion accompanied by snowfall reached central and eastern Europe resulting in a sudden drop in temperatures and causing a series of night-frost events after mid April. This cooling is likely to have negatively affected the areas with flowering rapeseed fields.

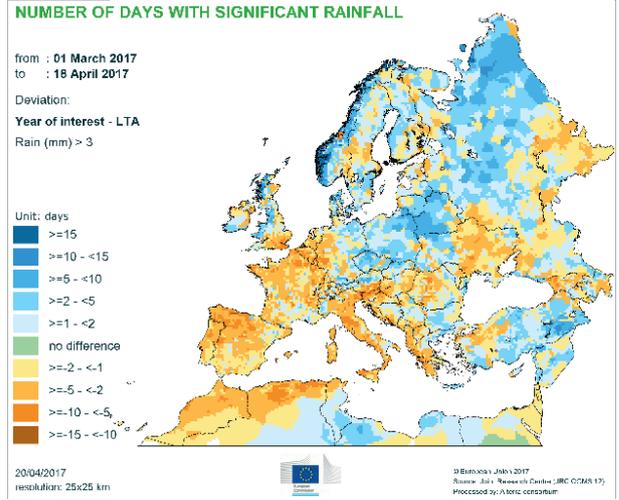
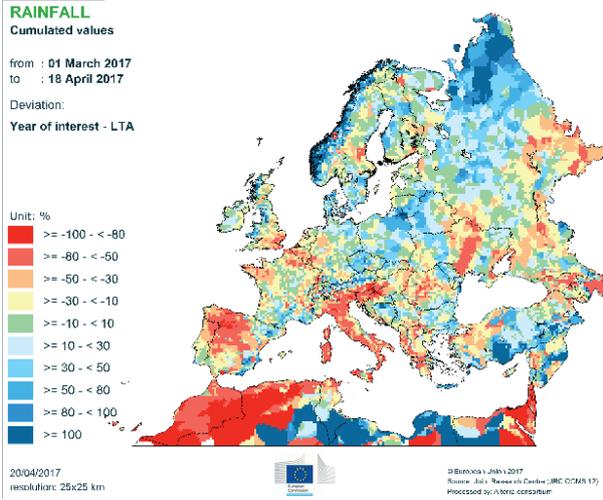
In most of Europe, frost events were sparse and mild until 18 April. The number of cold days (Tmin < 0 °C) was 5 to 20 days less than seasonal average in many areas of central and eastern Europe, especially in Belarus, Poland and Ukraine. The frost severity remained moderate (Tmin > -5 °C) in the region between the British Isles and eastern Ukraine.

Distinctly drier-than-usual weather conditions were experienced in several important agricultural regions. Precipitation totals remained significantly below the LTA in the western half of the Iberian peninsula (especially in *Castilla y León*), the eastern United Kingdom, northern and eastern France, the Benelux countries and western Germany. The precipitation deficit is particularly pronounced in most of Italy, Slovenia, southern Austria (*Kärnten and Steiermark*) and the western half of the Balkan peninsula (especially along the Adriatic coastline). A rainfall deficit also characterises the Carpathian basin, north-western Turkey, eastern and central Ukraine and numerous regions of southern Russia. All of the above-mentioned regions have been experiencing a precipitation deficiency since mid November, as clearly indicated by a negative climatic water balance anomaly, which is raising concerns of inadequate soil moisture replenishment and the possibility of spring drought, as already observed in the most affected areas. In the Maghreb region, rainfall has been below average in Morocco since late February and in most of northern Algeria since late January.

Above-average precipitation occurred only along the western coastline of the British Isles, Norway, southern France, eastern Spain and in some continental areas such as the Czech Republic, eastern Poland, eastern regions of the Baltic states, western Belarus and north-eastern Russia







2. Observed canopy conditions by remote sensing

Early biomass accumulation in the main EU crop-producing regions

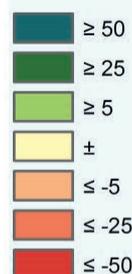
The map displays the differences between the fraction of absorbed photosynthetically active radiation (fAPAR) cumulated from 1 March to 10 April and the medium-term average (2007-2016) for the same period. Positive anomalies (in green) reflect above-average canopy density or early crop development, while negative anomalies (in red) reflect below-average biomass accumulation or late crop development. In **Spain**, the warm temperatures of early March led to advanced winter crop development and much higher-than-usual leaf-area expansion. The consequentially increased water demand by crops is currently satisfied, but the lack of precipitation during the past 30 days significantly reduced soil moisture, and substantial rain is needed in the coming weeks to maintain actual canopy conditions, especially in *Castilla y León*. In southern Italy, winter crops were slightly delayed but returned to normal (e.g. *Sicilia*) thanks to above-average temperatures after mid March. In northern **Italy**, winter crops development is well advanced due to the warm winter and early spring, but the persistent dry conditions could affect leaf-area expansion in the coming weeks. In **France**, positive temperature anomalies have occurred since the beginning of March and have deter-

mined a boost to the development of winter crops, which are now quite advanced and in need of more rain. Similar conditions have occurred in the **United Kingdom**, but the positive fAPAR anomalies and lack of precipitation are both less marked compared to France. In **Germany**, the growth of winter crops is proceeding at an advanced pace thanks to the predominance of warmer-than-usual temperatures. In **Poland**, the central regions have recently reached normal development and biomass accumulation thanks to the warm temperatures and well-distributed rains. The red anomalies shown on the map are the result of the previously delayed stages, as can be deduced from the *Wielkopolskie* fAPAR graph. In central Europe (**Czech Republic, Hungary and Austria**), crop development and biomass accumulation (*Dél Alföld*) are normal. In **Bulgaria and Romania**, favourable weather conditions have resulted in significantly above-average biomass accumulation of winter crops, as can be seen in the map and the profile of *Sud-Muntenia*. In central **Turkey (Konya)**, after an unfavourable winter, spring regrowth is underway at a much slower pace than usual, which is causing significant concern about the further development of the winter crop season.

Cumulated fAPAR comparison

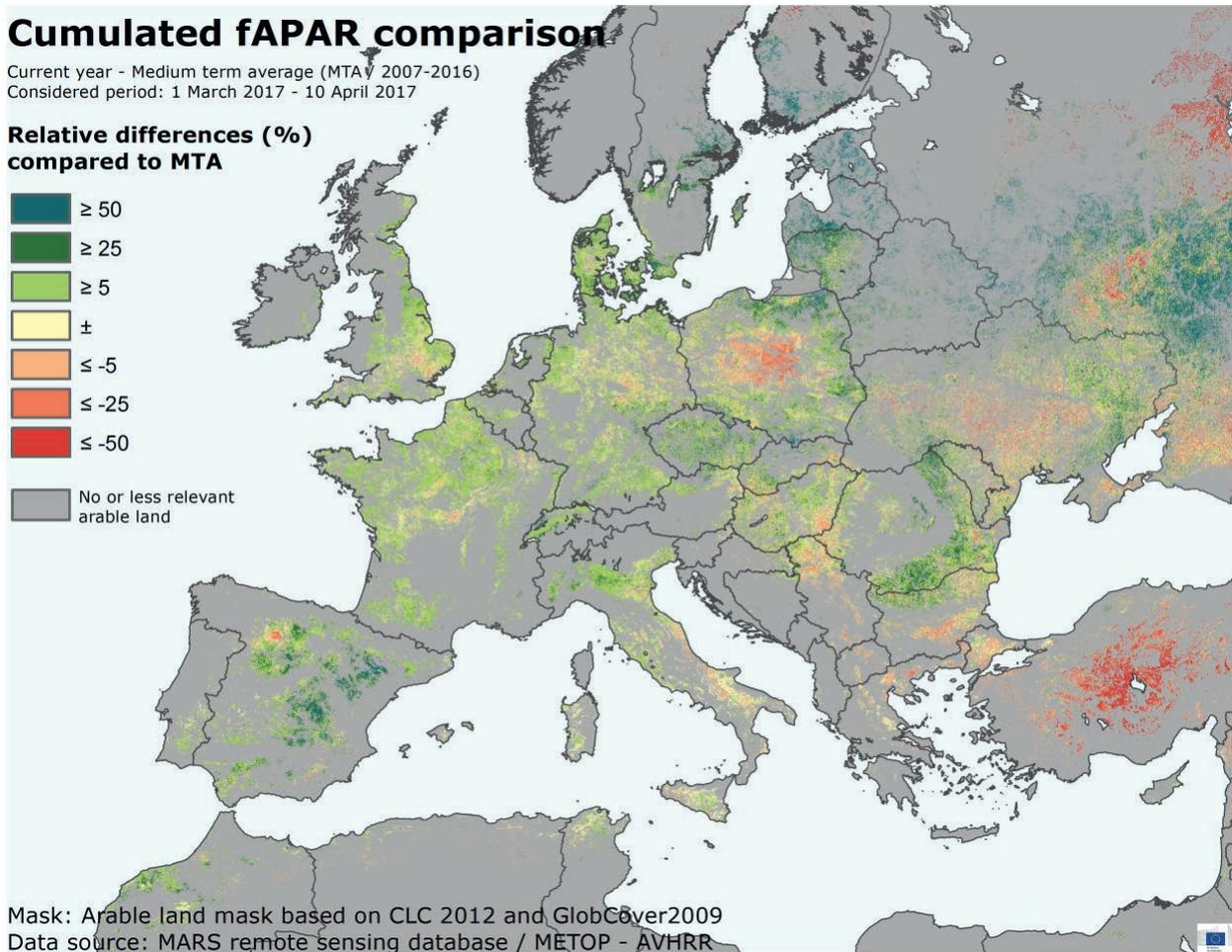
Current year - Medium term average (MTA 2007-2016)
Considered period: 1 March 2017 - 10 April 2017

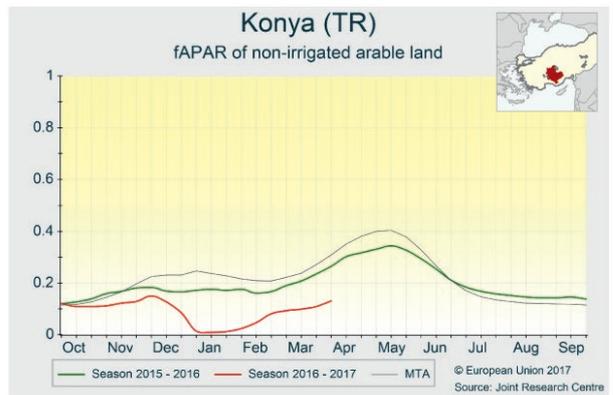
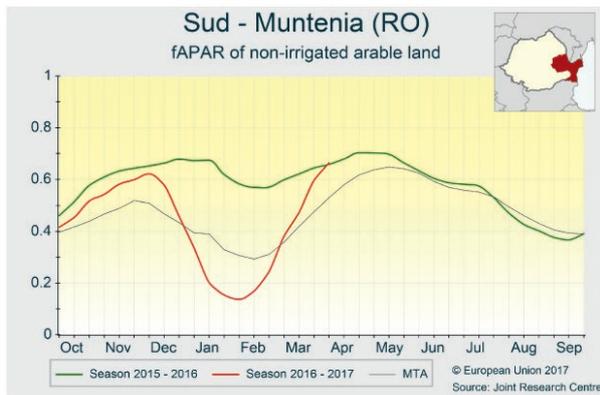
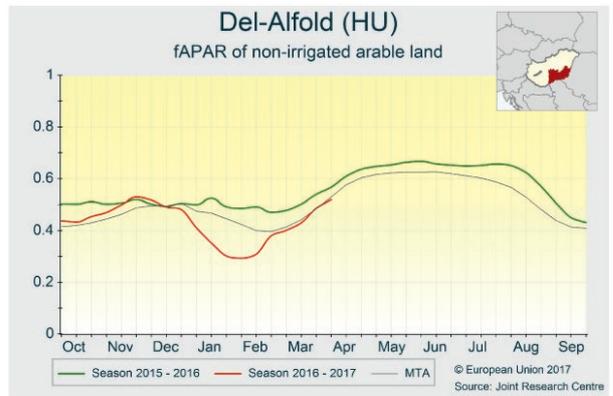
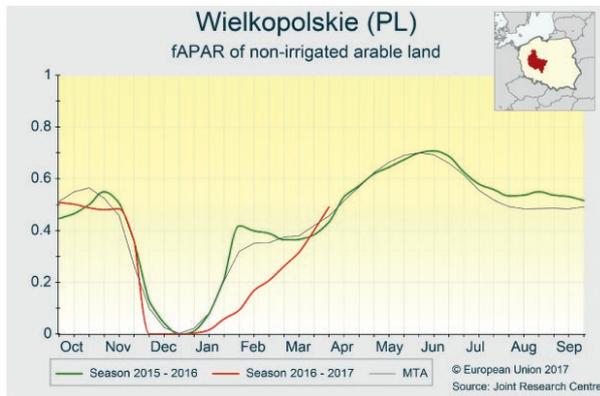
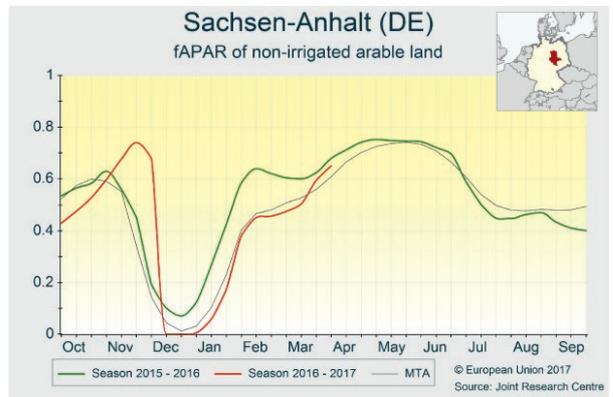
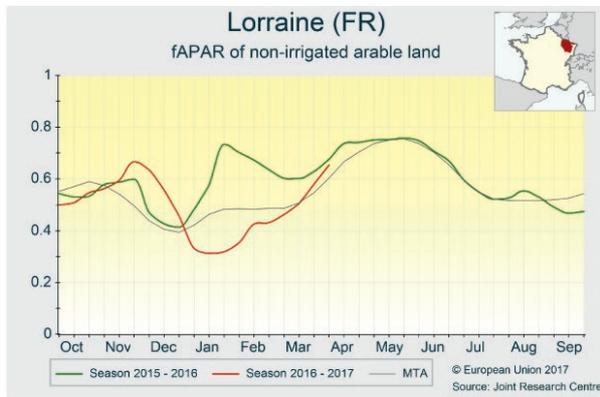
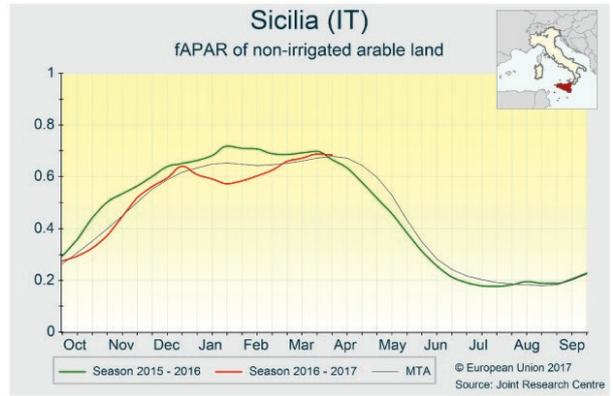
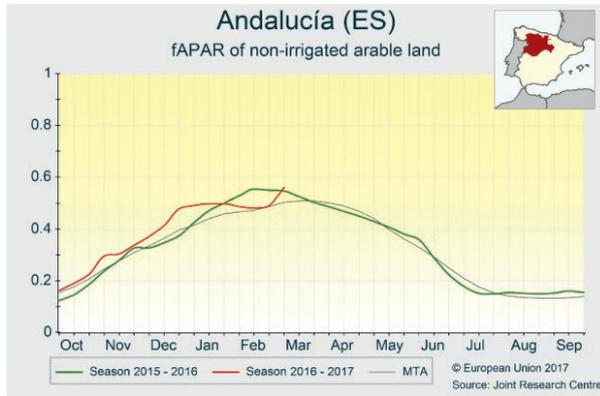
Relative differences (%) compared to MTA



 No or less relevant arable land

Mask: Arable land mask based on CLC 2012 and GlobCover2009
Data source: MARS remote sensing database / METOP - AVHRR





3. Country analysis

3.1. Sowing conditions

Spring barley

Spring barley has been sown in southern Europe, where mild temperatures in February and March favoured a rapid emergence. In central Europe, the United Kingdom and the Baltic Sea countries, sowing activities are progressing well and are generally advanced compared to an average season.

The late sowing of spring barley was completed at the end of February in Spain, the EU's largest spring barley producer. Barley is now in the tillering phase, and crop status is currently average, except in *Castilla y León* where meteorological conditions have been unusually dry since October. In that region, spring barley varieties are mainly sown in autumn and winter, and the dry conditions observed have limited vegetative growth during early crop development. In France, the sowing campaign was concluded by mid March. Mild temperatures since February have favoured rapid emergence, about 1 week earlier than in 2016. Overall, crop conditions are favourable thanks to sufficient precipitation in February and March.

Sowing activities are progressing in north-western Europe under favourable conditions, with higher-than-usual temperatures and average rainfall. In eastern England and Ireland, barley-sowing activities finished by mid March with no significant delays, and the crop status is

positive. In northern England and Scotland, groundwork started in the second half of March, and the sowing campaign is about to conclude with no major delays.

The sowing phase is almost finished in the Czech Republic, Denmark, Germany and Poland. In general, conditions are satisfactory, with adequate soil moisture thanks to near-average precipitation in February and March and unusually mild conditions favouring rapid emergence in earlier sown areas.

Sowing usually starts in mid April in the Baltic Sea countries, but the unusually high temperatures since mid March this year (3–4 °C above the LTA), combined with adequate precipitation, have favoured an early start to the sowing campaign, especially in the south of Sweden and Lithuania.

In Ukraine, above-average temperatures and the absence of substantial rainfall since March have permitted spring barley to be sown earlier than usual. In the southernmost regions, the sowing campaign has been completed and barley is now in the tillering phase. In the centre and north of the country, sowing activities have progressed smoothly and are about to conclude. Temperatures in the second half of April will determine the start of the sowing campaign in western Russia; soil moisture is sufficient to start preparing the soil, as precipitation in March and April has been close to average.

Sugar beet and potatoes

Meteorological conditions have been adequate for the sowing of sugar beet in most of Europe so far (until 18 April). The above-average daily temperatures led to the early warming of the topsoil, allowing for an early start to the sugar beet sowing campaign. Precipitation was mostly below average and infrequent, providing good conditions for sowing within and even ahead of the normal window. In the main EU sugar beet-producing regions of Germany and Poland, the sowing of sugar beet has gone well to date due to the scarce rains, but it is still early in the campaign. In France, considerable rainfall may have interrupted sowing activities, primarily in the *Champagne-Ardenne*, *Centre* and *Haute-Normandie* regions. Sowing is advanced and free of major difficulties in most of the United Kingdom, the Benelux countries, Austria, Hungary, Slovakia and Croatia, but the dry (locally very dry) topsoil may compromise emergence in many regions of the Carpathian basin. In Romania, overly wet conditions caused delays, but the situation improved considerably in early April. In Italy and Turkey, extensive dry periods supported the timely sowing of sugar beet, but spring precipitation is needed

for proper germination and early crop development. Weather conditions have also allowed for the timely start and good pace of sowing activities in the southern regions of Ukraine and Russia to date, although the sowing campaign is still ongoing and will continue until mid May in northern areas.

The potato-sowing campaign has also made a good start; early varieties have already been sown in most regions. The main sowings have just started.

Potential impacts of the cold spell that started at the end of the review period in large parts of central and eastern Europe are likely to be manageable. Recently, sown crops have not emerged yet and are protected by the overlying soil. Crops that have just emerged are most vulnerable to frost damage. Therefore, early-sown potato crops are often covered with plastic sheets. Even if damaged, potatoes have a strong ability to recover, but development will be delayed. Damaged sugar beet fields could still be resown, if needed.

Maize

Generally favourable conditions led to a good start to the sowing campaign, with the exception of northern Italy where dry conditions in the Po Valley have slowed down sowing activities

The sowing of maize has started in Bulgaria, Spain (*Andalucía* and *Castilla y León*), south-western France, Italy, Hungary and Romania. In other European maize-producing countries, it should start in the next few days. In general, temperatures have been optimal, slightly above the LTA, allowing for earlier-than-usual sowing activities in many areas. However, the cold spell, which started in mid April and is expected to last at least until the end of April in northern and eastern countries of Europe, could delay sowing operations in these areas.

In Bulgaria and northern Romania, sowing activities have just got underway, while they are well advanced in southern Romania and Bulgaria, with no significant concerns.

In France, it is estimated that 30 % to 40 % of the grain maize areas were sown by the first deced of April and that sowing activities are ongoing.

Sunflowers

Sunflower-sowing activities started under contrasting conditions. Spain and Italy are facing a rain deficit, which is unfavourable for the emergence of the plants. In the most important sunflower-producing areas of Bulgaria, France, Hungary and Romania, sowing activities are advanced and emergence has benefited from favourable conditions.

In Spain, the sowing of sunflowers is on hold in *Castilla y León* due to the serious rain deficit observed since mid February. A substantial rain deficit is also observed in the eastern half of *Andalucía*. In *Extremadura*, adequate rainfall has ensured crop emergence. In Italy, no significant rainfall has been observed since the second deced of March, and seedbeds are currently too dry. Two of the main producing regions of sunflowers (*Umbria* and *Toscana*) have had a rain deficit since the beginning of March, putting emergence at risk. As temperatures have been higher than usual since the end of February in Bulgaria, Hungary and Romania (the EU's three main

In Italy, sowing activities started during the second half of March. In the areas where maize was sown, development is around the phenological stage of two to three leaves. However, the Po Valley (the most important maize region in Italy) has been affected by dry conditions, especially in the western parts of *Emilia Romagna*, southern Lombardy, some areas of *Friuli-Venezia Giulia* and *Veneto*. In these areas, soil water contents are reaching critical levels, and the vegetative growth of emerged crops could be affected very soon if the situation does not change. Water levels in lakes and river basins are also falling, which could compromise future supplementary irrigation. As a consequence, sowing activities in many of these areas are being delayed in anticipation of precipitation.

In Turkey, sowing activities have started in the northern and southern regions. In central areas, sowing activities are being delayed due to the adverse conditions since February (low temperatures and rainfall) and the snow-fall of recent days.

sunflower producers), farmers started sowing early, and sufficient rainfall has ensured a good start to the season. In France, temperatures have also remained largely above average since February, allowing for early sowing activities, and adequate rainfall has ensured sprouting in the main producing regions. Sowing activities have started in Ukraine and will be completed soon, depending on continued favourable temperature conditions (above 6 °C).

Sunflower-sowing activities are still ongoing. Apart from Italy and Spain, weather conditions are generally expected to remain positive for sowing and germination. Early sunflower sowing increases the probability of good yields. While sunflowers are resistant to drought, the seedbed needs to be sufficiently humid to guarantee emergence. In the parts of Italy and Spain where such conditions are currently lacking, the area sown could be significantly reduced.

3.2 . European Union

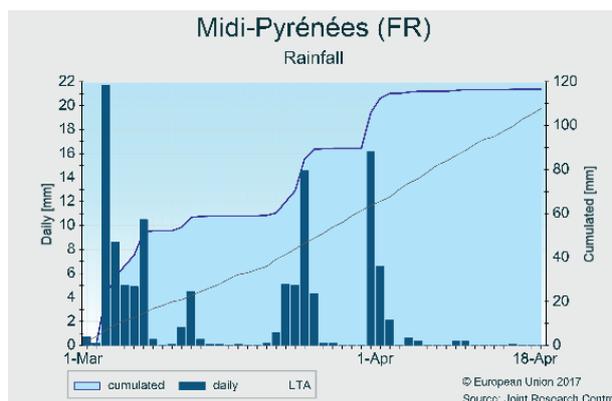
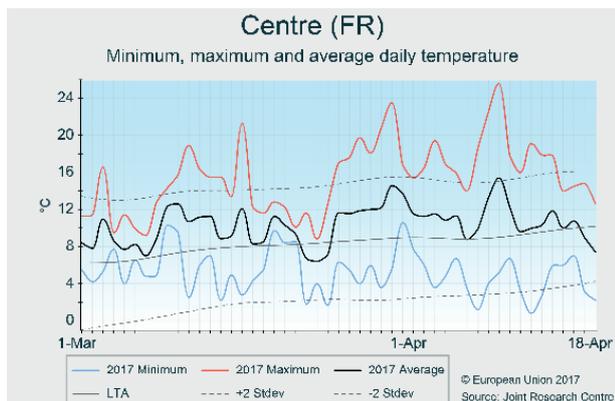
France

Dry conditions to watch

Winter crop conditions are positive following the warm temperatures and above-average global radiation observed since the beginning of March. In the northern half of the country, the dry conditions observed since autumn are raising uncertainty in the yield outlook. Rain will be needed to prevent crops being impacted by water stress in the coming weeks.

Crop conditions are generally good given the warm temperatures and above-average global radiation observed since the beginning of March. Substantial rainfall was observed at the beginning of March in all regions. However, apart from in the southernmost regions, the rain deficit is still significant, as cumulated rainfall since October is close to a record low (similar to 1976 and 1996). In *Centre, Pays de la Loire* and *Lorraine*, the rain deficit sporadically affected durum wheat and winter barley, but led to no major concerns. Disease pressure on winter cereals was relatively high, particularly on winter barley in the

northern half of the country, but the spread should be contained given the dry conditions. As soils are relatively dry, farmers will have no difficulties in applying fungicides. The substantial rainfall observed at the beginning of March interrupted spring barley-sowing activities, but the warm temperatures accelerated their progress. In the main producing regions of sunflowers and grain maize (*Aquitaine* and *Midi-Pyrénées*), the substantial rainfall since the beginning of March will ensure that farmers will complete their sowing activities and conditions for emergence are beneficial. The yield outlook for all crops still has a high degree of uncertainty and depends on rainfall in the coming weeks. If there is sufficient rainfall, the outlook will be positive, but may turn negative if dry conditions persist. In the case of rapeseed, which is reaching the end of the flowering stage, there is currently a risk of yields being affected by frosts given the cold temperatures currently observed.



Germany

Accelerated growth during March

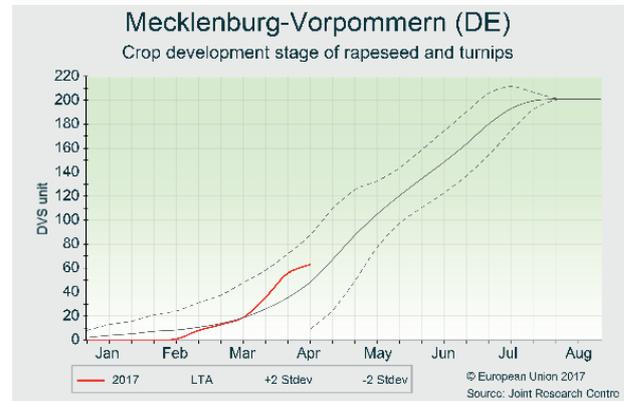
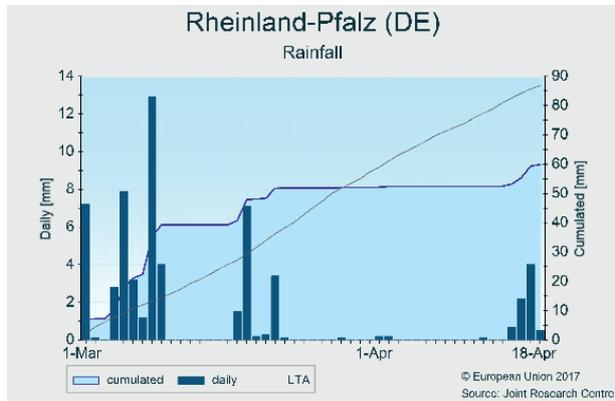
Weather conditions from March to mid April were mostly favourable, but more rain is still needed in the centre-west. Crop growth advanced well in March and slowed down again in April. Current conditions provide a favourable outlook in general, but winter rapeseed is at a critical point right now due to frosty conditions.

March was a mild month with a higher-than-usual temperature accumulation and daily maximum temperatures above the LTA. Consequently, after the rather cold winter (which was favourable in helping to avoid pest and disease pressure), crop growth has speeded up. Mild temperatures continued until mid April, followed by a period of unstable weather and considerably lower tem-

peratures associated with a risk of ground frost. This could be particularly damaging for rapeseed, which is close to or has already started flowering. Persistent low temperatures could affect winter rapeseed pollination. The significant rain deficit since winter was attenuated in eastern and northern Germany with above-average rainfall during March. In April, rainfall was around average in the north and east, but relatively low in the centre and south-west. Rainfall is expected in the coming days, but to a lesser degree for the driest areas located in Rheinland-Pfalz and Saarland. The rainfall deficit in the centre-west, since the beginning of the year in the range of 40-100 mm, and even greater locally, will therefore

continue. Spring sowing activities are underway but not yet complete. Maize-sowing activities have just started, with a potential risk of delay due to the current cold temperatures. Forecasts at this stage of the season are mainly based on historical trends and averages, but the

general crop growth conditions are satisfactory and a good yield potential is expected for winter cereals. The outlook is less optimistic for rapeseed, as explained above.



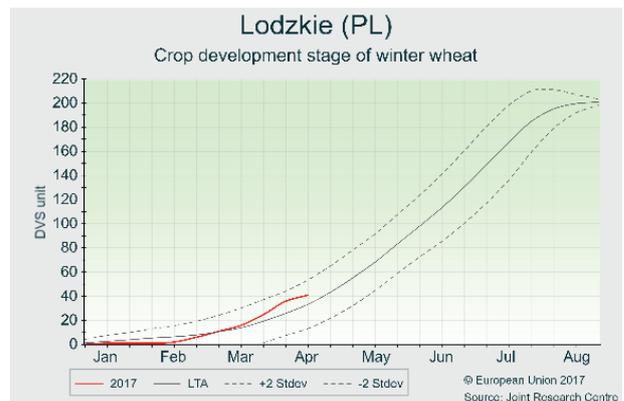
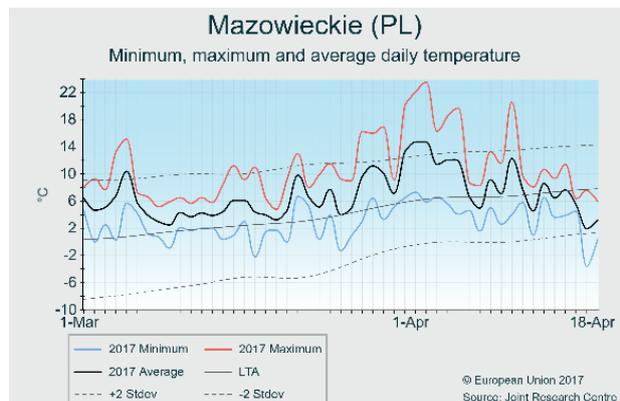
Poland

Promising conditions

Warm weather and satisfactory water availability are providing a positive start to the season. Since mid February, temperatures have remained above the LTA, accelerating the development of winter crops and creating favourable conditions for the sowing of spring crops.

Temperature accumulation (base 0 °C) since the beginning of March has been one of the highest since 1975, particularly in southern regions. After the temperature drop in January and February (see previous bulletin), temperatures have been constantly above the LTA. The cold spell that started in mid April and is expected to last until the end of the month, with minimum temperatures falling below 0 °C (– 3.4 °C in *Mazowieckie* and – 3.8 °C in *Lubelskie*), is unlikely to cause damage to staple crops and will just slow down development. Precipitation since the beginning of the year was around

the LTA or slightly below in the whole country. Rainfall during the last few days of the review period, and forecast for the coming week, will bring precipitation well above the LTA and will replenish soil water levels. Warm thermal conditions in March and April, together with recorded and expected precipitation, are creating very good growing conditions for winter crops and ideal conditions for spring and summer crop sowing throughout the country. Crop model simulations indicate higher-than-average biomass accumulation and leaf-area development. The overall picture is positive but, as it is still very early in the season, and considering the low temperatures during the past few days, our previous forecast (based on historical trends) has been maintained.



Ireland and the United Kingdom

Crops are faring well but more rain is needed in the south-eastern United Kingdom

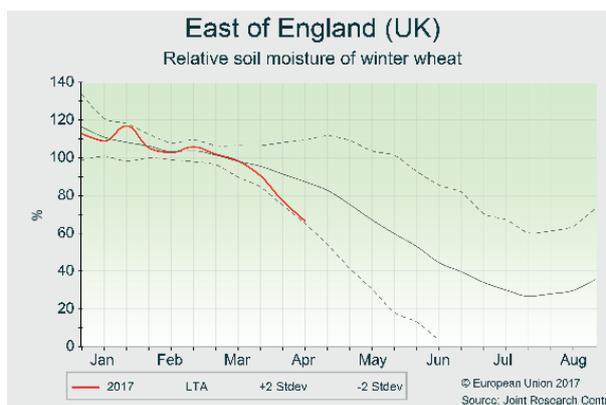
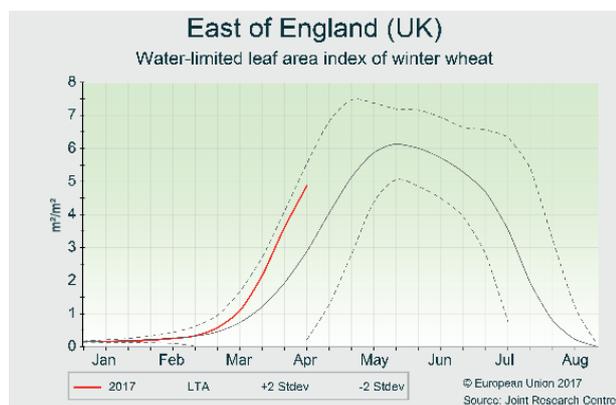
Above-average temperatures and high levels of sunshine have been favourable for the growth and development of winter crops, but more rain is needed to sustain high yield potentials in the important cropping regions of the south-eastern United Kingdom. Spring sowing is progressing well.

Temperatures in the British Isles almost constantly fluctuated above the LTA, with no extreme anomalies. Frosts in the agricultural areas were absent or sparse, with minimum temperatures that did not drop below $-4\text{ }^{\circ}\text{C}$.

Rainfall was below average in most agricultural areas of Ireland and the United Kingdom, especially in April. The deficit is most pronounced in the southern and south-eastern United Kingdom, which received almost

no significant rain from 21 March until the end of the review period.

Winter crops are faring well. Crop development is advanced in Ireland and in the United Kingdom thanks to the warm thermal conditions. However, more rain is needed to sustain good growth, especially in the south-eastern United Kingdom where winter crops on light soils have already started to present signs of water stress. Rain during the last days of the review period and forecast for the coming days will mitigate the situation, but more will be welcomed to fully restore soil moisture levels. Spring sowing is progressing well but emerging crops would also benefit from more rain. As it is still early in the season, yield outlooks are maintained at the historical trend or the 5-year average



Spain and Portugal

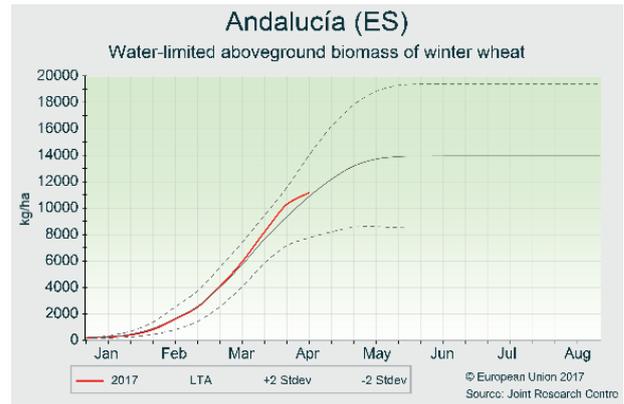
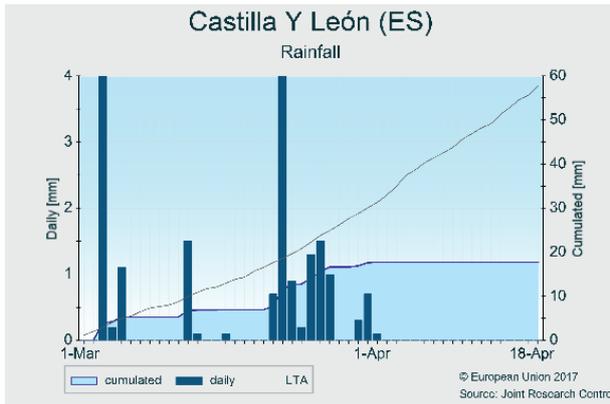
Dry conditions in the north-west

Temperatures in March and April remained above average in all regions, leading to the advanced development of winter cereals. Precipitation is close to the average except in the north of Castilla y León, where low soil moisture levels are starting to raise concerns. The yield outlook for winter cereals is close to the average.

Spring conditions have been unusually mild in the Iberian peninsula, as temperatures registered in March and April have so far been systematically $2\text{--}3\text{ }^{\circ}\text{C}$ above the LTA. Precipitation was close to the average in most of the main cereal-producing regions, with the exception of the north-west (*Castilla y León*). There, the dry conditions observed during winter are persisting, and only sparse rainfall was registered in March and April. Winter cereals are in the grain-filling stage in the southern half of the peninsula (*Alentejo* and *Andalucía*) and

are flowering in the east (*Aragón*). In both areas, crop status is positive and the overall yield expectations for winter cereals remain close to the average. In the north-west of *Castilla y León*, where soil moisture is substantially lower than usual, the yield potential of wheat and barley may be drastically reduced if rainfall continues to be scarce in the coming weeks.

Sunflower-sowing activities are underway in the Iberian peninsula, aside from in the north-west, where farmers are waiting for rainfall to increase soil moisture in order to guarantee adequate germination. The sowing campaign of maize has just started and, particularly in *Andalucía* and *Castilla y León*, water reserves are lower than in previous years, which could constrain irrigation during the summer months.



Italy

Dry conditions in the Po Valley and the Tyrrhenian coastal regions

Warm weather throughout the Italian peninsula is pushing thermal accumulation above the LTA. Precipitation has been sparse, especially in the Po Valley, the Tyrrhenian coastal regions and Sicily.

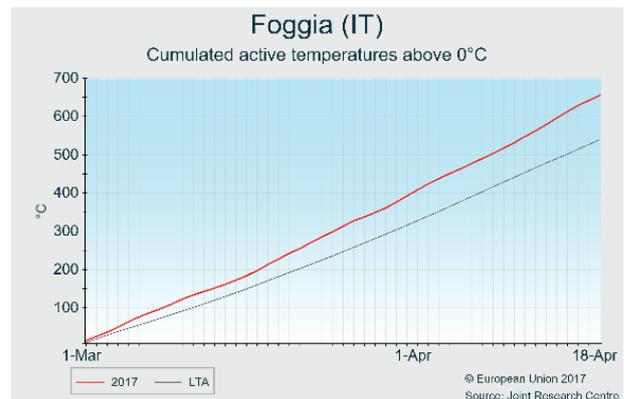
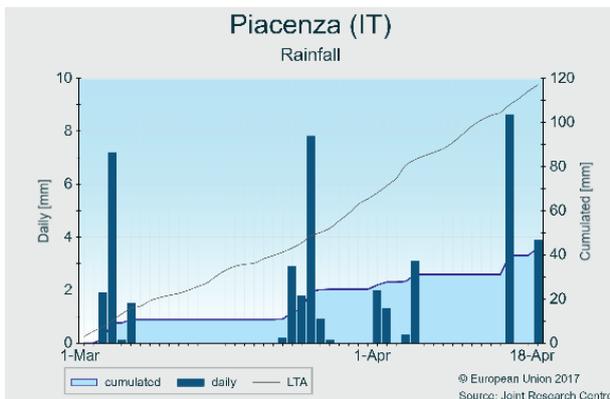
After the cold spell at the end of January, warm temperatures pushed the thermal accumulation (base 0 °C) above the LTA. However, the cold wave that started in mid April is slowing down thermal accumulation. In northern regions, minimum temperatures fell to around 0 °C, causing some late frost events. However, this had no major impact on crops.

In many areas of the Po Valley, precipitation has been scarce since the end of 2016. In these areas, soil moisture contents are reaching critical levels and water levels in lakes and river basins are falling, which could compromise future supplementary irrigation. The growth of the

already sown and emerging summer crops could also be affected. In many areas, maize sowing is being delayed, waiting for precipitation. Low levels of precipitation were also recorded in the Tyrrhenian coastal regions and in western Sicily, where durum wheat growth was reported to be reduced. Late sowing activities could be affected if this situation persists (*source: SIAS Regione Sicilia*).

The central Adriatic coastal regions and the southern regions received below-average but sufficient levels of precipitation, which, combined with the above-average thermal conditions recorded so far, results in a positive outlook.

Our forecasts are still in line with the historical average, as a change in the precipitation trend would still improve the situation in the drought-affected areas.



Hungary

Favourable spring sowing conditions but risk of water shortage

March and the first half of April were warmer and drier than usual. Winter crops show advanced development and above-average leaf-area expansion and biomass accumulation. Rainfall is needed, however, to prevent negative impacts of water shortage. The spring sowing campaign is progressing well.

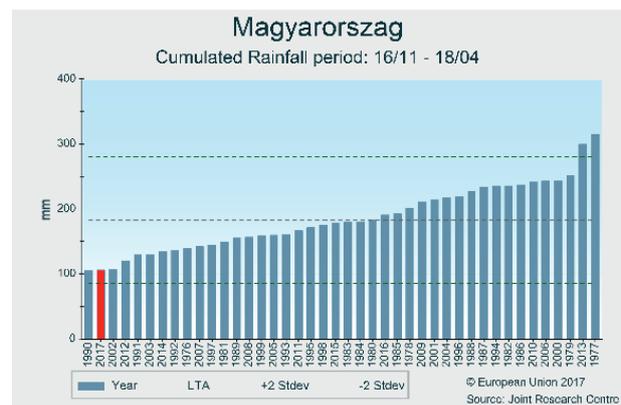
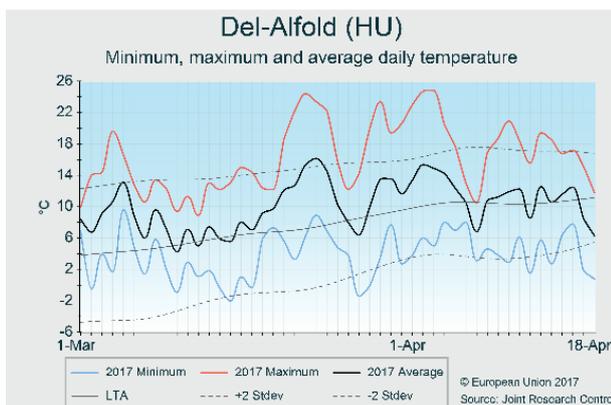
After the mild late February, warm weather persisted during March and the first days of April. The daily temperatures exceeded the LTA by 2 °C to 4 °C. Near-average thermal conditions have prevailed since 5 April. Rainfall was sparse during the review period, resulting in only 10-40 mm of precipitation. Large areas west of the Danube and some regions along the eastern border were particularly dry, with half of the usual amount of precipitation. The climatic water balance indicates considerable shortage (100 mm) since mid November. The

past 5-month period is among the driest in Hungary, thus presenting a high risk of spring drought.

Winter crop phenology is advanced by 5 to 10 days. The warm weather helped the plant stands to recover after the freezing winter and boosted biomass accumulation and leaf-area expansion. Good water supply and warm weather conditions would be beneficial for rapeseed crops, which have started to flower.

Scarce rains and warmer-than-usual topsoil have provided good conditions for field preparations and facilitated the sowing of spring barley and sugar beet. The sowing campaign of sunflowers, potatoes and maize has started and is progressing slightly ahead of schedule.

The yield forecast for winter cereals was maintained, while the yield outlook of rapeseed was revised slightly downwards.



Romania

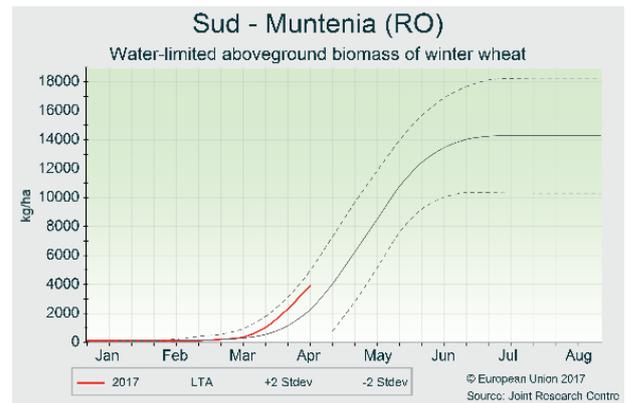
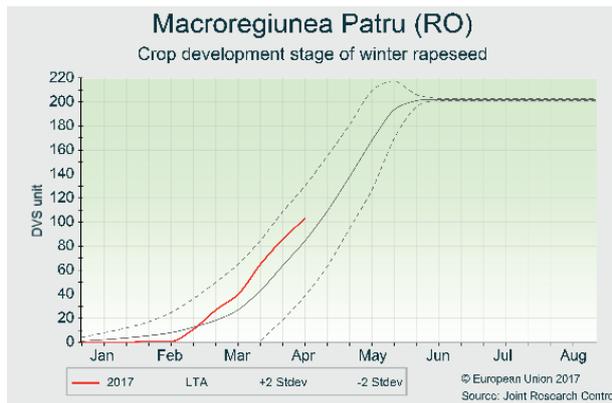
Positive outlook for winter crops

Warm weather accelerated crop development, and the biomass accumulation of winter crops is remarkable. The spring sowing campaign progressed normally thanks to the dry periods between rainfall events. Soil water levels are replenished. Overall, the yield outlook is positive and the forecast for winter cereals was revised upwards.

This March ranks as the warmest of the past 42 years. Daily mean temperatures were mostly 3 °C to 5 °C above the LTA. In early April, thermal conditions became near average or slightly colder than average in southern Romania, whereas the northern areas remained moderately warmer than usual. Precipitation presented high spatial and temporal variability. In the *Centru* and *Sud-Est* regions, only 20-40 mm of rain was recorded, while the northern and southern regions experienced abundant (locally even excessive) rainfall (50-100 mm) dur-

ing the review period. The period between 20 March and 5 April was less rainy, allowing for the good progress of spring barley and sugar beet-sowing activities. Topsoil conditions are adequate for the timely sowing of maize and sunflowers.

The mild conditions in March facilitated the regrowth of winter cereals and led to accelerated phenological development. Water supply was adequate, except in the *Nord-Est* region, where overly wet conditions prevailed in March but without significant impact on winter cereals. Our crop model simulation indicates above-average biomass accumulation of winter wheat crops in the eastern and southern parts of the country, whereas in the central and some smaller north-eastern areas, biomass accumulation lags behind. As the picture as a whole is very positive, our yield forecast was revised upwards.



Bulgaria

Winter crops are in good shape

Since early March, weather conditions in Bulgaria have been characterised by milder-than-usual thermal conditions and near-average precipitation. The spring sowing campaign started early and progressed well, with rainfall causing only sporadic local delays. Winter cereals are in good condition; they present advanced development and above-average biomass and leaf-area indices.

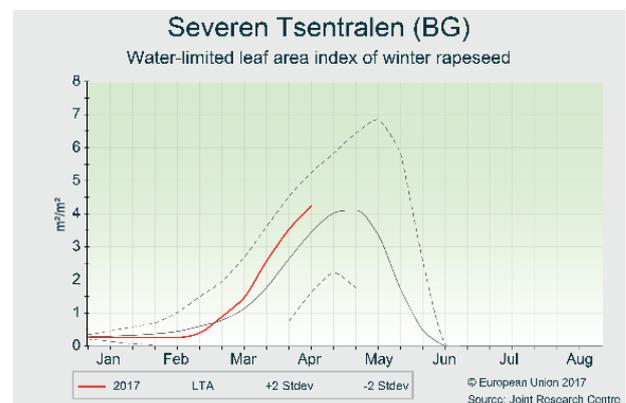
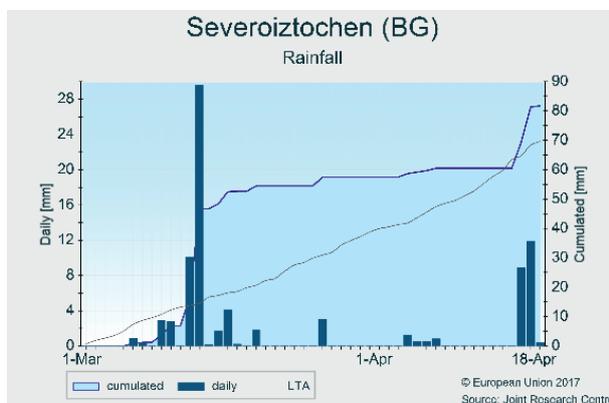
In March, daily temperatures almost persistently fluctuated above the LTA, leading to a positive anomaly of 3 °C to 4 °C. The first half of April presented near-average or slightly above-average thermal conditions.

Considering the review period (1 March–18 April) as a whole, precipitation was close to the LTA. However, its temporal distribution was unequal, with plentiful rainfall during the first half of March followed by fewer and much smaller events until the end of the review period.

Winter cereals present slightly early development, whereas rapeseed crops are considerably advanced. According to our models, biomass accumulation and canopy expansion are significantly above average. In mid April, soil moisture content under winter crops fell to slightly below the average but still meets plant water requirements.

From the second decadal of March onward, the dry topsoil conditions facilitated spring sowing activities. The mild temperatures allowed for a timely or even an advanced start to sunflower-, maize- and potato-sowing activities. The sowing campaign is progressing well, but more rain would be favourable for the adequate emergence and early growth of summer crops.

The yield outlook for winter cereals is positive, but rain is needed to sustain the yield potential. The yield forecast for summer crops is based on the historical trend.



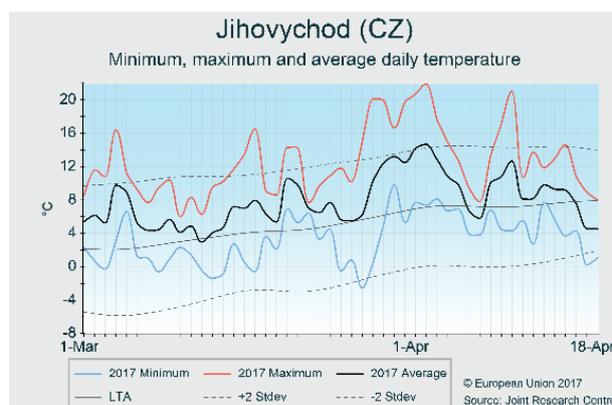
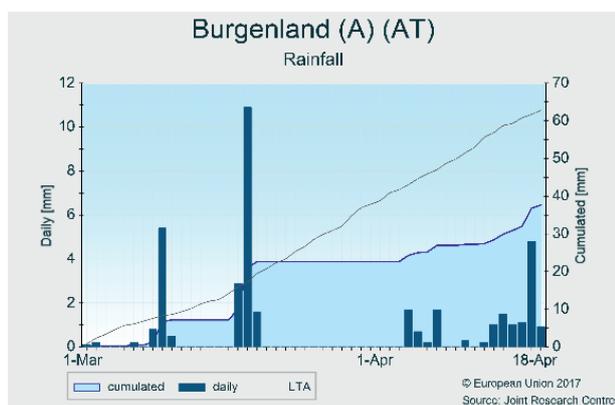
The Czech Republic, Austria and Slovakia

Unusually warm weather followed by a cold spell

March weather conditions were among the warmest on record. The warmer-than-usual weather continued during the first half of April, followed by an abrupt drop in temperatures. Winter crops are generally in good condition, but the rainfall deficit is starting to have an impact. The sowing of summer crops is underway.

March was among the warmest months on record since 1975, with average temperatures of 2 °C to 4 °C above the LTA. The unusually warm weather anomaly continued during the first half of April followed by an abrupt temperature drop during the last days of the review period. A rainfall deficit was recorded in major parts of southern and eastern Austria, the south-eastern part of the Czech Republic and regionally in Slovakia. Rainfall cumulates in the most affected

areas did not exceed 40 mm. Winter crops are generally advanced and in good condition; however, the lack of soil moisture in the abovementioned areas is starting to have an impact on growth. The yield potential for soft wheat in the affected regions will greatly depend on the weather in the coming month while approaching the most sensitive stage of flowering. In addition, the cold conditions that are forecast to dominate the weather during the second half of April is expected to slow down crop development. The extent of the impact on crops will depend on minimum temperatures. This is especially relevant for winter rapeseed, which is approaching flowering. The lack of soil moisture also interferes with the sowing of summer crops, which due to the warm weather conditions has already started in many regions.



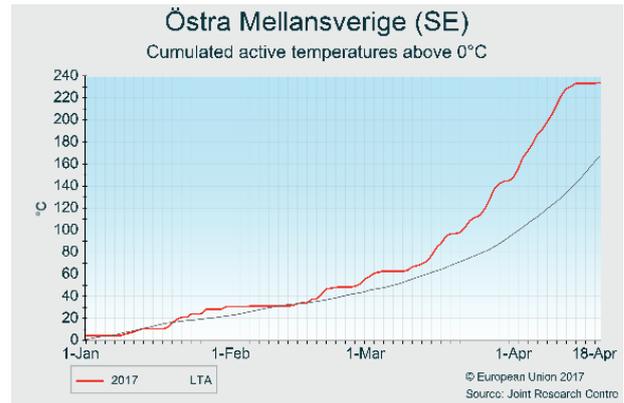
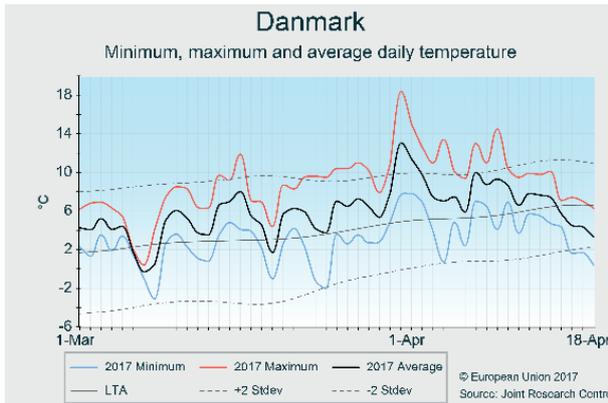
Denmark and Sweden

Advanced crop development interrupted by a cold spell

While the period from 1 March to mid April was characterised by very mild temperatures, the region was subjected to a severe frost in the subsequent Easter period. Crop development, which was generally advanced due to the mild temperatures, slowed down due to the recent frost period. Eastern parts of Sweden exhibit a water balance deficit.

The temperatures in Denmark and Sweden were clearly above average in the review period (with the exception of northern Sweden), which led to accelerated crop development. However, temperatures dropped considerably in mid April, first in the northern areas of Sweden (around 11 April) and then also in Denmark (after 14 or 15 April). The cold conditions are forecast to continue for a 5-8-day period after the review period. So far, dur-

ing this cold period, temperatures have been about 4 °C to 5 °C colder than the local LTA for Denmark and for the Swedish regions *Sydsverige*, *Västsverige* and their adjacent areas, but around 5 °C to 7 °C colder in eastern and northern Sweden. Minimum temperatures oscillated accordingly, reaching their lowest values around mid April (e.g. – 8 °C to – 9 °C in *Östra Mellansverige* and *Norra Mellansverige*, respectively). Thanks to the abundant precipitation after 10 April, the water balance is back in the positive range, except for the Swedish region of *Stockholms län*. Spring barley-sowing activities are complete or ongoing under mostly favourable conditions. Only the very southern Swedish region of *Skåne län* suffered from excessive rainfall during the usual sowing period.



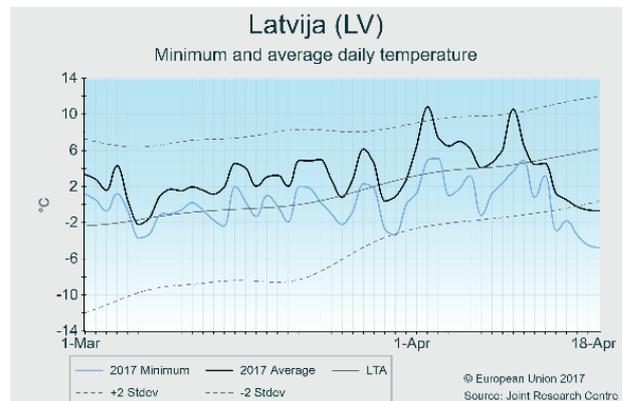
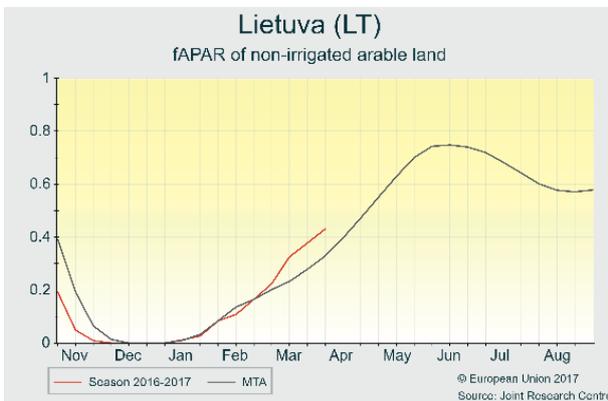
Estonia, Latvia, Lithuania and Finland

Early start to the spring sowing campaign

Overall, warmer-than-usual weather provided good conditions for the growth of winter crops and the sowing of spring crops, which has started earlier than usual. The current outlook is positive so far, but this could worsen if the cold temperatures recorded since 14 April persist.

Thermal conditions were generally milder than the LTA during the period under review (1 March–18 April) in all countries, and were especially marked in southern Latvia and Lithuania, where temperature accumulation was significantly above average until 13 April. Precipitation in the Baltic region was generally abundant in March and scarcer in April, while Finnish agricultural areas benefited from regular and abundant precipitation throughout the whole period, after a particularly dry winter. The mild temperatures since March led to the spring sowing campaign getting started in Lithuania in mid March, around 2 weeks earlier than usual. The

favourable weather also allowed farmers to apply the fertilisation treatment of winter crops, which is especially necessary for the soft wheat and rapeseed crops that were most impacted by the two frost-kill episodes of winter, thus compensating for any possible lack of nutrients to stimulate crop growth. Conditions suddenly changed during the last 5 days of the review period, with temperatures dropping across the whole region to minimum values of less than $-2\text{ }^{\circ}\text{C}$. Overall, winter crop development and biomass accumulation is above average because of the milder-than-usual conditions from 1 March until 13 April. It is too early to evaluate any impact of the current cold spell, which could constrain winter crop development and spring fieldwork if it persists in the coming weeks. Our current forecast is based on historical averages and trend values, and thus maintains the values from the last bulletin.



Belgium, Luxembourg and the Netherlands

Adequate crop development but more rain is needed in southern areas

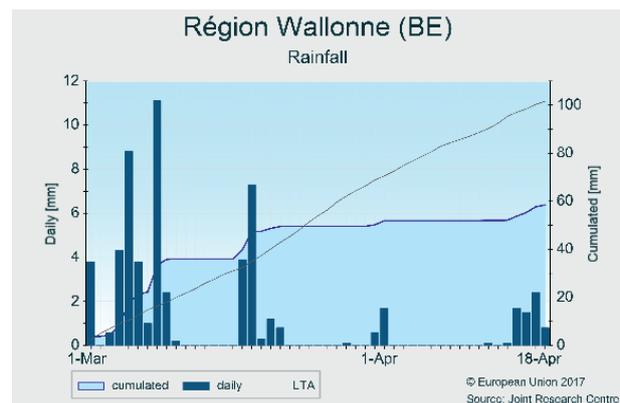
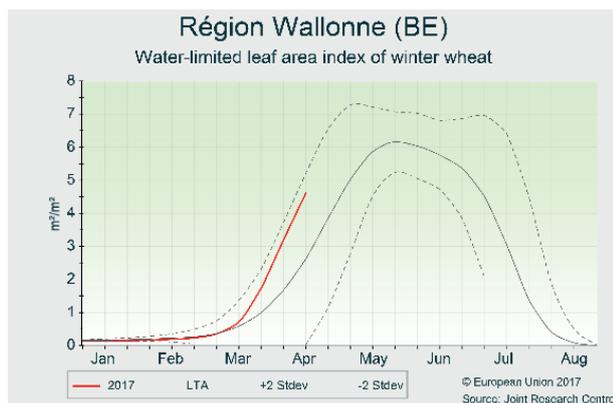
Above-average temperatures and high levels of sunshine have been favourable for the growth and development of winter crops, but more rain is needed to sustain high yield potentials, especially in southern Belgium and Luxembourg. Spring sowing is progressing well.

Temperatures in the Benelux countries almost constantly fluctuated above the LTA, with no extreme anomalies. Frosts in the agricultural areas were absent or sparse with minimum temperatures that, with some exceptions, did not fall below $-2\text{ }^{\circ}\text{C}$. The end of the review period presented a sudden temperature drop, however, which is forecast to continue for about 1 week and during which minimum temperatures are likely to present lower values in Luxembourg and eastern parts of Belgium and the Netherlands.

Rainfall was below average in almost all parts of the Benelux countries. The deficit is most pronounced in southern Belgium and Luxembourg. Most areas received

almost no significant rain from mid March until the end of the review period.

Winter crops are generally faring well. Crop development, which was lagging behind, is often advanced now thanks to the warm thermal conditions of the past 2 months. More rain is needed to sustain continued good growth. Rain during the last days of the review period and forecast for the coming days will restore soil moisture levels, but to what extent remains to be seen. Sugar beet sowing is practically complete and potato sowing has made a good start. Emerging crops would also benefit from more rain, and some areas are likely to be affected by the cold spell, depending on its duration and severity. Nevertheless, the overall picture provides a fairly positive outlook for now. As it is still early in the season, yield forecasts are maintained at the historical trend or the 5-year average.



Greece and Cyprus

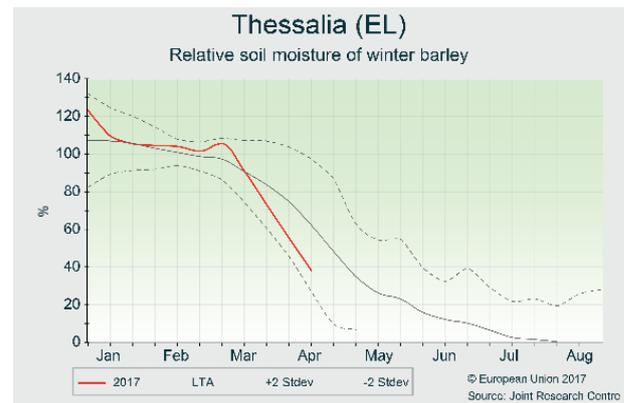
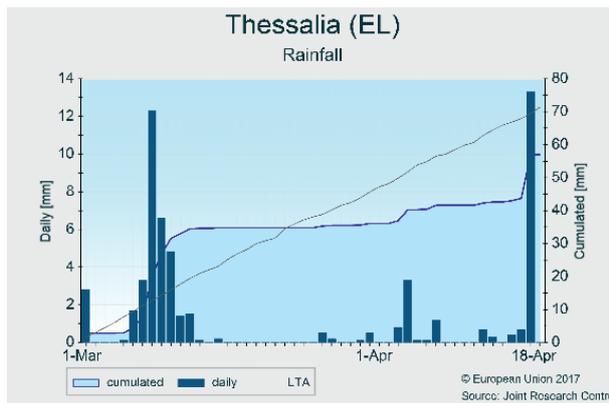
A fairly positive outlook

Warm temperatures in Greece boosted the biomass accumulation of winter crops. Precipitation around mid April sustained average yield expectations for winter crops. Maize-sowing activities started in April under favourable conditions. In Cyprus, the yield outlook for winter crops is also fairly positive.

March temperatures were warm, promoting the leaf-area expansion and biomass accumulation of winter crops. Crop model simulations for winter crops and remote sensing observations agree on the boost in canopy density between mid March and mid April due to the increased temperatures. In Thessalia, the phenological development of barley and wheat accelerated from delayed to normal stages in April. In northern Greece, where the leaf-area expansion of winter crops is now above average, well-distributed precipitation

and above-average temperatures have driven optimal growth. The associated increased crop water demand should be supported by precipitation during the coming weeks to avoid soil water shortages during the grain-filling stage. Maize-sowing activities started in April under favourable conditions: the dry conditions at the end of March favoured field preparations, while the precipitation around mid April has been beneficial for seed germination.

In Cyprus, the end of the winter crop-flowering stage was delayed by almost 10 days compared to an average season. Some sparse rainfall events around mid March and in April helped to maintain soil moisture above critical levels and to prevent early senescence and reduced grain yield of non-irrigated crops such as barley.

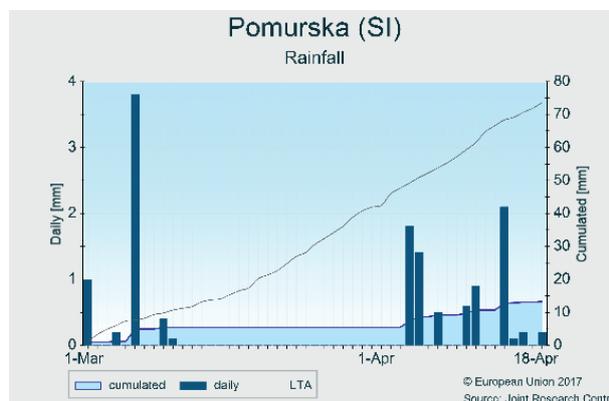


Croatia and Slovenia

Warm weather with contrasting rainfall conditions

March weather conditions were among the warmest on record (since 1975). Warmer-than-usual weather continued into April but was interrupted by a pronounced cold spell at the end of the analysis period. North-eastern Croatia and Slovenia (especially the north-eastern part) face a substantial rainfall deficit. The lack of soil moisture is limiting the growth of winter crops in these regions. The sowing of summer crops is ongoing. March was among the warmest on record (since 1975) in both countries, with average temperatures of more than 3 °C above the LTA. Maximum daily temperatures reached 21 °C to 25 °C. Less than 20 mm of rainfall has been recorded since the beginning of March in north-eastern Croatia and north-eastern Slovenia, making the analysis period the driest on record for these regions. Parts of coastal Croatia and the rest of Slo-

venia also faced a strong rainfall deficit, whereas conditions in eastern Croatia were close to normal. In the most affected regions, the lack of rainfall is limiting the growth of winter crops. In the main agricultural production areas of eastern Croatia, winter crops are generally in good condition. The yield potential of soft wheat will greatly depend on the weather in the coming decades, coinciding with the sensitive stage of flowering. The sowing of grain maize has already been ongoing since the beginning of April (especially on shallow soils) in order to take advantage of the remaining soil moisture from the winter months. Due to a cold air inflow, the air temperatures in Slovenia dropped below 0 °C at the end of the analysis period, mostly affecting winter rapeseed, which is approaching the flowering stage, and potato crops that have already emerged.



3.3. Black Sea area

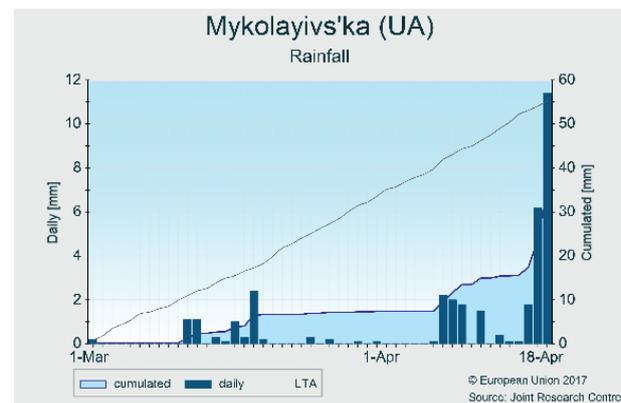
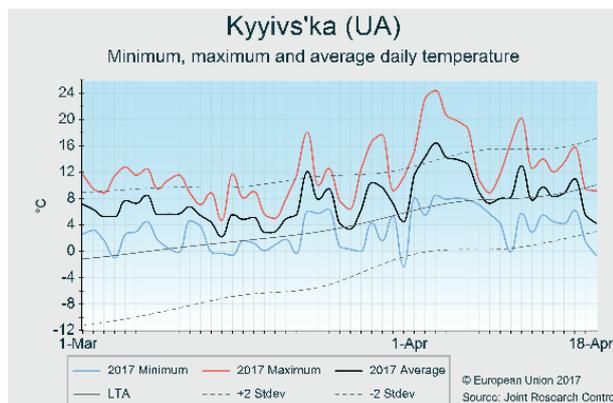
Ukraine

A positive perspective

Weather conditions since the beginning of March have been beneficial to winter cereals and spring-sown grains. A substantial rain deficit was observed in central and eastern Ukraine, but substantial rain is forecast in the coming days. The outlook is turning positive.

Temperatures have remained 3 °C to 4 °C above average since the beginning of March. The mild temperatures have been favourable for winter cereals to restart their growth after dormancy during a long and cold winter. After the snow melted, concerns about the possible impact of frost kill on winter crops were dispelled. Soft wheat is reported to be in good condition. The above-average temperatures were also beneficial

for the early sowing of spring barley. Since the beginning of March, central and eastern Ukraine has received half of the average rainfall for the period, prolonging a rain deficit already observed in February. The rain deficit had no impact on crop development and should be filled soon, as substantial rainfall is forecast in the areas concerned. Grain maize-sowing activities have recently started in the southern Oblasts, and sunflower sowing is progressing quickly. The expected rain will be beneficial, but temperatures have dropped in the past few days, which could lead to interruptions in the sowing activities.



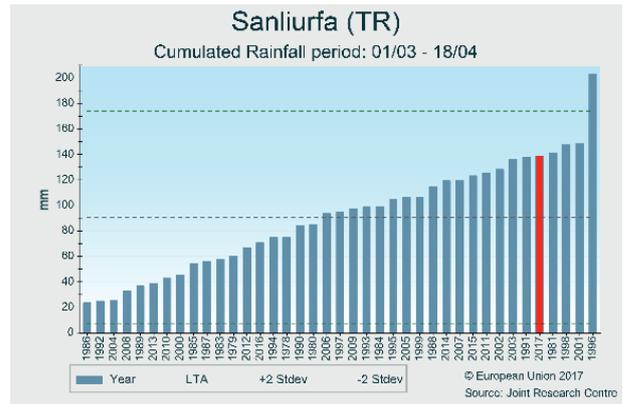
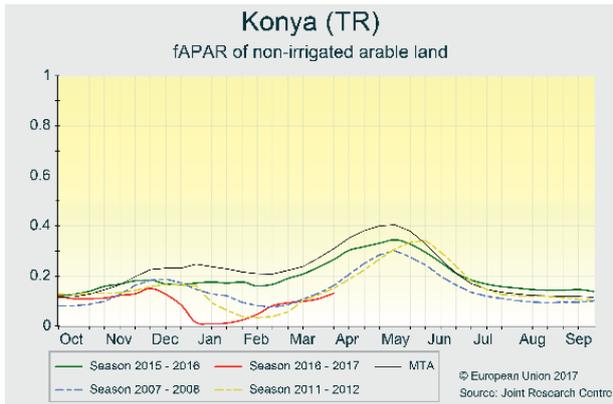
Turkey

Increasing concerns about winter crops in Anatolia

March and April had well-distributed precipitation and cumulated temperatures are generally above average. In south-eastern regions, winter crop development is favourable, but in central Anatolia winter crops appear to be underdeveloped. Yield forecasts for wheat and barley are now slightly below the 5-year average and are likely to decrease if the current trend in Anatolia persists.

Remote-sensing information suggests that the main agricultural regions of central Anatolia (*Ankara, Konya* and *Kirikkale*) still present significant deficits of biomass accumulation (e.g. fAPAR Ankara). These regions account for more than 20 % of winter crop production in Turkey. The fAPAR trend observed indicates that biomass production is in line with that of 2007-2008, when the lowest national yield of winter cereals in the past 10 years was recorded. The reason for the current year's trend in central Anatolia is not fully understood; the sufficient rain and favourable thermal conditions during spring should have triggered a more relevant

boost in crop growth. The late sowing during dry conditions in autumn and the persistent snow cover during winter may be a more plausible explanation. While the snow cover provided insulation against the freezing air temperatures, its persistence may have caused respiration problems for crops that had not fully hardened. The negative crop status in the Anatolia region is partially compensated for by the positive development in other parts of the country, especially in south-eastern Turkey (*Mardin, Şanlıurfa, Gaziantep* and *Malatya*), where around 30 % of durum wheat is produced. One of the wettest springs on record sustained accelerated wheat development (which was delayed and is now close to average) and biomass accumulation, which is currently above average. Maize-sowing activities have been favoured by the well-distributed rain, but some concerns remain about water reservoirs for summer crop irrigation.



3.4. Belarus and European Russia

European Russia

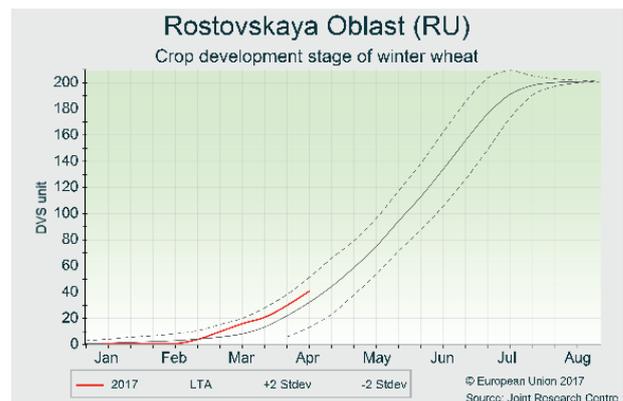
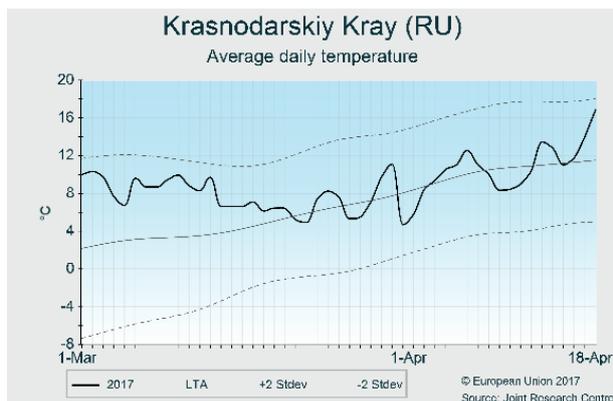
Mild weather conditions

Above-average temperatures and moderate rainfall provided favourable conditions for crops. The development of winter cereals is moderately advanced. Canopy development and biomass accumulation are mostly around average, but crops are underdeveloped in some important wheat-production areas between the Black Sea and the Caspian Sea, probably due to bad wintering. Spring sowing activities in southern Russia are making good progress.

Extremely mild weather conditions started in mid February and persisted during March in most of European Russia. Daily temperatures typically exceeded the LTA by 3 °C to 5 °C. In April, the daily temperatures fluctuated closer to the average, resulting in a moderate (1 °C to 2 °C) positive thermal anomaly in a wide region of Russia, encompassing the southern part of the *Central*, the western part of the *Near Volga* and the northern part of the *Southern Okrugs*. Only the south-eastern regions of the *Near Volga Okrug* presented near-average thermal conditions during the review period.

Since 1 March, only 20-50 mm of rainfall has been recorded in the southern half of Russia, whereas the agriculturally less important northern areas have received abundant (typically 60-100 mm) precipitation. The warmer-than-usual and drier-than-usual weather allowed for a timely (or even early) start and adequate progress of the spring sowing campaign in southern Russia.

Regarding winter cereals, the mild weather facilitated crop recovery after the winter dormancy period, and accelerated crop development in the main wheat-producing south-western region. Remote-sensing images depict a positive picture with above-average canopy expansion and biomass accumulation, but some areas along the Caucasus mountains (primarily in *Krasnodarsky kray* and *Stavropolsky kray*) are lagging behind, most likely due to the frost-kill damage of the previous winter.



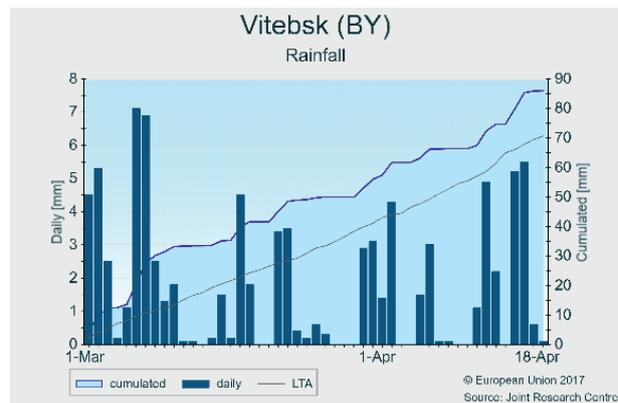
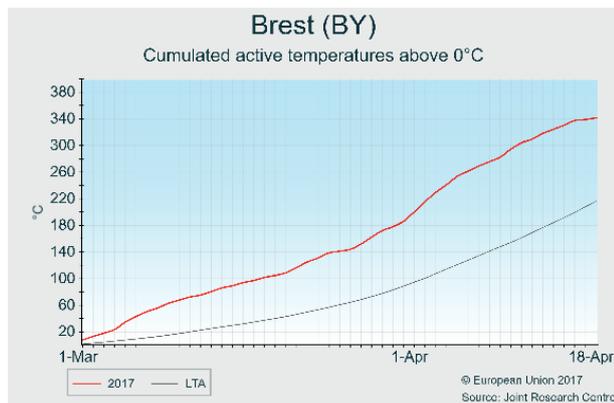
Belarus

Good crop conditions

Warm temperatures and good water availability during March and April accelerated winter crop development and created favourable conditions for spring sowing.

Temperatures have constantly been above the LTA since the second half of February, pushing up thermal accumulation (base 0 °C) throughout the country, leading to anomalies of up to 140 °C (*Brest* region). This rapid thermal accumulation slowed down by mid April due to the cold spell that was crossing Europe and that is expected to last until the end of the month. Temperatures have fallen below 0 °C (minimum temperature of – 8 °C in the *Vitebsk* region), but this should not cause any problems for crops in this period of the season. Precipitation since the beginning of March has been well above the LTA in most of the country (around the LTA in the *Mogilev* region).

The predominantly favourable temperature conditions and the optimal soil water content are creating very good growing conditions for winter crops and ideal conditions for the start of spring and summer crop-sowing activities (which normally start between the end of April and early May). Our crop model shows very fast crop development and biomass accumulation, well above the LTA, since the second half of February. This rapid development was halted by the cold spell. Overall, the outlook is positive but, as it is still very early in the season and considering the low temperatures during the last few days of the review period, our previous forecast (based on the historical average) has been maintained.



3.5. Maghreb

Algeria, Morocco and Tunisia

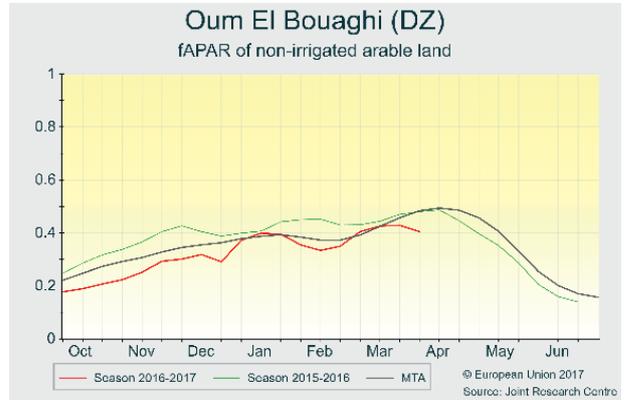
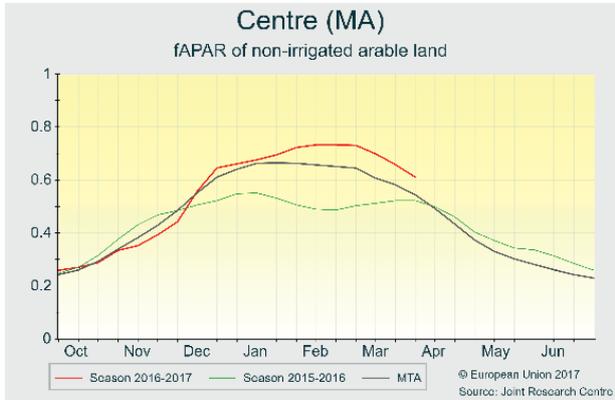
Winter cereals in eastern Algeria affected by persistent drought stress

The generally dry conditions during March have worsened the drought situation in eastern Algeria, thus constraining yields. Morocco and Algeria faced the dry conditions with higher soil water reserves and the positive (Tunisia) to excellent (Morocco) yield outlook remains unchanged. Lack of precipitation has marked the beginning of spring in the Maghreb, since only little rain in northern Morocco and central-coastal Algeria was recorded during March. The first decad of March was unusually warm (although $T_{max} < 30$ °C) in the three countries, after which temperatures dropped to around average until the end of the review period (1 March–18 April). In Morocco, these weather conditions coincided with the grain filling of winter cereals, and the positive remote-sensing signal

to date does not show any evidence of stress. Agricultural areas in Tunisia benefited from precipitation in April, which was the first significant rainy episode since mid February. However, abundant rain during winter had provided sufficient water to sustain crop development during flowering and the outlook remains positive so far. In Algeria, the situation is more delicate. After a very dry winter and spring until March, rains were recorded during April in the eastern half of the country, but they came late and the first signals of constrained yield potential were recorded at the beginning of flowering. A similar signal of reduced biomass accumulation (as reflected in fAPAR) appears in the western regions of *Tiaret*, where conditions have remained dry since Jan-

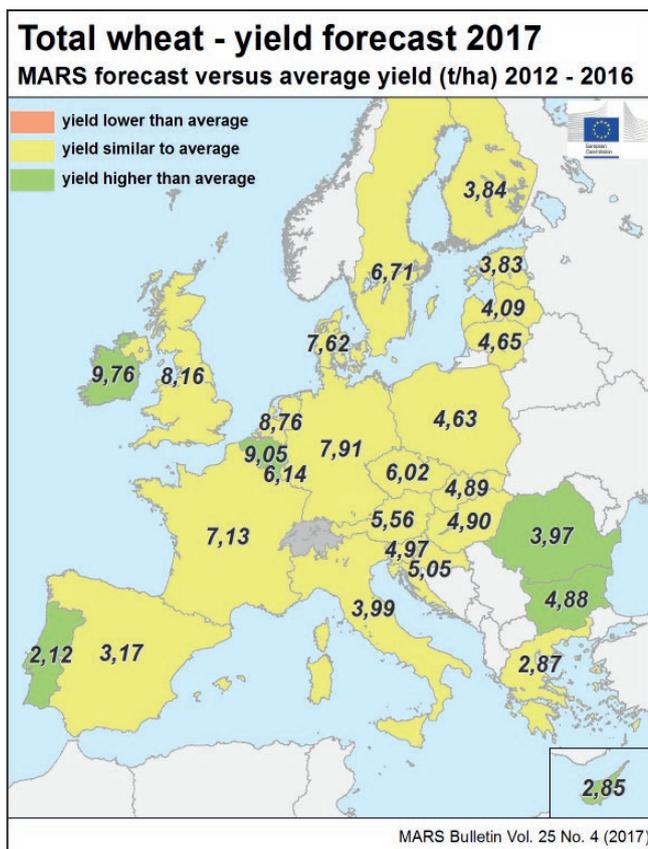
uary. In the rest of western and central Algeria, which received more abundant rainfall throughout the season, soil water reserves have been sufficient to sustain grain formation so far and the outlook is average. Yield

forecasts were revised downwards to below average in Algeria, while they remain unchanged for Morocco and Tunisia.

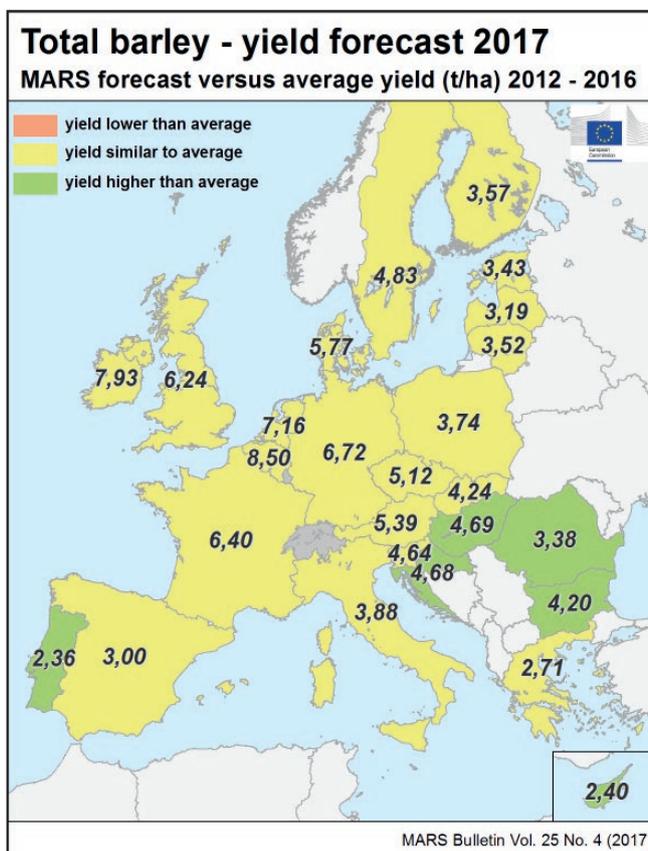


4. Crop yield forecasts

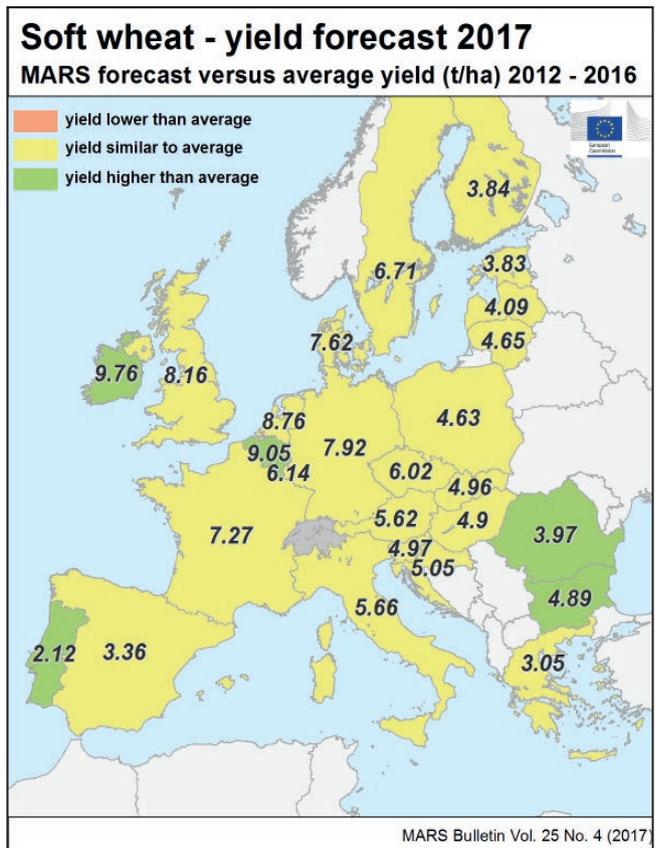
Country	TOTAL WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.60	5.37	5.79	+ 3.3	+ 7.8
AT	5.48	6.22	5.56	+ 1.5	-11
BE	8.52	6.65	9.05	+ 6.3	+ 36
BG	4.32	4.94	4.88	+ 13	-1.2
CY	2.36	2.51	2.85	+ 20	+ 13
CZ	5.88	6.52	6.02	+ 2.3	-7.8
DE	7.95	7.65	7.91	-0.4	+ 3.5
DK	7.54	7.19	7.62	+ 1.0	+ 5.8
EE	3.77	2.77	3.83	+ 1.6	+ 38
ES	3.07	3.53	3.17	+ 3.2	-10
FI	3.84	3.77	3.84	-0.1	+ 1.9
FR	6.94	5.30	7.13	+ 2.7	+ 35
GR	2.83	2.35	2.87	+ 1.6	+ 22
HR	5.04	5.64	5.05	+ 0.3	-10
HU	4.72	5.38	4.90	+ 3.7	-8.9
IE	9.13	9.62	9.76	+ 7.0	+ 1.5
IT	3.96	4.20	3.99	+ 0.6	-5.1
LT	4.66	4.36	4.65	-0.2	+ 6.6
LU	5.95	5.07	6.14	+ 3.1	+ 21
LV	4.20	4.30	4.09	-2.6	-4.9
MT	-	-	-	-	-
NL	8.89	8.01	8.76	-1.5	+ 9.3
PL	4.52	4.54	4.63	+ 2.3	+ 1.9
PT	1.82	2.31	2.12	+ 17	-8.3
RO	3.52	4.05	3.97	+ 13	-2.1
SE	6.53	6.32	6.71	+ 2.8	+ 6.2
SI	5.08	5.19	4.97	-2.1	-4.1
SK	4.91	5.73	4.89	-0.4	-15
UK	7.87	7.89	8.16	+ 3.6	+ 3.4



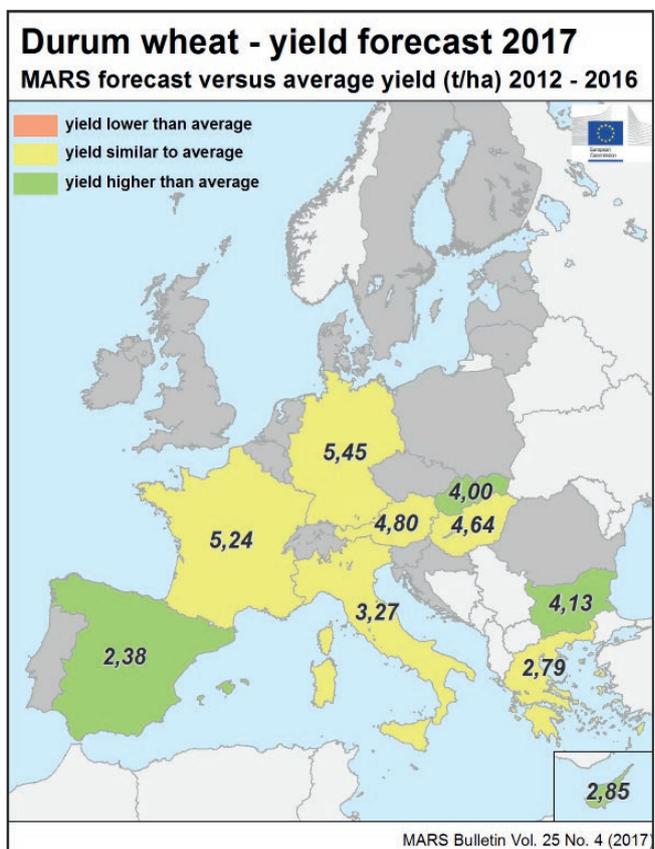
Country	TOTAL BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.82	4.87	4.90	+ 1.5	+ 0.5
AT	5.39	6.12	5.39	+ 0.0	-12
BE	8.18	6.21	8.50	+ 3.9	+ 37
BG	3.92	4.42	4.20	+ 7.1	-5.1
CY	1.88	2.00	2.40	+ 28	+ 20
CZ	5.08	5.68	5.12	+ 0.8	-9.8
DE	6.79	6.69	6.72	-1.0	+ 0.4
DK	5.78	5.61	5.77	-0.2	+ 2.8
EE	3.39	2.64	3.43	+ 1.1	+ 30
ES	2.91	3.62	3.00	+ 3.2	-17
FI	3.57	3.59	3.57	-0.1	-0.5
FR	6.41	5.41	6.40	-0.2	+ 18
GR	2.79	2.31	2.71	-2.8	+ 17
HR	4.47	4.74	4.68	+ 4.6	-1.4
HU	4.43	5.14	4.69	+ 5.9	-8.8
IE	7.69	7.69	7.93	+ 3.1	+ 3.1
IT	3.81	4.13	3.88	+ 2.0	-6.1
LT	3.55	3.13	3.52	-0.7	+ 12
LU	-	-	-	-	-
LV	3.22	2.96	3.19	-1.0	+ 7.8
MT	-	-	-	-	-
NL	7.02	6.82	7.16	+ 2.0	+ 5.0
PL	3.72	3.75	3.74	+ 0.7	-0.1
PT	2.04	2.62	2.36	+ 16	-9.9
RO	3.23	3.82	3.38	+ 4.5	-12
SE	4.89	4.80	4.83	-1.1	+ 0.6
SI	4.61	4.78	4.64	+ 0.8	-2.9
SK	4.34	5.29	4.24	-2.3	-20
UK	6.10	5.93	6.24	+ 2.3	+ 5.3



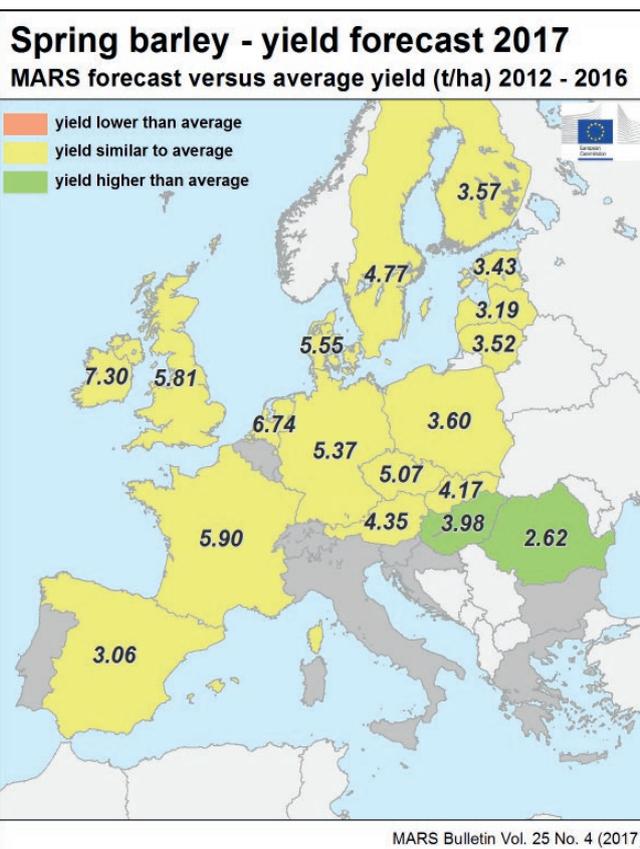
Country	SOFT WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.84	5.59	6.05	+ 3.5	+ 8.2
AT	5.52	6.29	5.62	+ 1.7	-11
BE	8.52	6.65	9.05	+ 6.3	+ 36
BG	4.33	4.94	4.89	+ 13	-1.1
CY	-	-	-	-	-
CZ	5.88	6.52	6.02	+ 2.3	-7.8
DE	7.96	7.67	7.93	-0.4	+ 3.4
DK	7.54	7.19	7.62	+ 1.0	+ 5.8
EE	3.77	2.77	3.83	+ 1.6	+ 38
ES	3.25	3.84	3.36	+ 3.3	-13
FI	3.84	3.77	3.84	-0.1	+ 1.9
FR	7.07	5.38	7.27	+ 2.8	+ 35
GR	3.10	2.33	3.05	-1.8	+ 31
HR	5.04	5.64	5.05	+ 0.3	-10
HU	4.72	5.39	4.90	+ 3.8	-9.0
IE	9.13	9.62	9.76	+ 7.0	+ 1.5
IT	5.51	5.65	5.66	+ 2.7	+ 0.1
LT	4.66	4.36	4.65	-0.2	+ 6.6
LU	5.95	5.07	6.14	+ 3.1	+ 21
LV	4.20	4.30	4.09	-2.6	-4.9
MT	-	-	-	-	-
NL	8.89	8.01	8.76	-1.5	+ 9.3
PL	4.52	4.54	4.63	+ 2.3	+ 1.9
PT	1.82	2.31	2.12	+ 17	-8.3
RO	3.52	4.05	3.97	+ 13	-2.1
SE	6.53	6.32	6.71	+ 2.8	+ 6.2
SI	5.08	5.19	4.97	-2.1	-4.1
SK	4.98	6.06	4.96	-0.3	-18
UK	7.87	7.89	8.16	+ 3.6	+ 3.4



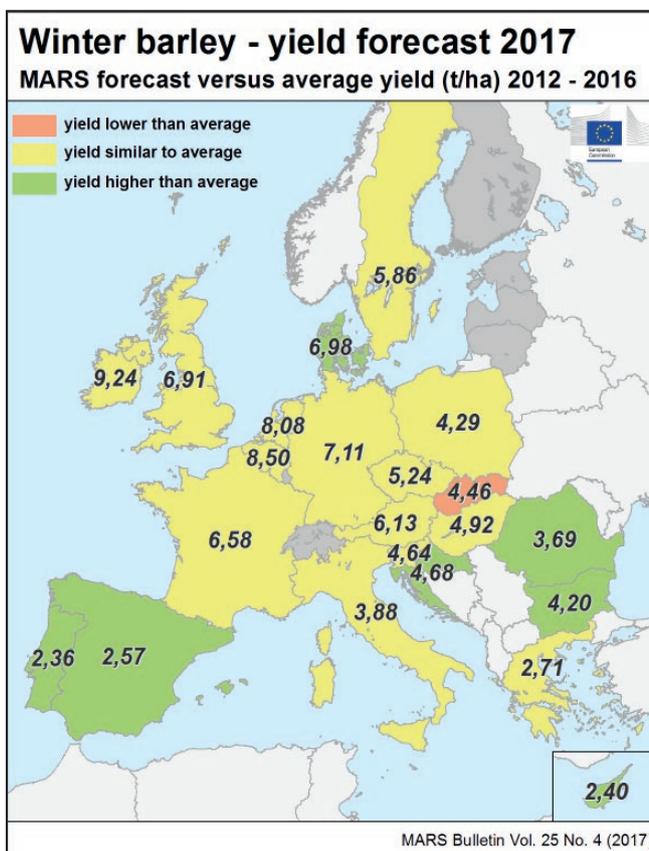
Country	DURUM WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.32	3.38	3.39	+ 2.1	+ 0.3
AT	4.65	5.33	4.80	+ 3.1	-10
BE	-	-	-	-	-
BG	3.42	4.83	4.13	+ 21	-15
CY	2.36	2.51	2.85	+ 20	+ 13
CZ	-	-	-	-	-
DE	5.36	5.31	5.45	+ 1.7	+ 2.7
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	2.16	2.29	2.38	+ 10	+ 3.8
FI	-	-	-	-	-
FR	5.13	4.24	5.24	+ 2.2	+ 24
GR	2.70	2.36	2.79	+ 3.4	+ 18
HR	-	-	-	-	-
HU	4.64	4.97	4.64	+ 0.0	-6.6
IE	-	-	-	-	-
IT	3.28	3.65	3.27	-0.2	-10
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	-	-	-	-	-
RO	-	-	-	-	-
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	3.53	2.66	4.00	+ 13	+ 50
UK	-	-	-	-	-



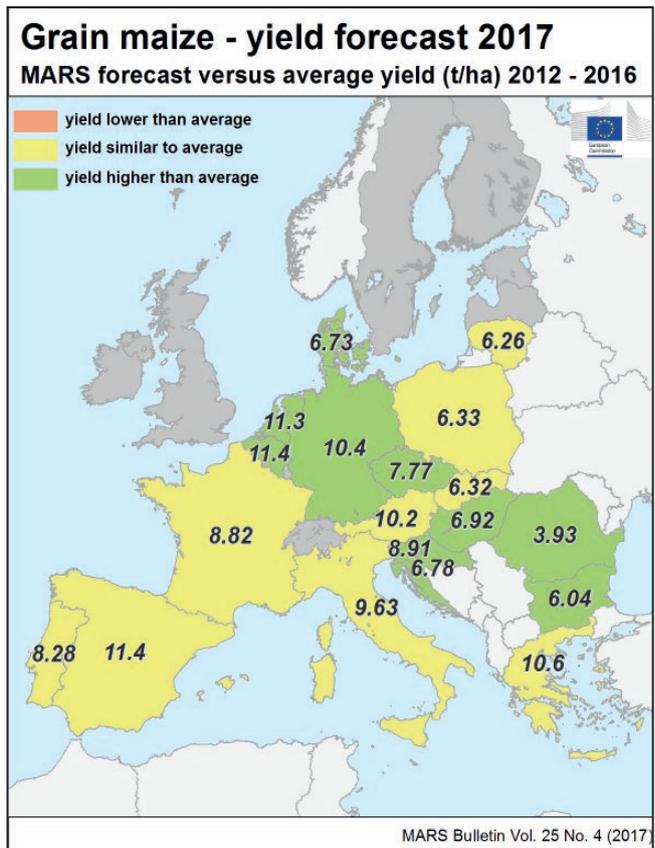
Country	SPRING BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.20	4.34	4.21	+ 0.3	-2.9
AT	4.49	5.31	4.35	-3.1	-18
BE	-	-	-	-	-
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	5.05	5.48	5.07	+ 0.4	-7.5
DE	5.55	5.26	5.37	-3.3	+ 2.0
DK	5.65	5.51	5.55	-1.8	+ 0.6
EE	3.39	2.64	3.43	+ 1.1	+ 30
ES	3.00	3.74	3.06	+ 2.1	-18
FI	3.57	3.59	3.57	-0.1	-0.5
FR	5.99	5.00	5.90	-1.6	+ 18
GR	-	-	-	-	-
HR	-	-	-	-	-
HU	3.55	4.18	3.98	+ 1.2	-4.7
IE	7.14	7.10	7.30	+ 2.3	+ 2.8
IT	-	-	-	-	-
LT	3.55	3.13	3.52	-0.7	+ 12
LU	-	-	-	-	-
LV	3.22	2.96	3.19	-1.0	+ 7.8
MT	-	-	-	-	-
NL	6.77	6.53	6.74	-0.5	+ 3.2
PL	3.59	3.62	3.60	+ 0.2	-0.7
PT	-	-	-	-	-
RO	2.43	2.77	2.62	+ 7.7	-5.5
SE	4.83	4.74	4.77	-1.2	+ 0.7
SI	-	-	-	-	-
SK	4.21	5.03	4.17	-1.0	-17
UK	5.66	5.61	5.81	+ 2.6	+ 3.5



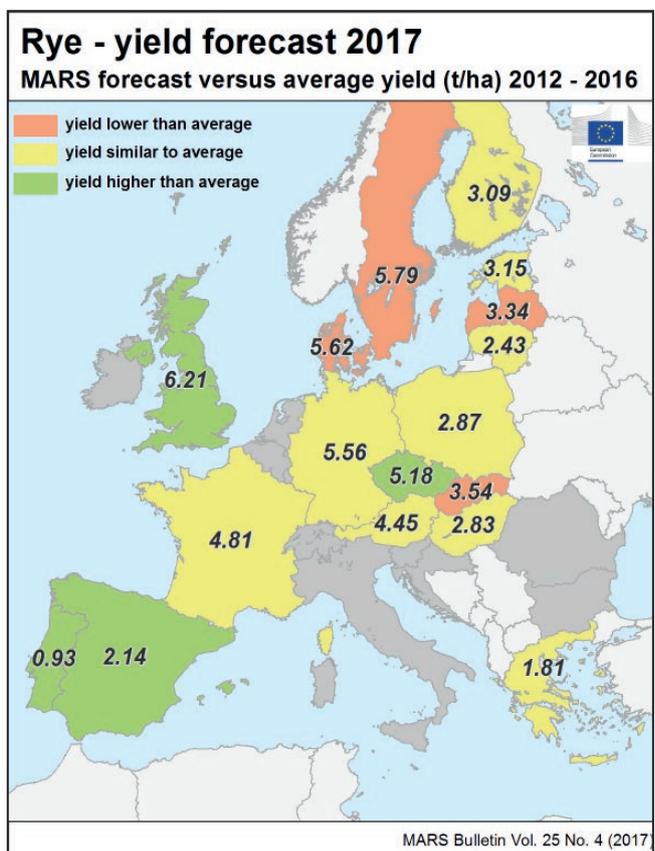
Country	WINTER BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.68	5.54	5.82	+ 2.5	+ 5.1
AT	6.08	6.59	6.13	+ 0.9	-6.9
BE	8.18	6.21	8.50	+ 3.9	+ 37
BG	3.92	4.42	4.20	+ 7.1	-5.1
CY	1.88	2.00	2.40	+ 28	+ 20
CZ	5.16	6.11	5.24	+ 1.6	-14
DE	7.20	7.08	7.11	-1.3	+ 0.4
DK	6.45	6.16	6.98	+ 8.1	+ 13
EE	-	-	-	-	-
ES	2.37	2.66	2.57	+ 8.2	-3.3
FI	-	-	-	-	-
FR	6.56	5.53	6.58	+ 0.3	+ 19
GR	2.79	2.31	2.71	-2.8	+ 17
HR	4.47	4.74	4.68	+ 4.6	-1.4
HU	4.74	5.31	4.92	+ 3.6	-7.5
IE	9.15	8.60	9.24	+ 1.0	+ 7.5
IT	3.81	4.13	3.88	+ 2.0	-6.1
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	8.00	7.53	8.08	+ 1.0	+ 7.3
PL	4.21	4.28	4.29	+ 1.7	+ 0.1
PT	2.04	2.62	2.36	+ 1.6	-9.9
RO	3.52	4.17	3.69	+ 4.7	-11
SE	6.09	5.77	5.86	-3.8	+ 1.5
SI	4.61	4.78	4.64	+ 0.8	-2.9
SK	4.86	5.90	4.46	-8.4	-24
UK	6.88	6.43	6.91	+ 0.5	+ 7.5



Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	6.90	7.19	7.13	+ 3.3	-0.8
AT	9.92	11.2	10.2	+ 2.5	-8.8
BE	10.4	8.01	11.4	+ 9.0	+ 42
BG	5.65	5.40	6.04	+ 6.9	+ 12
CY	-	-	-	-	-
CZ	7.43	8.10	7.77	+ 4.6	- 4.1
DE	9.62	8.79	10.4	+ 7.9	+ 18
DK	6.23	6.28	6.73	+ 8.0	+ 7.1
EE	-	-	-	-	-
ES	11.1	11.1	11.4	+ 2.6	+ 2.3
FI	-	-	-	-	-
FR	8.82	8.19	8.82	- 0.0	+ 7.7
GR	10.8	10.1	10.6	- 1.9	+ 4.8
HR	6.35	7.70	6.78	+ 6.8	-12
HU	6.17	8.64	6.92	+ 12	-20
IE	-	-	-	-	-
IT	9.45	10.4	9.63	+ 1.9	- 6.9
LT	6.32	6.91	6.26	- 1.1	- 9.4
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	10.2	7.84	11.3	+ 10	+ 44
PL	6.33	7.17	6.33	- 0.0	-12
PT	8.28	8.03	8.28	- 0.1	+ 3.1
RO	3.70	3.74	3.93	+ 6.3	+ 5.2
SE	-	-	-	-	-
SI	8.00	9.54	8.91	+ 11	- 6.6
SK	6.31	7.76	6.32	+ 0.1	- 1.9
UK	-	-	-	-	-



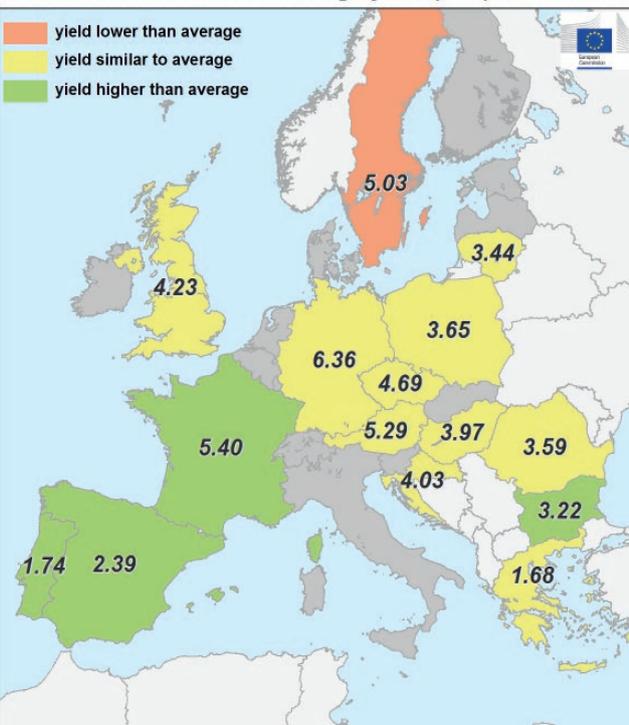
Country	RYE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.89	3.89	3.78	- 2.7	-2.8
AT	4.49	5.05	4.45	- 0.9	- 12
BE	-	-	-	-	-
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	4.95	5.44	5.18	+ 4.5	- 4.8
DE	5.71	5.55	5.56	- 2.6	+ 0.2
DK	5.96	5.73	5.62	- 5.7	- 2.0
EE	3.06	2.61	3.15	+ 3.1	+ 21
ES	2.01	2.50	2.14	+ 6.2	- 14
FI	3.16	3.38	3.09	- 2.2	- 8.6
FR	4.75	3.97	4.81	+ 1.2	+ 21
GR	1.87	1.48	1.81	- 3.1	+ 22
HR	-	-	-	-	-
HU	2.77	3.03	2.83	+ 2.1	- 6.4
IE	-	-	-	-	-
IT	-	-	-	-	-
LT	2.44	2.38	2.43	- 0.3	+ 2.1
LU	-	-	-	-	-
LV	3.48	3.94	3.34	- 4.1	- 1.5
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	2.91	2.89	2.87	- 1.5	- 0.7
PT	0.85	0.90	0.93	+ 9.5	+ 3.7
RO	-	-	-	-	-
SE	6.19	6.12	5.79	- 6.4	- 5.3
SI	-	-	-	-	-
SK	3.70	3.78	3.54	- 4.2	- 6.2
UK	3.48	1.88	6.21	+ 79	+ 230



Country	TRITICALE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.21	4.02	4.21	-0.1	+ 4.6
AT	5.44	5.88	5.29	- 2.8	- 10
BE	-	-	-	-	-
BG	2.99	3.27	3.22	+ 7.8	-1.4
CY	-	-	-	-	-
CZ	4.72	4.99	4.69	- 0.8	- 6.0
DE	6.49	6.08	6.36	- 2.1	+ 4.5
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	2.25	2.41	2.39	+ 6.3	- 1.1
FI	-	-	-	-	-
FR	5.17	4.33	5.40	+ 4.4	+ 25
GR	1.75	1.75	1.68	- 3.9	- 4.3
HR	4.11	4.54	4.03	- 2.1	- 11
HU	3.86	4.14	3.97	+ 2.8	- 4.0
IE	-	-	-	-	-
IT	-	-	-	-	-
LT	3.43	3.28	3.44	+ 0.2	+ 4.7
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	3.63	3.60	3.65	+ 0.6	+ 1.4
PT	1.53	1.95	1.74	+ 14	- 11
RO	3.48	3.87	3.59	+ 3.2	- 7.3
SE	5.61	5.23	5.03	- 10	- 3.8
SI	-	-	-	-	-
SK	-	-	-	-	-
UK	4.08	3.91	4.23	+ 3.5	+ 8.1

Triticale - yield forecast 2017

MARS forecast versus average yield (t/ha) 2012 - 2016

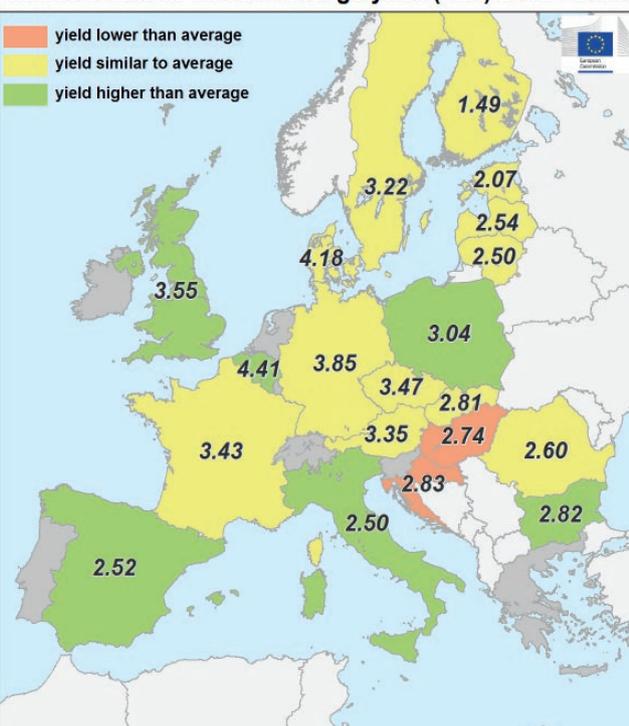


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Country	RAPE AND TURNIP RAPE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.26	3.09	3.27	+ 0.4	+ 5.9
AT	3.26	3.58	3.35	+ 2.6	- 6.4
BE	4.21	3.77	4.41	+ 4.7	+ 17
BG	2.57	2.94	2.82	+ 9.6	- 4.0
CY	-	-	-	-	-
CZ	3.41	3.46	3.47	+ 1.8	+ 0.1
DE	3.90	3.46	3.85	- 1.4	+ 11
DK	4.05	3.97	4.18	+ 3.3	+ 5.4
EE	2.06	1.69	2.07	+ 0.5	+ 23
ES	2.36	2.58	2.52	+ 6.9	- 2.1
FI	1.49	1.53	1.49	+ 0.0	- 2.5
FR	3.35	3.06	3.43	+ 2.1	+ 12
GR	-	-	-	-	-
HR	2.95	3.40	2.83	- 4.0	- 17
HU	2.88	3.13	2.74	- 4.8	- 13
IE	-	-	-	-	-
IT	2.36	2.52	2.50	+ 5.9	- 1.0
LT	2.43	2.86	2.50	+ 3.0	- 12
LU	-	-	-	-	-
LV	2.61	2.83	2.54	- 2.5	- 10
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	2.88	2.69	3.04	+ 5.6	+ 13
PT	-	-	-	-	-
RO	2.52	2.78	2.60	+ 3.1	- 6.3
SE	3.10	2.89	3.22	+ 3.9	+ 11
SI	-	-	-	-	-
SK	2.89	3.47	2.81	- 2.6	- 19
UK	3.40	3.06	3.55	+ 4.4	+ 16

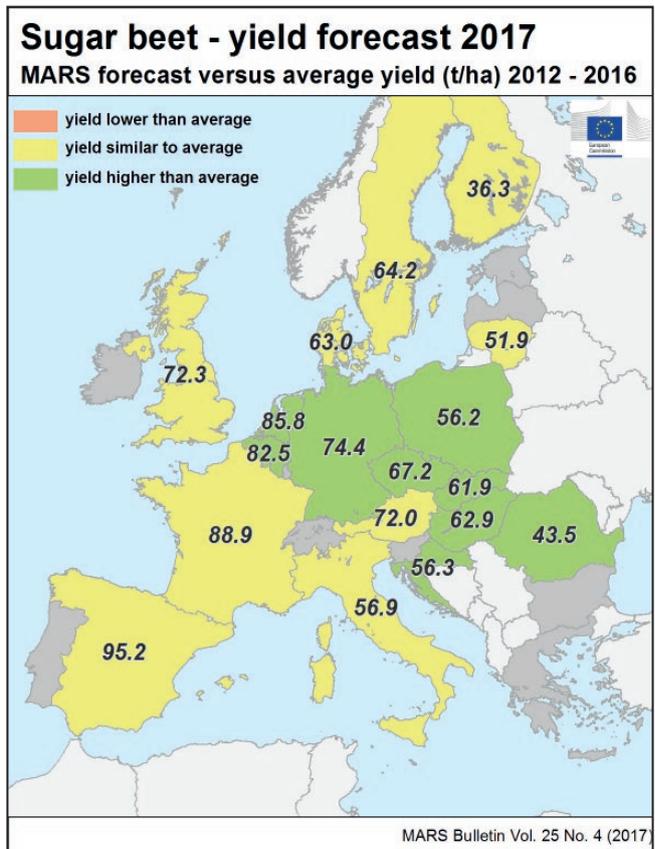
Rapeseed - yield forecast 2017

MARS forecast versus average yield (t/ha) 2012 - 2016

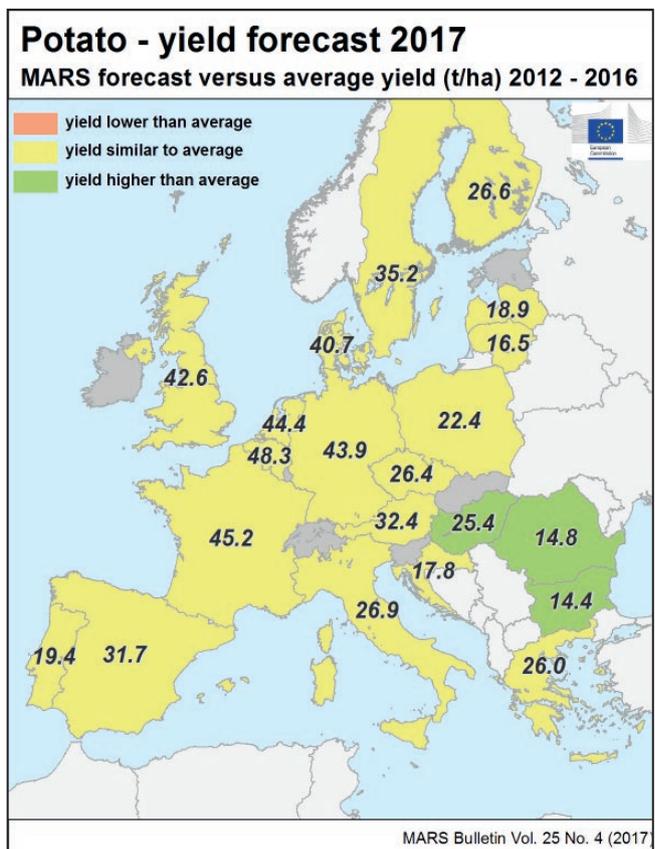


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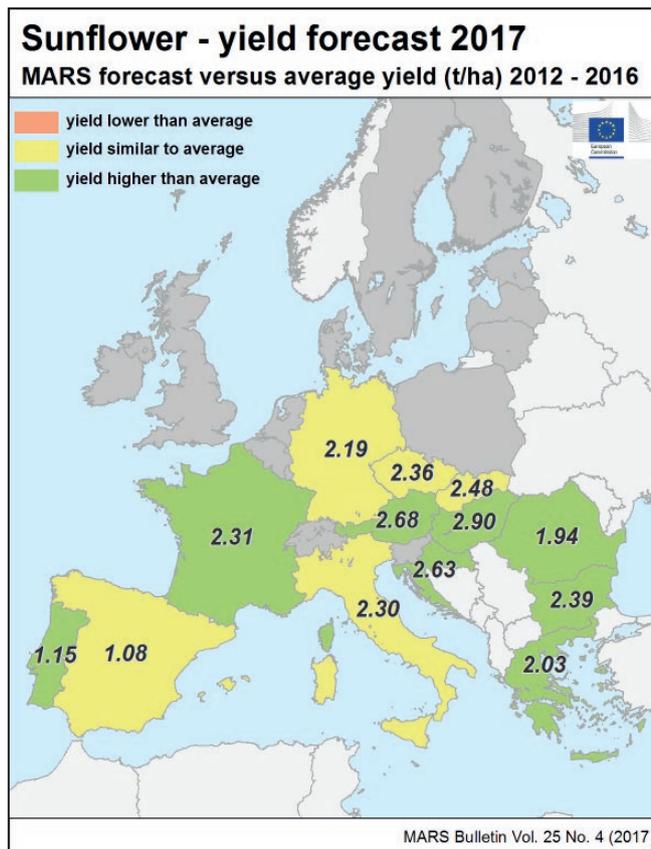
Country	SUGAR BEETS (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	71.6	72.3	74.2	+ 3.7	+ 2.6
AT	71.8	81.3	72.0	+ 0.2	- 11
BE	78.4	NA	82.5	+ 5.2	NA
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	64.2	67.8	67.2	+ 4.6	- 0.9
DE	71.4	72.2	74.4	+ 4.3	+ 3.1
DK	63.0	NA	63.0	- 0.1	NA
EE	-	-	-	-	-
ES	92.5	95.7	95.2	+ 2.9	- 0.5
FI	36.4	37.3	36.3	- 0.4	- 2.9
FR	87.3	83.7	88.9	+ 1.9	+ 6.3
GR	-	-	-	-	-
HR	52.1	NA	56.3	+ 8.0	NA
HU	57.2	67.5	62.9	+ 10	- 6.7
IE	-	-	-	-	-
IT	55.6	NA	56.9	+ 2.5	NA
LT	52.0	50.0	51.9	- 0.2	+ 3.7
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	81.7	83.3	85.8	+ 4.9	+ 3.0
PL	53.0	51.7	56.2	+ 6.0	+ 8.7
PT	-	-	-	-	-
RO	37.7	41.1	43.5	+ 16	+ 6.0
SE	63.9	65.0	64.2	+ 0.5	- 1.3
SI	-	-	-	-	-
SK	55.7	64.6	61.9	+ 11	- 4.2
UK	72.0	NA	72.3	+ 0.4	NA



Country	POTATO (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	32.4	29.4	33.4	+ 3.0	+ 13
AT	31.4	36.2	32.4	+ 3.3	- 10
BE	48.2	NA	48.3	+ 0.2	NA
BG	13.3	13.6	14.4	+ 8.1	+ 5.9
CY	-	-	-	-	-
CZ	26.5	29.9	26.4	- 0.5	- 12
DE	43.8	43.2	43.9	+ 0.3	+ 1.7
DK	41.7	NA	40.7	- 2.2	NA
EE	-	-	-	-	-
ES	30.9	30.7	31.7	+ 2.8	+ 3.5
FI	26.7	27.1	26.6	- 0.2	- 1.8
FR	43.7	NA	45.2	+ 3.2	NA
GR	25.1	27.7	26.0	+ 3.8	- 6.1
HR	17.2	NA	17.8	+ 3.5	NA
HU	24.1	24.6	25.5	+ 5.7	+ 3.4
IE	-	-	-	-	-
IT	26.2	NA	26.9	+ 2.7	NA
LT	16.8	16.0	16.5	- 1.9	+ 3.1
LU	-	-	-	-	-
LV	18.8	19.9	18.9	+ 0.3	- 5.0
MT	-	-	-	-	-
NL	43.4	42.7	44.4	+ 2.4	+ 4.1
PL	22.9	23.7	22.4	- 1.9	- 5.4
PT	18.7	19.0	19.4	+ 3.7	+ 2.2
RO	14.2	13.5	14.8	+ 4.6	+ 9.6
SE	34.3	35.7	35.2	+ 2.7	- 1.5
SI	-	-	-	-	-
SK	-	-	-	-	-
UK	41.3	NA	42.6	+ 3.0	NA



Country	SUNFLOWER (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	1.94	2.03	2.10	+ 8.3	+ 3.1
AT	2.53	3.30	2.68	+ 6.1	- 19
BE	-	-	-	-	-
BG	2.15	2.20	2.39	+ 11	+ 9.0
CY	-	-	-	-	-
CZ	2.28	2.60	2.36	+ 3.2	- 9.3
DE	2.19	2.17	2.19	+ 0.0	+ 0.9
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	1.05	0.99	1.08	+ 2.9	+ 9.1
FI	-	-	-	-	-
FR	2.17	2.12	2.31	+ 6.2	+ 8.9
GR	1.95	2.11	2.03	+ 4.3	- 3.8
HR	2.48	2.50	2.63	+ 5.8	+ 5.1
HU	2.55	2.98	2.90	+ 14	- 2.6
IE	-	-	-	-	-
IT	2.26	2.42	2.30	+ 1.9	- 5.0
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	0.93	1.30	1.15	+ 24	- 12
RO	1.81	1.84	1.94	+ 6.8	+ 5.4
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	2.47	2.93	2.48	+ 0.5	- 15
UK	-	-	-	-	-



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

Sources: 2012-2017 data come from DG Agriculture and Rural Development short-term outlook data (dated March 2017, received on 4.4.2017), Eurostat Eurobase (last update: 3.4.2017) and EES (last update: 28.10.2016). 2017 yields come from MARS Crop Yield Forecasting System (output up to 20.4.2017). NA = Data not available.

Country	WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	3.66	3.71	3.78	+ 3.2	+ 1.8
DZ	1.61	1.45	1.55	- 4.2	+ 6.9
MA	1.75	1.18	2.00	+ 14	+ 70
TN	1.93	1.85	2.00	+ 3.7	+ 8.0
TR	2.69	2.71	2.64	- 1.9	- 2.6
UA	3.71	4.32	4.23	+ 14	- 2.0

Country	BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	3.44	3.50	3.58	+ 4.2	+ 2.3
DZ	1.39	1.20	1.29	- 7.6	+ 7.1
MA	1.07	0.51	1.33	+ 24	+ 159
TN	1.19	1.34	1.20	+ 0.7	-11
TR	2.63	2.48	2.50	- 4.9	+ 0.8
UA	2.75	3.41	2.79	+ 1.2	- 18

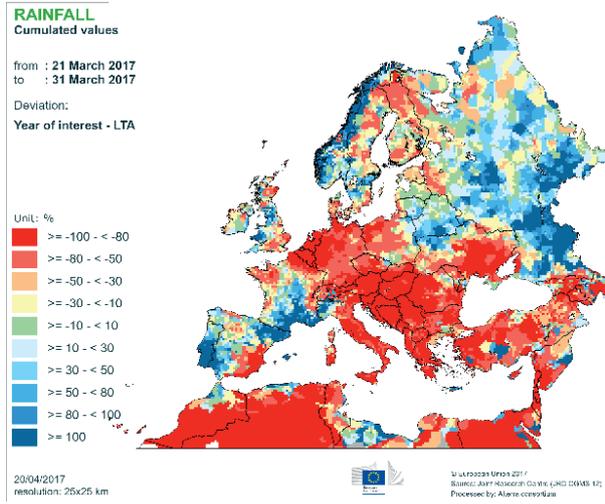
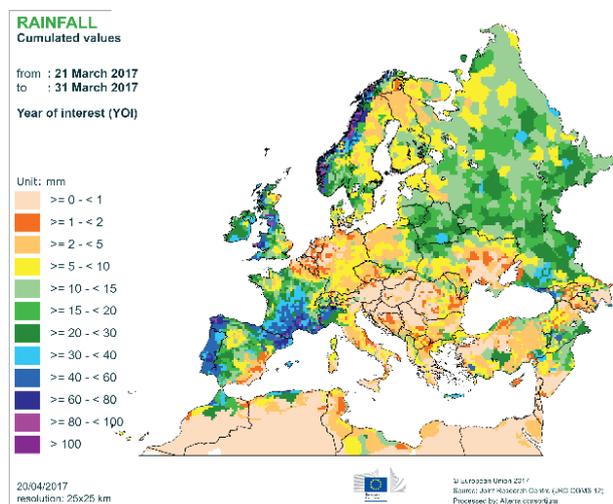
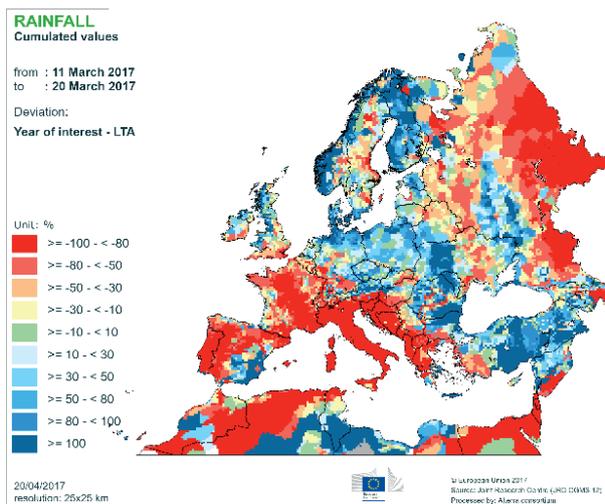
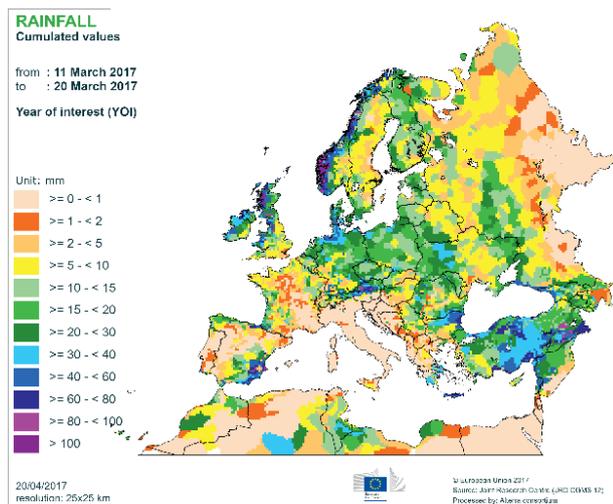
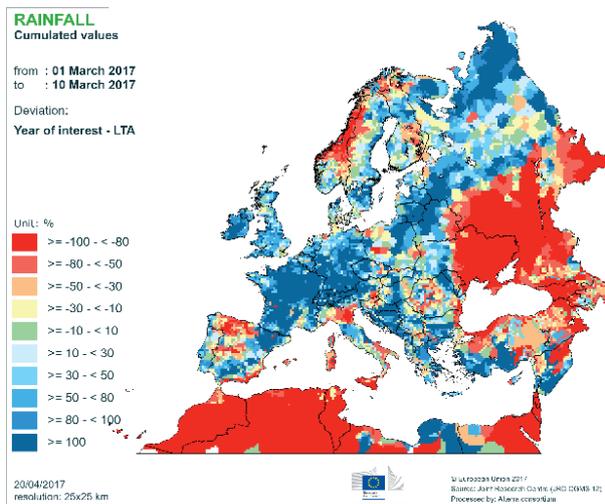
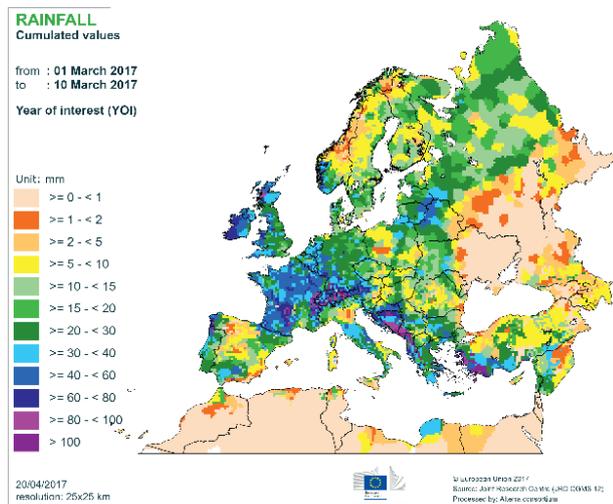
Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	5.26	5.33	5.43	+ 3.3	+ 1.9
DZ	-	-	-	-	-
MA	-	-	-	-	-
TN	-	-	-	-	-
TR	8.83	9.42	9.60	+ 8.6	+ 1.9
UA	5.84	6.60	6.00	+ 2.6	- 9.1

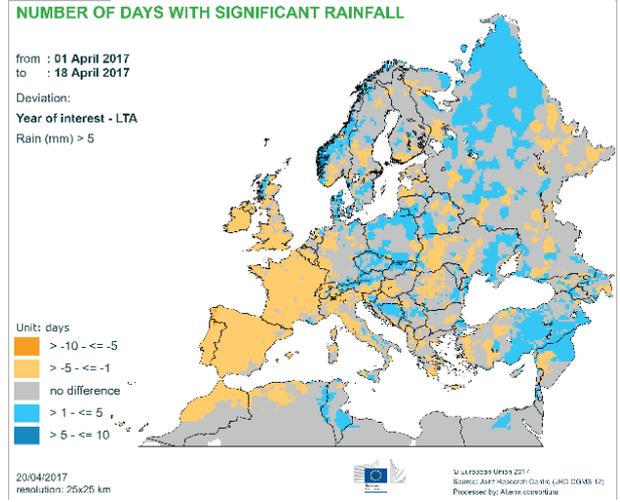
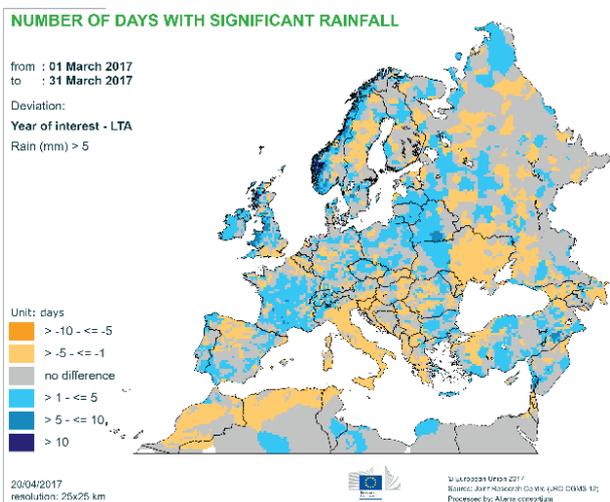
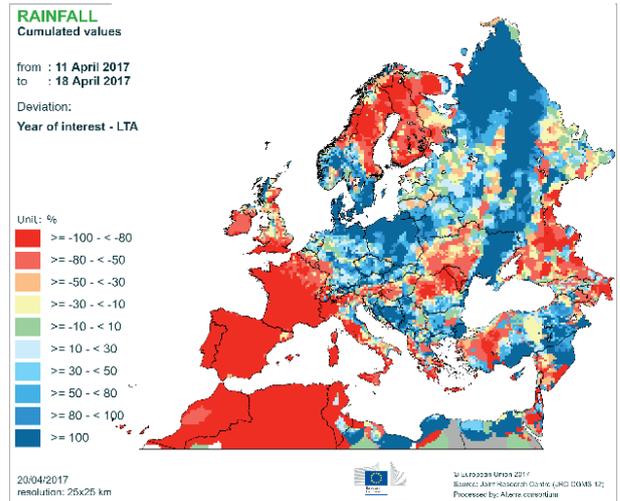
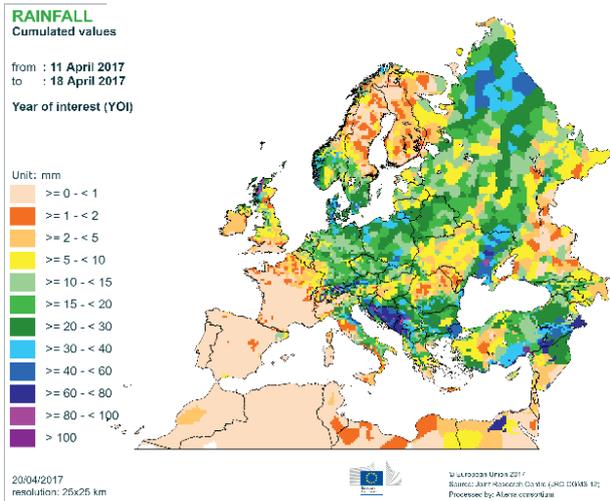
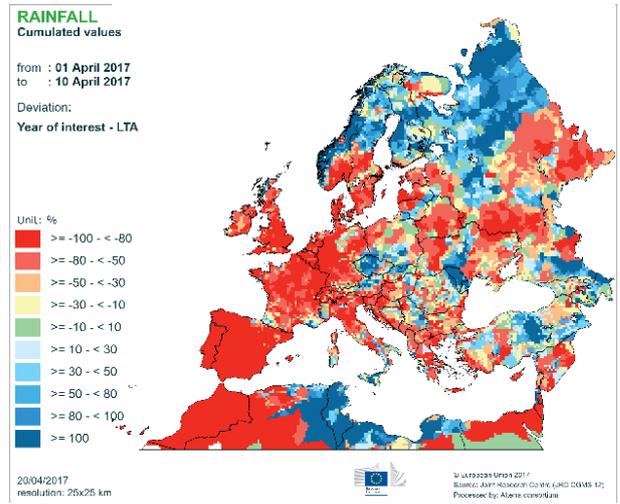
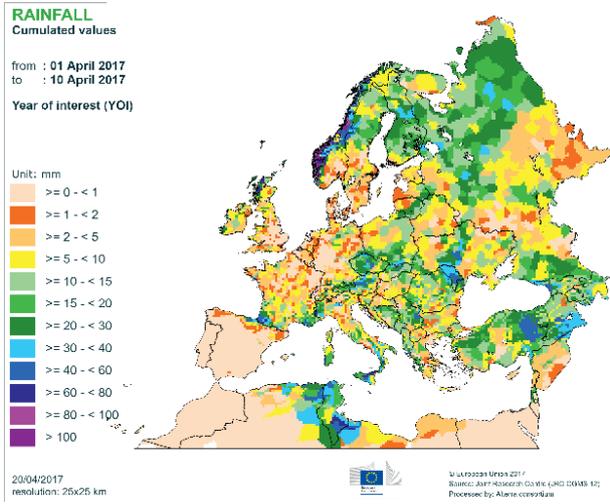
Note: Yields are forecast for crops with more than 10 000 ha per country.

Sources: 2012-2016 data come from USDA, DSASI-MADR Algeria, INRA Maroc, CNCT Tunisie, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 3.4.2017), State Statistics Service of Ukraine, FAO and PSD-online. 2017 yields come from MARS Crop Yield Forecasting System (output up to 20.4.2017).

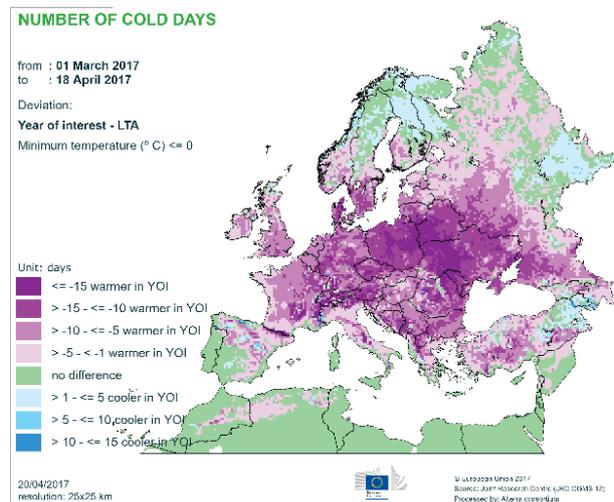
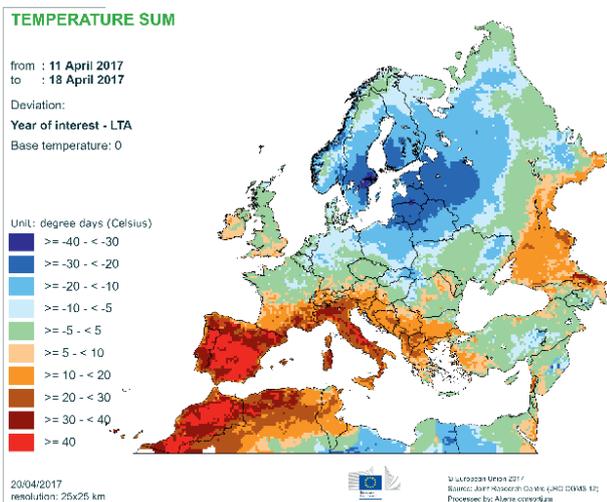
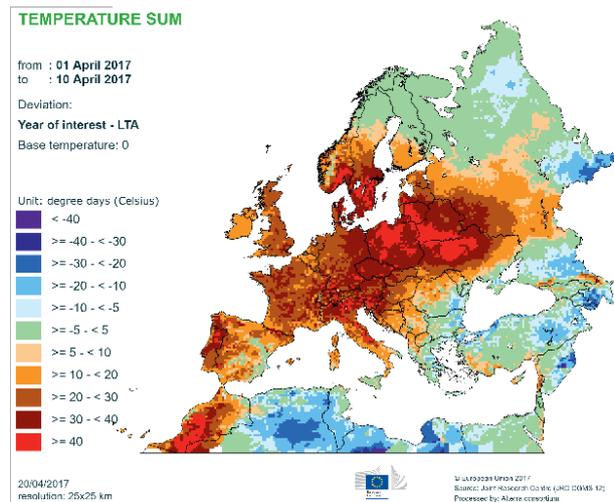
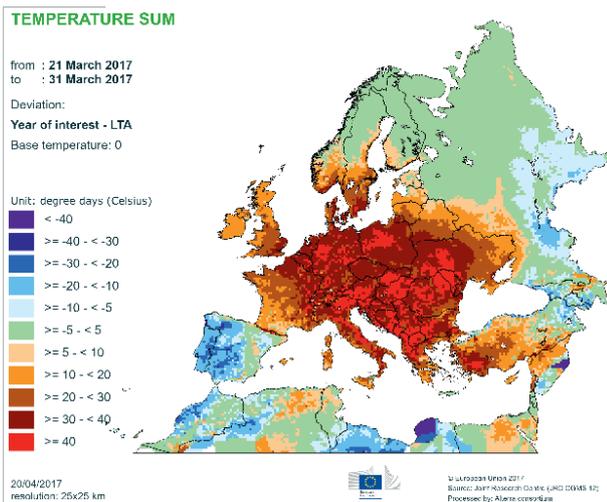
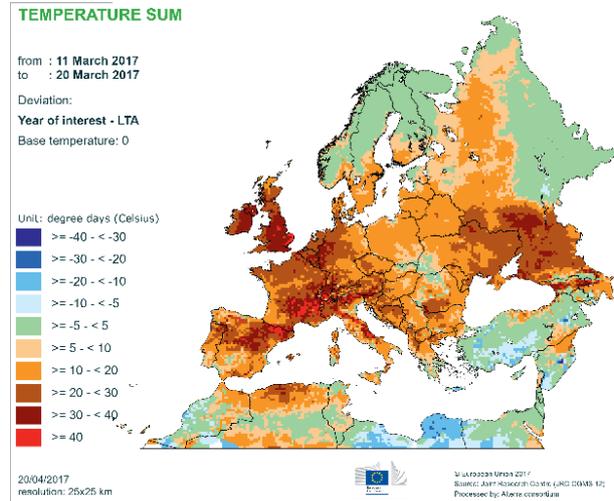
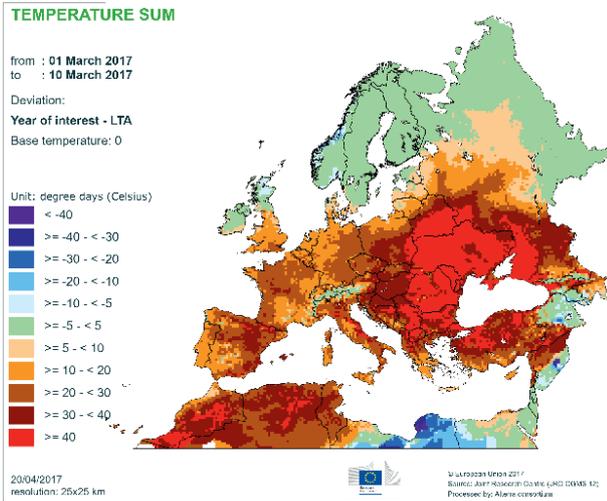
5. Atlas

Precipitation

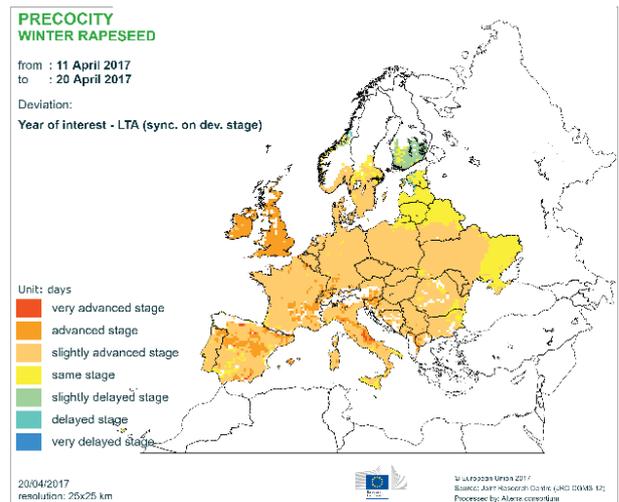
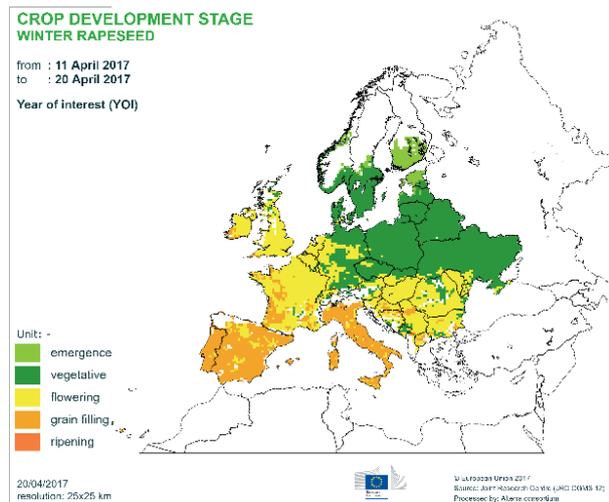
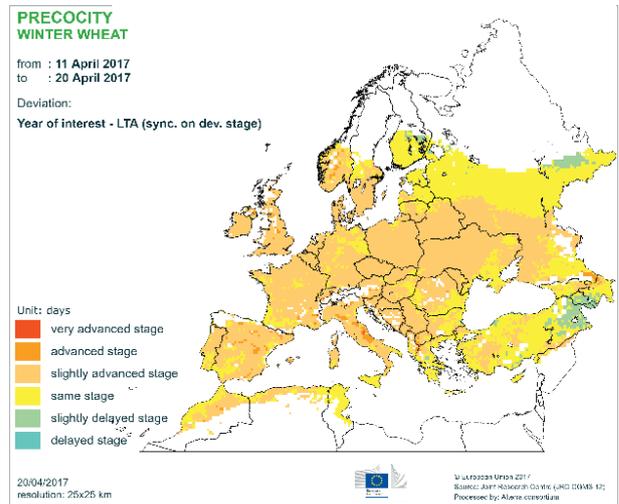
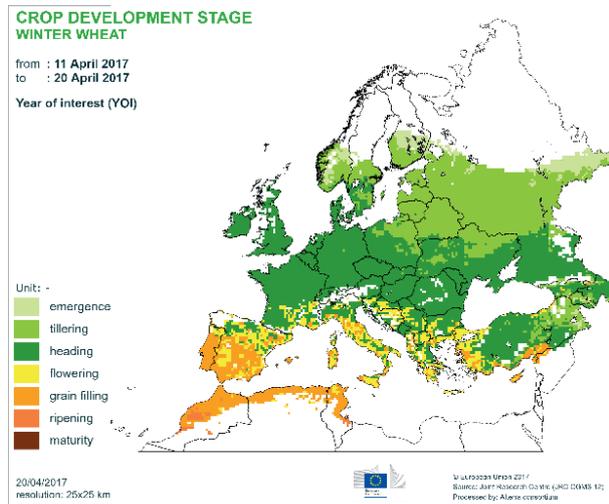




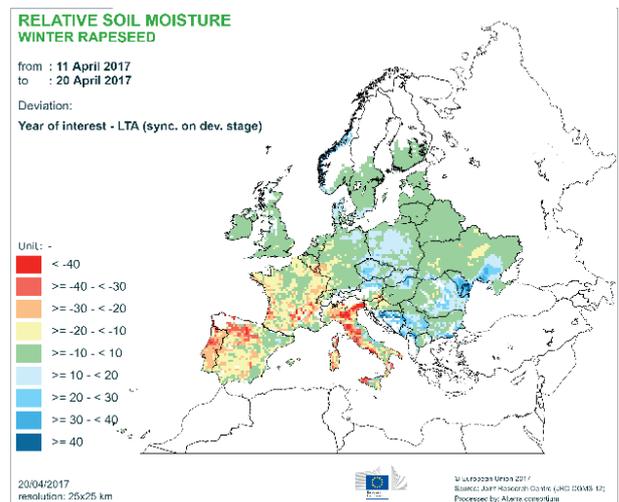
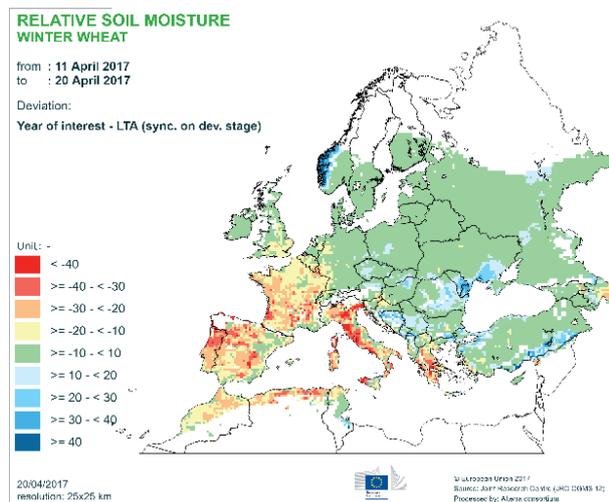
Temperature regime



Crop development stages and precocity



Relative soil moisture



JRC MARS Bulletins 2017

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

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Analysis and reports

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