JRC MARS Bulletin Vol. 24 No 7

European Commission

Period covered: 1 June–20 July
Issued: 25 July 2016

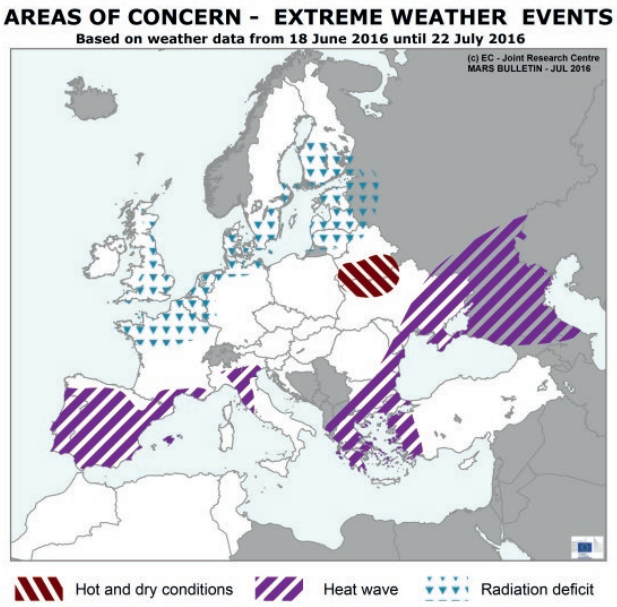
JRC MARS Bulletin
Crop monitoring in Europe
July 2016

Winter cereal yields above the five-year average

Good prospects for maize

Conditions have been particularly favourable for winter crops in Bulgaria and Romania, where the yield forecast for winter cereals is at a record high. Yield expectations are also highly positive in the Iberian peninsula and Hungary. Yield forecasts in the other EU Member States are closer to the five-year average, except in Poland, Greece and Cyprus, where the forecast for winter cereals is below average. At EU level, the forecast for winter cereals remains well above the five-year average but below last year's levels. The outlook for maize is also positive, but weather conditions in the coming weeks will determine the final yields.

During the review period, large parts of western Europe were affected by persistent cloud cover, which determined a radiation deficit. The reduced radiation and associated precipitation maintained high levels of soil moisture and exposed crops to pest and disease pressure, especially in northern France and most of the Benelux region, where conditions were already overly wet at the end of May. A prolonged heatwave affected the Iberian peninsula in late June, with no consequences for the irrigated summer crops, but heatwaves did impact the flowering of grain maize in Greece and southern Bulgaria.



Crop	Yield t/ha				
	Avg 5yrs	May Bulletin	MARS 2016 forecasts	% Diff 16/5yrs	% Diff May
TOTAL CEREALS	5.32	5.53	**5.52**	+ 3.9	- 0.2
Total Wheat	5.60	5.85	**5.85**	+ 4.4	+ 0.5
soft wheat	5.83	6.07	**6.10**	+ 4.6	+ 0.5
durum wheat	3.33	3.48	**3.46**	+ 4.0	- 0.6
Total Barley	4.72	5.01	**4.99**	+ 5.8	- 0.4
spring barley	4.13	4.33	**4.32**	+ 4.8	- 0.2
winter barley	5.57	5.94	**5.90**	+ 5.8	- 0.7
Grain maize	6.93	7.35	**7.42**	+ 7.1	+ 1.0
Rye	3.76	3.77	**3.79**	+ 0.8	+ 0.5
Triticale	4.20	4.20	**4.18**	- 0.3	- 0.2
Rape and turnip rape	3.20	3.24	**3.22**	+ 0.8	- 0.6
Potato	32.07	33.16	**32.97**	+ 2.8	- 0.6
Sugar beet	71.80	73.20	**73.18**	+ 1.9	- 0.0
Sunflower	1.94	2.08	**2.08**	+ 7.6	+ 0.0

Issued: 22 july 2016

Joint Research Centre

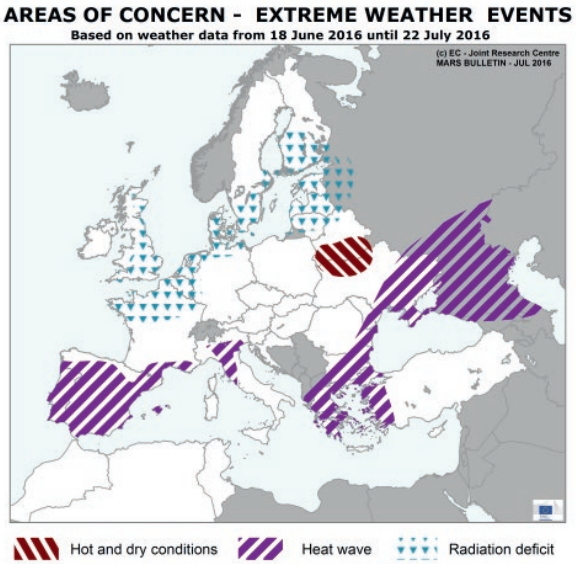
1. Agro-meteorological overview

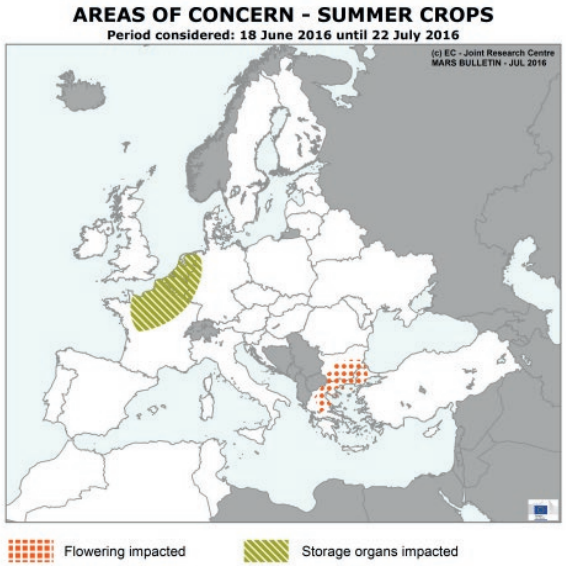
1.1. Areas of concern

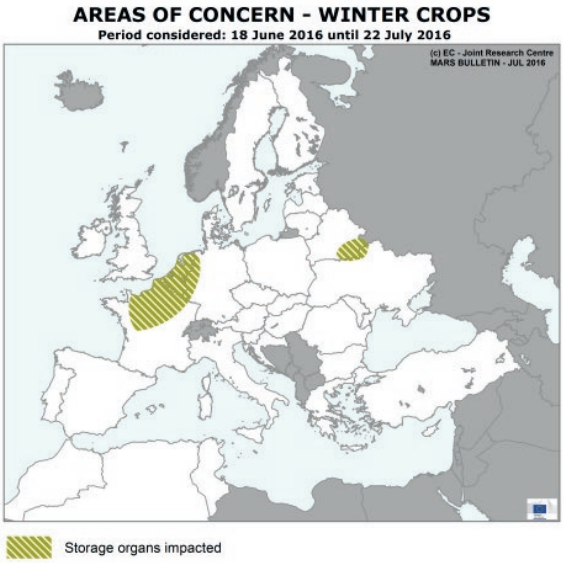
The maps depict the main weather events, and their impacts, between 18 June and 22 July. During the second half of June, persistent cloud cover determined a radiation deficit in **northern France, the southern United Kingdom, Belgium, the Netherlands, Luxembourg, Denmark and north-eastern Germany.** The reduced radiation and associated wetness did not impact the flowering of winter crops, but may have had a minor impact on grain filling.

It also maintained high levels of soil moisture and exposed crops to pest and disease pressure. Such conditions were unfavourable for winter crops and tuber crops, especially in **northern France** and most of the **Benelux region**, where overly wet conditions had already started at the end of May. In July, the weather situation changed and a radiation deficit occurred in **Denmark, north-western Germany, the Baltic states (Estonia, Lithuania, Latvia), southern Sweden** and **Finland**.

A prolonged heatwave affected the **Iberian peninsula** in late June, with no consequences for the irrigated summer crops. Maximum daily temperatures reached or even exceeded 40 °C. Heatwaves also occurred in **Italy**, and in eastern and south-eastern Europe. In **Greece**, maize-flower fertility was affected by several days of high temperatures, especially at the beginning of July. In southern **Bulgaria**, the heatwaves negatively impacted the flowering of grain maize, but no impact is expected in **Romania** and **Ukraine**. The rain deficit in southern and south-eastern **Belarus**, which started at the beginning of June, became more marked and lasted until mid July. During grain filling, winter crops suffered from the reduced soil moisture.







1.2. Meteorological review (1 June-20 July)

The first half of June was warmer than usual in the Iberian peninsula, the northern half of Germany, Denmark, the British Isles, the Benelux countries, southern Scandinavia and the Maghreb countries, with temperature anomalies of mainly between 2 °C and 4 °C above the long-term average. Maximum daily temperatures of more than 30 °C were mainly limited to western Mediterranean regions, western Black Sea regions and the Maghreb countries.

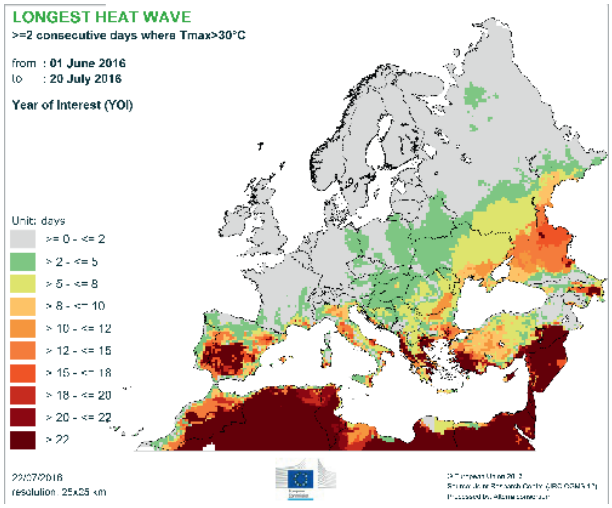
In the second half of June, hot weather conditions prevailed in central, south-eastern and eastern Europe. Temperatures exceeded the long-term average by 2-6 °C. Maximum daily temperatures mostly reached 30 °C, but rose to 37-42 °C on the hottest days. In western Europe, near-average temperature conditions were observed.

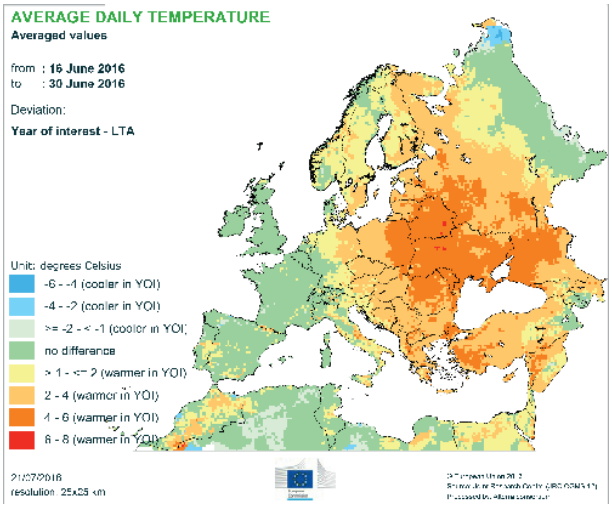
The second decad of July was warmer than usual in Ukraine, southern (and very northern) regions of Russia, and Morocco, with positive temperature anomalies that were typically between 3 °C and 8 °C. Maximum daily temperatures fluctuated around 35 °C, and in some places exceeded 40 °C. The number of hot days with maximum daily temperatures of 30 °C significantly exceeded the expected value in southern Europe, the Balkan peninsula, Turkey, Ukraine and southern Russia.

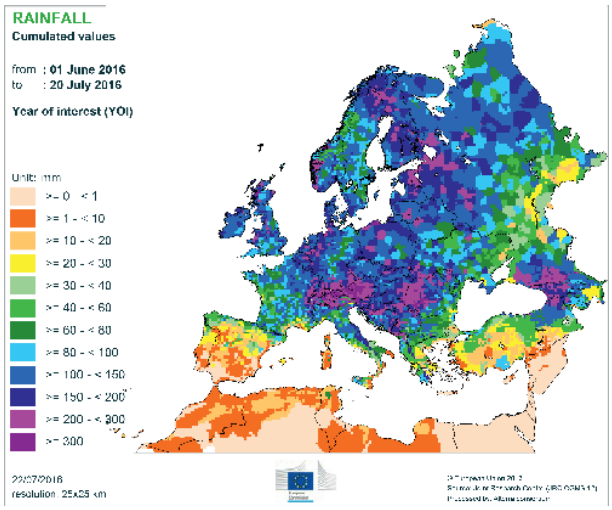
Dry conditions were observed in the Iberian peninsula, Ukraine and locally in many areas of Bulgaria, Belarus, Greece, Turkey and the southern-central part of European Russia.

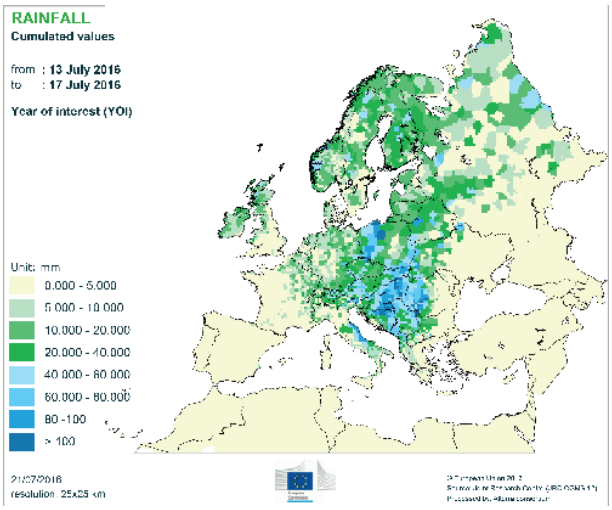
A precipitation surplus was recorded in the United Kingdom, Denmark, the Benelux countries, Alpine and Caucasian regions, Italy, the western Balkans, the Carpathian Basin, along the eastern coastline of the Baltic Sea, northern Russia, most of Germany and locally in France and Poland. Rainfall cumulates exceeded the climatological norm by 50 % in these areas.
Humid conditions with low radiation until the end of June in northern France and southern Benelux.

Unusually abundant precipitation occurred between 13 and 17 July between the Baltic and Adriatic Seas. The cumulated precipitation in several places exceeded 80 mm for 4-5 days, resulting in waterlogging, decreased grain quality and agricultural damage in crop stands due to thunderstorms.





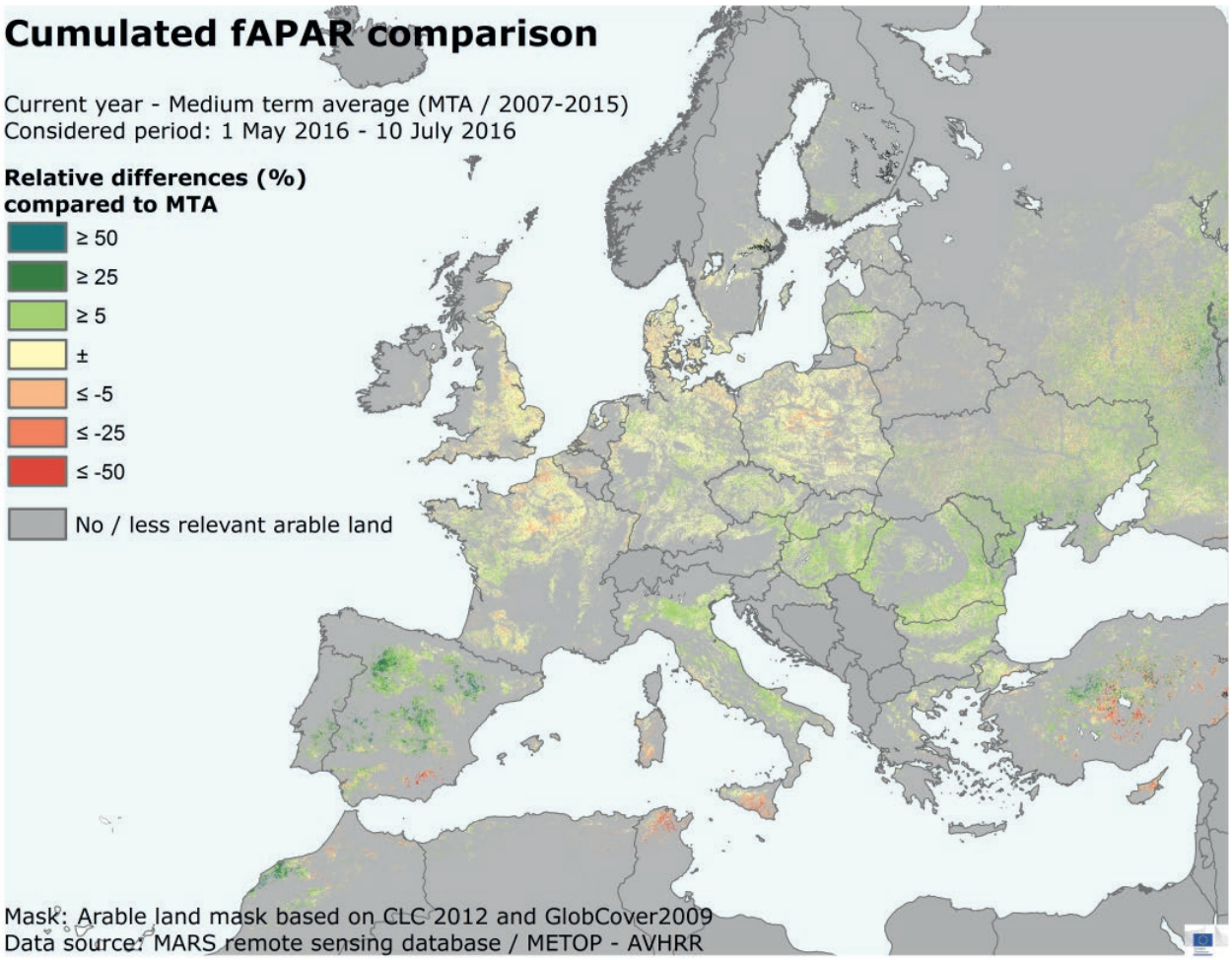


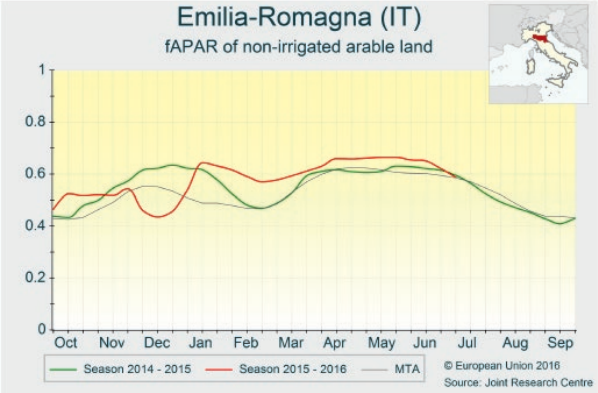


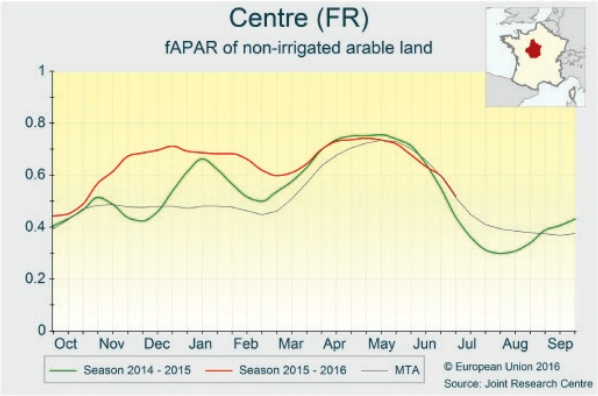
2. Remote sensing — Observed canopy conditions

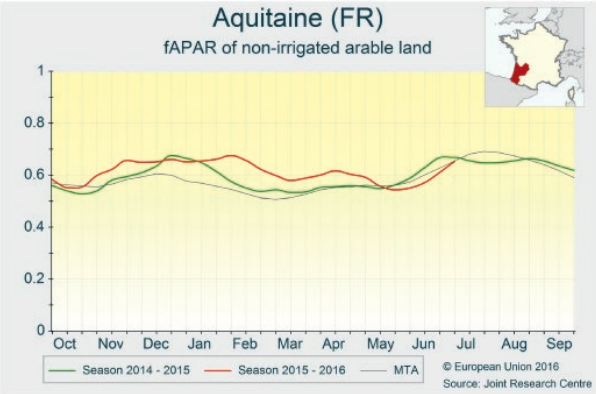
Average to favourable biomass accumulation for summer crops

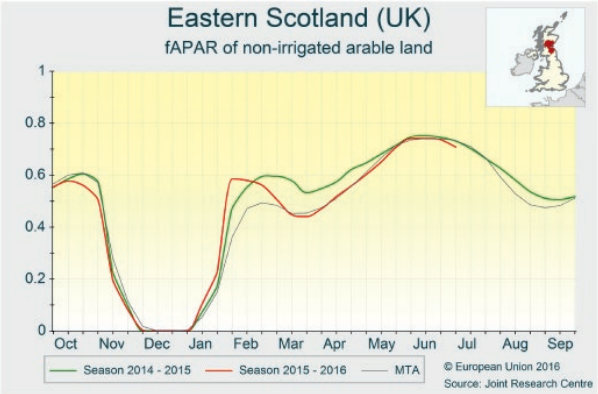
The map displays the differences between the fraction of absorbed photosynthetically active radiation (fAPAR) cumulated during the period from 1 May to 10 July 2016 and the medium-term average (MTA, 2007-2015) for the same period. The period covers flowering to maturity for most of the winter crops and leaf-area expansion for the summer crops. In **Spain**, the winter crop season ended and the summer crop canopy is well developed. In the Po valley, in **Italy**, the harvesting of winter crops started in July (e.g. Emilia Romagna) after a season with optimal to average biomass accumulation. Crop development shifted from advanced stages during spring to average in June because of lower-than-average temperatures at the end of May. In regions of northern **France** (e.g. Centre), overly wet conditions and low radiation from late May to late June slowed down the development of winter crops and the vegetative growth of summer crops. In southern regions, summer crops faced a drier-than-usual June, and their development moved from late to normal stages thanks to slightly above-average temperatures (e.g. Aquitaine). In the **United Kingdom**, crop development is average with crops around the grain-filling stage, even in the northern barley-growing regions (e.g. Eastern Scotland). In **Germany**, crop conditions are mixed. In the southern regions, summer crop development is average thanks to a few days of high temperatures at the end and beginning of June and despite reduced radiation (e.g. Oberbayern). In north-eastern regions, the precipitation deficit slightly hampered the already fragile winter crops and led to early senescence. In northern **Poland**, weather conditions were favourable, with sufficient rains in June and July that supported crops during the beginning of the grain-filling stage. Rains were less favourable in the central arable land region where crops faced early senescence (e.g. Wielkopolskie). In **central Europe** (AT, SK, CZ, HU), although the growth of summer crops slowed down in late June because of the reduced radiation and the high temperatures, the overall yield outlook is not compromised (e.g. Del-Dunantul, HU). Similar conditions prevail in **Romania** and **Bulgaria**; in Bulgaria, the rain deficit of July was unfavourable for summer crop growth. In **Ukraine**, the southern and eastern winter crop-growing regions, after an optimal development, are entering into maturity. The eastern regions had optimal winter crop development but average summer crop growth, while in the **central** regions a boost of biomass accumulation occurred in June due to hot and wet weather conditions (e.g. Cherkas'ka). In **Turkey**, the negative anomalies describe regions with sub-optimal canopy growth due to the dry conditions of late spring and summer. In **Russia**, canopy biomass accumulation ranges from average to favourable or very favourable.

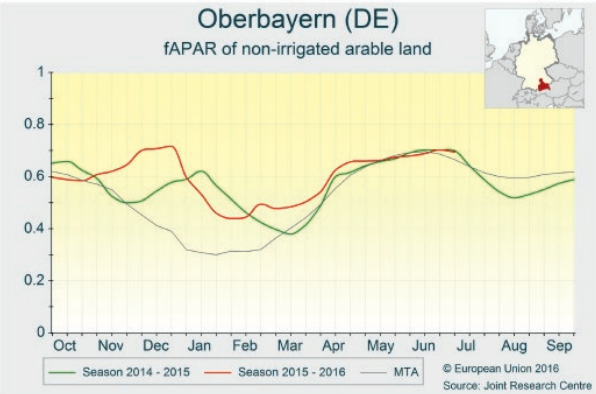


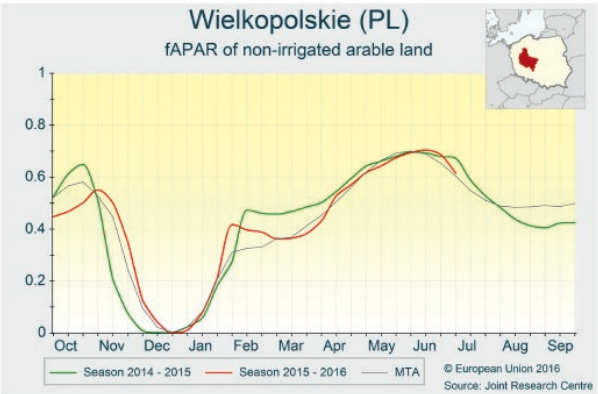

Emilia-Romagna (IT)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

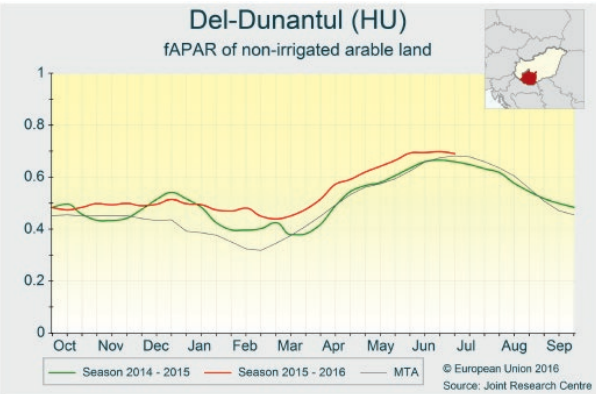

Centre (FR)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

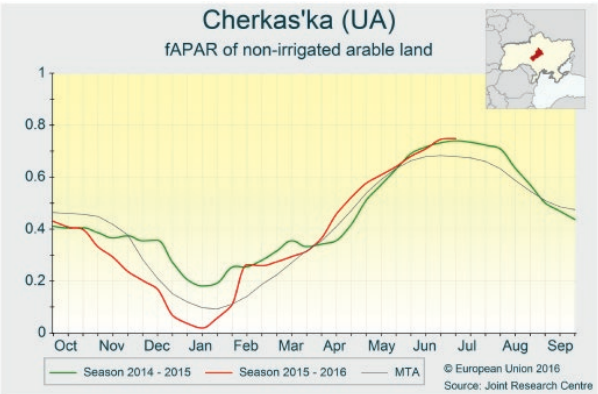

Aquitaine (FR)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Eastern Scotland (UK)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Oberbayern (DE)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Wielkopolskie (PL)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Del-Dunantul (HU)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Cherkas'ka (UA)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

3. Country analysis

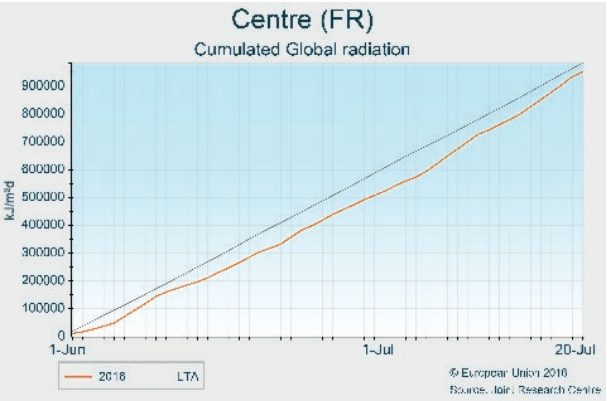
3.1. European Union

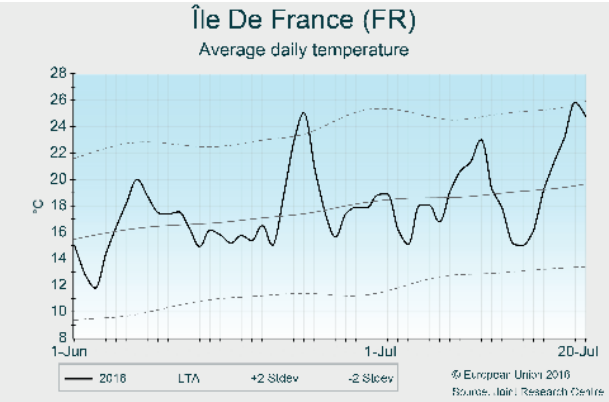
France

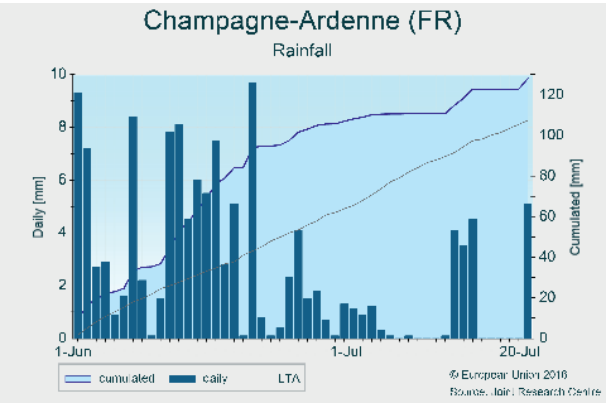
Prolonged humid conditions are deteriorating crop conditions

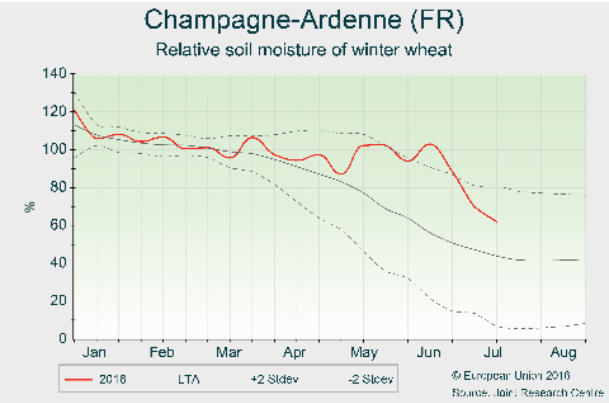
The poor conditions observed in late May continued in June with substantial rainfall, exceptionally low global radiation and near-average temperatures. Overly wet conditions led to saturated soils. Consequently, yield forecasts are revised downwards to average levels.

Rainfall was greatly above average in the northern half of the country during the first half of June, and slightly below average in the southernmost regions. Champagne-Ardenne, Centre, Ile de France, Picardie, and Bourgogne received twice the average rainfall for May and June. June was also characterised by exceptionally low global radiation in the northern half of the country, with temperatures remaining close to seasonal values and only exceeding the average during the last decad. The low global radiation, mild temperatures and above-average rainfall kept soils saturated following the exceptional precipitation recorded in late spring. No significant rainfall has been recorded since the last decad of June, which allowed soils to dry. In the northern half of the country, conditions for nearly all crops continued to deteriorate. Winter cereals became partly lodged, and crops were exposed to increased disease pressure. The yields of soft wheat, winter and spring barley (the most impacted crops) have been revised downwards, and are now close to the five-year average and greatly below last year's yields. The prolonged humid conditions have also had an effect on the quality of grains, and a lower protein level of cereals is expected. Durum wheat is less impacted as conditions were better in the southernmost regions. As potato was also significantly exposed to the humid conditions and high disease pressure, yield is expected to be lower than the one of last year. The grain maize yield is also revised downwards as a result of anoxia. As some sunflower crops were sown late, the yield is also forecast to be slightly lower than the five-year average.









Germany

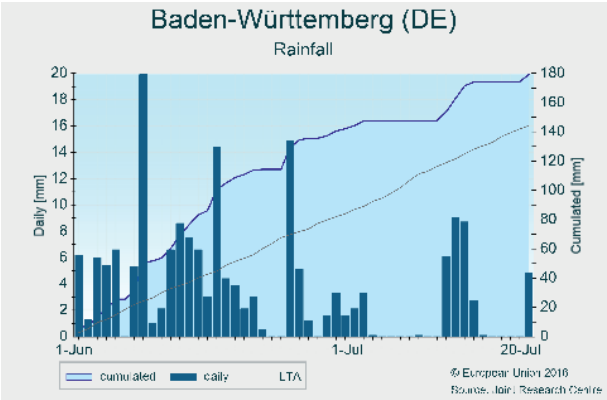
Winter cereal yields above average

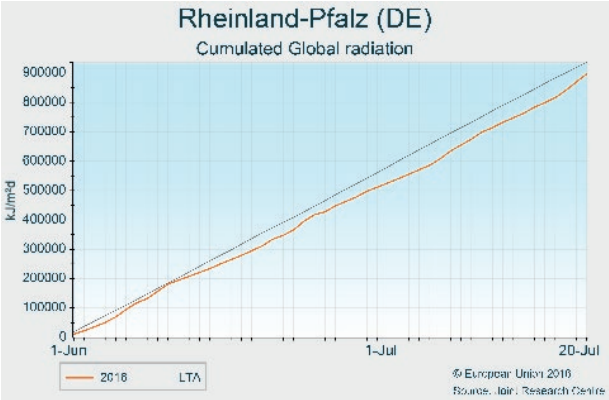
No major obstacles to the grain filling of winter and spring cereals, despite the low radiation levels and very wet conditions in most of the country in June. Overall, the yield prospects for cereals are above the five-year average.

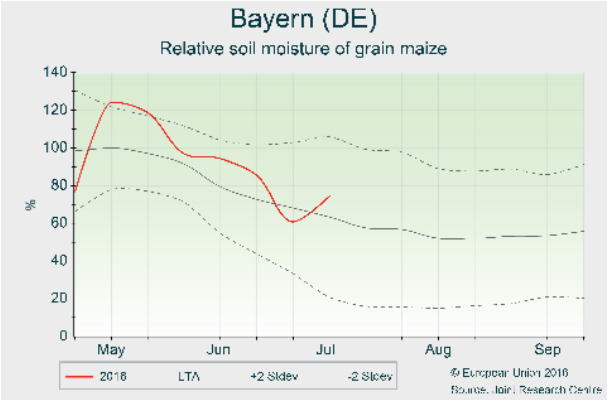
In general, the period under review was characterised by unsettled weather with plentiful precipitation. A particularly high number of rainy days are recorded for Nordrhein-Westfalen, Rheinland-Pfalz and close to the Alps. Although drier conditions prevailed in a band from Hessen, Thüringen, Sachsen-Anhalt, Brandenburg to Mecklenburg–Vorpommern, some beneficial rains led to an almost balanced water supply during the period under review and partly replenished the soil moisture in the regions that had formerly been too dry. Since 1 June, temperature accumulation is mostly above average, but the sharp temperature fluctuations extenuated the unsettled weather conditions. A few (3-5) hot days were recorded, mostly in the south and east of the country. Global radiation was below average (except in the east) in June, while in July the picture to date is reversed.

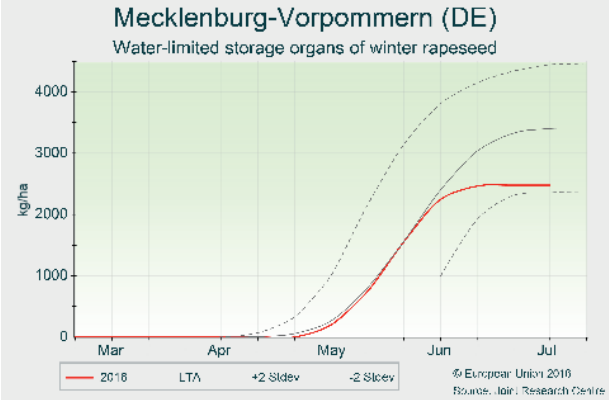
Winter barley has matured and the harvest is underway, albeit later than usual due to a lack of sunshine and delayed maturity. Soft wheat is in the ripening stage and in some areas is approaching maturity. Simulated yields exhibit a gradient from well above average in the north-west to average in the south. Below-average yields are simulated for parts of Mecklenburg-Vorpommern and Brandenburg due to the previously dry conditions. At national level, the yield forecast remains practically unaltered from the June bulletin and close to the five-year average, but slightly below last year's yield. Although the forecast for rapeseed was lowered compared to the June bulletin to account for the disappointing maturation in the north, the yield outlook is still close to the five-year average.

Soil moisture levels in the main maize-producing regions are satisfactory. Maize is now in the flowering phase and slightly advanced in central and northern Germany, and the forecast is well above 2015 yields.







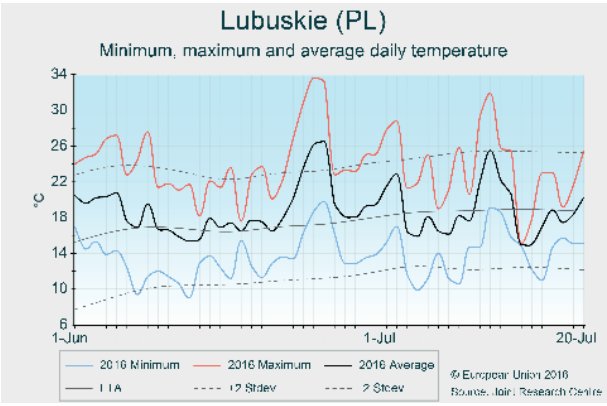


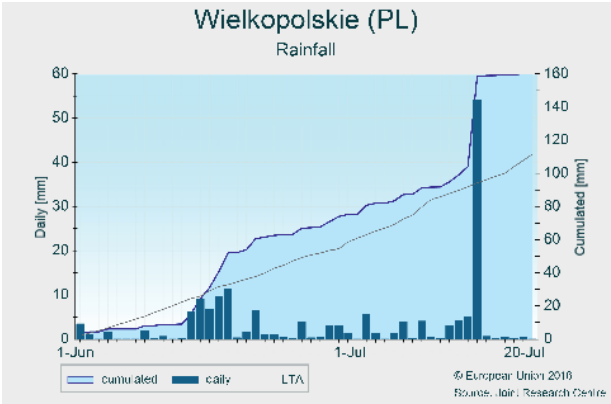
Poland

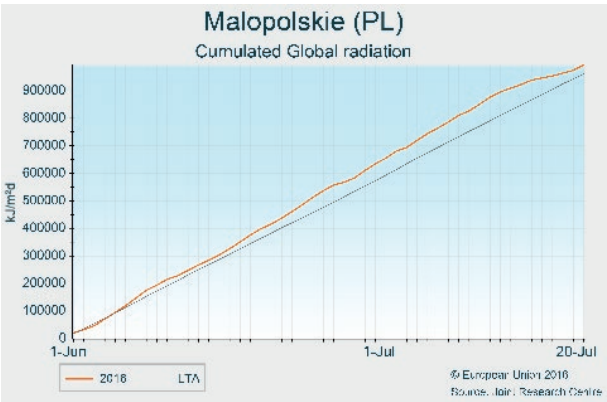
Finally, favourable conditions locally impacted by rainfall

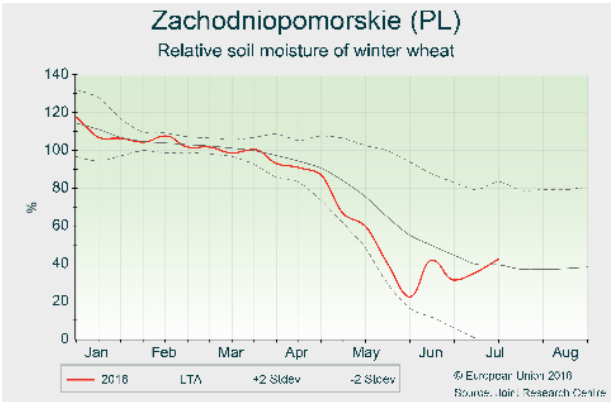
Weather conditions were mostly favourable for all crops from the beginning of June. The only concern is the rainfall that occurred locally while the harvest of winter cereals is approaching. The yield forecasts of winter cereals are maintained below the average, but other crops benefited from favourable conditions and are forecast to be above the average.

Rainfall was greatly above the average in western and northern regions from the beginning of June. Precipitation was unevenly distributed, and most of the surplus was recorded following rainfall events on 14 July, with more than 50 mm in Wielkopolskie and 70 mm in Pomorskie. The heavy rainfall slightly helped to replenish the soils. In south-eastern regions, rainfall remained closer to the average. Temperatures were above seasonal values during the period of analysis, particularly in south-eastern regions. Since the last decad of June, three short heat spells with maximum temperatures greater than 30 °C were recorded, lasting less than three consecutive days. Seven days with maximum temperatures above 30 °C were recorded in south-eastern regions. Apart from these events, no prolonged heatwaves were observed, and the warm temperatures are not expected to impact crop growth as most of the crops were not in critical development stages. The above-average radiation in south-eastern regions was beneficial for potato, sugar beet and grain maize crops. The yield forecasts for sugar beet, potatoes and grain maize are maintained above the five-year average as conditions have been good since the start of the season. Spring barley is forecast to be close to the average as a result of the dry conditions observed locally this spring. Soft wheat, winter barley, rye, triticale and rapeseed yield forecasts are maintained below the five-year average, and the negative outlook is reinforced by the latest downpours that have occurred as the harvest is about to get underway.









United Kingdom and Ireland

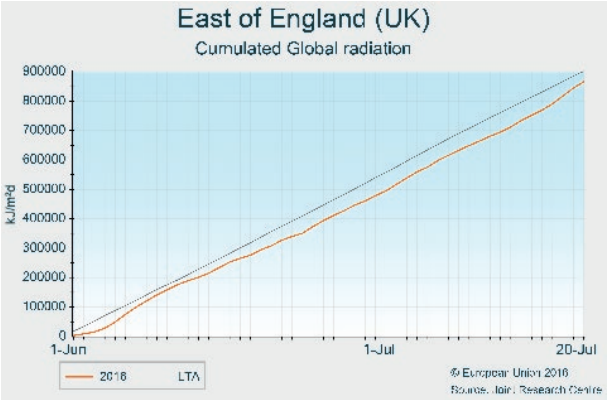
Continued modest yield outlook

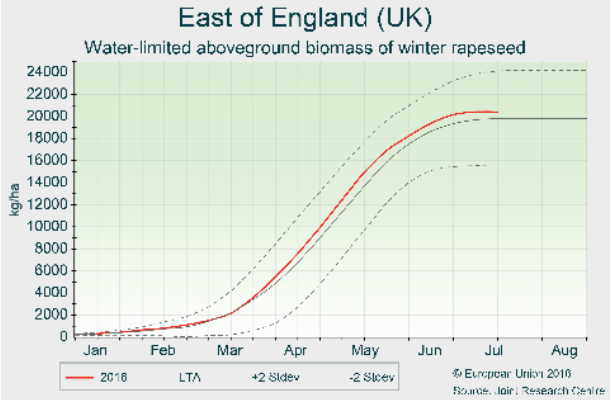
Crop development and biomass accumulation are mainly above average, but pest and disease pressure remain high. The yield forecasts remain close to or slightly above the five-year average.

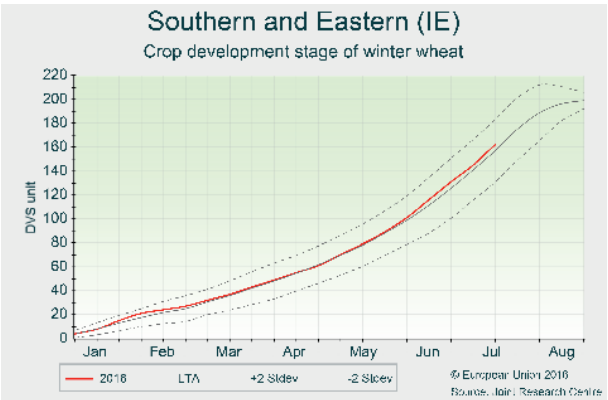
Temperatures were near average in the United Kingdom and Ireland, with above-average values predominating in the first half of June (especially in the western United Kingdom and Ireland) and below-average values in the first half of July; however, there were no large extremes. Temperatures climbed during the last days of the analysis period, towards the low 30s in the southern United Kingdom.

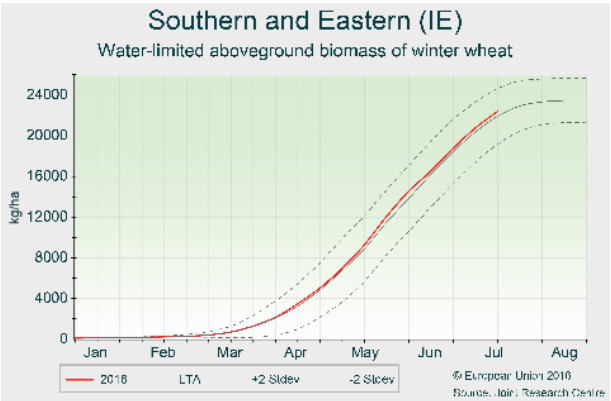
Rainfall was above average. In the southern United Kingdom, rainfall amounts and frequency were particularly high during the last three weeks of June. In other parts of the United Kingdom and Ireland, rainfall was more evenly distributed and highly frequent, even in the cropland areas of southern and eastern Ireland, where the total amount of rainfall was close to the average. As a consequence, radiation levels were below average, especially in the south- and central-eastern United Kingdom, which had also experienced low radiation levels due to densely overcast weather conditions at the end of May.

Model indicators continue to show average to above-average development and biomass accumulation of winter crops, and ample water supply. However, below-average radiation and high humidity may have affected grain filling and ripening, and have led to persistently high pest and disease pressure, with negative effects on yields and grain quality. These factors introduce a high margin of uncertainty into our yield forecasts, which remain close to or slightly above the five-year average, and close to those of the previous bulletin. The harvesting of rapeseed and winter barley has started with mixed results, confirming the modest overall outlook.







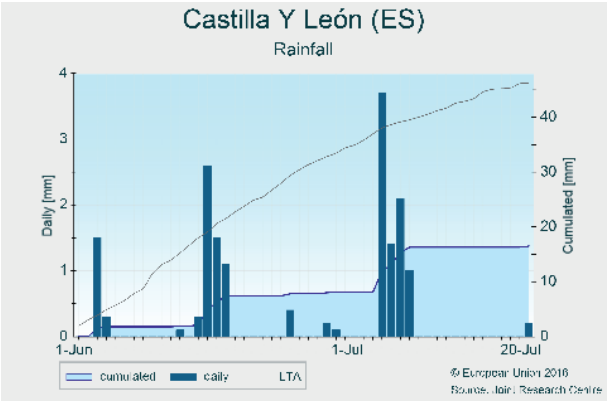


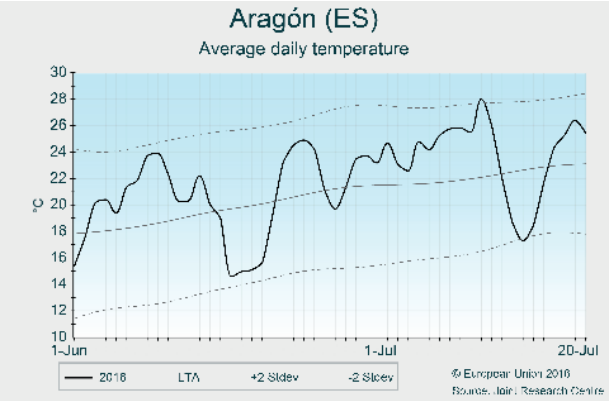
Spain and Portugal

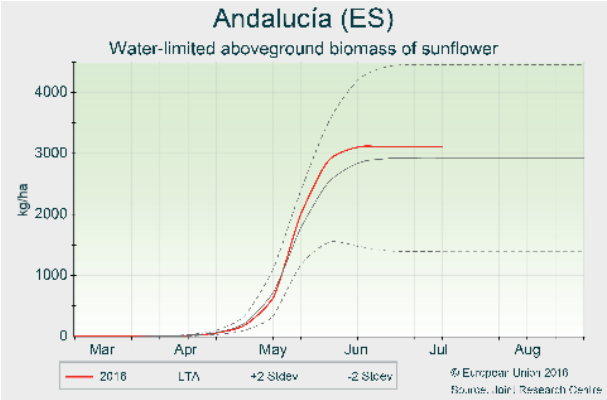
Unusually high temperatures

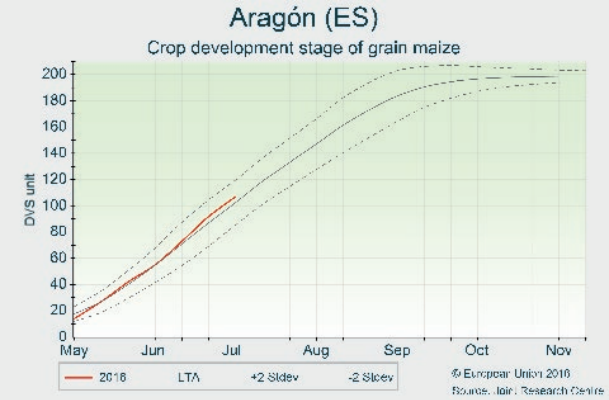
The winter-cereals harvest is reaching completion in the Iberian peninsula, favoured by the scarcity of precipitation since mid June. Weather conditions during most of the growing season have been extremely positive, and yield expectations are greatly above those of previous years. The unusually high temperatures registered in June and July are fostering the rapid development of summer crops.

Following a chilly period in mid June, when average temperatures dropped to 4 °C below the long-term average, weather conditions in most of the Iberian peninsula have been unusually warm. Maximum temperatures for the second half of June and July were persistently above 30 °C in central and southern regions. Rainfall during the whole period was rather scarce: cumulative precipitation in June and July was less than half that of an average year. These dry conditions were more pronounced in the southern half of the peninsula, where no significant rainfall events were registered. The lack of precipitation favoured the smooth progression of the winter-cereals harvest, which has already been completed in the centre and south and is still underway in the northern provinces of Castilla y León. Yield expectations are very positive, thanks to the favourable spring weather conditions in most of the main winter-cereal-producing regions. The high temperatures are boosting the development of summer crops. Sunflowers are in the grain-filling phase in the centre and north of the Iberian peninsula, and have already reached maturity in Andalucía. The abundant rainfall in spring was essential for adequate crop growth and, therefore, the yield outlook is above last year's results. Maize is flowering in most of the main producing regions under average crop conditions, as the irrigation campaign has been progressing without restrictions to date.









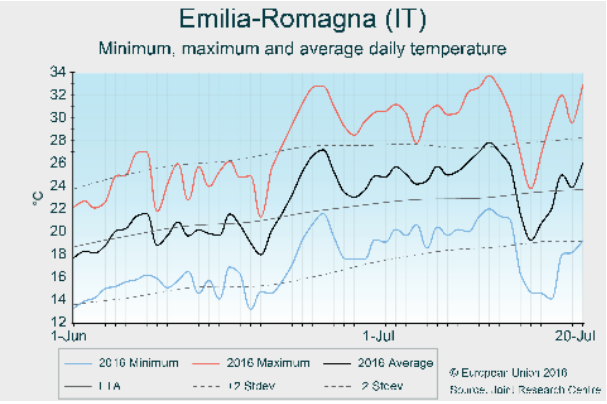
Italy

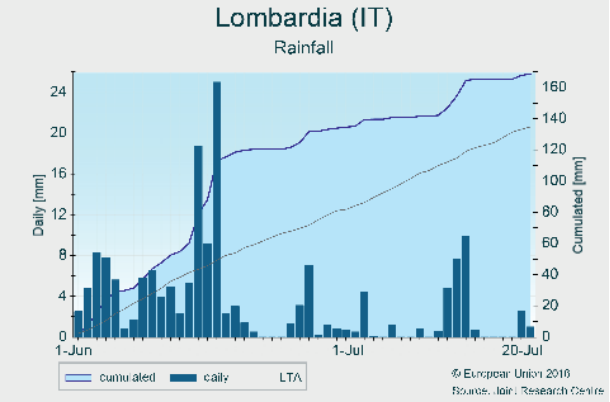
Good outlook for spring crops despite excess rain

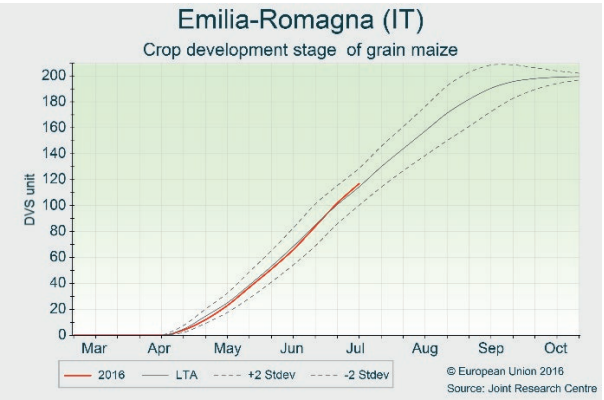
Close-to-average temperatures and abundant rainfall resulted in good growth conditions for spring crops. In several areas from north to south, heavy precipitation caused an excess of water in the fields. The yield forecasts for winter cereals, grain maize and sunflowers remain slightly above average.

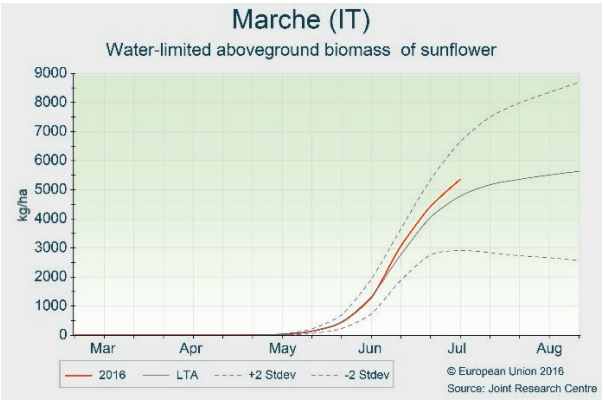
Overall, near-average thermal conditions and abundant rainfall prevailed in Italy during the period under review (1 June-20 July). There were large temperature fluctuations in many areas across the country. The first two decads of June were characterised by copious rain and cooler-than-average temperatures in several regions across the country. This was followed by 20 days of warmer- and drier-than-usual weather (particularly in the north). The only exceptions were Basilicata, northern Puglia and western Sicilia, where abundant precipitation continued to be registered. In mid July, temperatures dropped by about 10 °C in most regions, and strong thunderstorms occurred, mainly along the Adriatic coast.

Above-average soil moisture, combined with average cumulated active temperatures, created good conditions for the growth of spring crops, but an excess of water hampered the harvesting of winter crops. Heavy rainfall and strong winds were recorded in June, and may have negatively affected grain quality and led to the lodging of winter crops locally. Nevertheless, yields are expected to be slightly above average for all winter crops considered (durum wheat, soft wheat and winter barley). Grain maize is currently flowering in most regions, and simulated crop-growth indicators show that crop development and the leaf-area index are close to seasonal values. According to our model, the cumulated biomass of sunflowers is also close to or slightly above the average. Consequently, the previous forecasts for grain maize and sunflowers have been maintained at slightly above the average.









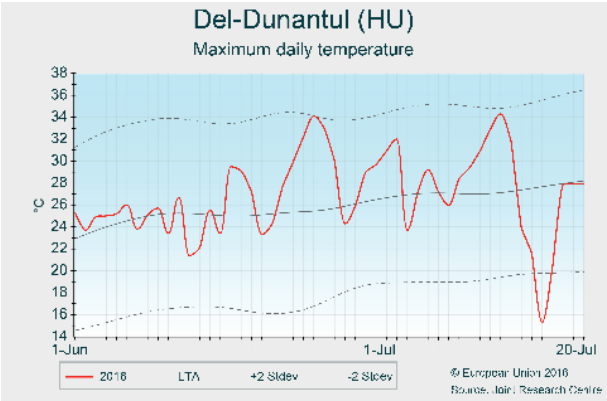
Hungary

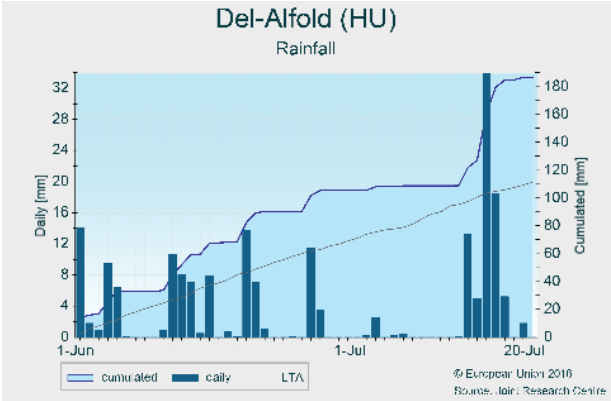
High yield outlook for winter crops

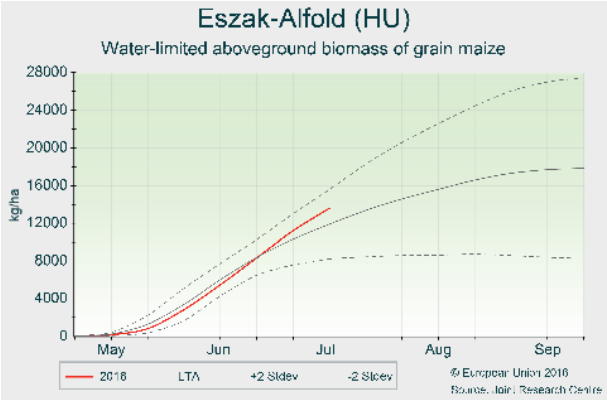
Moderately warm weather with frequent rains in early June was followed by a period of hot and dry conditions, which ended with heavy rains in mid July. The harvest of winter crops progressed well until mid July, when it was interrupted by the rains. The positive yield forecast both for winter and summer crops is maintained.

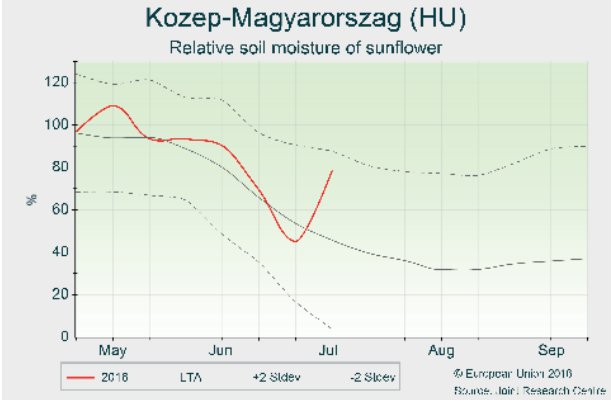
During the first two decads of June, daily temperatures fluctuated around the long-term average, and most of Hungary experienced frequent and abundant rainfall. Drier- and warmer-than-usual weather conditions prevailed from 21 June to 10 July. Three short (two- to five-day) heatwaves occurred during this period, with maximum air temperatures reaching 32-36 °C. Around mid July, wet weather returned with thunderstorms and a sudden drop in temperatures. Central and eastern Hungary received 60-120 mm of rain, while 40-60 mm of precipitation was measured over 4-5 days in western and north-eastern regions.

The harvest began one to two weeks earlier than usual and had good overall progress until the second decad of July, when it was interrupted by heavy rains. Our model simulations show very high-yield biomass accumulation and no harmful effects from the short heatwaves on winter crops. The heavy rains caused local damage, however, with negative effects on grain quality. On balance, assuming that the harvest can be finalised on time under normal weather conditions, our yield forecasts for winter cereals were kept at the high level of last month's bulletin. The aforementioned heatwaves accelerated the phenological development of maize and sunflowers, but is not considered to have compromised the pollination of maize thanks to satisfactory water supply. The recent rains favourably replenished the soil moisture for the yield-formation period. Leaf-area expansion, biomass accumulation and available water levels are near or above average, therefore the yield expectations for summer crops are also positive.









Romania

Beneficial rains sustain high yield potential

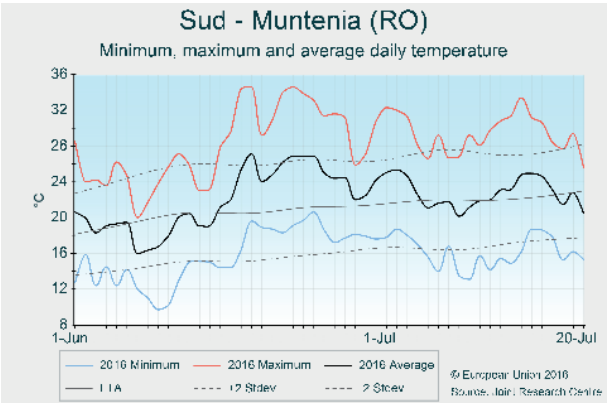
The yield outlook for winter cereals is at a record high. The harvest of winter cereals progressed well until mid July, when it was hampered by abundant rainfall in western regions. The overall conditions for summer crops are promising, but south-eastern Romania is facing intensifying water deficiency.

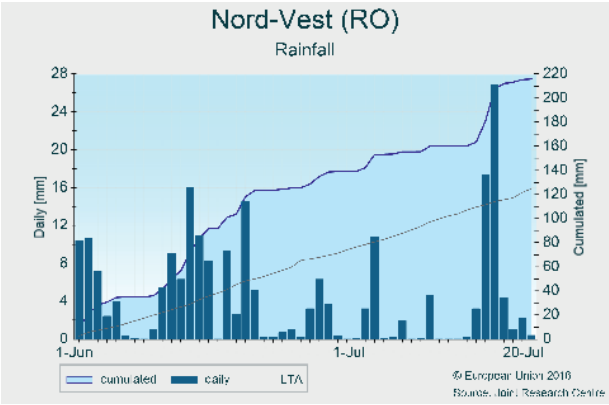
During the first half of June, Romania experienced slightly below- or near-average daily temperatures. A very warm period started in mid June which lasted until mid July. During this period, the number of hot days (Tmax > 30 °C) exceeded the average by 5-10 days in north-western and central regions, and by 10-17 days in southern and eastern Romania. Precipitation was abundant in June in most of Romania, reaching 150-200 % of the usual precipitation cumulates, although some southern areas along the Bulgarian border remained dry. The first decad of July was drier, but around mid July abundant precipitation (40-100 mm) returned to the western part of Romania.

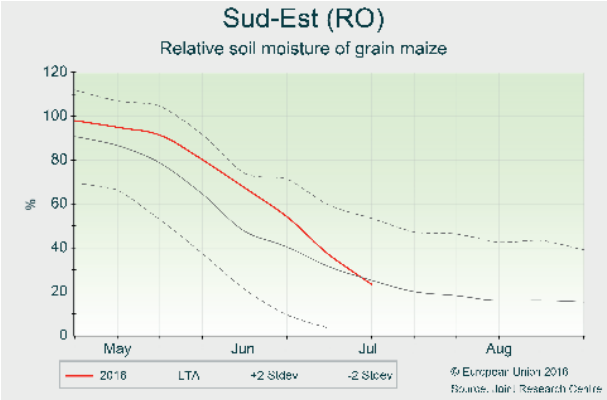
The rainy weather of May and June was beneficial for yield formation, but also increased the risk of plant disease and is likely to have negatively affected the grain quality of the winter cereals. Harvesting started after mid June and progressed well until the second decad of July, when it was hampered by rainfall in western regions. Assuming that the interruption will be manageable, our high yield forecast was maintained at record levels.

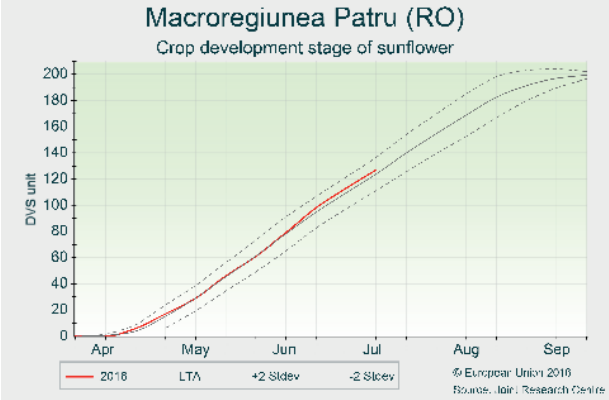
Regarding summer crops, any constraint caused by the hot spells to the flowering of sunflowers and grain maize has been of little significance, thanks to adequate water supply. Soil moisture levels in the Sud-Est and Sud-Muntenia regions, however, have now decreased to average or slightly below-average levels for mid July.

As our crop model simulations indicate near- or above-average biomass accumulation of summer crops so far, the optimistic yield forecast is maintained, but rain is needed soon in south-eastern regions in order to sustain this potential.









Bulgaria

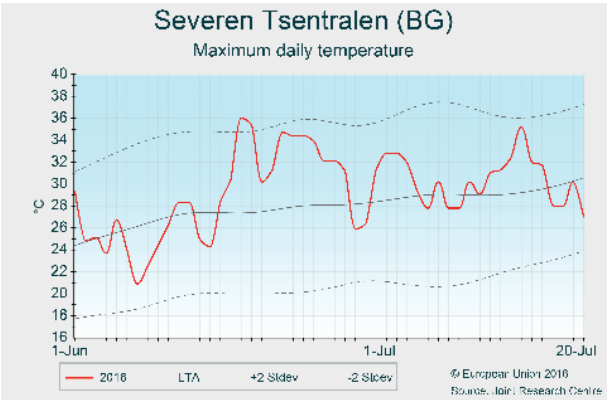
High yield expectations and harvest progressing well

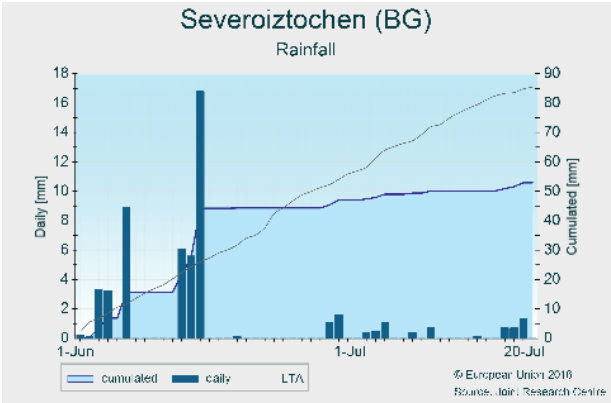
Sparse rainfall facilitated the harvesting of winter cereals. Water-supply conditions are adequate in western regions, but the rainfall deficiency began to affect the summer crops in the eastern half of the country. Consequently, the yield forecast for maize and sunflowers was revised slightly downwards.

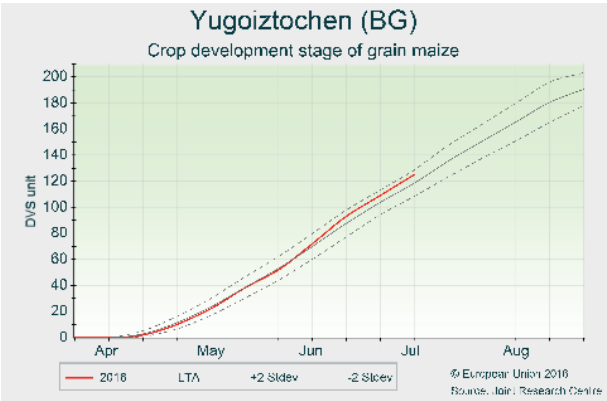
After the near-average thermal conditions of early June, temperatures fluctuated mostly far above the long-term average from the middle of the month onwards. Daily maximum temperatures frequently exceeded 30 °C, reaching 36-38 °C on the hottest days. Abundant, above-average rainfall prevailed until 16 June, although later the precipitation tendency decreased. Precipitation was near average in western regions, while the eastern half of the country typically received less than 20 mm of precipitation in the last 40 days of the review period.

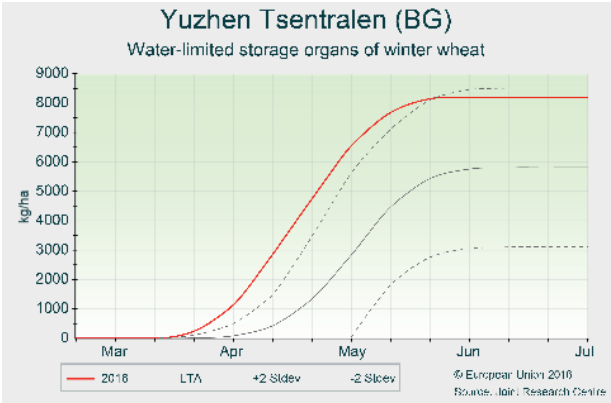
The harvesting of winter cereals got underway earlier than usual, as a consequence of advanced crop development. The dry weather conditions and infrequent precipitation events of late June and early July facilitated the progress of the harvest. Thanks to the exceptional biomass accumulation of winter cereals during this crop season, the yield expectations are exceeding those of the previous excellent year.

The development of maize and sunflower crops is advanced by about one week. The rainfall deficiency started to affect summer crops in the eastern regions, and the soil moisture has fallen below the average since mid July. The water supply of summer crops is adequate in western Bulgaria. The aforementioned warm periods coincided with the tasselling of maize, which is likely to have had a moderately negative effect on fertilisation. The current biomass accumulation is adequate, but the persistence of problematic water supply conditions may lead to deteriorated yield formation. Sunflowers, a more drought-tolerant crop, are probably less affected. The forecast was revised slightly downwards for summer crops, especially for grain maize, but more rain will be needed to maintain the current yield outlook.









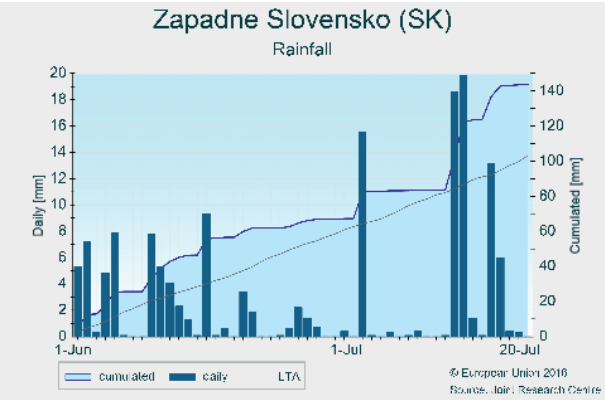
Austria, Slovakia and the Czech Republic

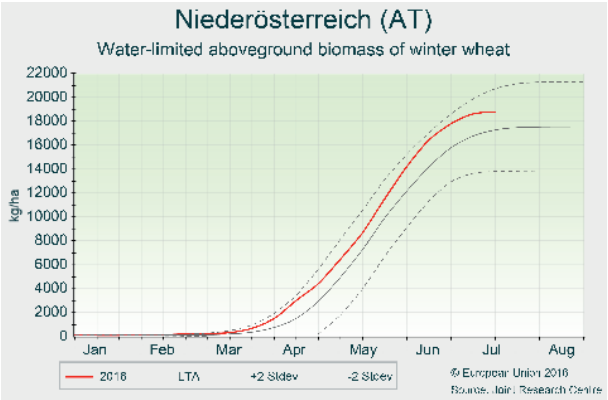
Favourable weather conditions slightly increased the crop yield outlook

Generally, wet and mild conditions in Austria ensured beneficial soil moisture conditions, but increased disease pressure. Winter wheat yield outlooks have been slightly increased in Austria and the Czech Republic due to a favourable grain-filling period. Summer crops are in good condition.

June was generally 1-2 °C warmer than the long-term average. The end of June brought the first heatwave, with maximum daily temperatures above 30 °C. The highest number of hot days was observed in Slovakia, especially in south-western and eastern parts. Air temperatures returned to normal values during the first and second decads of July. Rainfall cumulates exceeded 150 mm during the analysis period in Austria, the westernmost regions of the Czech Republic and the northern half of Slovakia; rainfall cumulates of over 200 mm were observed regionally in eastern and north-eastern Austria. Heavy rainfall events were observed in these regions at the end of May and beginning of June.

The weather was generally favourable for crop growth and development. Dry weather at the end of June and beginning of July accelerated the ripening of winter wheat and winter barley in Slovakia and the Czech Republic, where the harvest has begun. Rainfall during the second decad of July was beneficial for grain maize, which is mainly in the flowering stage. The mild winter and humid weather in Austria contributed to higher pressure from pests and fungal diseases. Nevertheless, according to our models, the expectations for winter wheat yields are good due to generally favourable weather during the grain-filling period. Winter wheat yield expectations have also been slightly increased for the Czech Republic, whereas they remain slightly below the five-year average in Slovakia. Summer crops are generally in good condition, especially due to beneficial rainfall conditions during the second decad of July.



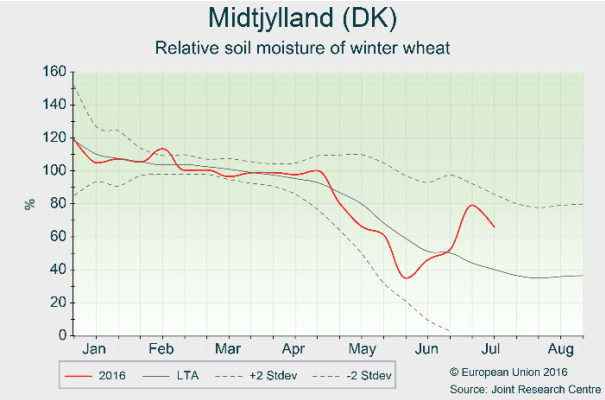


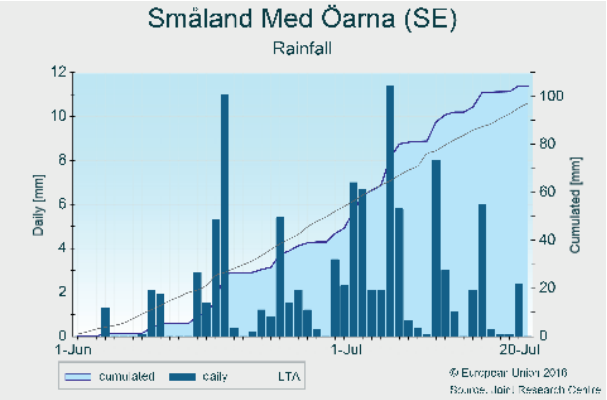
Denmark and Sweden

Good yield outlook

Rainfall events after mid June improved soil moisture conditions in both countries. However, the upcoming harvesting of winter cereals could be delayed if the high frequency of rainfall continues. Generally, all crops present advanced development stages with good yield expectations.

June started with above-average temperatures and little rainfall in both countries. After mid June, rainfall frequency increased and temperatures fell to near average values for the rest of the review period, with the exception of 24 and 25 June, when maximum temperatures reached 27 °C. Cumulated rainfall for the period of review is above the seasonal average, and soil moisture levels have been restored before dropping below critical levels, thus removing the concerns raised in our previous bulletin. Winter cereals are at the final stage of grain filling, and are gradually approaching maturity. Crop model indicators for winter cereals suggest that yields will be above average for both countries and quite close to those of 2015, which was a high-yielding year. Spring barley also benefited from the rainfall after mid June and is progressing quite well. Rapeseed has reached maturity in both countries. Grain maize development in Denmark is greatly advanced. The only concern at this time is about the continuation of the rainfall in the next period. If rainfall continues with the same frequency during ripening, this will lead to high grain moisture and will delay the harvest. The yield outlook for all crops is above the five-year average. The yield forecast for grain maize is based on the long-term trend, whereas scenario analyses have been used for the other crops.



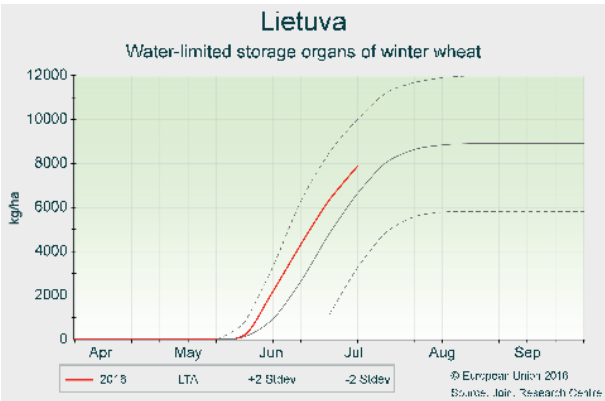


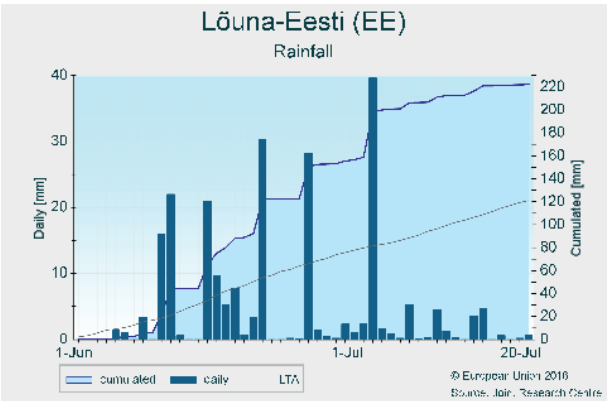
Finland, Lithuania, Latvia and Estonia

Soils replenished by abundant rainfall

Contrasting weather conditions characterised the period under review (1 June-15 July). Overall, conditions were favourable in all countries: the outlook for winter crops remains above average, while spring and summer crop forecasts are in line with average values.

Cold temperatures and mostly drier-than-usual conditions that prevailed until the first half of June were followed by an increase in both rainfall and temperatures (3-3.5 °C above average) during the second half of June. Since 1 July, temperatures gradually fell to seasonal values in the Baltics, while in Finland they were 1-2 °C below average. To date, July has been a very rainy period in all these countries, which helped to replenish soils in areas that experienced high levels of water shortages (southern Finland and the eastern halves of Latvia and Lithuania), improving growing conditions. However, Estonia experienced more extensive rains, twice as much as the long-term average in Lõuna-Eesti, and soils are therefore oversaturated. Unless evapotranspiration increases in the coming weeks, this could lead to disease and a reduction in the quantity and quality of rye, winter wheat and rapeseed grains. Central Finland is also experiencing overly wet soil conditions, but this does not currently represent a risk. The grain formation of winter wheat, winter rapeseed, rye and triticale is currently finishing, and forecasts have been revised upwards (remaining above average). Spring crops (mainly barley, wheat and rapeseed) are passing through the flowering stage under favourable conditions, and their yield outlook is close to average. Late-sown crops (maize, potatoes and sugar beet) benefited from the substantial rains during the vegetative phase and are generally faring well, but forecasts still remain close to average.





Belgium, the Netherlands and Luxembourg

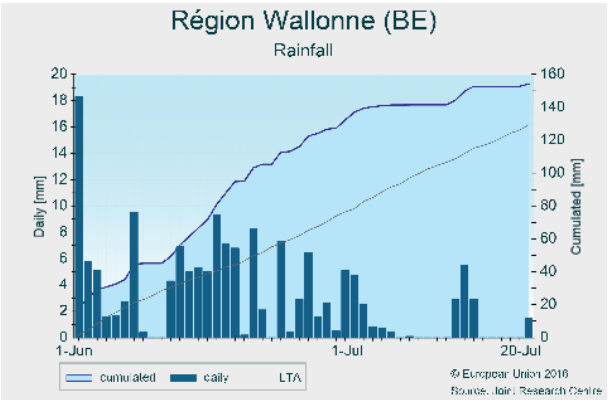
Continued wet weather further affects yield outlook

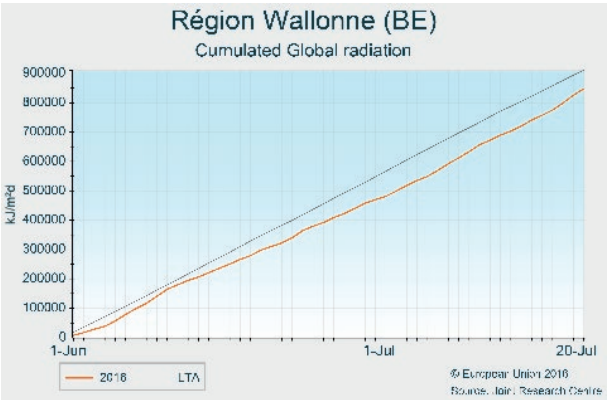
Continued wet weather until early July and associated low radiation, waterlogging and high pest and disease pressure further affected the yield outlook in large parts of the Benelux region. Yields for most crops were revised downwards, but remain close to the five-year average. The forecast for potatoes is now well below the five-year average.

In most of the Benelux region, June (especially the first half) was predominantly warmer than usual, and July was colder than usual. Temperature accumulation for the period as a whole is average in Belgium and Luxembourg, and slightly above average in the Netherlands. Maximum temperatures exceeding 30 °C only occurred on three days or fewer, depending on the location.

Rainfall was significantly above average. In Belgium, Luxembourg and southern parts of the Netherlands, the period of abundant precipitation that had started at the end of May continued until the beginning of July. The northern half of the Netherlands was less affected. There, the period of abundant rain started in the second decad of June and continued until the end of the review period, but with less frequency and intensity. Solar radiation levels were below average, particularly in Belgium and Luxembourg.

Negative impacts of the continued wet and overcast weather conditions include increased disease pressure, reduced photosynthesis, nutrient loss and damage to roots due to anoxia in waterlogged areas. Field activities to control these negative pressures have also been hampered. Many of these impacts can now be considered as being irreversible: winter crops were affected during grain-filling and/or ripening stages, and many sugar beet and potato fields were exposed for too long to waterlogged conditions, especially potatoes, which were often sown late under suboptimal conditions. On the positive side, crops in areas where water shortage is normally the main yield-limiting factor may have had a net benefit from the rains, for example winter cereals in Luxembourg and grain maize on well-drained light-textured soils. The complex trade-offs are difficult to quantify, and introduce a high margin of uncertainty in our forecasts. The yield forecasts were revised downwards for most crops, but remain close to the five-year average. The forecast for potatoes is now well below the five-year average.





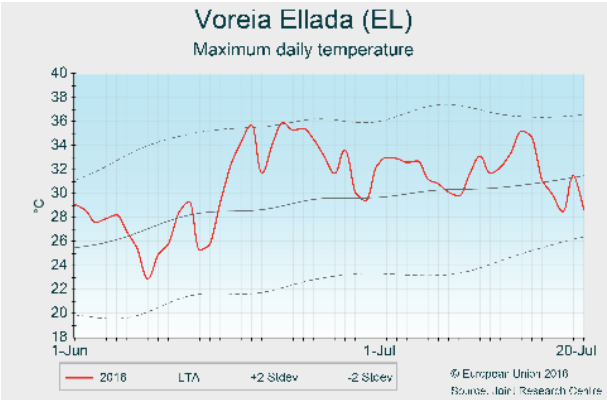
Greece and Cyprus

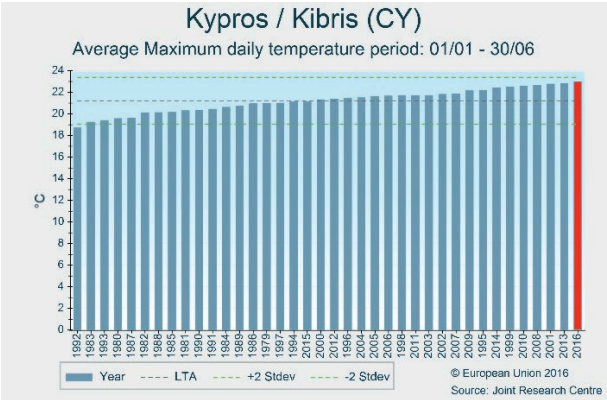
Heat wave during the flowering of grain maize

Precipitation was below average in Greece, and Cyprus was almost completely dry. A heatwave hit Greece between 15 and 25 June, during the flowering phase of grain maize. The harvesting of winter cereals in Greece finished without any particular obstacles, and the yield outlook is slightly below the five-year average..

Temperatures in Greece fluctuated around the average until mid June, but were subsequently consistently above the long-term average for the rest of the period under consideration. Moreover, a heatwave hit the country during the period from 15 to 25 June, with maximum values reaching 40 °C in several regions. Precipitation is below average, mainly because the second half of June was almost completely dry. Warm temperatures and June's dry conditions facilitated the completion of the winter cereal harvest. The yield outlook is rather mixed, with northern areas experiencing good yields as a result of the late-May rainfall events, while crops in central-southern areas were in the maturity stage and couldn't benefit from the rains. Overall, our yield forecast for winter cereals is based on scenario analyses, and is slightly below the five-year average. On the other hand, the fact that the heatwave occurred during the grain-maize flowering phase gives rise to concerns regarding pollination, which will affect the formation of the kernel. Currently, the development stage is simulated as being slightly advanced. Our yield forecasts for grain maize and potatoes are based on scenario analyses, and are slightly below the five-year average.

In Cyprus, the season for winter cereals has concluded with low yields because of the previous long warm period and limited rainfall events. More specifically, temperatures continued to fluctuate above the long-term average, and the first half of the year 2016 was the warmest in our database (i.e. since 1979). Warm temperatures accelerated the cycle of winter cereals that matured early, and the rainfall that occurred at the beginning of May came too late to improve the grain filling. Scenarios have been used make the crop yield forecasts, which are below the five-year average





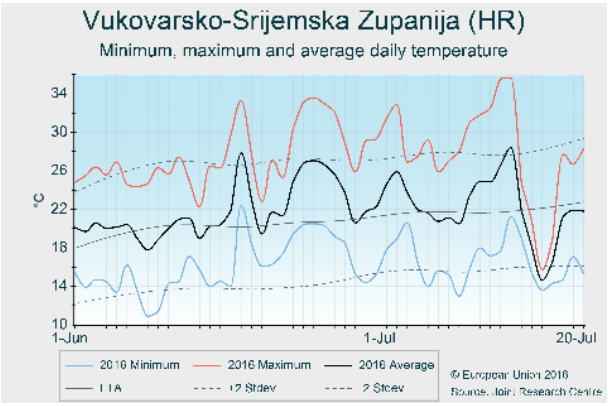
Slovenia and Croatia

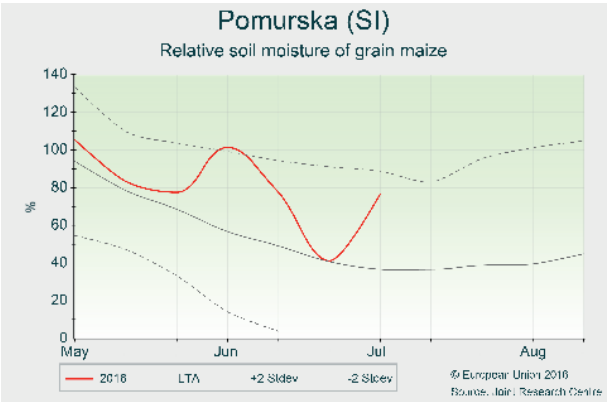
Above-average winter wheat yields in Croatia, good yield outlook for grain maize

Rainfall since the beginning of summer has been significant. Moderate drought stress has therefore been limited to areas where crops are grown on shallow soils. Winter wheat yields in Croatia are forecast to exceed the five-year average. Summer crops are in good condition, with current yield outlooks well above the five-year average.

June was generally 1-2 °C warmer than seasonal. The last decad of June saw a first heatwave, with two to five hot days with maximum daily temperatures above 30 °C. Seasonal air temperatures were observed in eastern Croatia and north-eastern Slovenia during the first two decads of July, whereas slightly warmer-than-usual conditions prevailed elsewhere. Maximum daily temperatures of around 35 °C were recorded in eastern and coastal regions of Croatia during two days in July. Spatially diverse rainfall conditions prevailed during the analysis period. Major agricultural areas in eastern Croatia and north-eastern Slovenia experienced wetter-than-usual rainfall conditions, with cumulates generally exceeding 150 mm. Regionally, in central and western Slovenia as well as in eastern Croatia, rainfall cumulates of more than 200 mm were observed.

The winter crop harvest is generally finished in Croatia and ongoing in Slovenia. The grain-filling period for winter wheat has been sustained by generous rainfall; drought stress therefore only slightly affected crops grown on shallow soils. The outlook for the winter wheat yield is therefore above the five-year average for Croatia. For Slovenia, the winter wheat yield outlook remains slightly below the five-year average, due to the cold spell event at the end of April, following which crops only partially recovered. The weather conditions in both countries were favourable for summer crops. Grain maize, which was replanted due to the cold spell at the end of April, is progressing well. The current outlook for the grain maize yield is well above the five-year average, especially due to the fact that there has been limited or no drought stress so far.



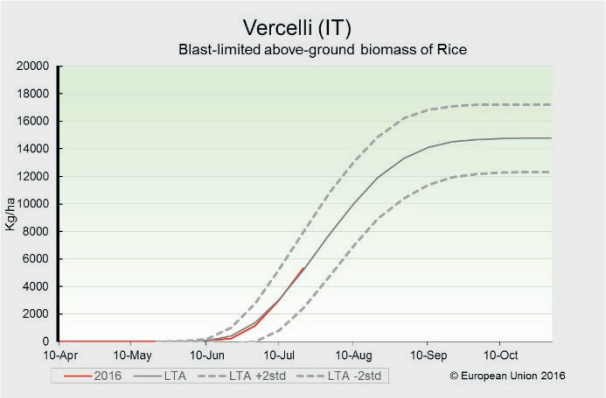


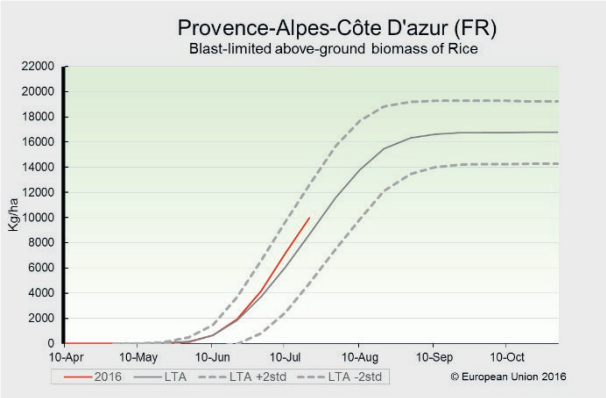
3.2.European Union — rice-producing countries

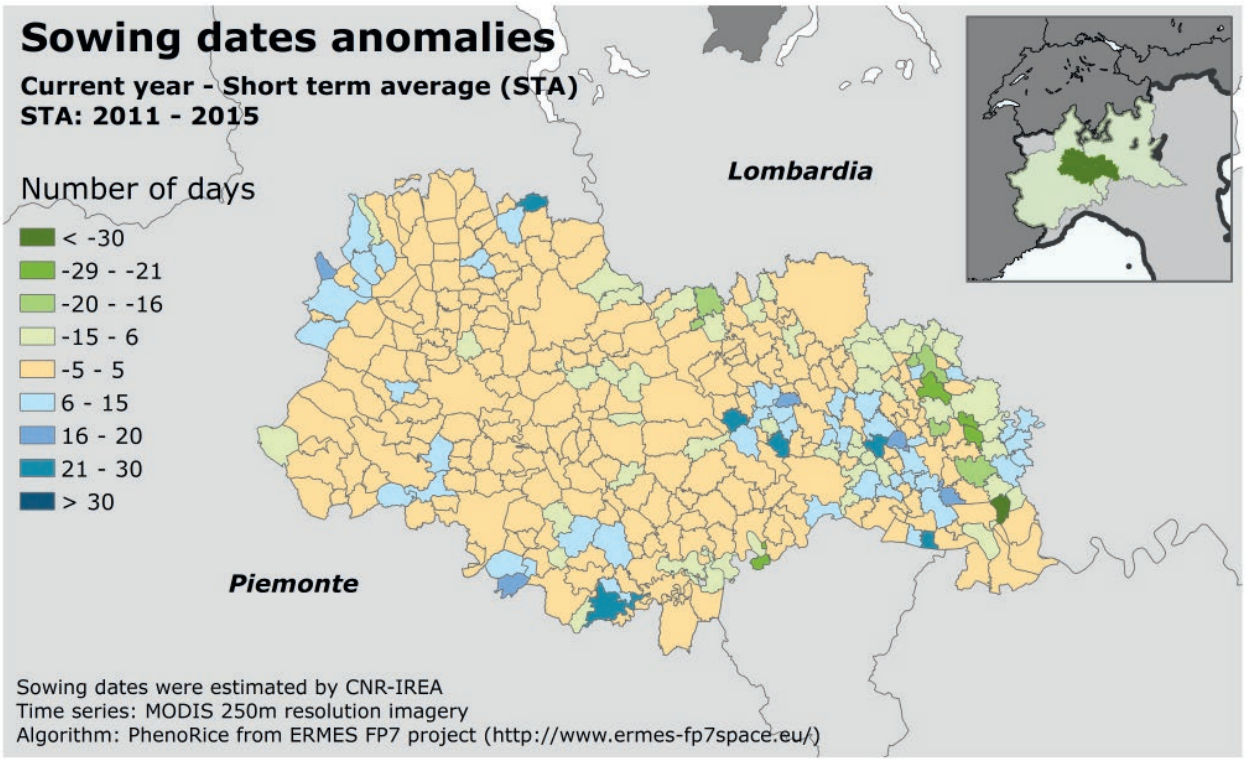
Italy and France

Crop growth conditions close to average

Meteorological conditions during the growing season have been generally favourable in the main rice-producing areas of Italy — Piemonte and Lombardia. Some temperature fluctuations have occurred since the end of June, but cumulated active temperatures during the growing season are close to the long-term average. Rainfall has been near average in Piemonte and above average in Lombardia. Rice was sown on time and is still in the vegetative phase, though with some local variations (see map). Reflecting these weather conditions, indicators based on remote-sensing analysis and model simulations, such as leaf-area expansion, total biomass and risk of fungal disease, are close to seasonal values. Therefore, average yields are expected for these regions. Average meteorological conditions also characterised the main rice-producing areas of France (Languedoc-Roussillon and Provence-Alpes-Côte d'Azur). There, however, radiation levels were above average, resulting in slightly above-average biomass accumulation and lower risk of blast infection. The yield forecast is still close to the five-year average but well above last year's value..





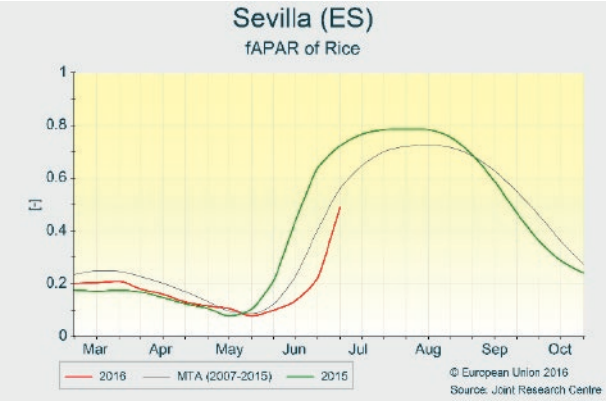


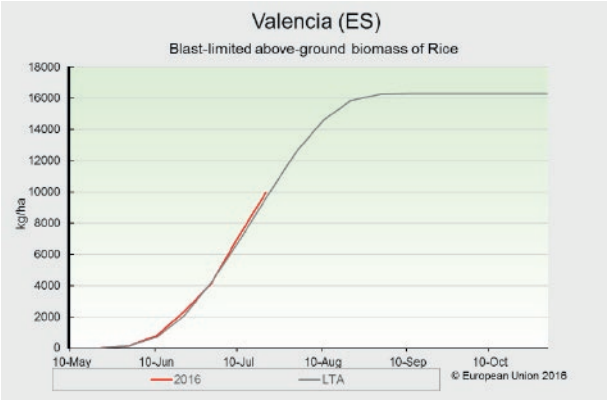
Spain and Portugal

Average crop conditions

Rice is approaching the flowering stage in the main producing areas of the Iberian peninsula. In the south-western rice-producing regions (Andalucía, Extremadura and Alentejo), precipitation in April and (especially) May was crucial to increasing water storage after a rather dry winter, thus avoiding possible irrigation restrictions to date. Crop vegetative growth is average, with the exception of the Guadalquivir marshes (Sevilla), where remote-sensing imagery reveals late crop development. Sowing activities in this region, which are usually finished by the end of May, were delayed by about two 2 weeks as a consequence of overly wet soils after the abundant rainfall in mid May. Thanks to higher-than-usual temperatures in the first half of July, rice is progressively recovering from that delay. Average yields are expected for these regions.

In the east (Comunidad Valenciana, Cataluña and Aragón), the unusually high temperatures since June have favoured rapid crop development. Rice is completing the vegetative growth phase, and leaf-area expansion is currently close to seasonal values. The yield outlook for these regions is currently average, as the irrigation water supply is meeting crop needs. However, the rice-growing season is particularly dry along the Valencia coast as no substantial rainfall has been registered since mid April, which has led the risk of blast infection to increase moderately above the long-term average.

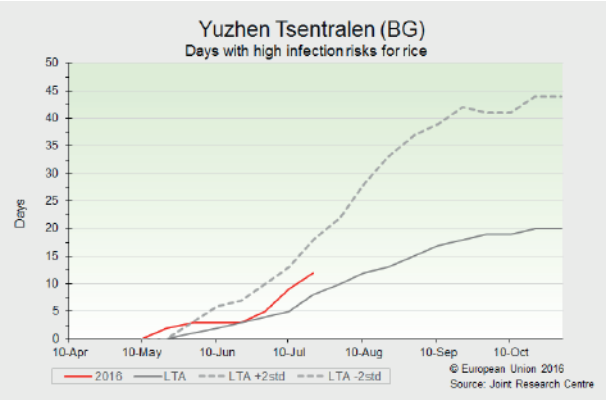


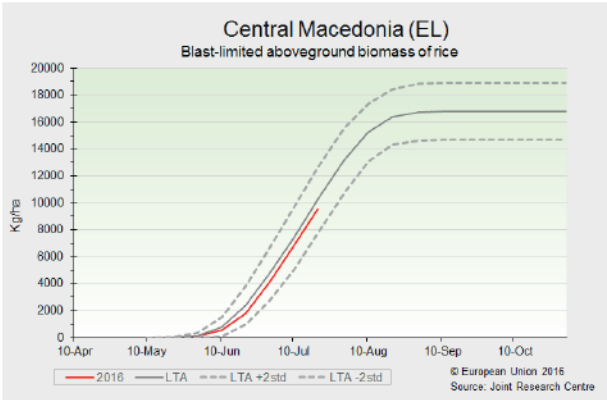


Greece and Bulgaria

Average rice conditions

The cumulated temperature since May in the rice-producing areas of Greece is seasonal, and satisfactory precipitation during May ensured appropriate water levels. However, rainfall was sparse in June and the first two decads of July. Rice was sown during the first two decads of May, within the normal sowing window. In the Central Macedonia region of Greece, the number of days during which there was a risk of fungal diseases was initially above average, but is currently simulated to be below average. At regional level, while the blast-limited aboveground biomass is simulated to be slightly below average, the potential leaf-area index is below both the average and the corresponding index of 2015. The yield outlook is currently below the five-year average. In Bulgaria's rice-producing areas, cumulated temperatures were above average. Moreover, several rainfall events occurred during the first half and at the end of June. These conditions increased the risk of fungal diseases, which is simulated to be higher than the long-term average. The crop development stage is currently slightly above average. The leaf-area index is below the long-term average but very close to the values of 2015. Currently, the forecast is for an average yield..



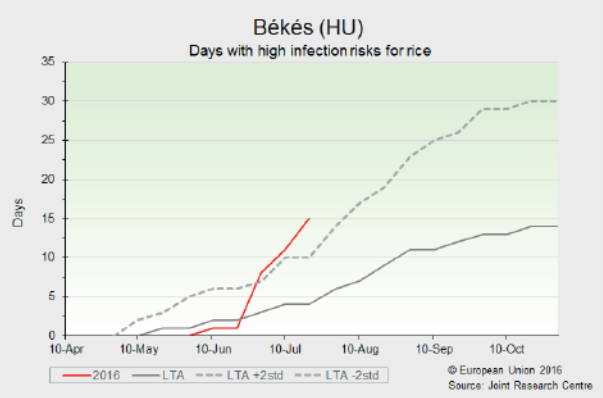


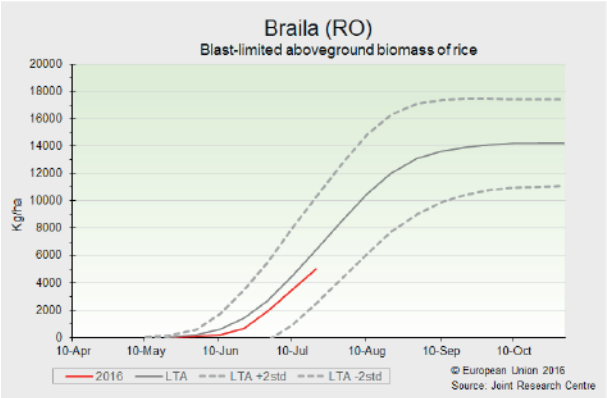
Hungary and Romania

Below-average yield expectations

Rice was sown during the normal window, but crop establishment was delayed due to the below-average temperatures in May and early June. Warmer-than-usual meteorological conditions have prevailed since mid June, favourably accelerating crop development. Although the rice crop is still in the vegetative phase in the second decad of July, it indicates moderate precocity. In both the rice-producing regions of Hungary (Dél-Alföld and Észak-Alföld), cumulated rainfall followed a near-average course from mid April until mid July, when excessive rainfall pushed it well above the average level. By contrast, in Romania, precipitation greatly and persistently exceeded the long-term average in the southern areas where rice is cultivated.

Considering the results of our rice model simulations, crop conditions in Hungary and Romania are characterised by near- or slightly below-average leaf-area expansion and biomass accumulation. The number of days during which crops were at high risk of fungal infection significantly exceeds the seasonal values in Hungary and in most of the rice-producing regions of Romania. The blast-limited aboveground biomass typically remains below the average. The rice yield is therefore forecast to be below average in both countries.





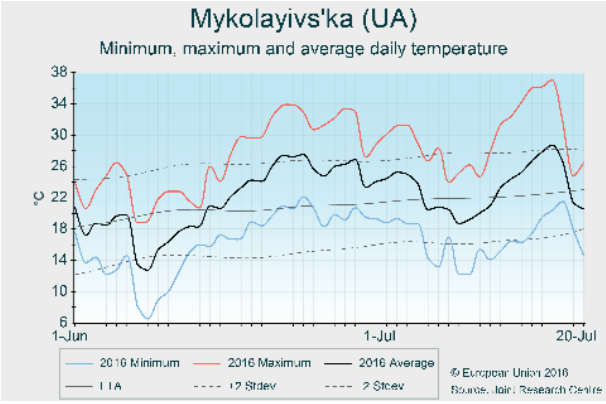
3.3. Black Sea area

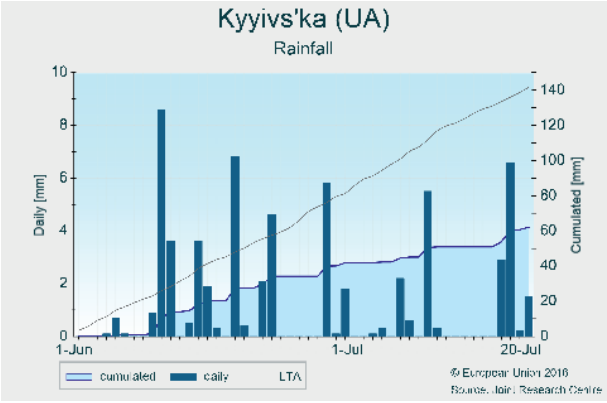
Ukraine

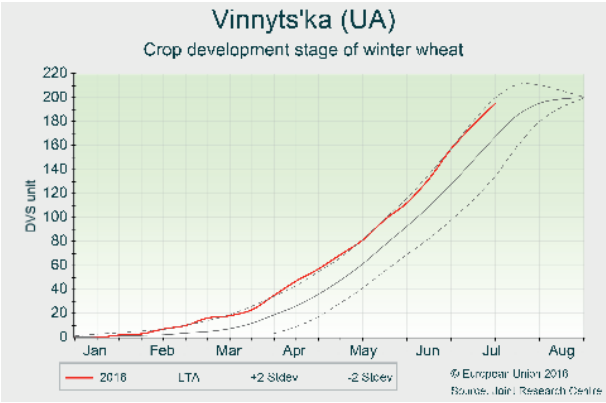
Positive outlook despite hot and dry weather

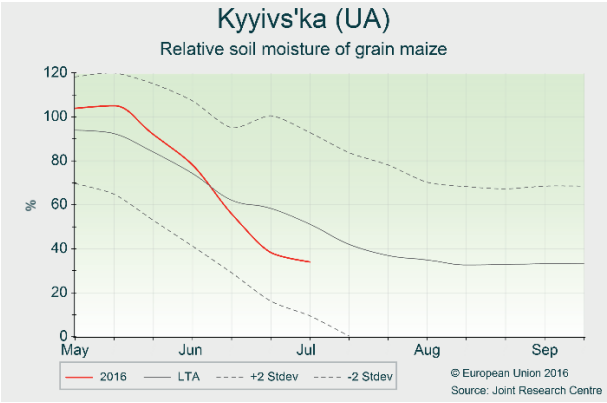
Crop growth conditions were favourable during the period of analysis, despite predominantly above-average temperatures and only a few significant rainfall events. Record yields of wheat and barley are forecast. The outlook for grain maize is also positive.

Temperatures since mid June have been greatly above average. Maximum temperatures stayed above 30 °C for several days at the end of June, followed by mild temperatures in early July. The last decad of the review period was particularly warm, with maximum temperatures reaching 37 °C in regions surrounding the Black Sea. Cumulated rainfall is below the average, except in the southernmost oblasts. Donets'ka, Kyyvs'ka, Chernihivs'ka and Zhytomyrs'ka received less than 50 % of the average rainfall. Soil moisture levels decreased considerably in these regions, but cumulated rainfall since January has been close to the average, and there is as yet generally no concern about soil moisture levels. Rain will be needed soon, however, to maintain the positive outlook for grain maize. The warm temperatures observed since mid June accelerated the development of all crops, and were beneficial for the barley and wheat harvests. Soft wheat has benefited from good conditions since the beginning of spring, and the yield forecast is close to the record yield of 2014. Spring barley also benefited from good conditions, and the yield forecast is greatly above the average. Winter barley is also forecast to be above average, so the total barley yield is expected to reach a record level.







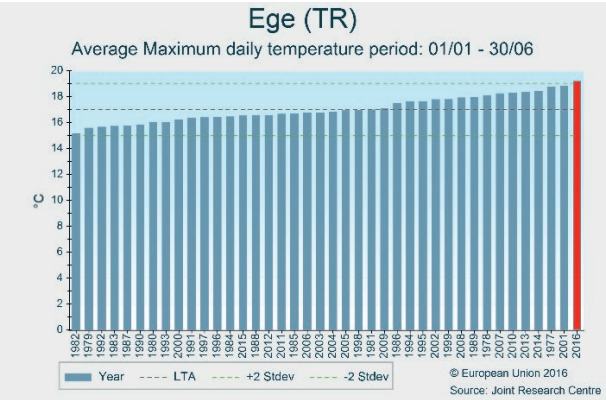


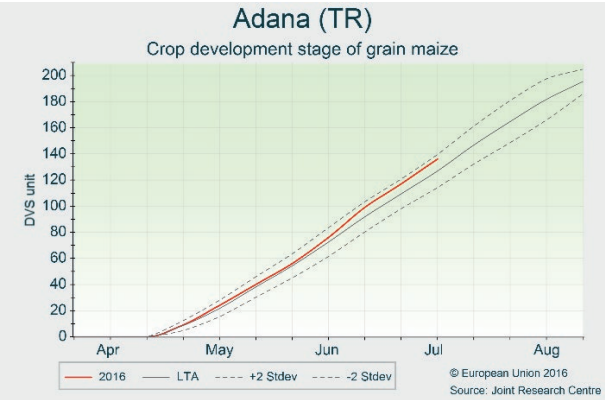
Turkey

Harvesting of winter cereals completed with average yields

A heatwave occurred in western and southern regions during the second half of June while grain maize was at the flowering stage. While these conditions may have affected pollination, they also allowed the harvesting of winter cereals to be completed. Yield estimates are high in northern parts and low in southern parts of the country.

Temperatures after mid June remained mainly above average in the country as a whole. A heatwave hit the southern and western regions of the country, with maximum temperatures exceeding 35 °C. For several important crop-producing regions, the first half of the year 2016 was the warmest in our database (i.e. since 1975). The rainfall events during the period under review were limited, and cumulated precipitation is at or below average levels. These conditions allowed the harvesting of the winter barley and the winter wheat to be completed in the first half of July. High yields are reported in the north-western parts of the country (e.g. Thrace), whereas lower-than-usual yields are observed in the central-southern regions (e.g. Konya) due to the dry period in April. Our country-level forecasts, which are based on scenario analysis, predict average yields. Crop model indicators for grain maize present above-average values. However, the aforementioned heatwave in the second half of June occurred mainly while the crop was at the flowering stage, which may have affected pollination. Our forecast for grain maize yields, which is based on scenario analysis, is currently above the five-year average but slightly below last year's level.





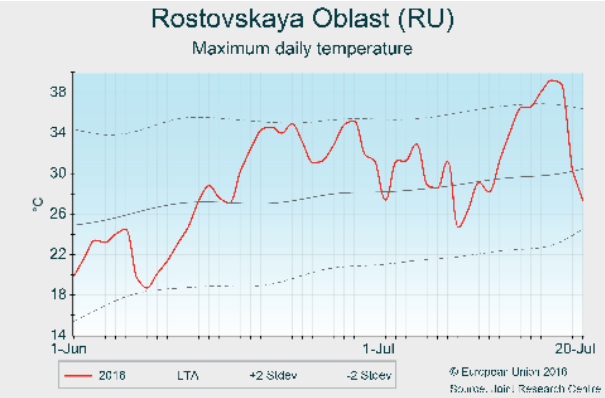
3.4. European Russia and Belarus

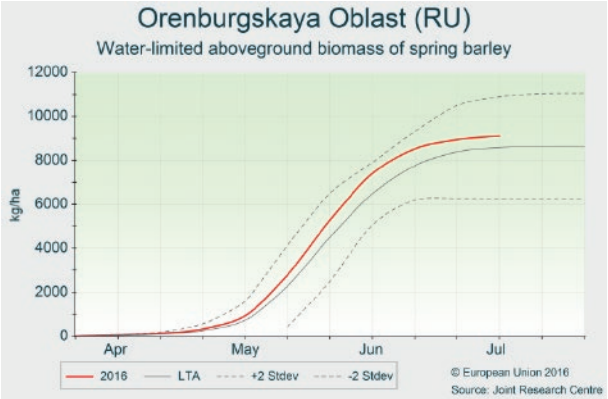
European Russia

Record outlook for winter cereals

INear-average thermal conditions characterised the eastern half of European Russia. The western area was colder than usual, but daily temperatures exceeded the average by 2-5 °C from mid June. The second decad of July was exceptionally hot in south-western Russia (Tmax = 35-41 °C). After abundant rainfall, dry weather conditions became dominant from mid June.

The harvest of winter cereals started earlier than usual in southern Russia and made good progress until the first decad of July, when plentiful rains hampered harvesting activities in the Southern and North Caucasian Okrugs. As our crop simulations and analysis of the satellite images indicate exceptionally high biomass accumulation, the winter wheat yield will set a new record. In July, soil moisture decreased significantly under spring and summer crops, but still provides sufficient water supply thanks to the beneficial preceding rains. The biomass accumulation and yield formation of spring barley and grain maize is above average, but further rains are needed to sustain steady growth.

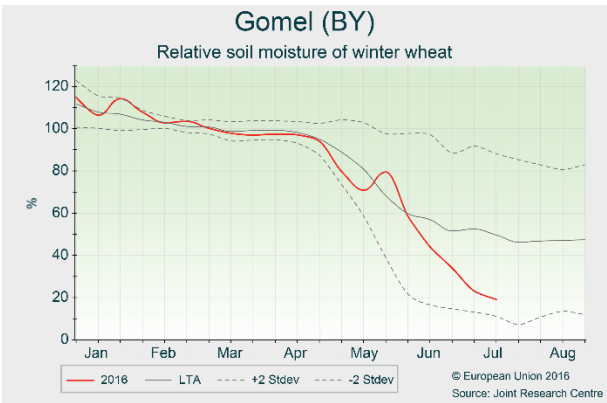


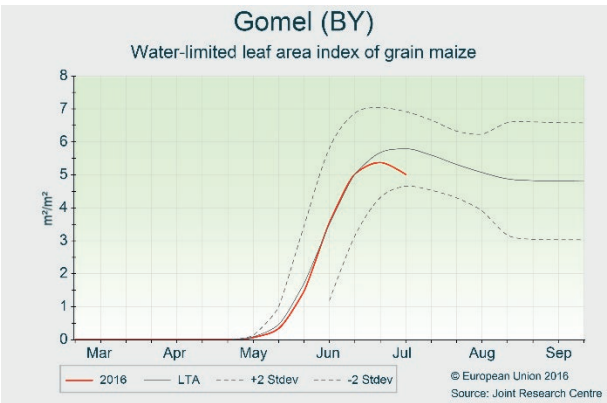


Belarus

Winter wheat yield forecast revised downwards due to water deficit

During the review period (1 June-20 July), rainfall was particularly low in south-eastern regions, and average temperatures remained higher than usual across the country. As a consequence, soil moisture levels decreased sharply in most of the country. All crops present advanced development. However, as confirmed by both remote sensing and crop model indicators, mostly winter wheat, but also maize, was negatively influenced by the dry conditions, particularly in Gomel. Spring barley is less affected, as the crop is more tolerant of water stress and about a decad in advance compared to winter wheat. The yield forecasts remain well above the five-year average for spring barley, above average for winter wheat and slightly below average for maize.





4. Crop yield forecasts

Country	TOTAL WHEAT t/ha					TOTAL BARLEY t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.03	**5.85**	5.60	- 3.1	+ 4.4	5.02	**4.99**	4.72	- 0.6	+ 5.8
AT	5.70	**5.76**	5.39	+ 1.2	+ 6.8	5.54	**5.48**	5.38	- 1.0	+ 1.9
BE	9.36	**8.82**	8.83	- 5.8	- 0.2	9.28	**9.02**	8.62	- 2.8	+ 4.6
BG	4.53	**5.07**	4.10	+ 11.8	+ 23.4	4.04	**4.37**	3.86	+ 8.1	+ 13.1
CY	-	-	-	-	-	2.49	**1.04**	1.82	- 58.3	- 42.9
CZ	6.36	**5.98**	5.71	- 5.9	+ 4.7	5.44	**4.86**	4.93	- 10.6	- 1.4
DE	8.09	**7.99**	7.81	- 1.2	+ 2.2	7.17	**6.85**	6.61	- 4.5	+ 3.6
DK	7.96	**7.91**	7.34	- 0.6	+ 7.6	6.11	**5.96**	5.78	- 2.4	+ 3.1
EE	4.79	**3.84**	3.82	- 19.9	+ 0.3	4.23	**3.39**	3.38	- 20.0	+ 0.1
ES	2.92	**3.52**	3.07	+ 20.4	+ 14.7	2.46	**3.43**	2.73	+ 39.2	+ 25.3
FI	4.10	**3.89**	3.82	- 5.1	+ 1.8	3.46	**3.55**	3.54	+ 2.3	+ 0.2
FR	7.79	**7.23**	7.20	- 7.1	+ 0.5	7.09	**6.58**	6.49	- 7.2	+ 1.4
GR	2.99	**2.93**	2.99	- 2.2	- 2.2	2.51	**2.70**	2.78	+ 7.6	- 2.9
HR	5.39	**5.26**	4.96	- 2.4	+ 6.1	4.39	**4.61**	4.36	+ 5.1	+ 5.9
HU	5.14	**5.42**	4.49	+ 5.4	+ 20.6	4.82	**4.96**	4.24	+ 3.0	+ 17.2
IE	10.66	**9.98**	9.23	- 6.4	+ 8.1	8.58	**8.16**	7.78	- 4.9	+ 4.9
IT	3.93	**3.98**	3.89	+ 1.4	+ 2.4	3.91	**3.85**	3.72	- 1.7	+ 3.4
LT	5.24	**4.65**	4.53	- 11.2	+ 2.8	4.00	**3.49**	3.46	- 12.8	+ 0.8
LU	6.29	**6.53**	6.05	+ 3.7	+ 7.9	-	-	-	-	-
LV	5.03	**4.19**	3.90	- 16.6	+ 7.6	3.83	**2.83**	2.93	- 26.1	- 3.3
MT	-	-	-	-	-	-	-	-	-	-
NL	9.04	**8.98**	8.88	- 0.6	+ 1.1	6.43	**6.37**	6.66	- 0.9	- 4.4
PL	4.57	**4.26**	4.44	- 6.9	- 4.0	3.53	**3.59**	3.62	+ 1.9	- 0.7
PT	2.16	**2.30**	1.62	+ 6.5	+ 41.7	2.32	**2.32**	1.76	+ 0.0	+ 31.5
RO	3.82	**3.92**	3.44	+ 2.6	+ 13.8	3.45	**3.55**	3.14	+ 2.7	+ 12.9
SE	7.21	**7.10**	6.34	- 1.6	+ 11.9	5.25	**5.08**	4.80	- 3.2	+ 5.8
SI	5.11	**5.06**	5.08	- 1.0	- 0.4	4.63	**4.88**	4.56	+ 5.3	+ 7.1
SK	5.53	**4.93**	4.68	- 10.9	+ 5.4	4.82	**4.36**	4.10	- 9.6	+ 6.3
UK	8.98	**8.09**	7.89	- 9.9	+ 2.5	6.69	**6.07**	6.12	- 9.3	- 0.8

Country	SOFT WHEAT t/ha					DURUM WHEAT t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.29	**6.10**	5.83	- 2.9	+ 4.6	3.49	**3.46**	3.33	- 0.8	+ 4.0
AT	5.77	**5.82**	5.44	+ 0.9	+ 7.0	4.64	**4.96**	4.53	+ 7.0	+ 9.4
BE	9.36	**8.82**	8.83	- 5.8	- 0.2	-	-	-	-	-
BG	4.54	**5.08**	4.12	+ 11.8	+ 23.3	3.29	**3.74**	3.17	+ 13.4	+ 17.9
CY	-	-	-	-	-	-	-	-	-	-
CZ	6.36	**5.98**	5.71	- 5.9	+ 4.7	-	-	-	-	-
DE	8.11	**8.00**	7.83	- 1.4	+ 2.2	4.64	**5.61**	5.23	+ 20.7	+ 7.1
DK	7.96	**7.91**	7.34	- 0.6	+ 7.6	-	-	-	-	-
EE	4.79	**3.84**	3.82	- 19.9	+ 0.3	-	-	-	-	-
ES	2.99	**3.69**	3.24	+ 23.6	+ 14.0	2.59	**2.69**	2.18	+ 3.7	+ 23.2
FI	4.10	**3.89**	3.82	- 5.1	+ 1.8	-	-	-	-	-
FR	7.92	**7.37**	7.34	- 6.9	+ 0.5	5.62	**5.19**	5.25	- 7.6	- 1.1
GR	3.25	**3.07**	3.20	- 5.7	- 4.1	2.86	**2.86**	2.90	- 0.2	- 1.6
HR	5.39	**5.26**	4.96	- 2.4	+ 6.1	-	-	-	-	-
HU	5.14	**5.42**	4.49	+ 5.5	+ 20.8	4.83	**5.03**	4.39	+ 4.0	+ 14.4
IE	10.66	**9.98**	9.23	- 6.4	+ 8.1	-	-	-	-	-
IT	5.41	**5.63**	5.43	+ 4.0	+ 3.6	3.31	**3.30**	3.18	- 0.3	+ 3.7
LT	5.24	**4.65**	4.53	- 11.2	+ 2.8	-	-	-	-	-
LU	6.29	**6.53**	6.05	+ 3.7	+ 7.9	-	-	-	-	-
LV	5.03	**4.19**	3.90	- 16.6	+ 7.6	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	9.04	**8.98**	8.88	- 0.6	+ 1.1	-	-	-	-	-
PL	4.57	**4.26**	4.44	- 6.9	- 4.0	-	-	-	-	-
PT	2.16	**2.30**	1.62	+ 6.5	+ 41.7	-	-	-	-	-
RO	3.82	**3.92**	3.44	+ 2.6	+ 13.8	-	-	-	-	-
SE	7.21	**7.10**	6.34	- 1.6	+ 11.9	-	-	-	-	-
SI	5.11	**5.06**	5.08	- 1.0	- 0.4	-	-	-	-	-
SK	5.56	**4.92**	4.70	- 11.4	+ 4.8	5.14	**5.20**	4.25	+ 1.1	+ 22.2
UK	8.98	**8.09**	7.89	- 9.9	+ 2.5	-	-	-	-	-

Country	SPRING BARLEY t/ha					WINTER BARLEY t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	4.18	**4.32**	4.13	+ 3.6	+ 4.8	6.13	**5.90**	5.57	- 3.8	+ 5.8
AT	4.92	**4.37**	4.66	- 11.2	- 6.2	5.99	**6.33**	5.99	+ 5.7	+ 5.6
BE	-	-	-	-	-	9.28	**9.02**	8.62	- 2.8	+ 4.6
BG	-	-	-	-	-	4.04	**4.37**	3.86	+ 8.1	+ 13.1
CY	-	-	-	-	-	2.49	**1.04**	1.82	- 58.3	- 42.9
CZ	5.43	**4.72**	4.96	- 13.1	- 4.8	5.46	**5.18**	4.87	- 5.1	+ 6.5
DE	5.42	**5.56**	5.70	+ 2.5	- 2.5	7.69	**7.23**	6.92	- 5.9	+ 4.4
DK	5.96	**5.79**	5.67	- 2.9	+ 2.0	6.76	**6.75**	6.31	- 0.2	+ 7.0
EE	4.23	**3.39**	3.38	- 20.0	+ 0.1	-	-	-	-	-
ES	2.51	**3.47**	2.79	+ 37.9	+ 24.2	2.11	**3.15**	2.40	+ 48.9	+ 30.9
FI	3.46	**3.55**	3.54	+ 2.3	+ 0.2	-	-	-	-	-
FR	6.50	**6.18**	5.97	- 4.9	+ 3.6	7.30	**6.71**	6.69	- 8.0	+ 0.3
GR	-	-	-	-	-	2.51	**2.70**	2.78	+ 7.6	- 2.9
HR	-	-	-	-	-	4.39	**4.61**	4.36	+ 5.1	+ 5.9
HU	3.89	**4.05**	3.68	+ 4.2	+ 10.0	5.14	**5.26**	4.49	+ 2.3	+ 17.3
IE	7.72	**7.38**	7.29	- 4.4	+ 1.2	10.21	**9.37**	9.31	- 8.2	+ 0.7
IT	-	-	-	-	-	3.91	**3.85**	3.72	- 1.7	+ 3.4
LT	4.00	**3.49**	3.46	- 12.8	+ 0.8	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-
LV	3.83	**2.83**	2.93	- 26.1	- 3.3	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	6.43	**6.37**	6.66	- 0.9	- 4.4	-	-	-	-	-
PL	3.30	**3.51**	3.49	+ 6.3	+ 0.5	4.13	**3.97**	4.10	- 3.8	- 3.2
PT	-	-	-	-	-	2.32	**2.32**	1.76	+ 0.0	+ 31.5
RO	2.38	**2.48**	2.50	+ 4.2	- 0.9	3.90	**3.96**	3.40	+ 1.4	+ 16.3
SE	5.20	**5.01**	4.76	- 3.5	+ 5.3	6.18	**6.14**	5.86	- 0.6	+ 4.8
SI	-	-	-	-	-	4.63	**4.88**	4.56	+ 5.3	+ 7.1
SK	4.74	**4.31**	4.04	- 9.2	+ 6.6	5.08	**4.52**	4.41	- 11.1	+ 2.4
UK	6.05	**5.60**	5.71	- 7.5	- 2.0	7.65	**6.94**	6.86	- 9.4	+ 1.1

Country	GRAIN MAIZE t/ha					RYE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.30	**7.42**	6.93	+ 17.8	+ 7.1	4.00	**3.79**	3.76	- 5.4	+ 0.8
AT	8.68	**10.91**	9.98	+ 25.7	+ 9.4	4.32	**4.58**	4.40	+ 5.8	+ 4.1
BE	11.87	**11.47**	10.96	- 3.4	+ 4.6	-	-	-	-	-
BG	5.41	**6.39**	5.62	+ 18.2	+ 13.9	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-
CZ	5.54	**8.17**	7.64	+ 47.5	+ 6.9	4.91	**5.10**	4.84	+ 4.0	+ 5.4
DE	8.72	**10.73**	9.95	+ 23.0	+ 7.8	5.66	**5.65**	5.50	- 0.3	+ 2.7
DK	5.89	**6.00**	5.98	+ 1.9	+ 0.4	6.33	**6.34**	6.08	+ 0.2	+ 4.2
EE	-	-	-	-	-	3.83	**3.18**	3.00	- 16.9	+ 6.0
ES	11.30	**11.27**	11.08	- 0.3	+ 1.6	1.91	**2.31**	1.99	+ 21.2	+ 16.0
FI	-	-	-	-	-	3.44	**3.22**	3.03	- 6.5	+ 6.2
FR	8.36	**9.16**	9.11	+ 9.7	+ 0.6	4.71	**4.77**	4.84	+ 1.2	- 1.4
GR	11.22	**11.09**	11.37	- 1.2	- 2.5	2.05	**1.91**	2.03	- 6.8	- 5.9
HR	6.49	**6.67**	6.01	+ 2.7	+ 10.9	-	-	-	-	-
HU	5.69	**7.36**	5.77	+ 29.4	+ 27.5	2.79	**2.77**	2.66	- 0.6	+ 4.3
IE	-	-	-	-	-	-	-	-	-	-
IT	9.72	**9.63**	9.28	- 1.0	+ 3.8	-	-	-	-	-
LT	4.81	**6.37**	6.38	+ 32.4	- 0.2	2.78	**2.52**	2.37	- 9.4	+ 6.4
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	4.28	**3.33**	3.22	- 22.1	+ 3.6
MT	-	-	-	-	-	-	-	-	-	-
NL	10.82	**11.60**	10.79	+ 7.2	+ 7.5	-	-	-	-	-
PL	4.71	**6.61**	6.15	+ 40.5	+ 7.5	2.78	**2.69**	2.82	- 3.2	- 4.7
PT	8.39	**8.42**	8.29	+ 0.4	+ 1.6	0.84	**0.95**	0.86	+ 12.8	+ 10.9
RO	3.19	**4.37**	3.80	+ 37.1	+ 15.1	-	-	-	-	-
SE	-	-	-	-	-	6.35	**6.28**	6.02	- 1.0	+ 4.3
SI	8.96	**8.75**	7.85	- 2.3	+ 11.4	-	-	-	-	-
SK	4.84	**6.50**	6.04	+ 34.3	+ 7.5	3.63	**3.10**	3.60	- 14.8	- 14.0
UK	-	-	-	-	-	-	-	-	-	-

Country	TRITICALE t/ha					RAPE AND TURNIP RAPE t/ha				
	2015	2016	Avg 5yrs	% 16/15	% 16/5yrs	2015	2016	Avg 5yrs	% 16/15	% 16/5yrs
EU-28	4.14	**4.18**	4.20	+ 1.1	- 0.3	3.34	**3.22**	3.20	- 3.5	+ 0.8
AT	5.29	**5.62**	5.26	+ 6.4	+ 6.9	2.98	**3.03**	3.23	+ 1.8	- 6.2
BE	-	-	-	-	-	4.28	**4.27**	4.37	- 0.4	- 2.4
BG	3.02	**3.36**	2.94	+ 11.1	+ 14.0	2.48	**2.91**	2.45	+ 17.6	+ 19.1
CY	-	-	-	-	-	-	-	-	-	-
CZ	4.72	**4.88**	4.64	+ 3.3	+ 5.3	3.43	**3.28**	3.28	- 4.5	- 0.1
DE	6.47	**6.42**	6.33	- 0.8	+ 1.4	3.90	**3.86**	3.80	- 1.2	+ 1.6
DK	5.13	**5.51**	5.41	+ 7.6	+ 1.9	4.28	**4.15**	3.94	- 3.0	+ 5.4
EE	-	-	-	-	-	2.77	**2.33**	2.03	- 15.9	+ 14.9
ES	2.08	**2.65**	2.22	+ 27.3	+ 19.3	2.10	**2.71**	2.22	+ 28.7	+ 22.0
FI	-	-	-	-	-	1.54	**1.49**	1.46	- 3.3	+ 1.9
FR	5.41	**5.30**	5.30	- 2.0	+ 0.0	3.56	**3.26**	3.43	- 8.6	- 5.1
GR	2.57	**2.51**	2.57	- 2.5	- 2.5	-	-	-	-	-
HR	3.82	**3.84**	3.93	+ 0.6	- 2.2	2.58	**3.05**	2.78	+ 18.1	+ 9.8
HU	3.99	**4.31**	3.75	+ 8.1	+ 15.1	2.63	**3.17**	2.66	+ 20.5	+ 19.4
IE	-	-	-	-	-	-	-	-	-	-
IT	-	-	-	-	-	2.29	**2.52**	2.32	+ 9.8	+ 8.6
LT	3.84	**3.51**	3.31	- 8.6	+ 6.0	3.13	**2.59**	2.25	- 17.2	+ 15.1
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	3.33	**2.67**	2.31	- 19.9	+ 15.5
MT	-	-	-	-	-	-	-	-	-	-
NL	-	-	-	-	-	-	-	-	-	-
PL	3.52	**3.43**	3.58	- 2.7	- 4.3	2.85	**2.62**	2.80	- 8.1	- 6.4
PT	1.72	**1.94**	1.39	+ 13.1	+ 39.5	-	-	-	-	-
RO	3.48	**3.78**	3.37	+ 8.7	+ 12.2	2.51	**2.73**	2.29	+ 9.0	+ 19.3
SE	5.81	**5.87**	5.50	+ 1.1	+ 6.8	3.80	**3.42**	3.06	- 10.1	+ 11.8
SI	-	-	-	-	-	-	-	-	-	-
SK	3.60	**3.38**	3.47	- 6.2	- 2.6	2.69	**2.86**	2.64	+ 6.6	+ 8.5
UK	4.78	**4.02**	4.11	- 15.9	- 2.3	3.56	**3.47**	3.49	- 2.5	- 0.6

Country	SUGAR BEETS t/ha					POTATO t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	71.72	**73.18**	71.80	+ 2.0	+ 1.9	32.05	**32.97**	32.07	+ 2.8	+ 2.8
AT	62.80	**73.13**	70.59	+ 16.4	+ 3.6	26.34	**30.82**	31.37	+ 17.0	- 1.7
BE	85.08	**78.36**	77.81	- 7.9	+ 0.7	46.58	**45.00**	47.82	- 3.4	- 5.9
BG	-	-	-	-	-	14.95	**14.69**	13.51	- 1.7	+ 8.7
CY	-	-	-	-	-	-	-	-	-	-
CZ	59.38	**65.76**	64.00	+ 10.7	+ 2.8	22.26	**25.38**	26.72	+ 14.0	- 5.0
DE	72.17	**71.16**	71.85	- 1.4	- 1.0	43.81	**45.52**	44.29	+ 3.9	+ 2.8
DK	66.90	**65.60**	63.97	- 1.9	+ 2.6	42.10	**42.54**	41.02	+ 1.0	+ 3.7
EE	-	-	-	-	-	-	-	-	-	-
ES	95.30	**95.64**	89.32	+ 0.4	+ 7.1	31.14	**32.00**	30.59	+ 2.8	+ 4.6
FI	32.74	**36.56**	36.65	+ 11.7	- 0.2	24.31	**26.44**	26.30	+ 8.8	+ 0.6
FR	87.50	**89.98**	89.15	+ 2.8	+ 0.9	42.50	**42.86**	44.23	+ 0.9	- 3.1
GR	-	-	-	-	-	24.25	**25.66**	25.31	+ 5.8	+ 1.4
HR	54.49	**60.27**	52.45	+ 10.6	+ 14.9	17.06	**17.11**	16.81	+ 0.3	+ 1.7
HU	57.66	**65.97**	53.96	+ 14.4	+ 22.2	22.65	**26.70**	24.19	+ 17.9	+ 10.4
IE	-	-	-	-	-	-	-	-	-	-
IT	57.01	**57.84**	55.93	+ 1.4	+ 3.4	27.55	**26.83**	26.09	- 2.6	+ 2.8
LT	50.61	**51.65**	51.70	+ 2.1	- 0.1	17.00	**16.47**	16.23	- 3.1	+ 1.5
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	18.00	**18.75**	17.97	+ 4.2	+ 4.3
MT	-	-	-	-	-	-	-	-	-	-
NL	83.30	**82.98**	81.21	- 0.4	+ 2.2	42.69	**42.50**	44.08	- 0.4	- 3.6
PL	52.00	**54.21**	52.79	+ 4.3	+ 2.7	21.70	**22.53**	22.26	+ 3.8	+ 1.2
PT	-	-	-	-	-	18.62	**19.21**	17.85	+ 3.2	+ 7.7
RO	39.40	**42.12**	36.73	+ 6.9	+ 14.7	14.37	**15.22**	14.92	+ 5.9	+ 2.0
SE	60.80	**65.14**	63.46	+ 7.1	+ 2.6	34.73	**34.67**	33.42	- 0.2	+ 3.7
SI	-	-	-	-	-	-	-	-	-	-
SK	56.01	**56.30**	55.28	+ 0.5	+ 1.8	-	-	-	-	-
UK	66.50	**70.94**	70.19	+ 6.7	+ 1.1	40.20	**43.36**	39.91	+ 7.9	+ 8.6

Country	SUNFLOWER t/ha					RICE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	1.87	**2.08**	1.94	+ 11.3	+ 7.6	6.68	**6.81**	6.70	+ 1.9	+ 1.6
AT	2.00	**2.65**	2.47	+ 32.5	+ 7.1	-	-	-	-	-
BE	-	-	-	-	-	-	-	-	-	-
BG	2.11	**2.36**	2.12	+ 12.1	+ 11.5	5.49	**5.42**	5.43	- 1.3	- 0.2
CY	-	-	-	-	-	-	-	-	-	-
CZ	2.05	**2.23**	2.29	+ 9.1	- 2.5	-	-	-	-	-
DE	1.92	**2.14**	2.14	+ 11.5	- 0.2	-	-	-	-	-
DK	-	-	-	-	-	-	-	-	-	-
EE	-	-	-	-	-	-	-	-	-	-
ES	0.94	**1.11**	1.07	+ 18.5	+ 3.2	7.70	**7.62**	7.61	- 0.9	+ 0.2
FI	-	-	-	-	-	-	-	-	-	-
FR	1.96	**2.25**	2.25	+ 14.7	- 0.2	4.61	**5.06**	5.09	+ 9.7	- 0.5
GR	2.71	**2.57**	2.53	- 5.2	+ 1.4	7.71	**7.46**	7.81	- 3.2	- 4.5
HR	2.73	**2.52**	2.54	- 7.7	- 0.8	-	-	-	-	-
HU	2.51	**2.56**	2.42	+ 2.0	+ 5.5	2.86	**3.03**	3.36	+ 6.2	- 9.7
IE	-	-	-	-	-	-	-	-	-	-
IT	2.17	**2.28**	2.23	+ 5.0	+ 2.1	6.45	**6.74**	6.54	+ 4.5	+ 3.0
LT	-	-	-	-	-	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	-	-	-	-	-					
PL	-	-	-	-	-	-	-	-	-	-
PT	1.10	**0.90**	0.76	- 18.7	+ 17.4	6.40	**6.16**	6.01	- 3.7	+ 2.5
RO	1.76	**2.10**	1.81	+ 19.6	+ 16.4	4.67	**4.26**	4.48	- 8.8	- 4.9
SE	-	-	-	-	-	-	-	-	-	-
SI	-	-	-	-	-	-	-	-	-	-
SK	2.31	**2.39**	2.33	+ 3.5	+ 2.6	-	-	-	-	-
UK	-	-	-	-	-	-	-	-	-	-

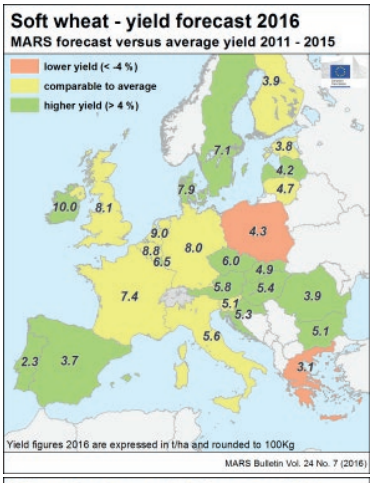
Note: Yields are forecast for crops with more than 10 000 ha per country (for rice more than 1 000 ha per country).
Sources: 2011-2015 data come from USDA, State Statistics Service of Ukraine, FAO, Turkish Statistical Office, PSD-online.2016 yields come from Mars Crop Yield Forecasting System (output up to 20.7.2016).

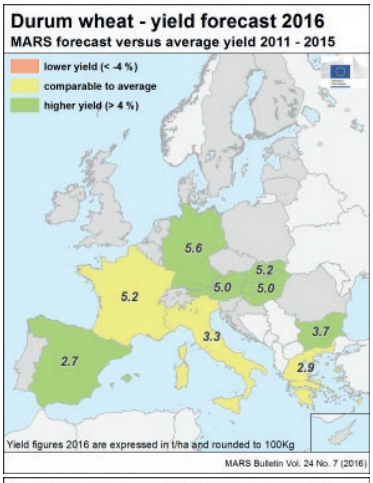
Country	WHEAT (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.43	**3.72**	3.47	+ 8.5	+ 7.2
DZ	1.28	**1.45**	1.46	+ 13.3	- 1.0
MA	2.36	**0.61**	1.86	- 74.2	-67.2
TN	2.15	**2.01**	2.05	- 6.5	- 1.8
TR	2.90	**2.69**	2.69	- 7.4	- 0.1
UA	3.88	**3.98**	3.52	+ 2.7	+ 13.2

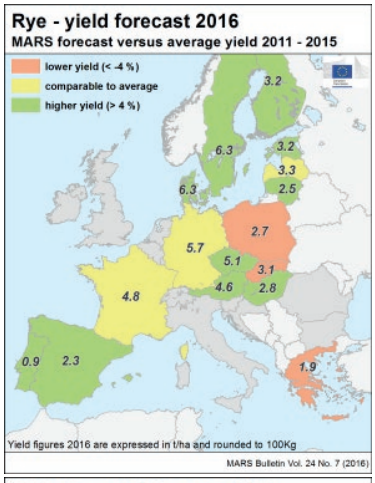
Country	BARLEY (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.33	**3.49**	3.24	+ 4.9	+ 7.7
DZ	0.84	**1.20**	1.09	+ 42.7	+ 9.7
MA	1.62	**0.44**	1.16	- 72.8	- 62.2
TN	1.44	**1.19**	1.30	- 17.1	- 8.4
TR	2.9	**2.59**	2.65	- 10.8	- 2.4
UA	2.95	**2.85**	2.57	- 3.5	+ 10.9

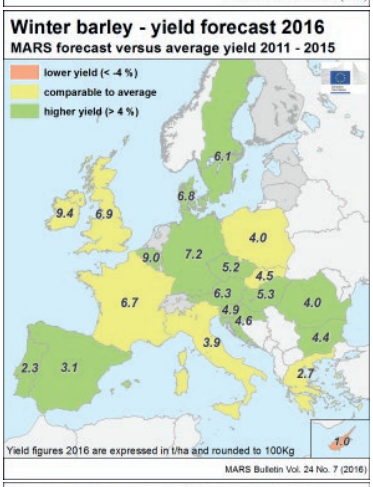
Country	GRAIN MAIZE (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	5.33	**5.46**	5.60	+ 2.4	- 2.6
DZ	-	-	-	-	-
MA	-	-	-	-	-
TN	-	-	-	-	-
TR	9.30	**9.13**	8.39	- 1.8	+ 8.8
UA	5.71	**6.03**	5.77	+ 5.7	+ 4.5

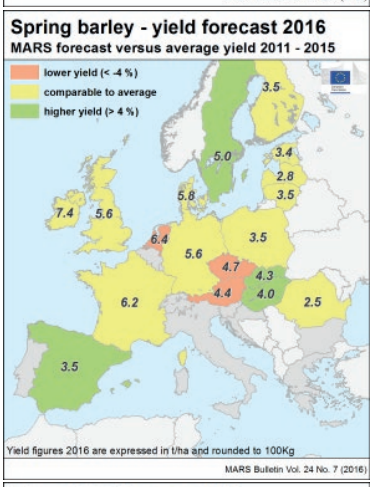
Note: Yields are forecast for crops with more than 10 000 ha per country.
Sources: 2011-2015 data come from USDA, State Statistics Service of Ukraine, FAO, Turkish Statistical Office, PSD-online, 2016 yields come from Mars Crop Yield Forecasting System (output up to 20.7.2016).

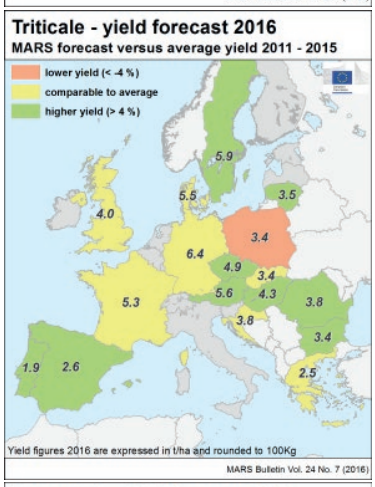

Soft wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

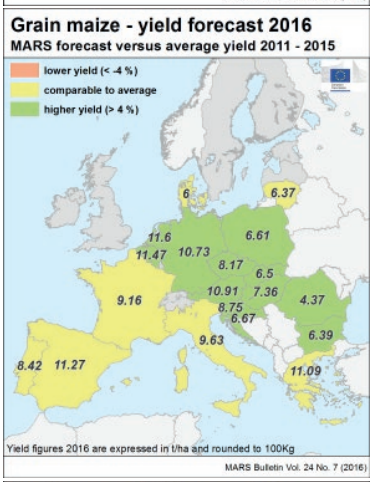

Durum wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

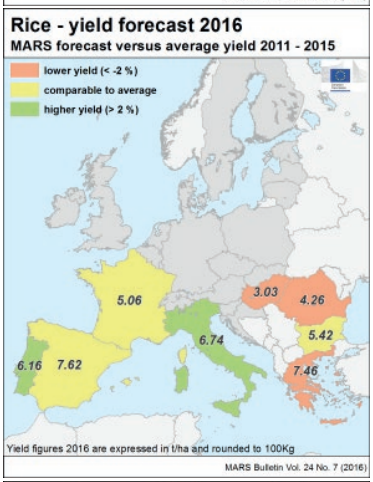

Rye - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

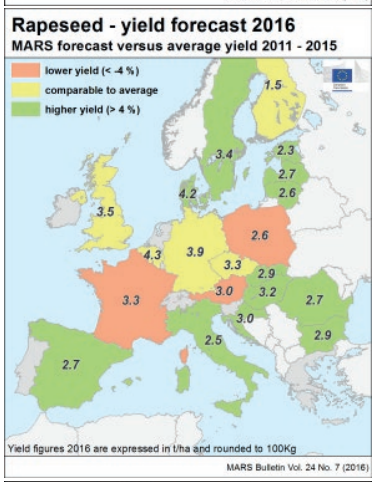

Winter barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

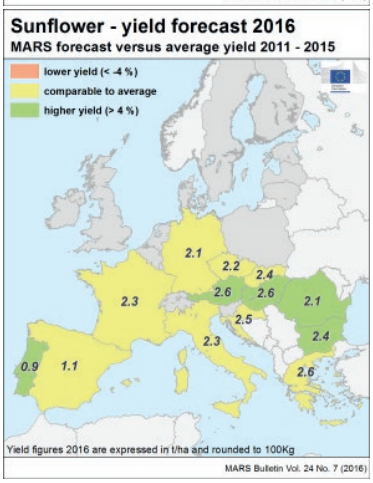

Spring barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

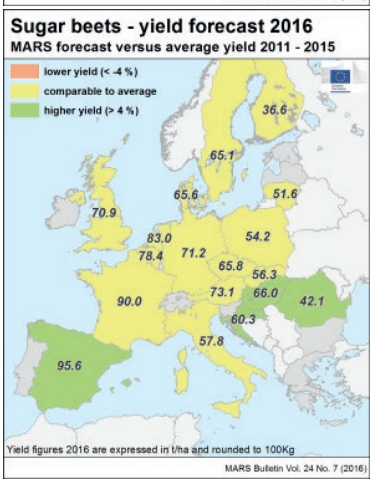

Triticale - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

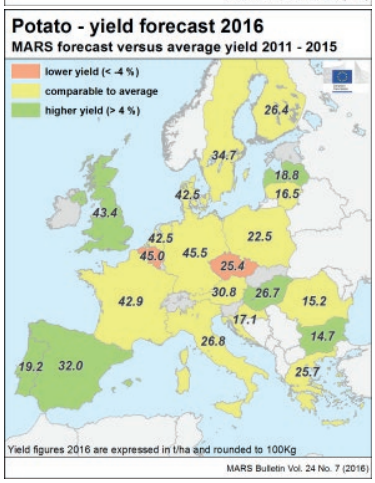

Grain maize - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)


Rice - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -2 %)
comparable to average
higher yield (> 2 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)


Rapeseed - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

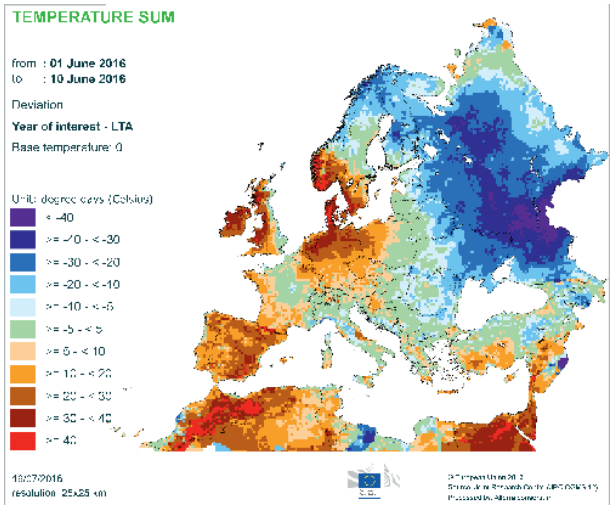

Sunflower - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

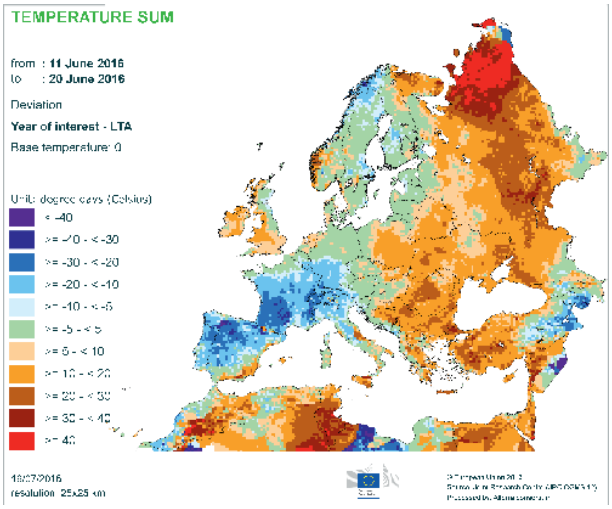

Sugar beets - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

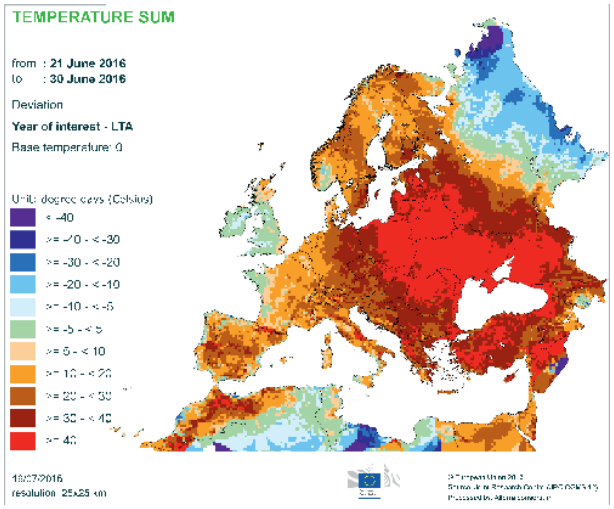

Potato - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No. 7 (2016)

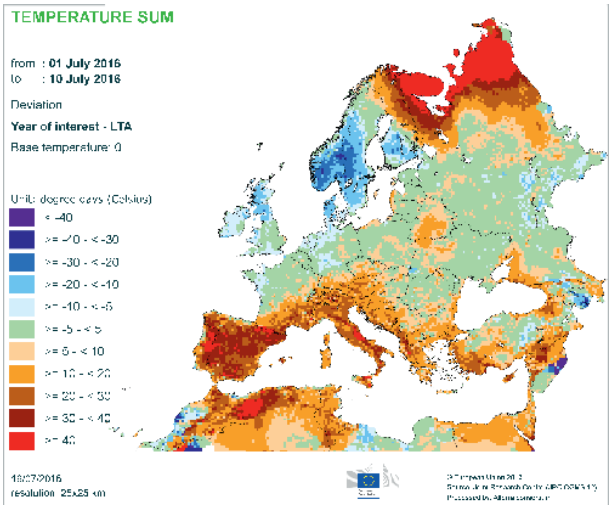
5. Atlas

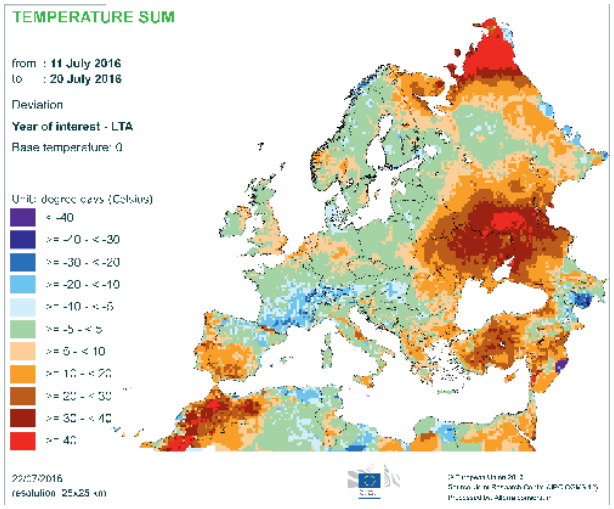
Temperatures

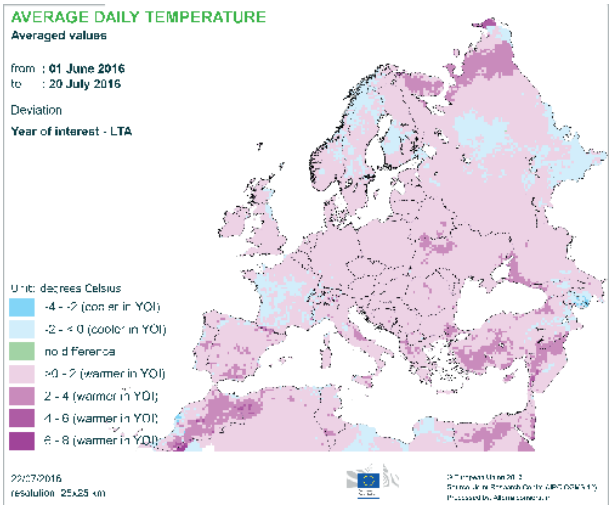




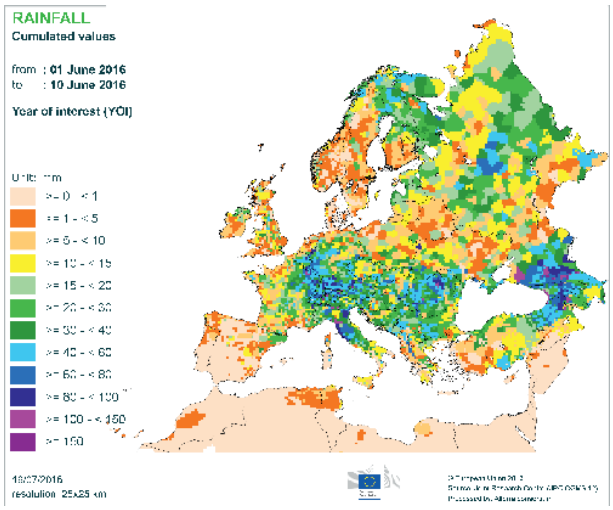


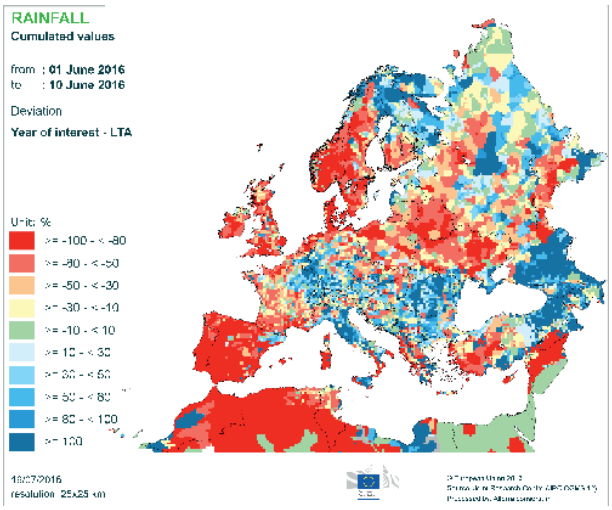


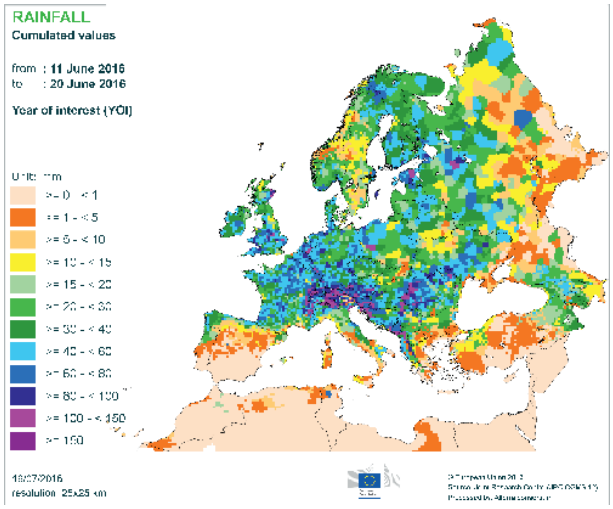


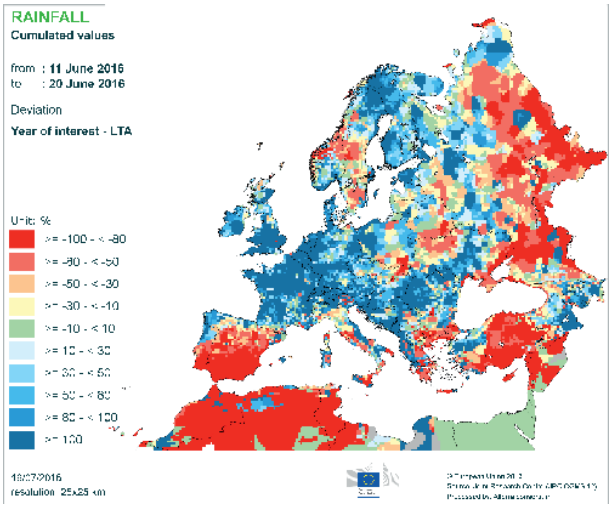


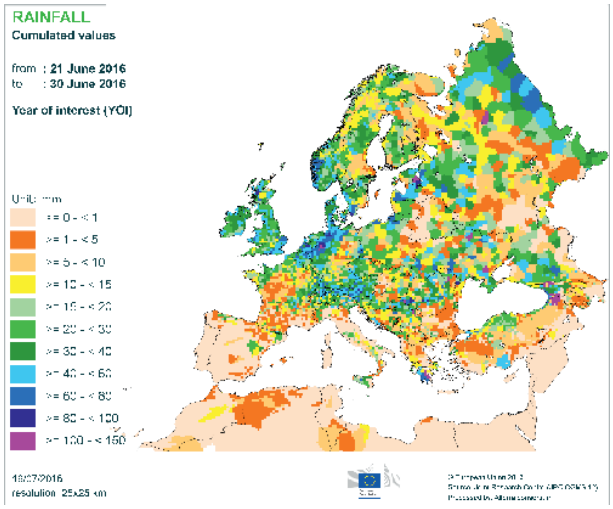
Precipitation

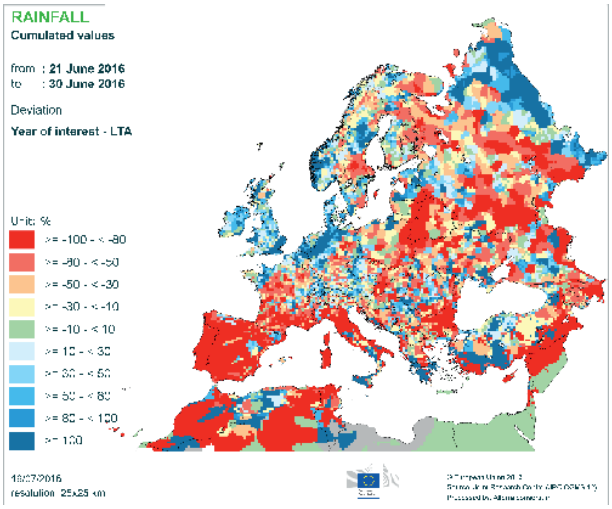


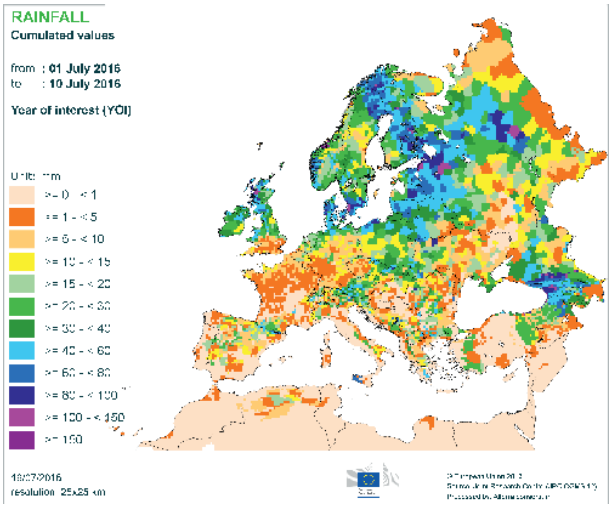


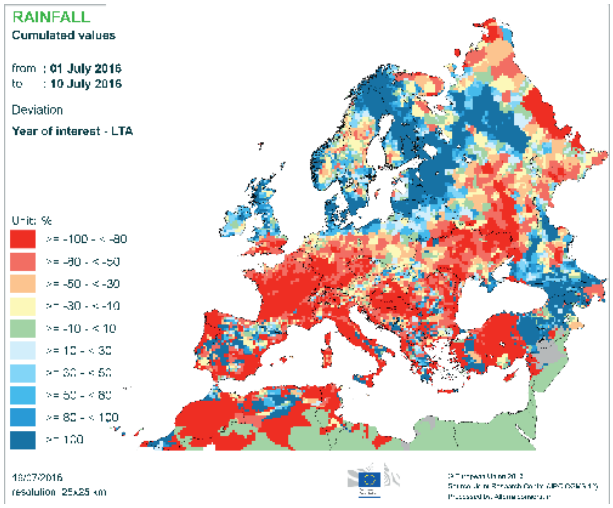


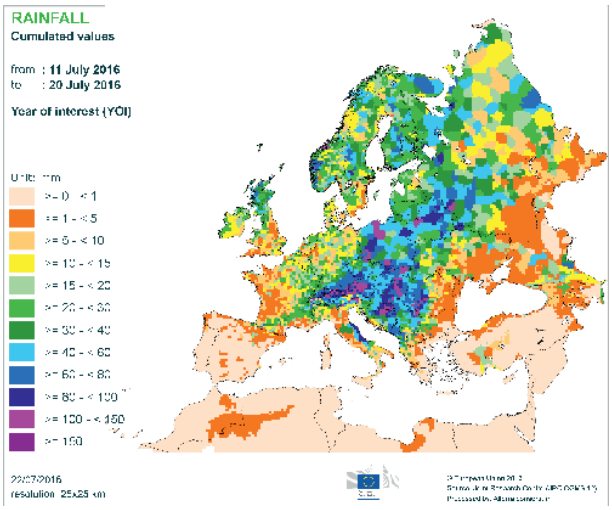


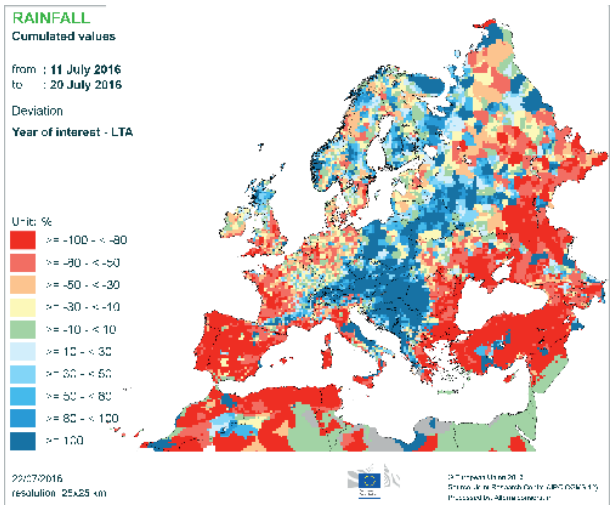




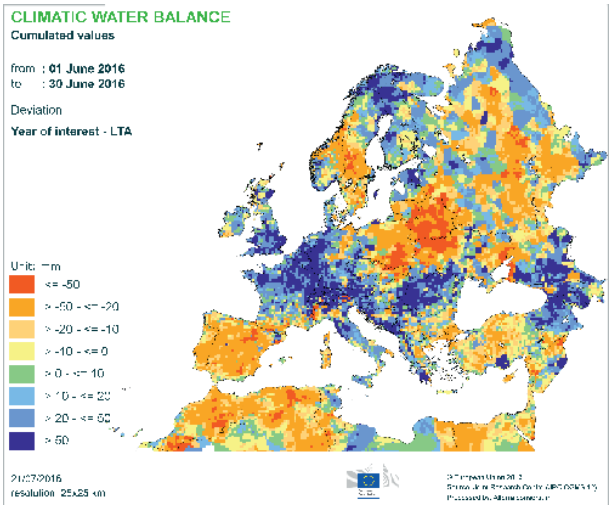


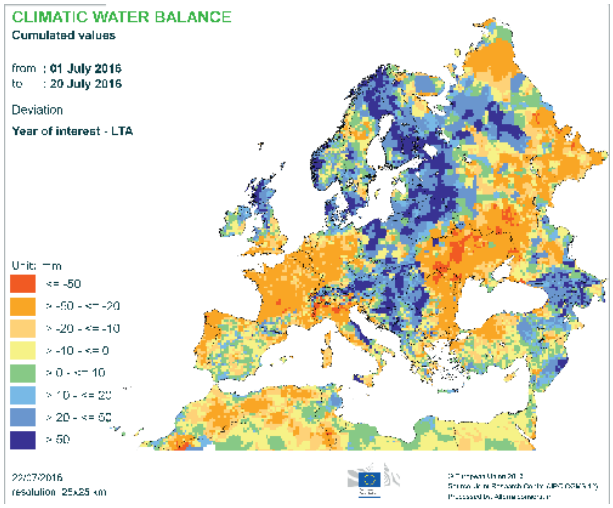




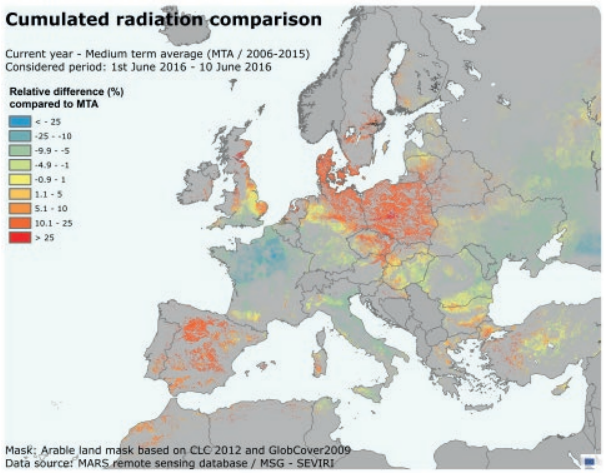


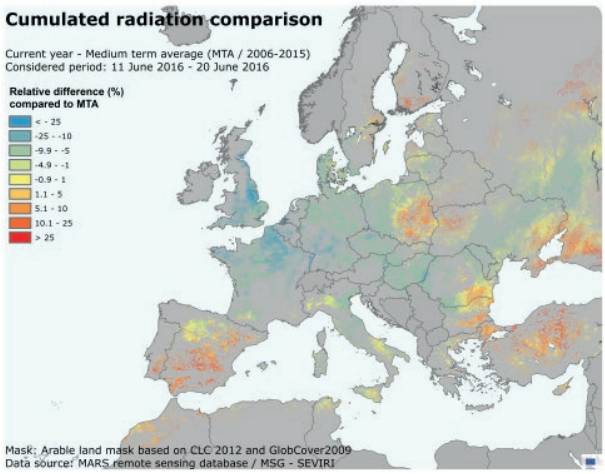
Climatic water balance

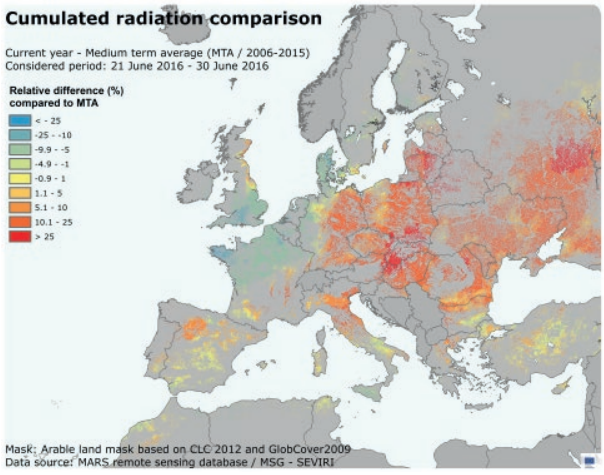


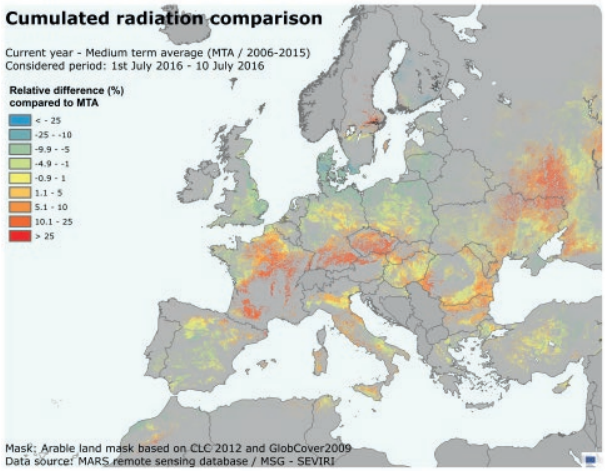


Radiation

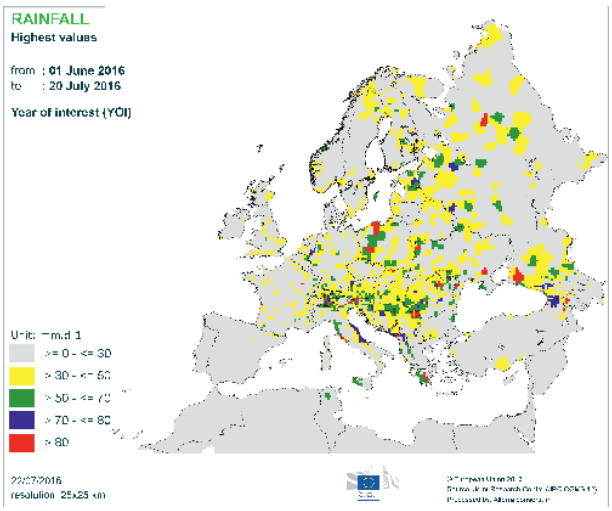


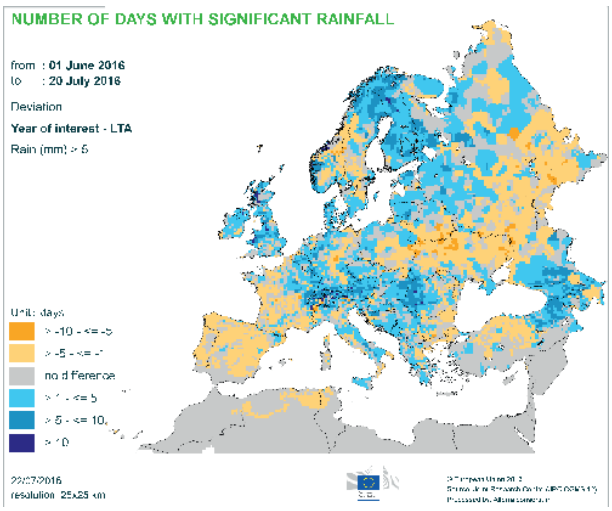


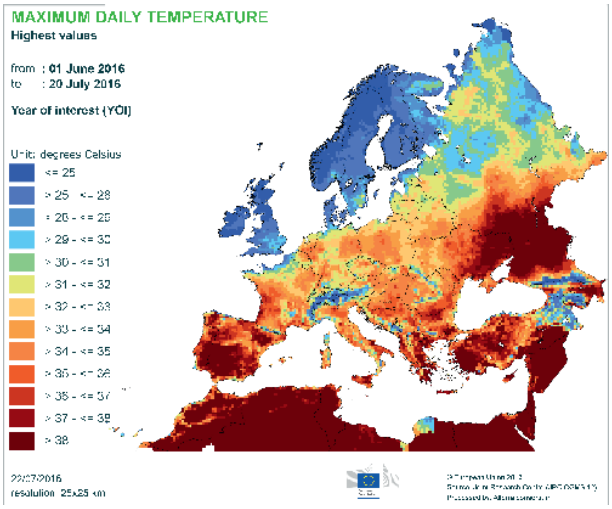


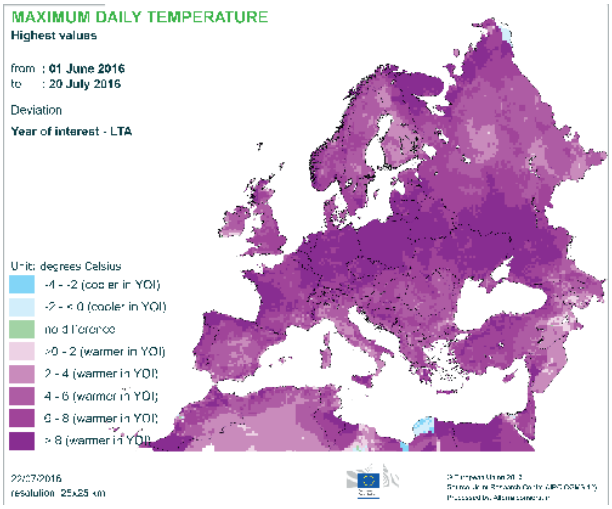


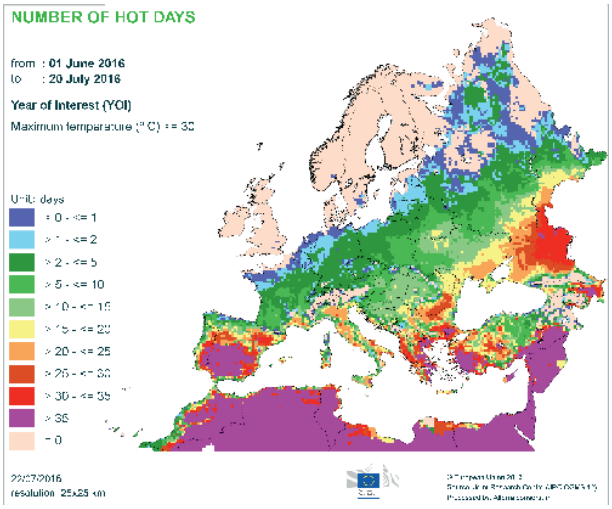
Weather events

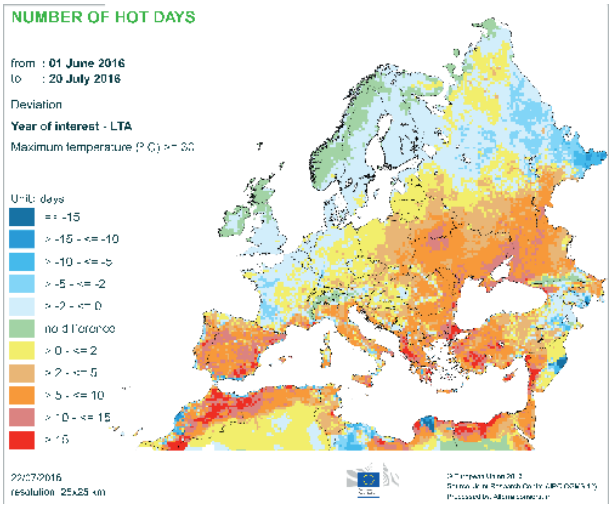




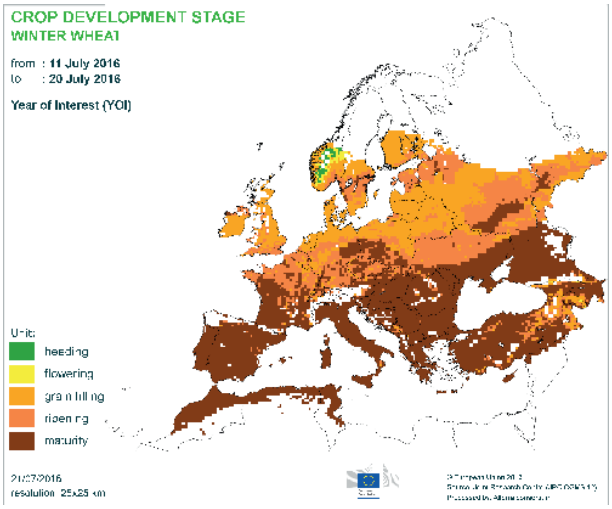


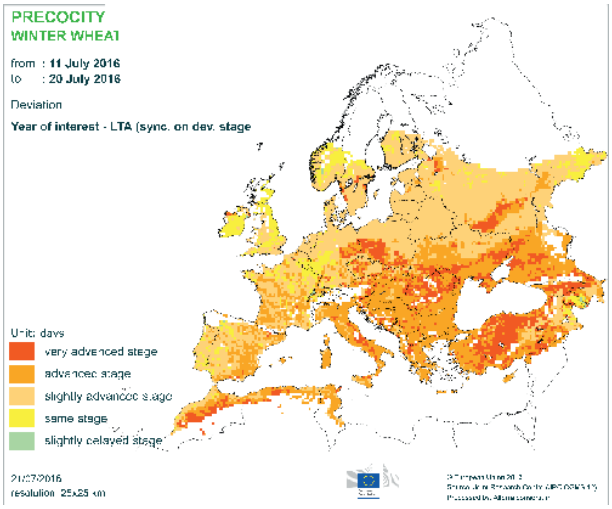


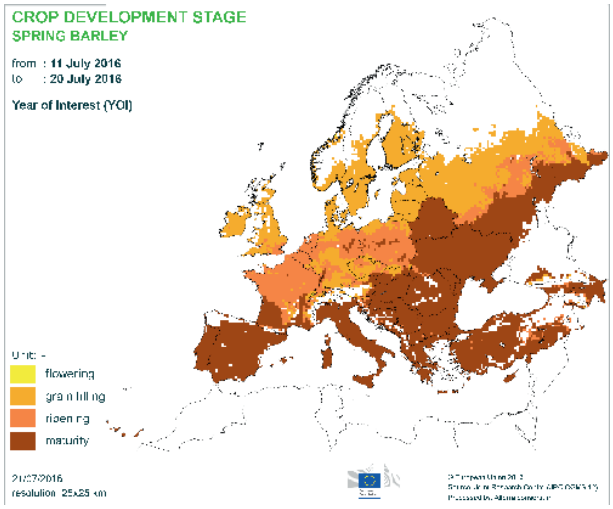


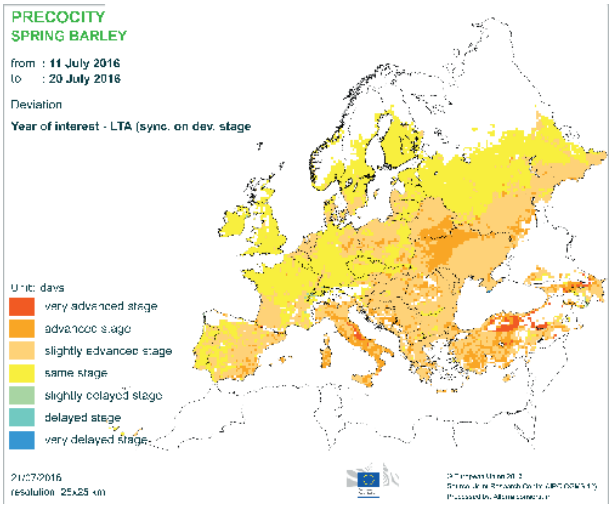


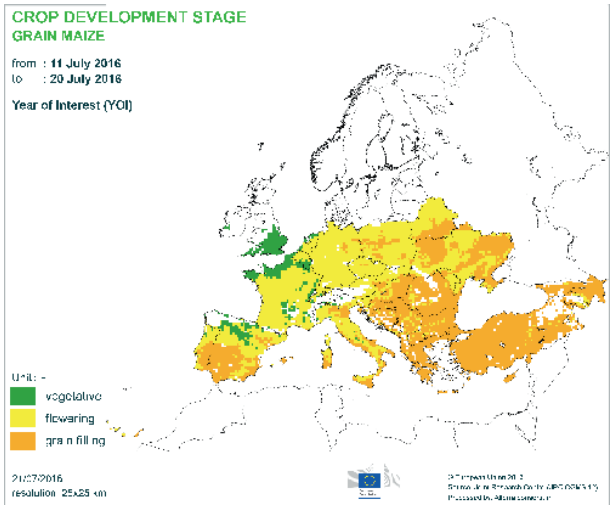
Crop development stages and precocity

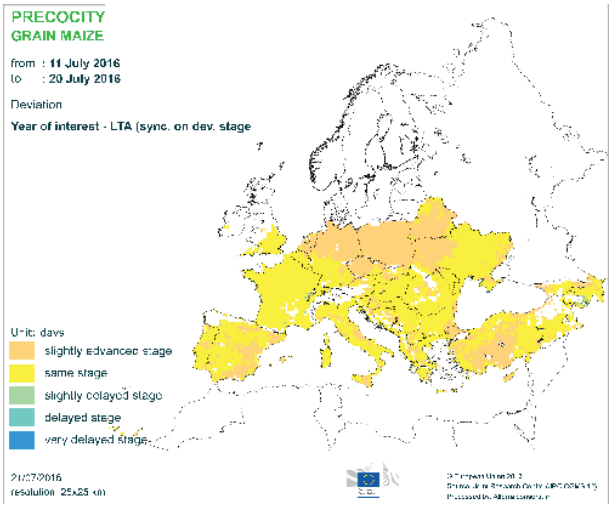


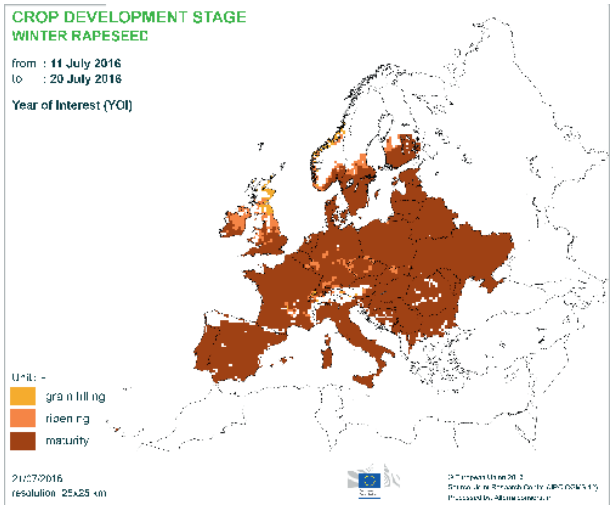


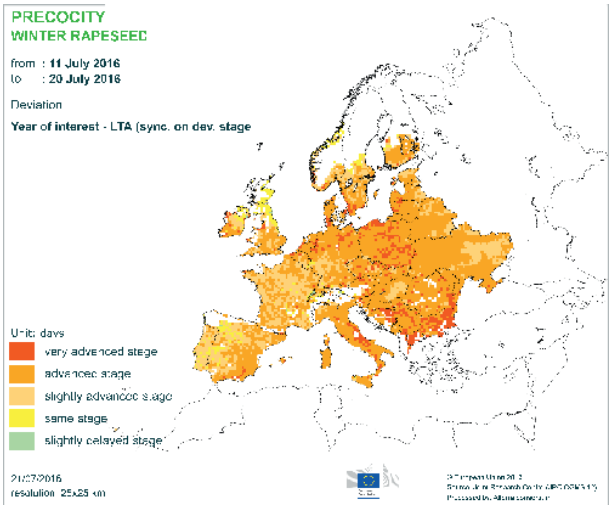

CROP DEVELOPMENT STAGE
SPRING BARLEY
from : 11 July 2016
to : 20 July 2016
Year of Interest (YOI)
Unit: -
flowering
grain filling
ripening
maturity
21/07/2016
resolution 25x25 km

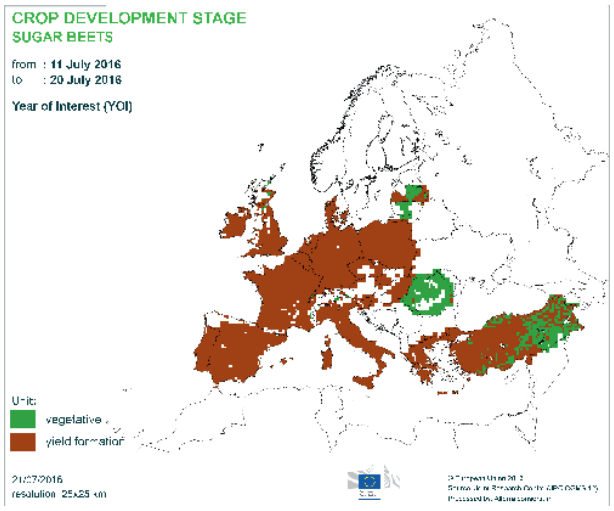

PRECOCITY
SPRING BARLEY
from : 11 July 2016
to : 20 July 2016
Deviation
Year of interest - LTA (sync. on dev. stage
Unit: days
very advanced stage
advanced stage
slightly advanced stage
same stage
slightly delayed stage
delayed stage
very delayed stage
21/07/2016
resolution 25x25 km

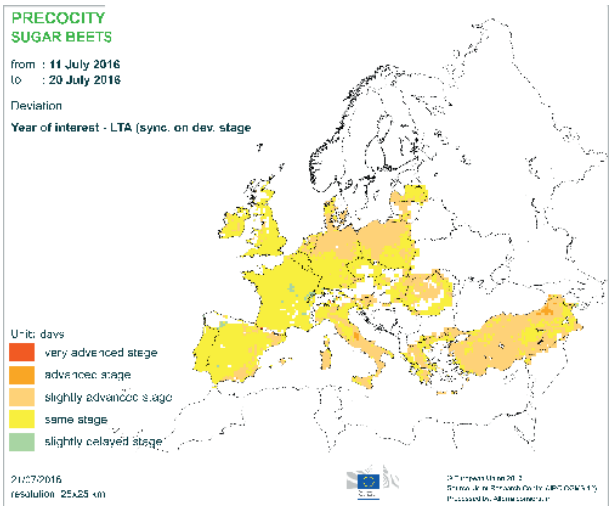

CROP DEVELOPMENT STAGE
GRAIN MAIZE
from : 11 July 2016
to : 20 July 2016
Year of Interest (YOI)
Unit: -
vegetative
flowering
grain filling
21/07/2016
resolution 25x25 km


PRECOCITY
GRAIN MAIZE
from : 11 July 2016
to : 20 July 2016
Deviation
Year of interest - LTA (sync. on dev. stage
Unit: days
slightly advanced stage
same stage
slightly delayed stage
delayed stage
very delayed stage
21/07/2016
resolution 25x25 km

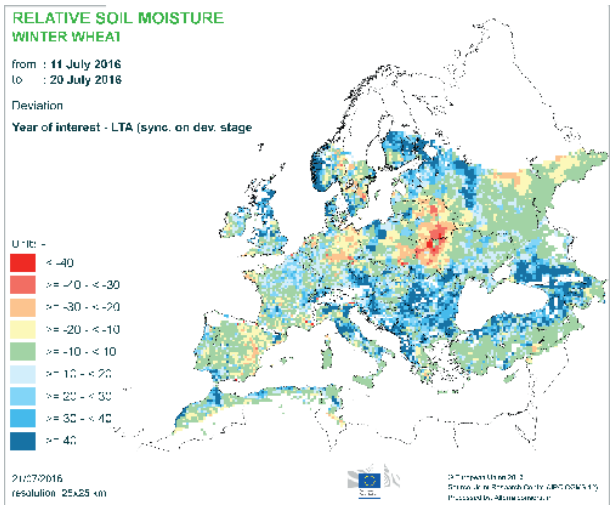

CROP DEVELOPMENT STAGE
WINTER RAPESEED
from : 11 July 2016
to : 20 July 2016
Year of Interest (YOI)
Unit: -
grain filling
ripening
maturity
21/07/2016
resolution 25x25 km

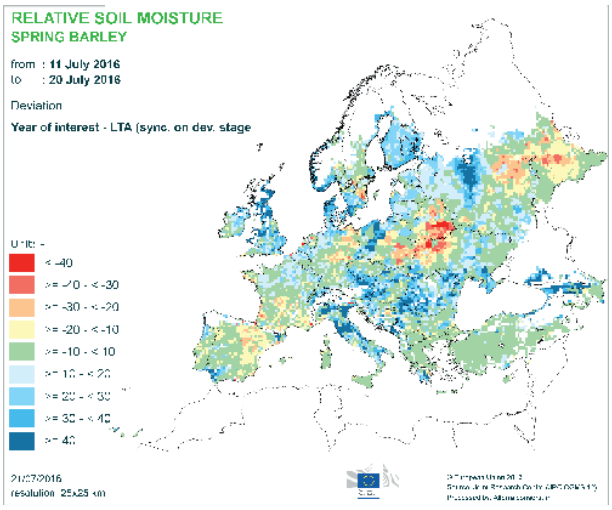

PRECOCITY
WINTER RAPESEED
from : 11 July 2016
to : 20 July 2016
Deviation
Year of interest - LTA (sync. on dev. stage
Unit: days
very advanced stage
advanced stage
slightly advanced stage
same stage
slightly delayed stage
21/07/2016
resolution 25x25 km

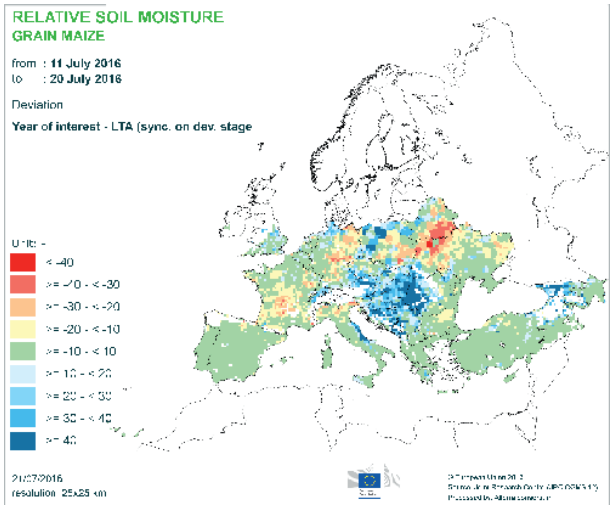


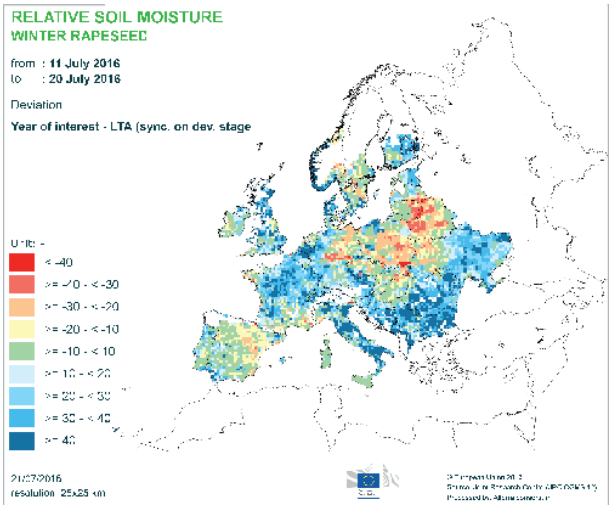


Relative soil moisture

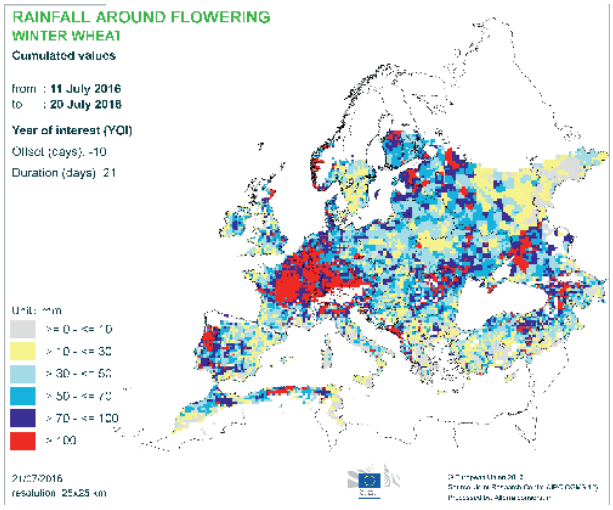


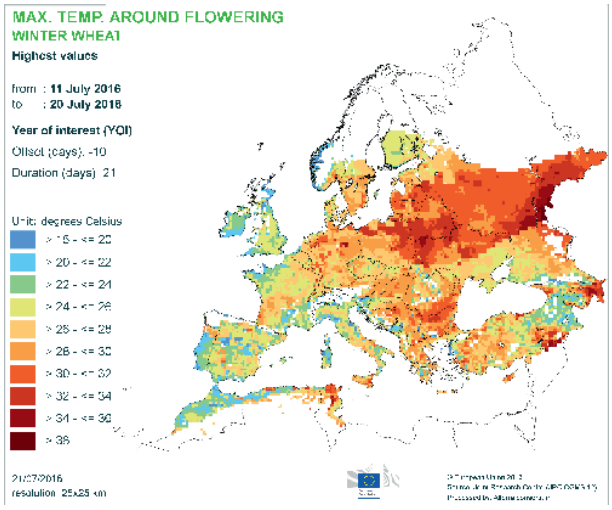


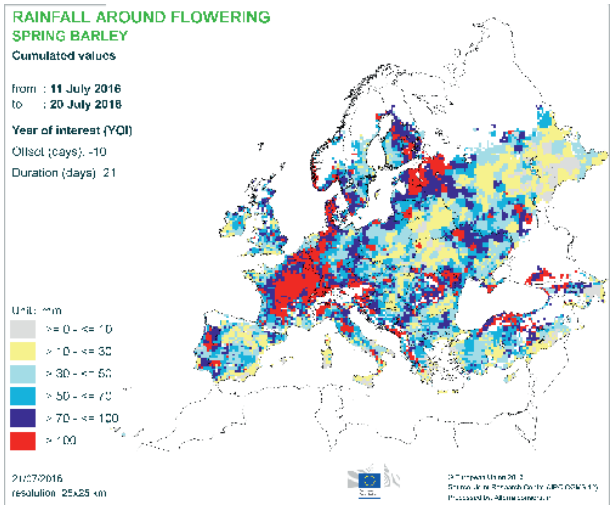


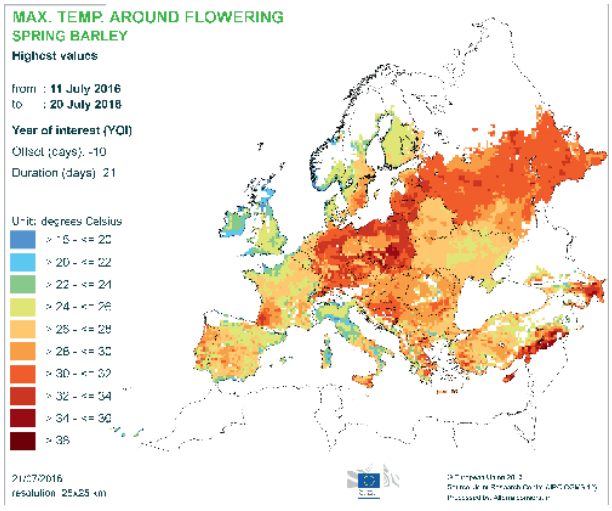


Rainfall and temperatures around flowering — winter wheat, spring barley

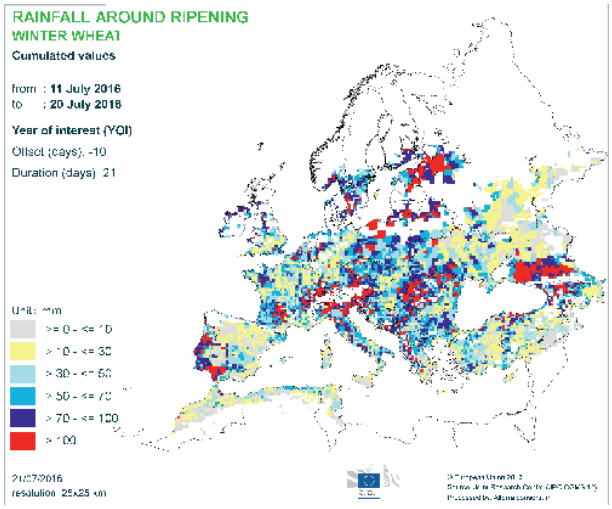


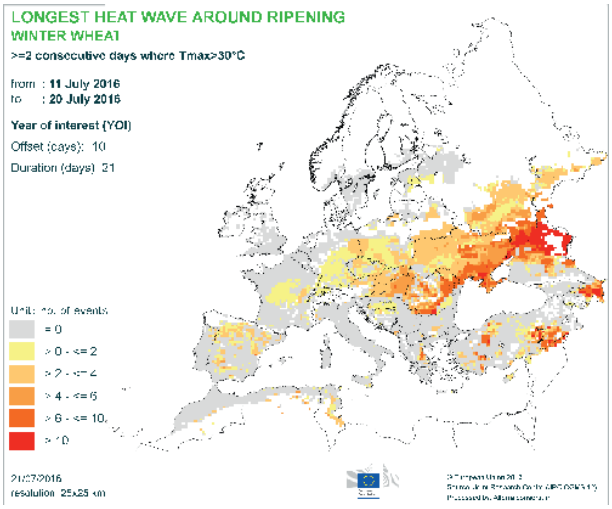


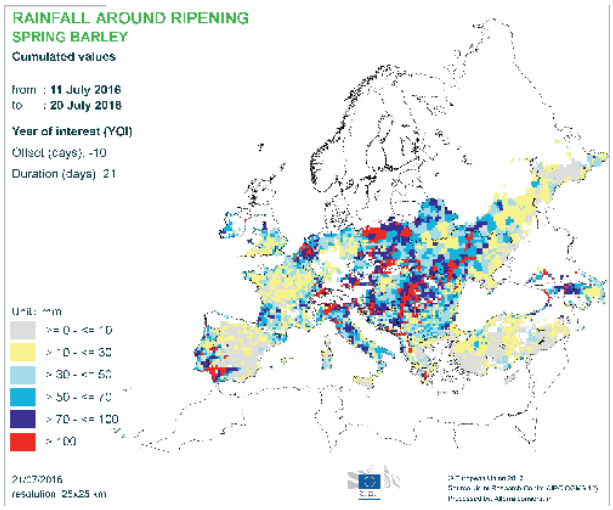


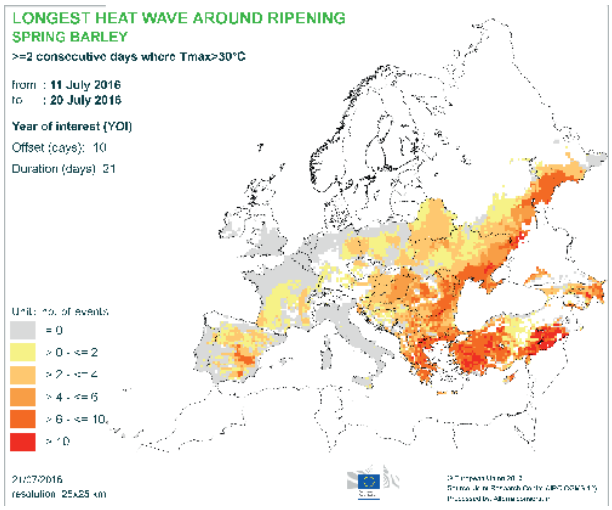


Rainfall and longest heatwave around ripening — winter wheat

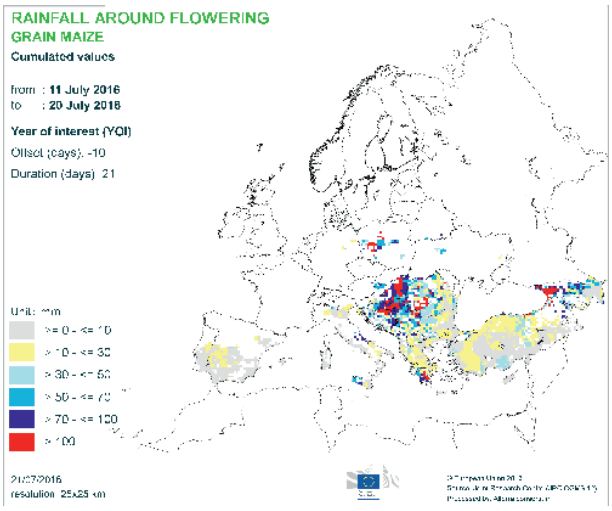


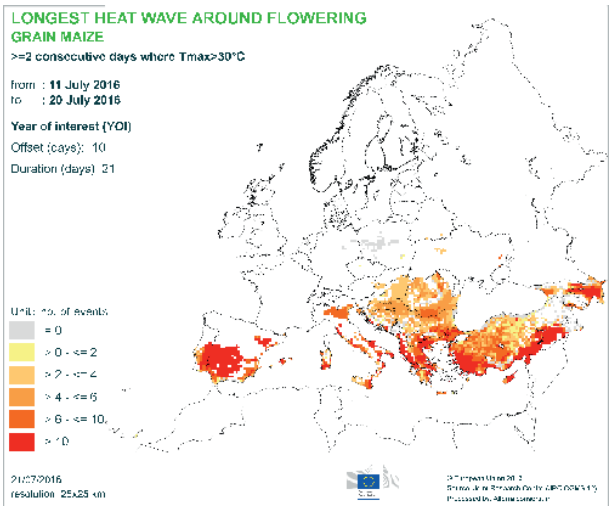






Rainfall and longest heatwave around ripening — maize





LB-AW-16-007-EN-N

JRC MARS Bulletins 2016

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

The current JRC MARS Bulletin — Crop monitoring in Europe is a JRC–European Commission publication from MARS Forecast/D5 Food Security Unit
https://ec.europa.eu/jrc/en/research-topic/crop-yield-forecasting

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

Analysis and reports
B. Baruth, I. Biavetti, A. Bussay, A. Ceglar, G. De Sanctis, S. Garcia Condado, S. Karetsos, R. Lecerf, R. Lopez, L. Nisini, L. Seguini, A. Toreti, M. Van den Berg, M. Van der Velde.

Reporting support
G. Mulhern

Editing
B. Baruth, M. Van den Berg, S. Niemeyer

Data production
MARS Forecast/D5 Food Security Unit, Alterra (NL), Meteogroup (NL), VITO (BE) and CMCC (IT)

Contact
MARS Forecast/D5 Food Security Unit
info-agri4cast@jrc.ec.europa.eu

*MARS stands for Monitoring Agricultural Resources

Technical note:
The long-term average (LTA) used within this bulletin as a reference is based on an archive of data covering 1975–2015.

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

Publications Office

Print ISSN 2443-826X LB-AW-16-007-EN-C
PDF ISSN 2443-8278 LB-AW-16-007-EN-N