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European Commission

Period covered: 1 August-20 September
Issued: 26 September 2016

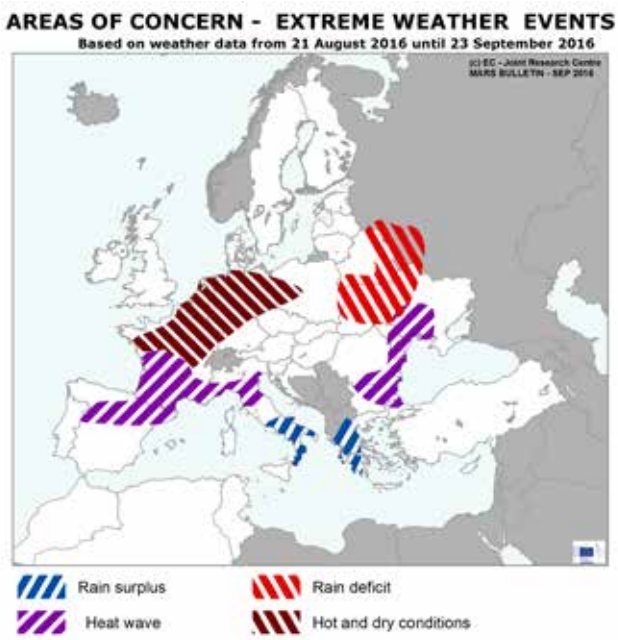
JRC MARS Bulletin
Crop monitoring in Europe
September 2016

EU-28 grain maize yields revised downwards

Inadequate water supply conditions had a negative impact on the yield formation

The total EU-28 cereal yield is now estimated to be below the five-year average after having been lowered by 3.7 % compared to the August Bulletin. This is partly due to a downward revision of grain maize yield estimates by 5.4 % compared to our last bulletin, and mediocre soft wheat and winter barley yields. The EU 28 yield forecast for sugar beets is slightly above last year's yield and the five-year average. Average EU 28 potato yields are forecast.

In many regions, the analysis period was one of the warmest on our records. Hot and dry conditions in eastern Romania, Bulgaria and southern Ukraine as well as in southern France and western Italy partially affected water supply and shortened the duration of grain filling in maize and sunflower crops, thus reducing yield expectations. Grain filling in western Ukraine and Belarus was affected by a lack of precipitation. Unusually warm and dry weather conditions also occurred in northern France, the Benelux region and northern Germany. In these regions, however, the drawbacks in terms of a shortened growing season and local water stress are deemed to have been compensated by the positive effects of increased radiation on photosynthesis



Crop	Yield t/ha				
	August 2016 forecasts	September 2016 forecasts	Avg 5yrs	% Diff Sept/5yrs	% Diff Sept/Aug
TOTAL CEREALS	5.36	5.16	**5.32**	- 2.9	- 3.7
Total Wheat	5.63	5.40	**5.60**	- 3.6	- 4.1
soft wheat	5.86	5.63	**5.86**	- 3.5	- 3.9
durum wheat	3.46	3.33	**3.33**	+ 0.1	- 3.8
Total Barley	4.88	4.77	**4.72**	+ 1.0	- 2.3
spring barley	4.20	4.20	**4.12**	+ 1.9	+ 0.0
winter barley	5.77	5.51	**5.57**	- 1.2	- 4.5
Grain maize	7.23	6.84	**6.93**	- 1.3	- 5.4
Rye	3.75	3.71	**3.75**	- 1.1	- 1.1
Triticale	4.12	4.12	**4.20**	- 2.0	+ 0.0
Rape and turnip rape	3.20	3.20	**3.20**	+ 0.0	+ 0.0
Potato	32.61	32.13	**32.08**	+ 0.1	- 1.5
Sugar beet	72.78	73.50	**71.80**	+ 2.4	+ 1.0
Sunflower	2.05	1.97	**1.94**	+ 1.9	- 3.9

Issued: 23 September 2016

Joint Research Centre

1. Agro-meteorological overview

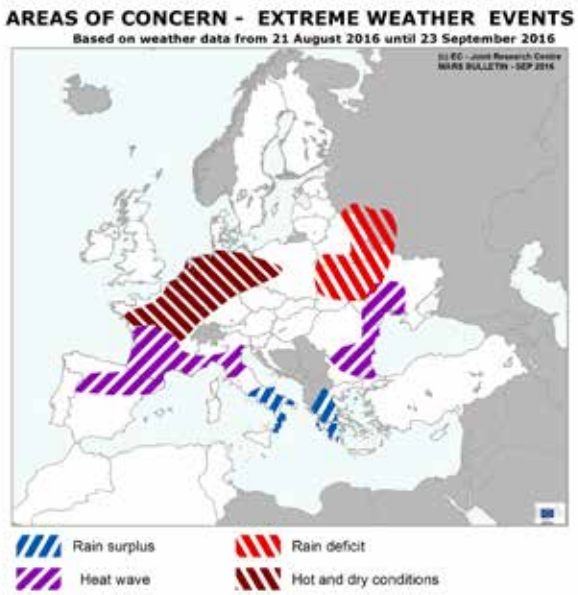
1.1. Areas of concern

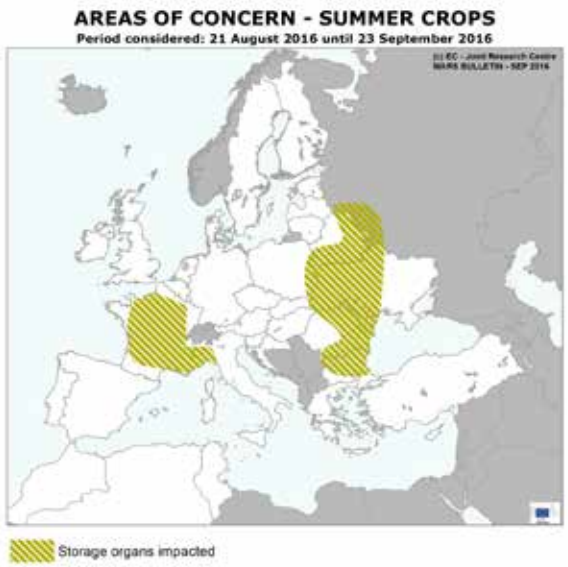
The above maps depict the main weather events, and their impacts, between 21 August and 23 September. Since the last 10 days of August, temperatures in **eastern Romania, Bulgaria and southern Ukraine** increased significantly above the average, with maximum temperatures reaching 30 °C to 35 °C for several days. The high temperatures accelerated the grain filling of summer crops and reduced yield expectations also because of sparse precipitation. Summer crops grain filling was slightly impacted even in **western Ukraine** and **Belarus** due to a persistent lack of precipitation.

High temperatures were recorded during the first half of September in **northern Spain, southern France and western Italy**. In Spain, the summer crop season has ended while in western Italy and southern France the grain filling of maize has been shortened and green maize senescence accelerated.

Similar crop conditions are projected for **northern France, Benelux and northern Germany**, where above-average temperatures (with maximum temperatures reaching above 30 °C) are associated with reduced or almost no precipitation in September. In these regions, however, soil water conditions had hitherto been favourable (except northern Germany) and the drawbacks in terms of a shortened growing season and local water stress are deemed to be compensated by the positive effects of increased radiation on photosynthesis. However, dry topsoils in these regions are hampering the potato harvest and soil preparations for the sowing of new winter crops.

At the beginning of September, **southern Italy** and **southern Greece** experienced strong rains (registering around 100 mm in a few days) that could have locally caused physical damage to the grain crops.





1.2. Meteorological review (1 July-16 August)

Warmer-than-usual summer weather prevailed throughout Belarus, Ukraine, Russia, the eastern side of the Balkan Peninsula, Greece, the eastern Mediterranean region and Turkey, as well as major areas of the Iberian Peninsula, Morocco and western parts of Algeria. Mean summer air temperatures generally exceeded the long-term average by 1 °C to 4 °C in these regions. Elsewhere in Europe, thermal conditions for the summer as a whole were close to average. Areas with average summer temperatures below the long-term average are negligible.

Exceptionally warm periods, with temperatures approaching or exceeding the highest values in our climatological database, were experienced in central and central-eastern Europe (covering the wide area between eastern Germany and the Caspian Sea) in the second half of June, and in eastern and south-eastern Russia during August.

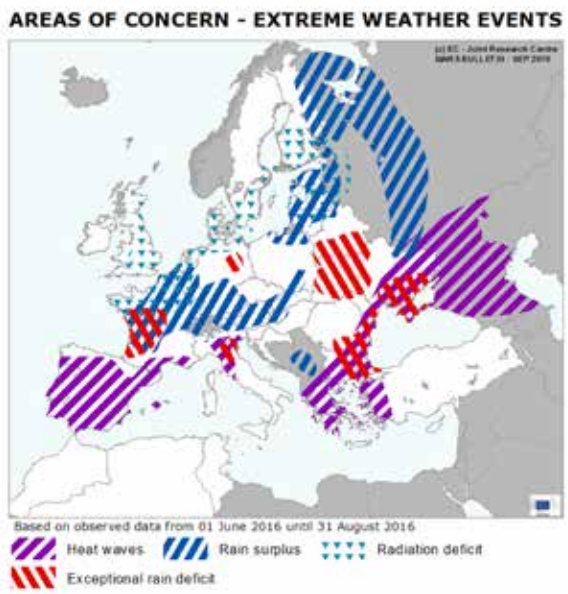
The number of hot days (Tmax > 30 °C) during this summer was considerably higher than average (typically by 15-25 days) in the Iberian Peninsula and the western half of the Maghreb region, as well as a large belt covering Turkey, Greece, Bulgaria, eastern Romania, southern Belarus, most of Ukraine (especially near the Black Sea) and southern Russia.

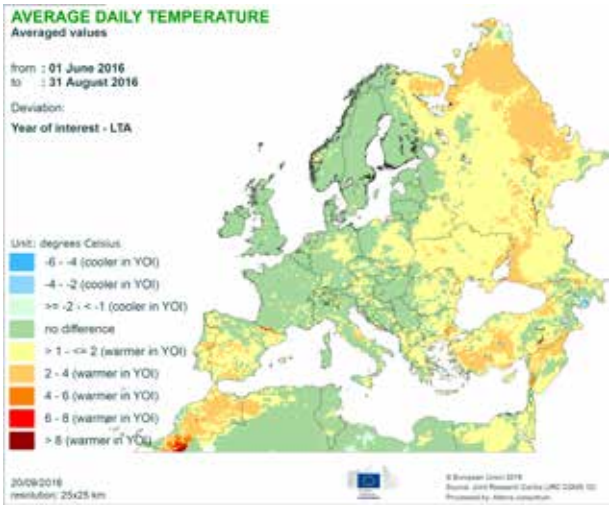
Summer precipitation significantly exceeded the long-term average along the western coastline of the UK and Norway, in the Alpine region, Carpathian Basin, western half of the Balkan Peninsula, northern Scandinavian regions, Baltic countries, north-western areas of Russia and in large areas between the Black Sea and the Caspian Sea. The precipitation surplus in these regions mostly reached 50-150 mm, and abundant rainfall with cumulates greater than 200 mm were typical in the majority of these abovementioned regions.

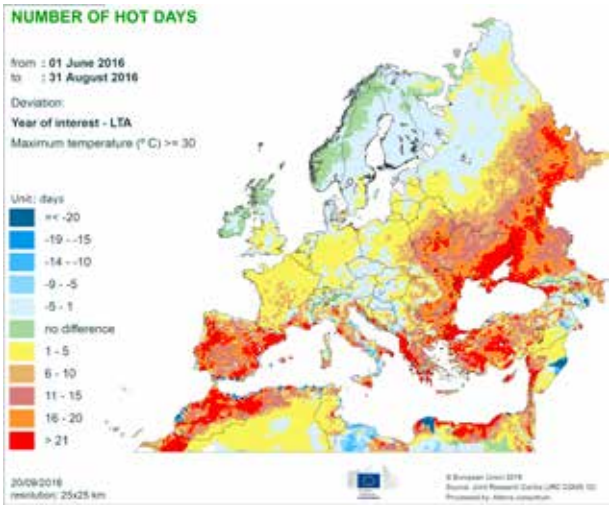
Heavy and persistent rainfall events during late May and early June caused severe waterlogging problems and flooding events, primarily in the central-northern part of France, southern and western Germany, and also affecting parts of Austria, Belgium and the Netherlands. In these regions, rainfall cumulates exceeded 100 mm over a week-long period starting on 28 May.

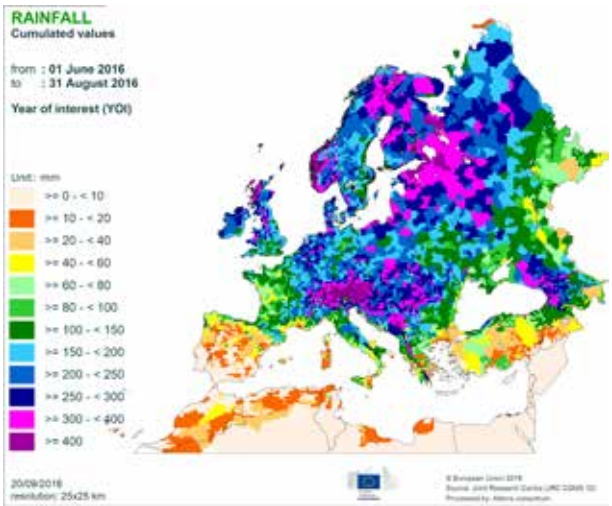
Persistent cloud coverage, resulting in a significant global radiation deficit, occurred for several weeks during the first half of this summer in large areas around the North Sea (Scotland, England, northern France, the Benelux region and Denmark) and surrounding regions of the Baltic Sea (southern Finland, the Baltic states and south-eastern Sweden).

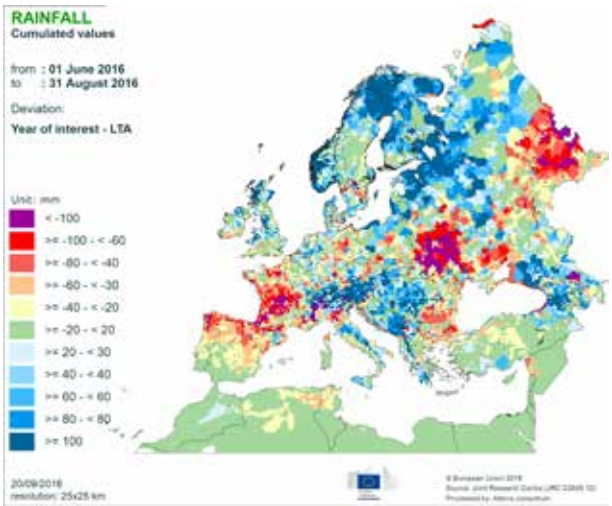
A precipitation deficit was experienced in northern areas of Spain and Portugal, western and central France, some spots of northern Italy, eastern Romania, most of Bulgaria, southern regions of Belarus, the majority of Ukraine and in large parts of south-eastern European Russia (especially in the Near Volga Okrug). The cumulated summer rainfall remained well below the average (typically by 50-150 mm) in these regions.









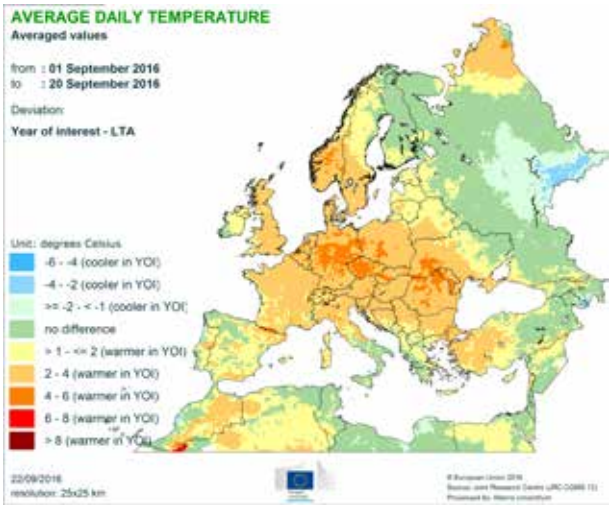


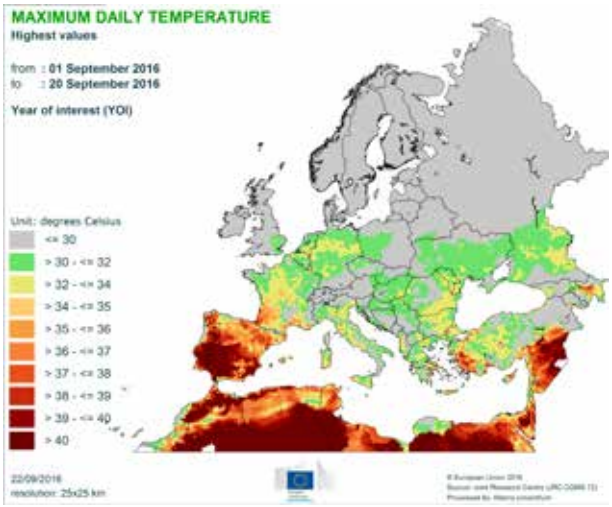
1.3 Meteorological review (1-20 September)

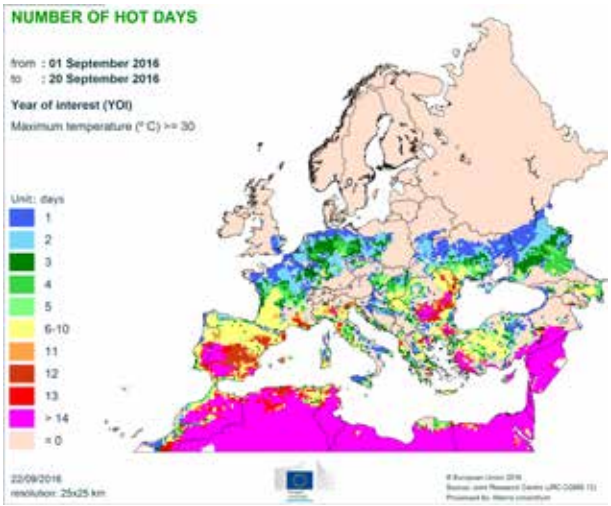
The analysed period was one of the warmest on our records for many regions in a broad band extending from the UK to western Turkey, in which a positive thermal anomaly of between 2 °C and 5 °C above the long-term average was recorded. Maximum temperatures of between 32 °C and 34 °C were recorded in central France, Italy, northern Germany, the Benelux countries, western Black Sea regions, the southern part of European Russia and central Turkey. Maximum temperatures above 34 °C were limited to south-western and southern France, the Iberian Peninsula, and south-western and south-eastern Turkey.

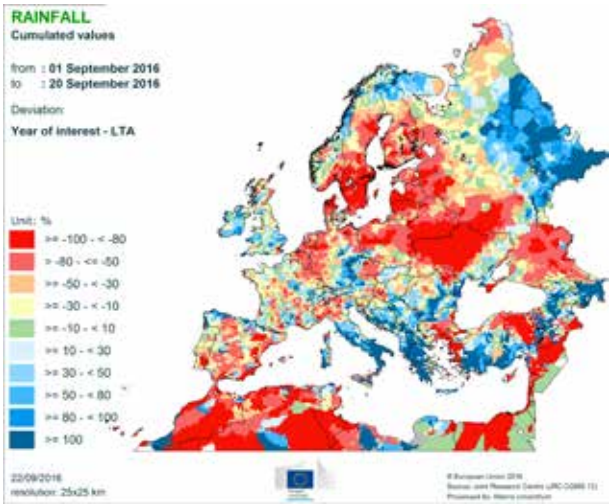
Drier-than-usual conditions were recorded in the Iberian Peninsula, regionally in France, northern Italy, the Benelux countries, major parts of Germany (except the south-eastern part), the central part of the Czech Republic, Denmark, a wide belt extending from Scandinavia to northern Black Sea regions, central and south-eastern Turkey, and eastern and northern regions surrounding Aegean Sea. Rainfall cumulates in these regions generally did not exceed 30 mm. Some of these regions remained dry, which might delay field preparation for the sowing of winter crops.

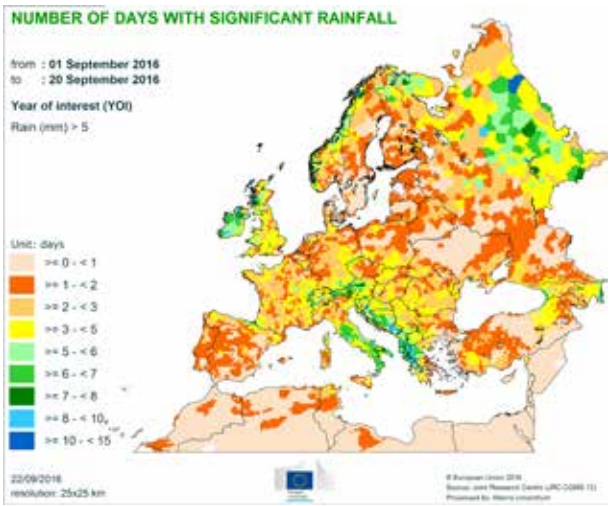
Above-average rainfall was recorded regionally in the British Isles, central and southern Italy, Greece, western Balkans, the eastern Carpathian region, Slovakia, Austria, south-eastern Germany, the western part of the Czech Republic, central European Russia and a major part of south-western Turkey. Rainfall cumulates in the abovementioned regions generally exceeded 30 mm. Southern Italy, Greece, the western Balkans and Alpine areas recorded more than 80 mm of rainfall. Exceptional rainfall events with daily cumulates of above 80 mm occurred locally in southern France, southern Romania, southern Greece and northern Adriatic coastal regions.

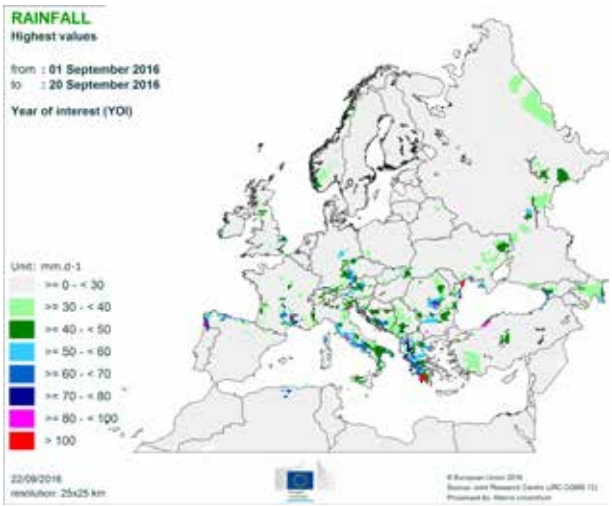

AVERAGE DAILY TEMPERATURE
Averaged values
from : 01 September 2016
to : 20 September 2016
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
>= -2 - < -1 (cooler in YOI)
no difference
> 1 - <= 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
22/09/2016
resolution: 25x25 km


MAXIMUM DAILY TEMPERATURE
Highest values
from : 01 September 2016
to : 20 September 2016
Year of interest (YOI)
Unit: degrees Celsius
<= 30
> 30 - <= 32
> 32 - <= 34
> 34 - <= 35
> 35 - <= 36
> 36 - <= 37
> 37 - <= 38
> 38 - <= 39
> 39 - <= 40
> 40
22/09/2016
resolution: 25x25 km


NUMBER OF HOT DAYS
from : 01 September 2016
to : 20 September 2016
Year of interest (YOI)
Maximum temperature (° C) >= 30
Unit: days
1
2
3
4
5
6-10
11
12
13
> 14
= 0
22/09/2016
resolution: 25x25 km


RAINFALL
Cumulated values
from : 01 September 2016
to : 20 September 2016
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
> -80 - <= -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
22/09/2016
resolution: 25x25 km

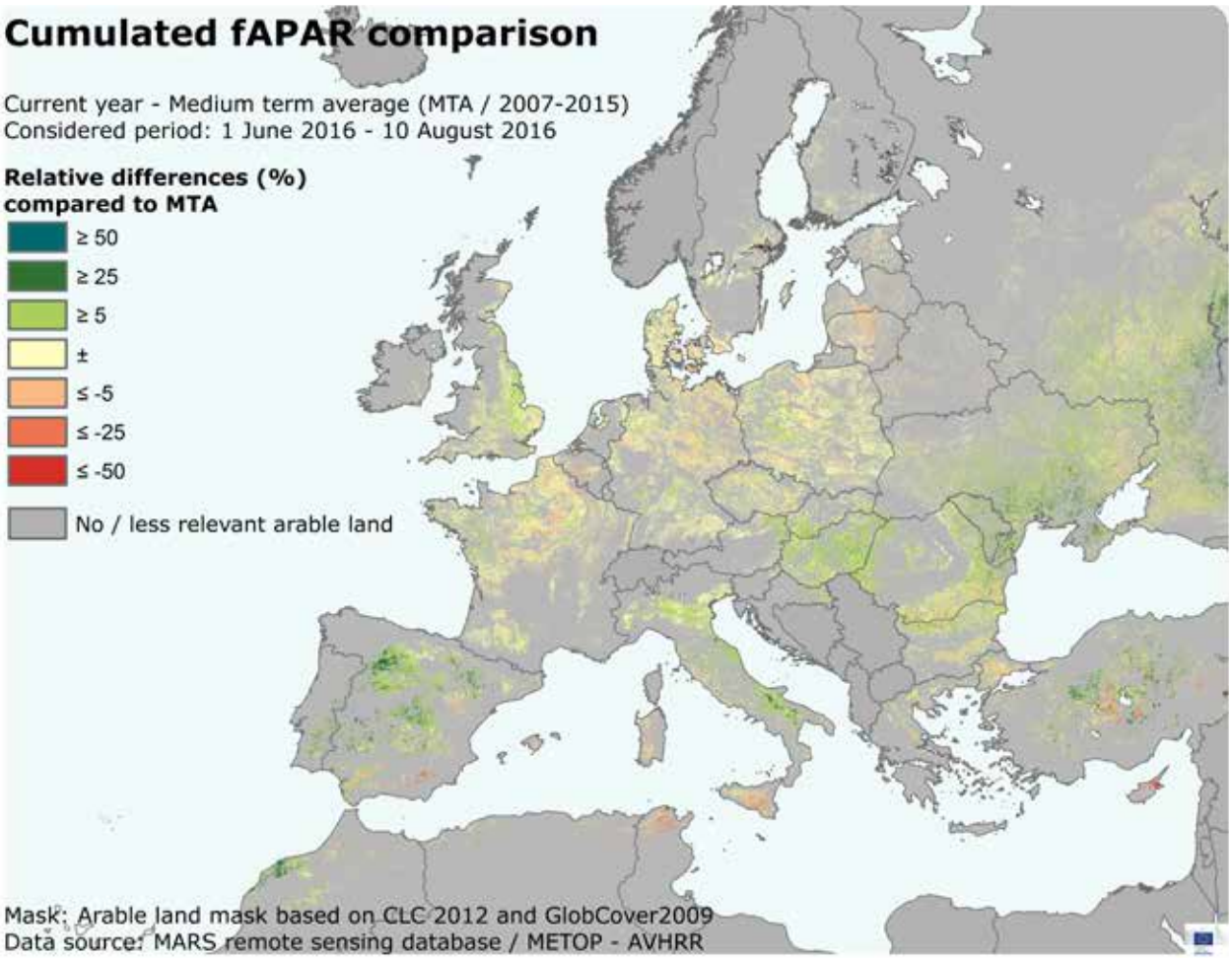

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 September 2016
to : 20 September 2016
Year of interest (YOI)
Rain (mm) > 5
Unit: days
>= 0 - < 1
>= 1 - < 2
>= 2 - < 3
>= 3 - < 5
>= 5 - < 6
>= 6 - < 7
>= 7 - < 8
>= 8 - < 10
>= 10 - < 15
22/09/2016
resolution: 25x25 km

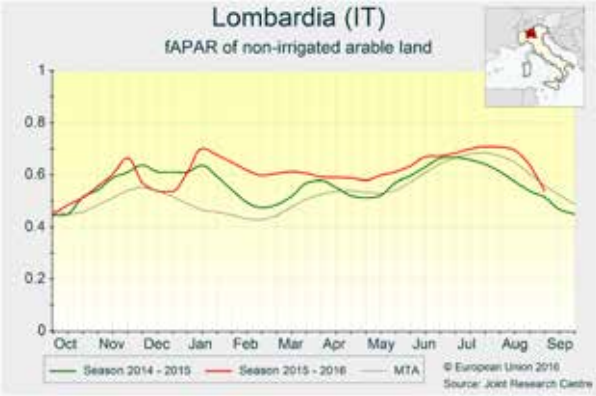

RAINFALL
Highest values
from : 01 September 2016
to : 20 September 2016
Year of interest (YOI)
Unit: mm.d-1
>= 0 - < 30
>= 30 - < 40
>= 40 - < 50
>= 50 - < 60
>= 60 - < 70
>= 70 - < 80
>= 80 - < 100
> 100
22/09/2016
resolution: 25x25 km

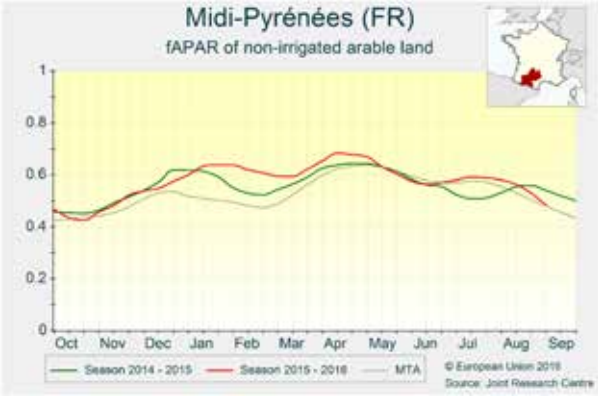
2. Remote sensing — Observed canopy conditions

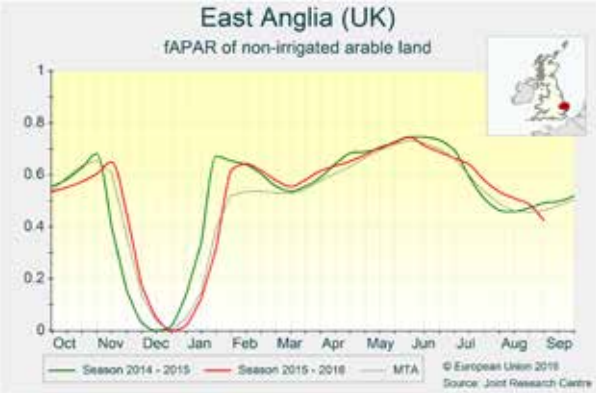
Hot and dry conditions hamper the grain filling of summer crops, particularly in Romania and Bulgaria

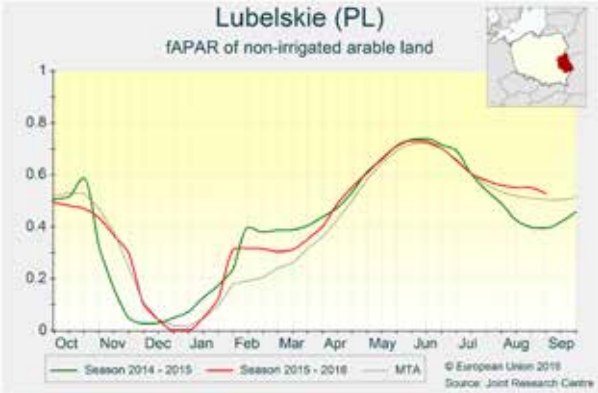
The map displays the differences between the fraction of Absorbed Photosynthetically Active Radiation (fAPAR) cumulated during the period from 1 August to 10 September 2016 and the medium-term average (MTA, 2007-2015) for the same period. In northern **Italy**, above-average temperatures and reduced precipitation from mid-August accelerated the maize senescence and shortened the grain-filling stage, especially in north-eastern regions (e.g. Veneto), where maize development was delayed. In **France**, summer crops were affected by the dry and hot conditions that occurred since mid-August. The main concerns related to the shortening of the grain-filling stage due to the hot temperatures. The lack of precipitation is not relevant for the irrigated grain summer crops (e.g. Midi-Pyrenees) but affected the yields of crops that were harvested while green. In the **United Kingdom,** spring and winter crop cycles ended slightly later than usual (e.g. East Anglia), with no relevant concerns. In **Germany**, summer crops developed slightly earlier than usual due to the above-average temperatures, but crop status remains favourable, especially in southern and northern regions. In **Poland**, the winter crops season has ended. Summer crops' biomass accumulation is greater than average (e.g. Lubelskie) thanks to the high temperatures of late August and September coupled with sufficient precipitation. In **Austria, Slovakia** and **Hungary**, favourable precipitation and above-average temperatures (with maximum temperatures frequently above 30 °C) determined an optimal development of storage organs (e.g. Kozep-Dunantul). In **Romania**, a significant precipitation deficit and high temperatures in the main southern and eastern (e.g. Nord Est) agricultural regions compromised the grain filling of summer crops, especially those planted late, and led to early senescence. In **Bulgaria**, weather conditions were suboptimal, with maximum temperatures often above 30 °C — even in September — and little precipitation. Summer crops faced a shortening of the grain-filling stage and entered into maturity earlier than usual (e.g. Yugoiztochen). In **Ukraine**, precipitation during August and September was lower than average. In western regions, these conditions hampered the grain-filling phase of summer crops, which was also shortened due to high temperatures. In central and eastern regions, the precipitation deficit started only in late August when summer crops already reached maturity under optimal conditions (e.g. Kharkivs'ka). In **Russia**, yield expectations remain high thanks to optimal conditions during the entire month of August.

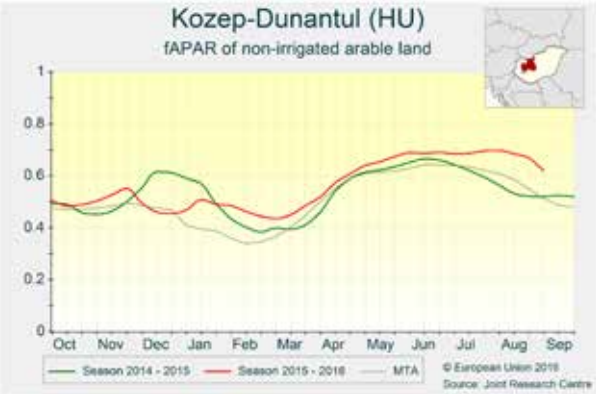


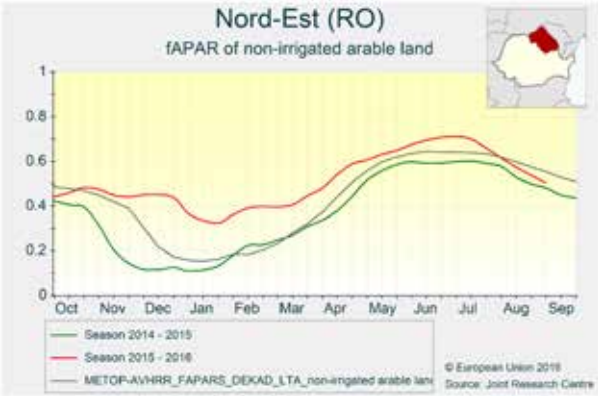

Lombardia (IT)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

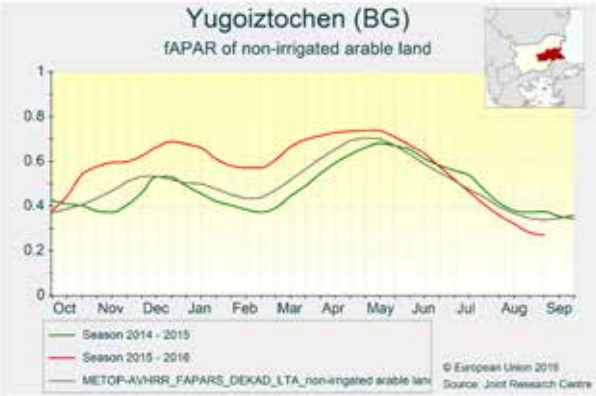

Midi-Pyrénées (FR)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

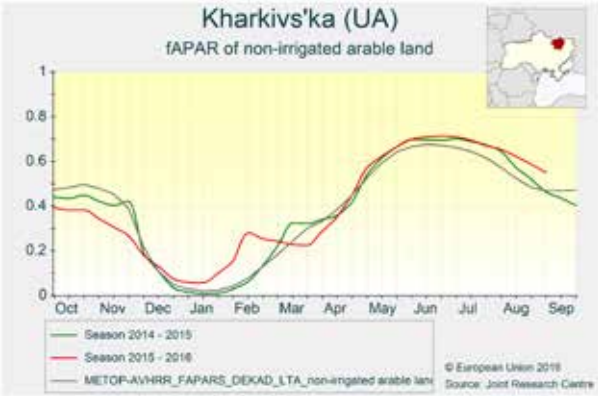

East Anglia (UK)
fAPAR of non-irrigated arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre


Lubelskie (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


Kozep-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


Nord-Est (RO)
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
METOP-AVHRR_FAPARS_DEKAD_LTA_non-irrigated arable lan
© European Union 2016
Source: Joint Research Centre


Yugoiztochen (BG)
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
METOP-AVHRR_FAPARS_DEKAD_LTA_non-irrigated arable lan
© European Union 2016
Source: Joint Research Centre


Kharkivs'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
METOP-AVHRR_FAPARS_DEKAD_LTA_non-irrigated arable lan
© European Union 2016
Source: Joint Research Centre

3. Country analysis

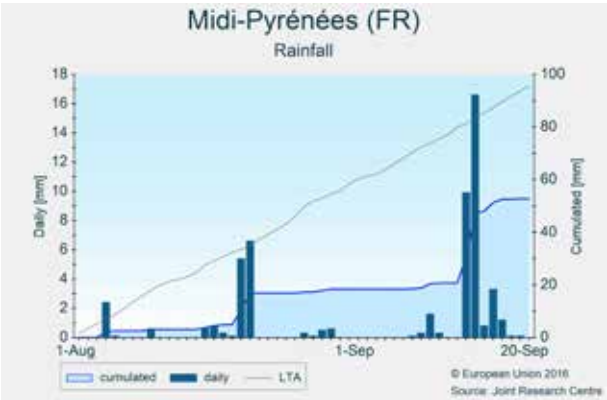
3.1. European Union

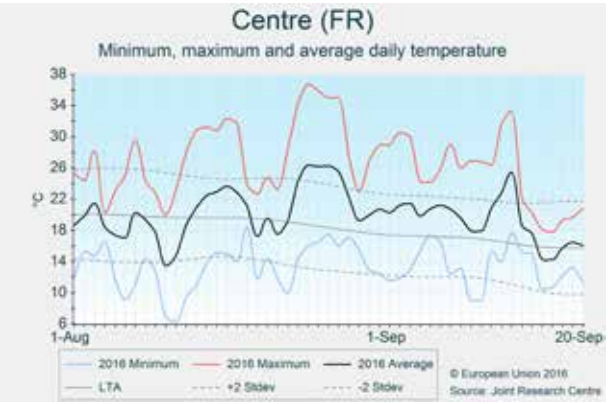
France

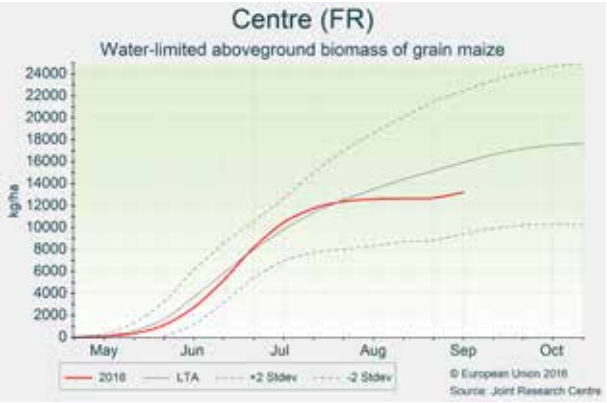
Dry conditions worsen maize and sunflower outlook

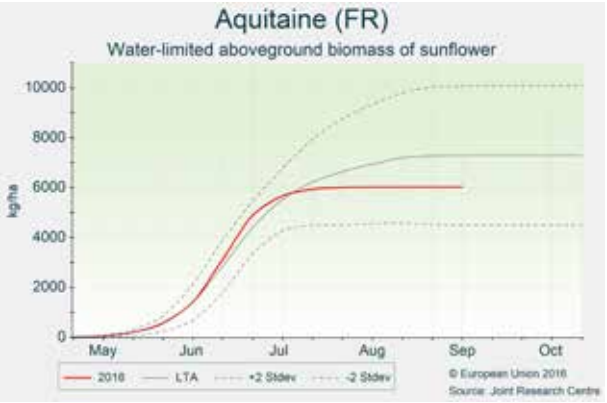
Only a few significant rainfall events were recorded this summer throughout the country. The dry conditions will impact maize and sunflower yields. Potatoes and sugar beets are spared the impacts of overly dry conditions as some rainfall was recorded in the northern regions.

Rainfall since the beginning of August was less than 50 % of the seasonal average in most regions, except Languedoc-Roussillon, Franche-Comté, Bretagne, Basse and Haute-Normandie, Picardie and Nord-Pas de Calais, where rainfall reached 70 to 75 % of the average. A rain deficit was already ongoing in July, and conditions in August exposed most of the crops to water stress. Temperatures during the first half of August were slightly below average but then increased to well-above average levels, and went up to 36 °C during the last dekad of August. Since 10 September, temperatures are milder and closer to the long-term average. Global radiation was greatly above the average during the period of analysis, which led to increased crop water use. Late-sown maize is most strongly impacted because the onset of water shortages coincided with flowering and early grain filling — the most sensitive stages for yield formation. Some irrigation restrictions were also imposed, impacting irrigated maize, more particularly in the Centre region. The yield forecasts for grain maize and green maize are revised downwards, well below the five-year average, albeit with a substantial margin of uncertainty due to the heterogeneity of sowing dates. The sunflower yield forecast is also revised downwards, but is expected to be less impacted than grain maize as it is less sensitive to dry conditions during grain filling. The sugar beet yield forecast is close to the five-year average, whereas the yield estimate for potatoes is substantially below the five-year average given the high level of disease pressure and other impacts associated with the excessively wet conditions that prevailed at the beginning of the season.







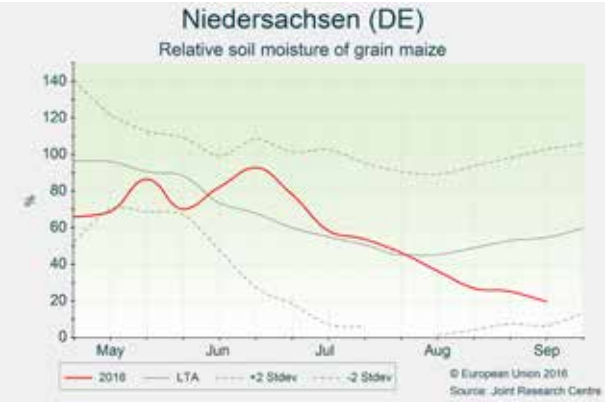


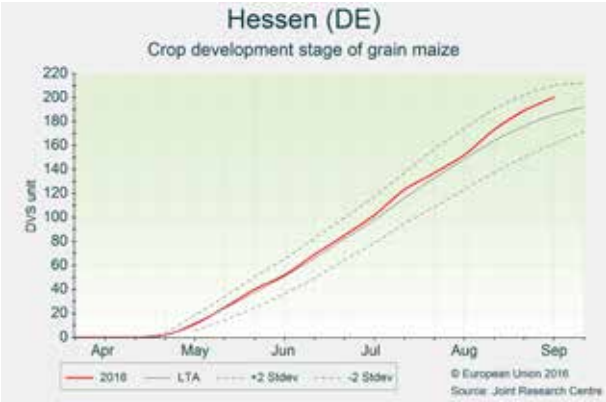
Germany

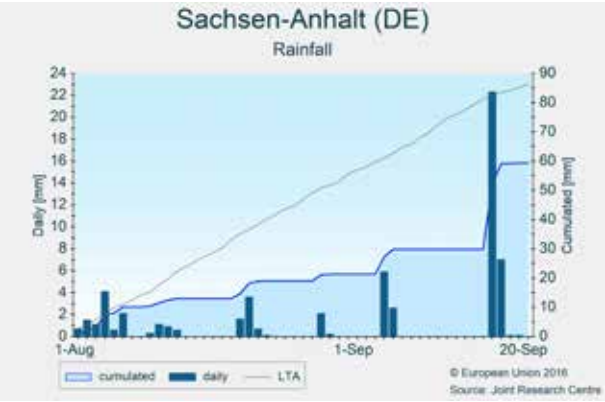
Dry and hot conditions lead to rapid maize maturation

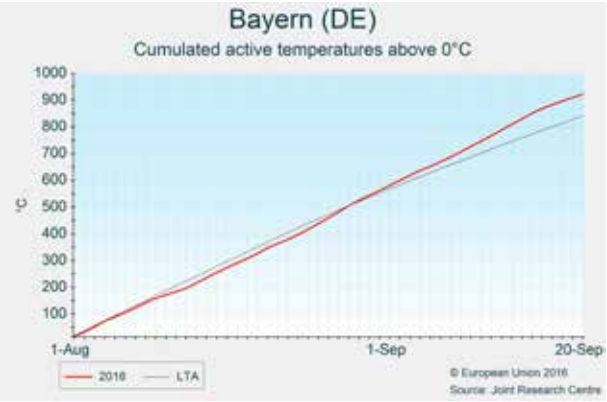
Maize experienced a rapid maturation due to the warm and dry conditions and rapidly depleting soil moisture levels from mid-August onwards. The maize forecast is now below average. A fairly average year is expected for sugar beets, whereas potato yields are forecast to be slightly below average.

The unsettled weather that characterised much of the summer of 2016 was replaced by more stable weather conditions from mid-August onwards, allowing the harvest of winter and spring cereals to come to a fast close. Temperatures remained almost constantly above average until 15 September, when cooler and fresher conditions set in. There were also a remarkably high number of hot days compared to the average during this period, e.g. up to 11 days in Sachsen-Anhalt. Rain was sparse, leading to a pronounced rainfall anomaly. Except for the extreme North and South, only one to three rainy days were registered between 15 August and 15 September. This led to extremely low soil moisture values, especially in north-eastern Germany, which had already suffered from a rainfall deficit before August. Consequently, the water supply for summer crops became inadequate for optimal biomass accumulation and yield formation during the past weeks. Grain maize forecasts are therefore lowered and, due to the rapid canopy senescence, the green maize harvest started well in advance, for instance in Niedersachsen. In the case of sugar beets, no large biomass gains are to be expected from this last phase of the growth cycle because of the dry and warm weather conditions, but this will lead to high sugar content. Potato yields are forecast to be slightly below average. In areas with extremely low soil moisture conditions, some rape seed crops have not emerged or are in poor condition.







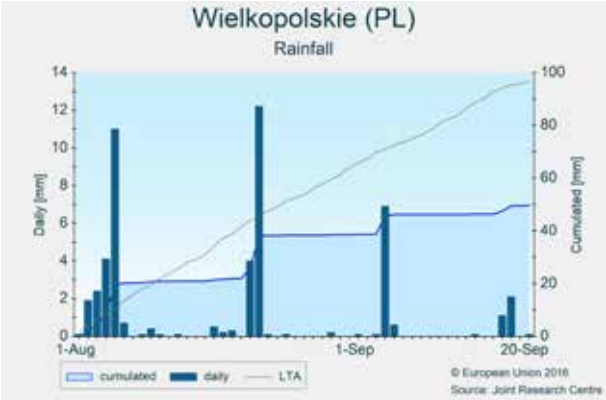


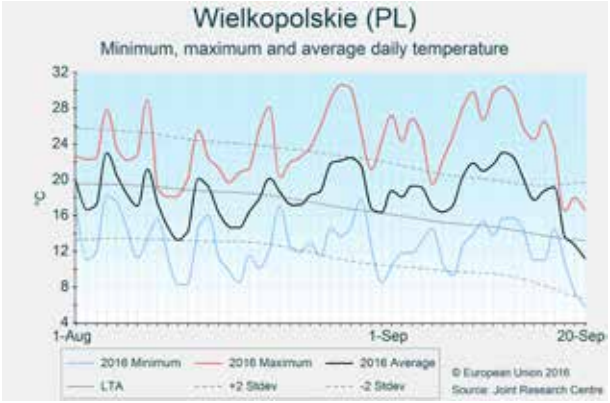
Poland

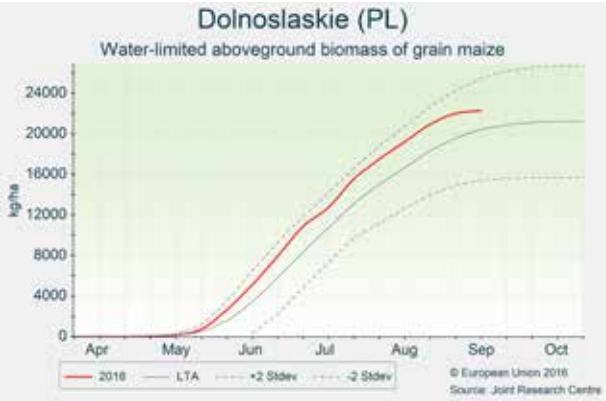
Positive outlook for summer crops

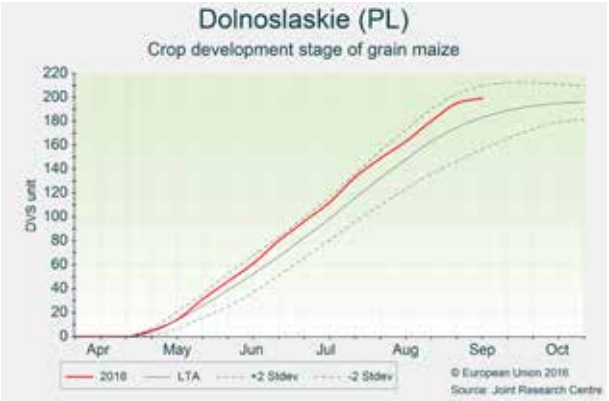
Weather conditions have been favourable since the beginning of August. The only concern is the sparse rainfall in central Poland since the last dekad of August, which delayed the sowing of winter crops. The outlook is positive for grain maize, green maize, potatoes and sugar beets, and yield forecasts are largely above average.

Close-to-average conditions observed at the beginning of August were favourable for all crops, and temperatures were slightly cooler than usual until 20 August. Since then, warm conditions were observed and temperatures rose to exceptionally higher than the average: the period from the last dekad of August to the second dekad of September was the warmest observed since 1975, albeit the maximum temperatures remained below 30 °C. The warm temperatures observed since the end of August accelerated the maturation of maize and sugar beets, and potatoes have already been harvested. Even though temperatures were exceptionally higher than usual in the past dekads, no impact on crops can be expected as all crops have already reached the ripening or maturity stages. Cumulated rainfall was slightly below average for the period of analysis. However, the cumulated rainfall for the whole summer is average due to the rain observed in July. The sowing conditions of winter cereals are currently not favourable for central Poland, given the dry topsoils, especially on the border between Lodzkie, Wielkopolsikie, Mazowieckie and Kujawsko-Pomorskie. The yield outlook for maize, potatoes and sugar beets is positive, and all yields are forecast to be above average and largely above those of last year, which was characterised by a drought that impacted most of the summer crops.







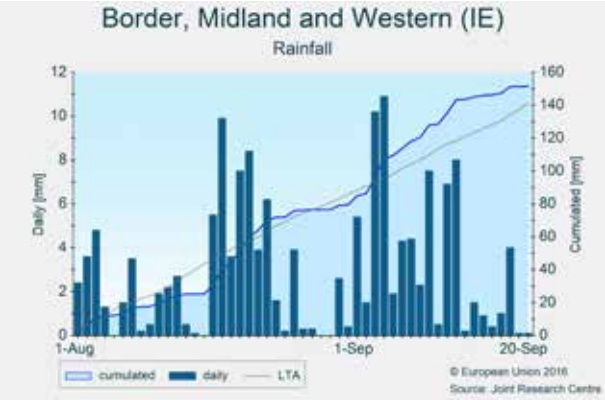


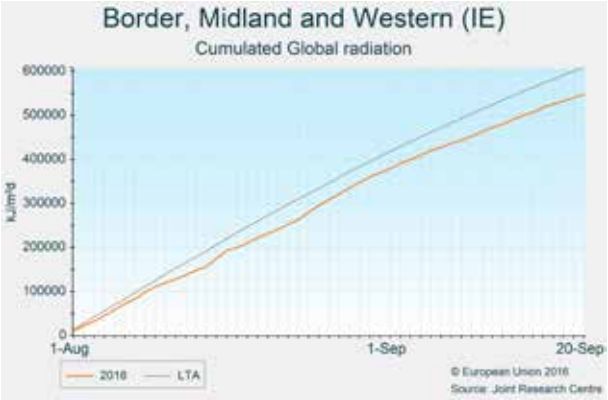
United Kingdom and Ireland

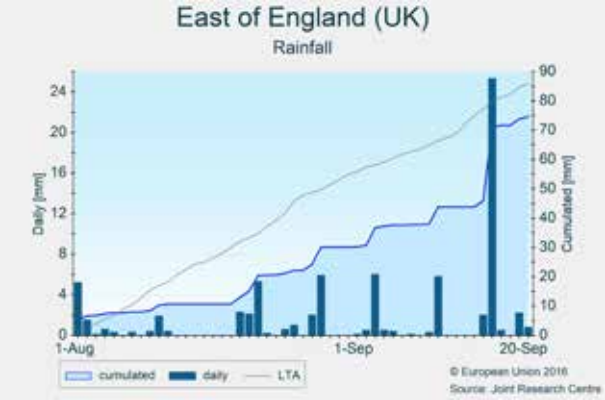
Wet conditions hamper end of grain harvest in Ireland

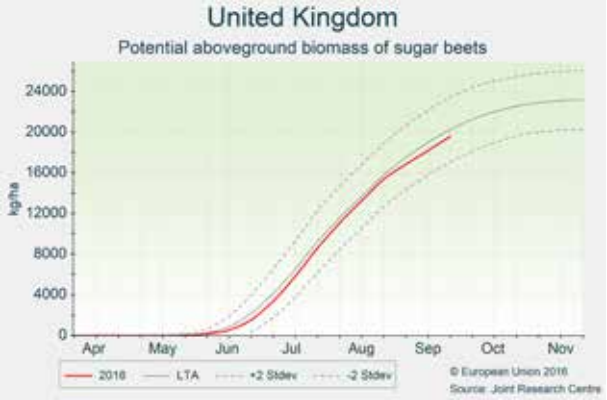
Weather conditions in the UK have mostly been adequate for the harvesting of winter cereals and spring barley, sugar beet growth and the start of the potato harvest. Wet weather hampered harvesting activities in large parts of Ireland and parts of the western UK.

Temperatures fluctuated around average during the first two dekads of August, after which they remained almost consistently above average until the end of the review period. In south-eastern parts of the UK, maximum temperatures reached 30 °C on 24 August and on 13 or 14 September, but they remained well below this level in the rest of the country and in Ireland. Rainfall for the period as a whole was 25 to 50 mm above average in Ireland and the western UK, 25 to 50 mm below average in the south-eastern UK and parts of Scotland, and around average in the rest of the UK. There were many rainfall events in Ireland and parts of Scotland, whereas other parts of the region presented more and longer dry periods. Radiation was well below average in Ireland and the western UK, and close to average in the rest of the UK. In most of the main UK cropland areas, conditions were adequate to finish the harvesting of winter crops and spring barley, as well as for sugar beet growth and the start of the potato harvest. However, the harvest was hampered in large parts of Ireland and parts of the western UK due to the high frequency of rain events and overcast weather conditions, which prevented drying. In the worst-affected areas, there is still a significant amount of grain to be harvested, some of which might still be harvested with low quality, or considered as lost. The possible overall impact (at country level) of these conditions on grain yields — especially of spring barley — appears to be minor for the UK but may be significant for Ireland. However, as the impact is very difficult to assess at this stage, it is not considered in our yield forecast, which remains practically unchanged.









Spain and Portugal

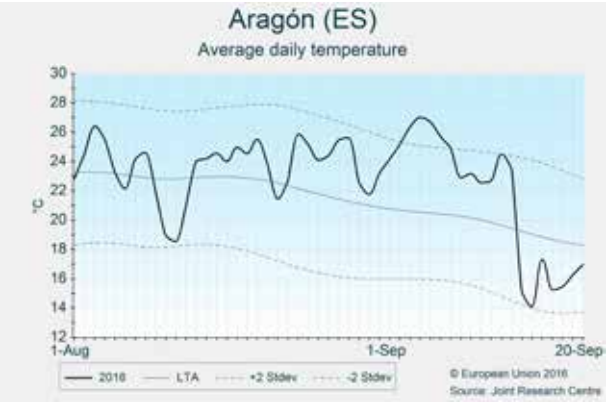
Warm and dry weather conditions

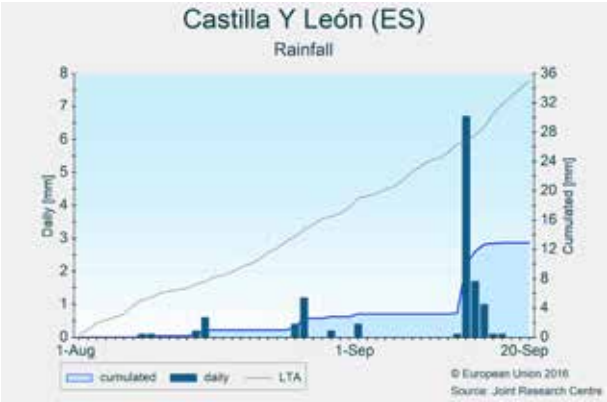
Higher-than-usual temperatures and sparse rainfall have been the norm since August in all the main crop-producing regions of the Iberian Peninsula. Yield expectations for summer crops are average, as the irrigation campaign did not experience any major constraints.

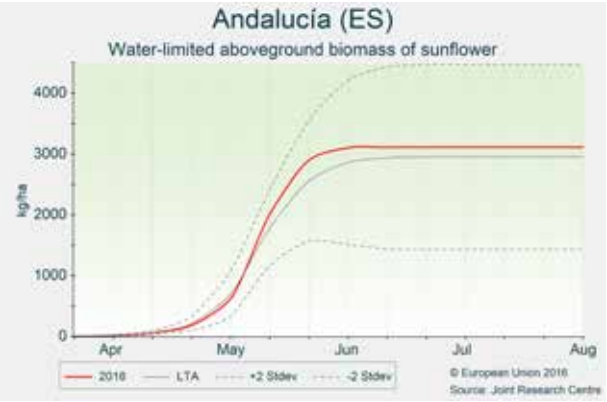
Weather conditions in the second half of summer were unusually warm and dry. Temperatures have been persistently above the long-term average, especially in the first two weeks of September, when daily averages repeatedly reached 25 °C in central and northern regions, exceptionally high temperatures for that period of the year. There was little precipitation since August, with the exception of some intense rainfall in the second week of September in the North of Spain (e.g. Galicia, Asturias), some areas of Castilla y León and Castilla-La Mancha.

The unusually warm conditions experienced since August favoured the rapid maturation of sunflowers in the northern half of the Peninsula. In Castilla y León, those areas that were sown late due to excessive rain in May are still to be harvested in the coming weeks. The particularly dry summer did not favour the grain-filling phase, and yield expectations for sunflowers are therefore only average, after the rather favourable weather conditions observed in late spring.

Grain maize has reached maturity in the southern half of the Peninsula, and harvesting will start shortly in Andalucía; the crop is still in the grain-filling phase in the north. Late-season sugar beet and potato crops are in the yield formation phase, and the harvest will start in October. Yield expectations for all these crops are close to the average, as the irrigation campaign progressed adequately without any major constraints.







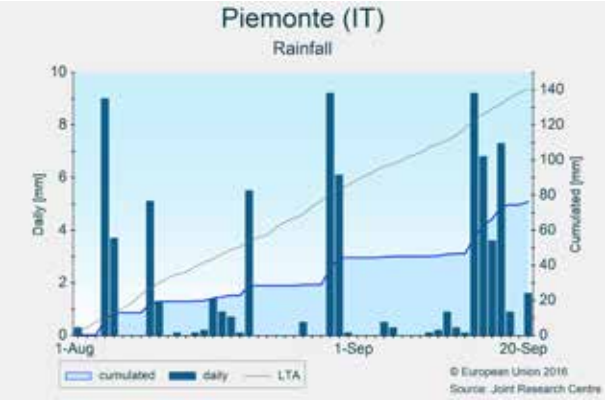
Italy

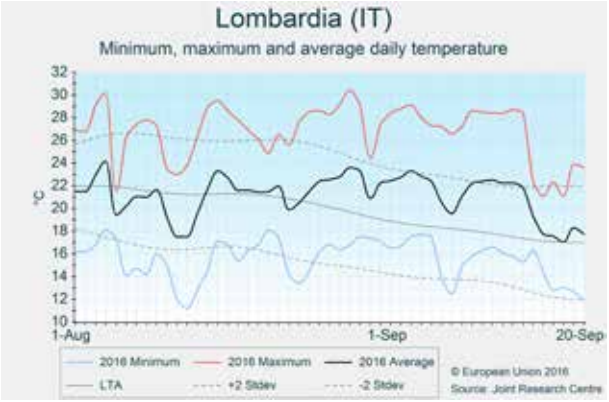
Summer crop yield expectations slightly above average

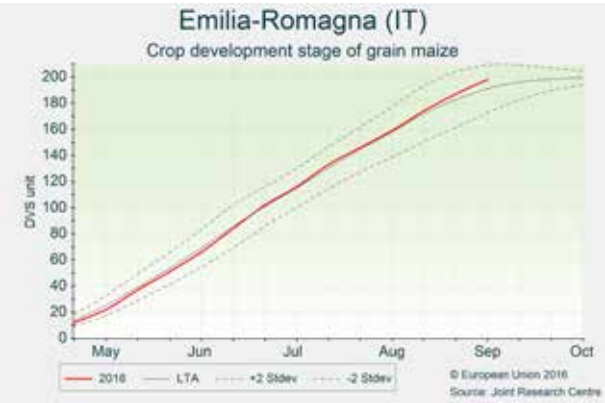
A rainfall deficit was recorded in north-western Italy and Sicily. Warm weather in September accelerated summer crop development. The yield forecasts for summer crops remain slightly above the five-year average.

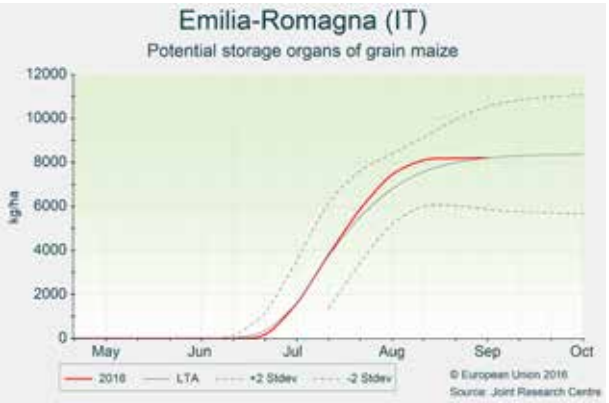
Seasonal temperature conditions in August were followed by a substantial warm anomaly during the first two dekads of September, with temperatures generally between 2 °C and 4 °C above the long-term average. The maximum duration of consecutive hot days with maximum daily temperatures exceeding 30 °C generally did not exceed 10 days, except limited areas in Toscana, Lazio and the Po valley. Maximum temperatures above 35 °C occurred in Toscana, Puglia, Basilicata, Sardegna and Sicilia. Drier-than-usual conditions were recorded in north-western Italy and Sicily, with rainfall cumulates generally below 50 mm, whereas above-average cumulates of more than 100 mm were recorded in the rest of Italy.

Grain maize is slightly advanced (apart from in the north-eastern regions) due to the exceptionally warm weather during the first two dekads of September, and is reaching maturity. Higher-than-average minimum temperatures during the grain-filling period could have increased the rate of senescence of grain maize (especially in Lombardia and Emilia Romagna), reducing the ability of plants to effectively produce grain. The yield forecast for grain maize has therefore been slightly reduced; nevertheless, it still remains above the five-year average, as the irrigation campaign faced no major constraints, and heat stress during the sensitive stage of flowering was rather limited. Yields above trend levels are also expected for sugar beet and potato crops. The yield outlook for sunflowers remains close to the five-year average.









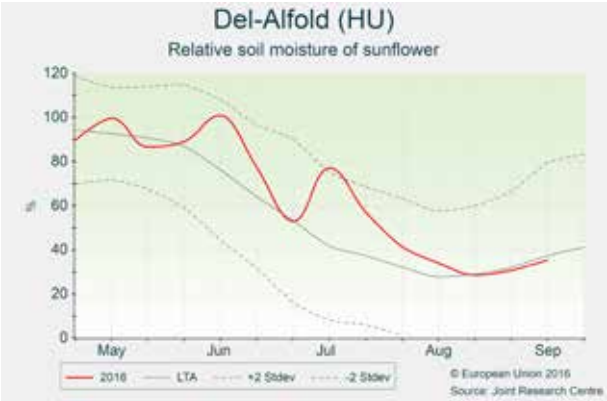
Hungary

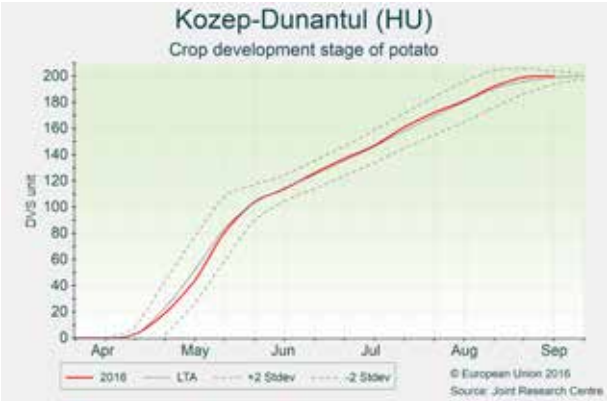
Record yield expectations for summer crops

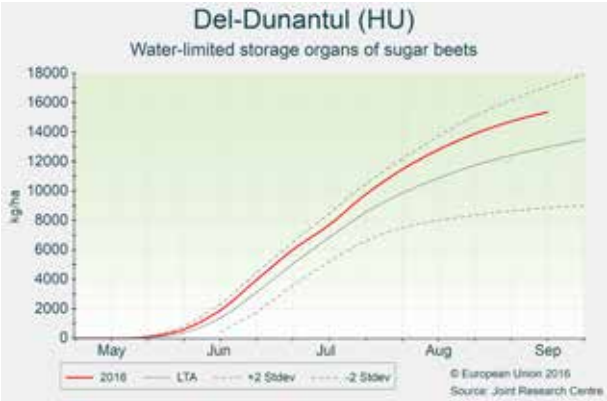
Plentiful rainfall in July, followed by slightly below-average precipitation in August, provided favourable soil moisture conditions for summer crops. The yield forecast was revised upwards, reaching record levels for maize, sunflowers and sugar beets. Current topsoil conditions are favourable for the sowing of rapeseed.

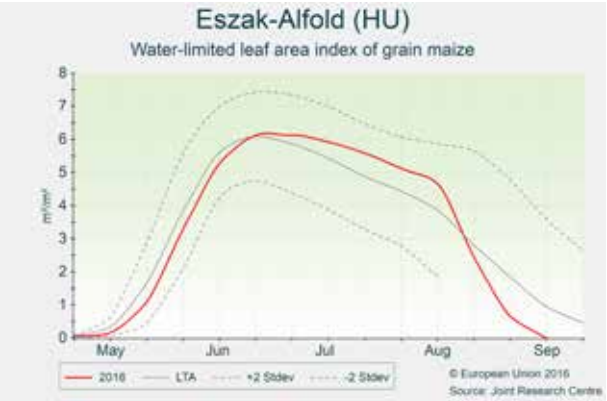
Temperatures during the first days of August typically fluctuated above the average, followed by a sharp drop and a predominance of well below-average temperatures during the second dekad of the month. Warmer-than-usual conditions slowly returned during the last days of August and persisted until mid-September. After the very wet July, precipitation during the first two dekads of August was close to normal and decreased to below-average levels during the rest of the review period, but with no negative effects on the summer crops, which nearly reached maturity.

The continuous favourable water supply and the moderately warm weather conditions delayed the start of canopy senescence of maize. Soil moisture levels exceeded the average during the whole growing season, and our model simulations indicate exceptionally high biomass accumulation and yields for maize, sunflowers and sugar beets. The yield forecasts for all these crops was revised upwards, and are now at record levels. The forecast for potatoes is slightly lower than last month's forecast due to their sensitivity to the heat waves that occurred in June and the overly wet conditions of July, but is still very good. Conditions were also favourable for the harvesting of potatoes and sunflowers, which started in late August. The drier topsoil conditions since then were also adequate for the soil preparation and sowing of rapeseed.









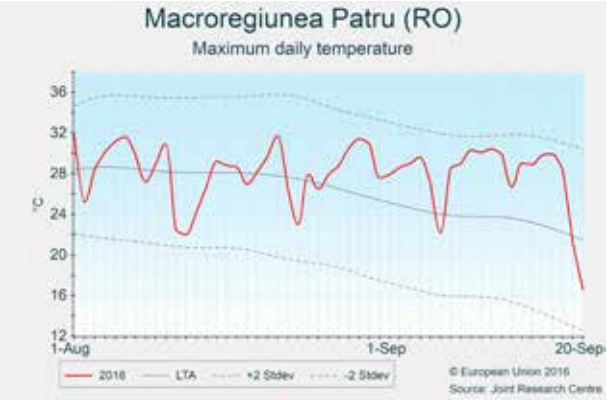
Romania

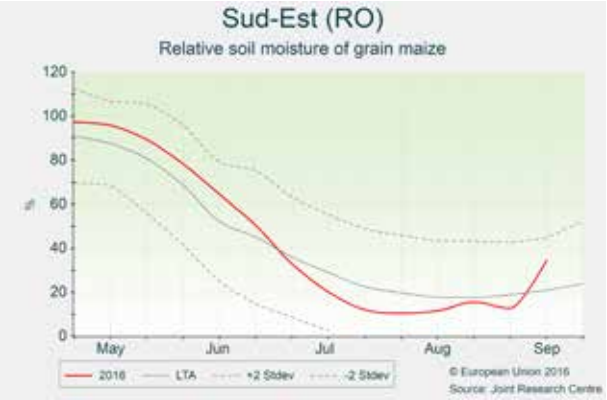
Drought reduced yield expectations

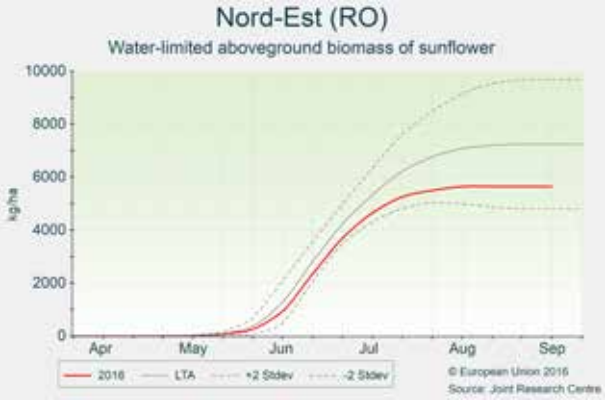
Inadequate water supply conditions in July and August had a negative impact on the yield formation of summer crops in southern and eastern Romania. Our yield forecasts were revised downwards.

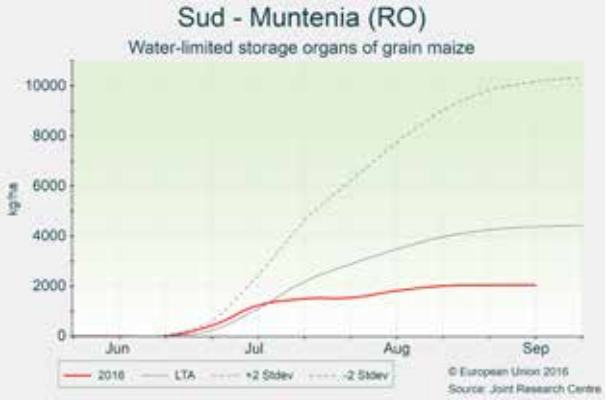
Daily mean temperatures mostly fluctuated above the long-term average during the review period, with the exception of the second dekad of August when an abrupt cooling occurred with below-seasonal temperatures. The number of hot days exceeded the seasonal average by 10 to 20 days in eastern and southern areas, whereas they were near average in the rest of the country. Western Romania experienced near-average rainfall, though the precipitation tendency decreased after mid-August. In the eastern and southern regions, summer crops started to be affected by drought in early July due to high evaporative demand and sparse rainfall since mid-June. Considerable precipitation (40-120 mm) eased the water deficiency during the last two dekads of August and after mid-September in these areas, but this was too late to improve the summer crop conditions.

In western Romania, the crop water supply conditions were favourable throughout the review period, but the soil moisture content remained below average in the most badly affected south-eastern regions until early September. The impact of soil moisture deficiency on the yield formation of maize and sunflowers was particularly explicit in the Sud-Est, Sud-Muntenia and the eastern half of the Macroregiunea Patru regions. On balance, for the country as a whole, notable yield losses are expected for all summer crops. Consequently, our yield outlook was revised downwards. The latest rainfall around mid-September caused some delay to the harvest, but supported the emergence of winter rapeseed.









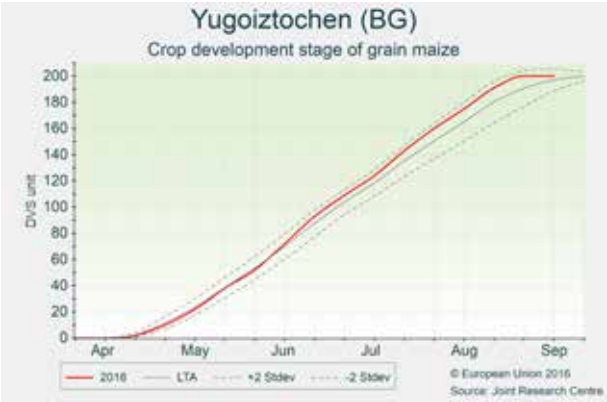
Bulgaria

Rains arrived too late for summer crops

Warm weather conditions, inadequate water supply and above-average evaporative demand constrained the yield formation of maize and sunflowers in Bulgaria. Rainfall arrived after 10 August but did not significantly improve the yield outlook, as these crops had already reached the late grain-filling phase. Our previous pessimistic yield forecast for sunflowers and grain maize is maintained.

Daily mean temperatures predominantly exceeded the average during the review period (1 August-20 September) except for a significantly colder-than-usual period of a few days around mid-August. The number of hot days (Tmax > 30 °C) exceeded the seasonal average by 6 to 12 days. In several places in Bulgaria, the period between 15 June and 15 September was one of the driest on our records. During the review period, significant precipitation (10-70 mm) in the main agricultural areas occurred only in the last two dekads of August. Most of Yuzhen Tsentralen region and some smaller areas also remained rainless in this period.

Soil moisture levels fell quickly in June. The inadequate water supply for summer crops started to impact biomass accumulation and yield formation from July onwards, and led to early senescence of the crop canopy. The rainfall of August arrived late and was insufficient to restore soil water levels or ease the negative effect of the drought. Phenological development of summer crops has been advanced by one to two weeks due to the warm weather conditions during most of the growing cycle. Therefore, an early harvest is expected this year. Our yield outlook is negative, and remains below both last year's level and the five-year average.

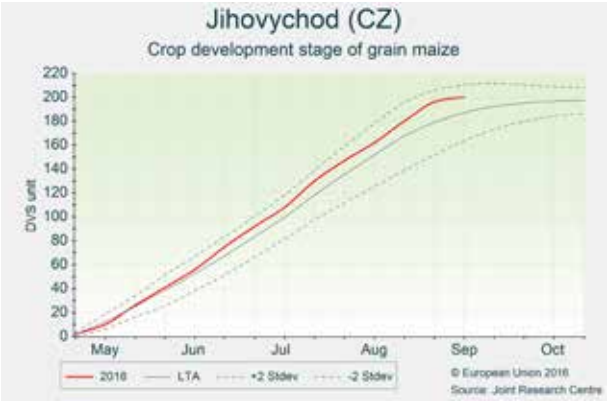


Austria, Slovakia and the Czech Republic

Weather conditions beneficial for summer crops

Weather conditions were generally favourable for crop growth and development. The yield forecasts for summer crops have been slightly increased due to the absence of drought and heat stress during the grain-filling period.

Normal temperature conditions in August were followed by substantially warmer-than-usual conditions in the first two dekads of September, when it was generally 2-6 °C warmer than usual and maximum temperatures exceeded 30 °C in western Slovakia, eastern Austria and the western part of the Czech Republic. Wetter-than-usual weather conditions prevailed in many parts of Austria and Slovakia, with rainfall cumulates exceeding 100 mm. The Czech Republic experienced drier-than-usual conditions in the east and normal rainfall conditions in the western half of the country. Summer crop development is advanced, mainly due to the unusually warm first two dekads of September. Grain maize is approaching maturity. The lack of drought and heat stress during the analysis period provided favourable conditions for grain maize, sunflowers and sugar beets. The yield forecast has therefore been revised upwards, with the exception of sugar beet yields in the Czech Republic, for which the forecast was revised slightly downwards due to the lack of rainfall in the central part of the country.

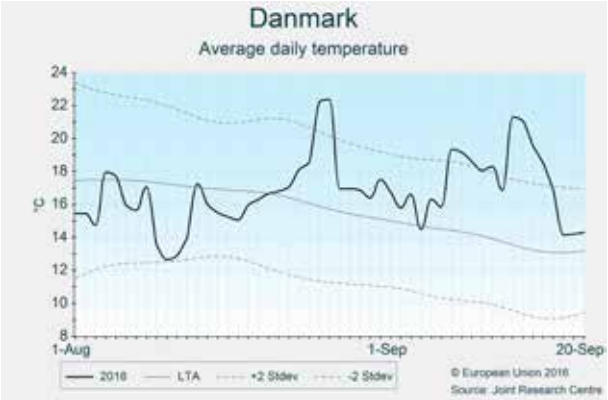


Denmark and Sweden

Low yields for cereals and rapeseed

During the period after 20 August, temperatures were above average with just a few rainfall events. This provided a convenient window for harvesting which had been delayed in both countries because of the preceding rainy period. Low yields are reported for cereals and rapeseed.

In both Denmark and Sweden, colder-than-usual temperatures prevailed during the first two dekads of August. The same period was characterised by frequent rainfall, causing delays to ripening and the start of the cereal harvest. After 20 August, temperatures increased gradually and remained above the long-term average. Rainfall events became less frequent, and after the first days of September it remained practically dry. The period following 20 August was convenient for the harvesting activities in both countries. The harvesting of wheat, barley, triticale and rye was completed by the first days of September in both countries. Recorded yields are well below last year's high levels. This is the result of an unusual growing season characterised by extended spring sowing (from late March to the beginning of May) and frequent rainfall events that occurred when crops were ready to be harvested. Our yield forecasts for the aforementioned crops is based on scenario analyses and are unchanged or revised slightly downwards compared to our last bulletin. The harvesting of rapeseed was completed by the end of August with low yields, and the forecasts of our last bulletin are maintained.

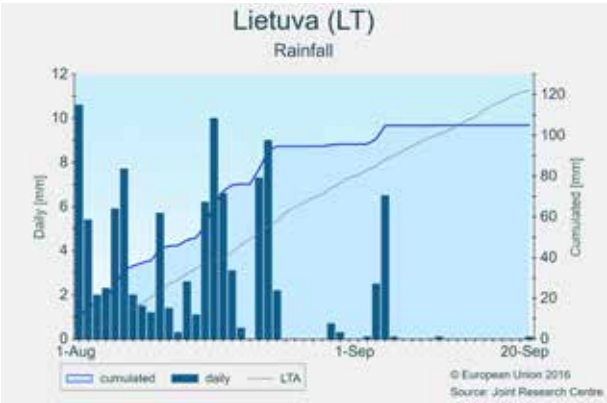


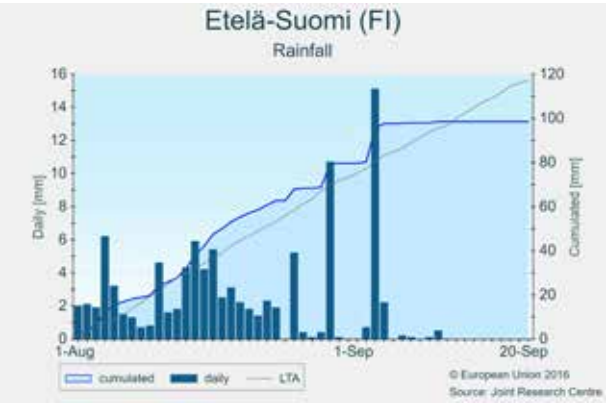
Finland, Lithuania, Latvia and Estonia

Harvest hampered by frequent rainfall

Continuous rainfall since the beginning of August created obstacles to harvesting activities and decreased both grain quality and yields in the Baltics. Nevertheless, almost all crops still present above-average yields in all countries. Yield prospects are good for sugar beet, maize and potato crops.

From 1 to 23 August, the weather was marked by persistent and heavy rains, especially in the Baltic countries. In the latter, cumulated rainfall was double that of the long-term average. In Finland, the precipitation regime was closer to seasonal values in southern regions (Etelä-Suomi) and more than 60 % above the average in central areas. Temperatures tend to be below average, contributing to decreased evapotranspiration and persistent wet conditions. Due to this, farmers have encountered serious difficulties to harvesting this year, mainly in the Baltics: oversaturated soils were almost inaccessible by mechanical means, frequent rains hampered field work, and persistent humid conditions resulted in a decrease in both qualitative and quantitative grain. However, since yield expectations were high, forecasts still remain above or slightly above the five-year average for most crops in the Baltics and Finland. On the other hand, the wet conditions were favourable for the late-sown crops (sugar beets, potatoes and maize), and forecasts remain above the five-year average. Since 24 August, weather conditions changed, bringing warmer-than-usual conditions and sparse rains to all countries. This helped to complete the harvesting field work (almost finished) and to start the sowing of winter crops (rapeseed, rye, wheat and triticale), which is delayed this year. Nevertheless, moderate rainfall in the coming weeks would be very beneficial for the optimal germination and establishment of winter crops.



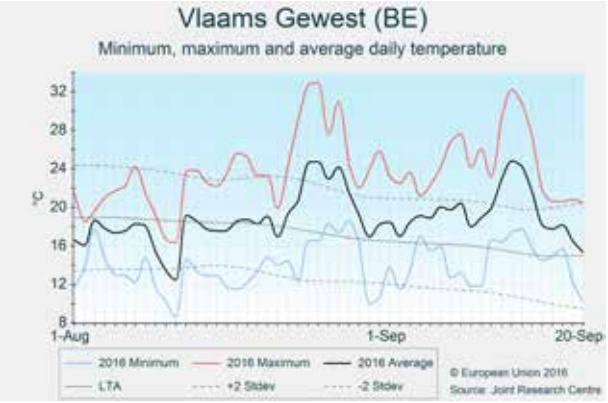


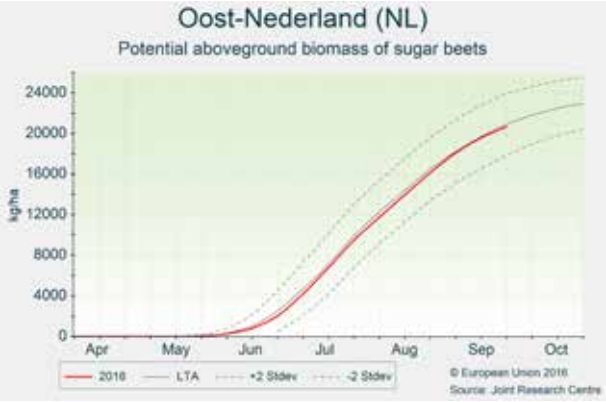
Belgium, the Netherlands and Luxembourg

Unusually warm end of season

Warm, relatively dry and sunny weather allowed for a quick finish to the harvesting of winter crops, but hampered the harvesting of potatoes due to dry topsoils. The yield forecast for summer crops is more or less maintained.

After a colder-than-usual first dekad of August and around average temperatures in the second dekad, temperatures remained practically uninterruptedly above the seasonal average until the end of the review period. Maximum temperatures exceeding 30 °C were common between 23 and 28 August and from 12 to 15 September; the latter representing record levels for mid-September. Rain events were frequent in the first dekad of August, which was followed by periods of longer dry intervals and shorter periods of rainfall events of moderate intensity. As a consequence, rainfall cumulates for the period as a whole were well below average, with a strong South-North gradient in the anomaly: by about 80 mm in Luxembourg to around 30 mm in Noord- and West Nederland. Radiation was significantly higher than average throughout the region. September was particularly sunny. These weather conditions allowed the harvesting of winter cereals to be finished quickly in the second half of August, after a difficult start (as reported in the previous bulletin). Sugar beets generally fared well, and the dry and sunny conditions were particularly favourable for sugar accumulation. Maize crops also benefited from the high radiation levels, but this could largely be offset by a shortened grain-filling period due to the unusually high temperatures and water stress in drought-prone areas. The warm conditions were not beneficial for potatoes, and harvesting of which is hampered due to dry topsoil conditions in many areas. The yield outlook for each of these crops varies strongly, especially depending on the local (in many places excessively wet) conditions at the beginning of the season. Our yield forecast remains practically unchanged compared to the last bulletin.



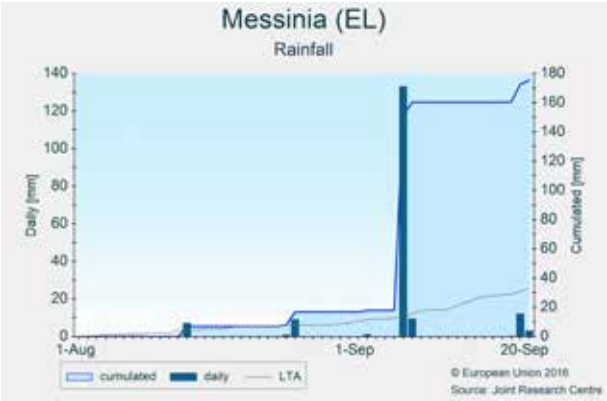


Greece and Cyprus

Intense rainfall caused floods

Since the beginning of August, temperatures fluctuated mainly above the long-term average. Rainfall in August was average, but very intense rains occurred on 6 September, and many flood occurrences were recorded across the mainland. In Cyprus, temperatures were consistently above the long-term average, but rainfall was scarce.

Above-average temperatures predominated in the period under review, with the exception of three to four days in mid-August which were cooler than usual. Nevertheless, maximum temperatures did not reach extreme values. Most regions (i.e. except East Macedonia and Trace and Crete) presented above-average rainfall in August, with several beneficial rainfall events especially in the central-southern regions of the country. Early varieties of grain maize reached maturity by the end of August and early September. Harvesting started in some regions but was interrupted on 6 September due to intense rainfall throughout the mainland. Southern regions (e.g. in the Peloponnese) received around 130-140 mm in a few hours, and the central-northern regions received 80-100 mm over two to three days. In some cases, the rain storms were accompanied by hail. Several agricultural areas were flooded, leading to crop damage. Conditions subsequently improved, and it is expected that harvesting will start again soon. The forecasts for grain maize and sunflowers, based on scenario analyses, are revised downwards compared to our last bulletin, whereas the yield forecasts for the other crops are maintained with respect to our last Bulletin. In Cyprus, temperatures in August and the first half of September fluctuated consistently above the long-term average, and cumulated rainfall was well below average.



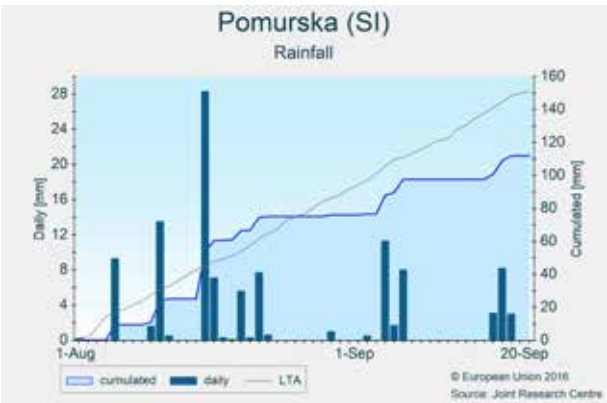
Slovenia and Croatia

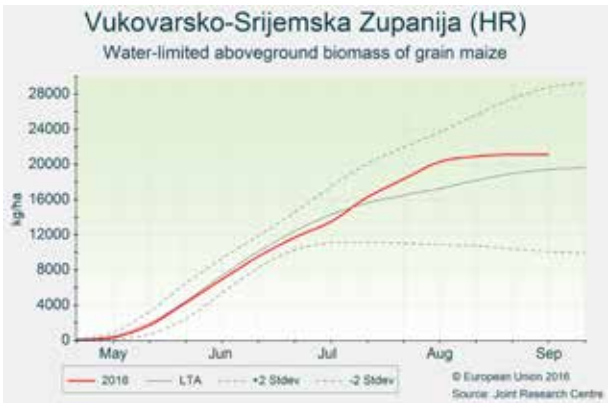
Above-average yield outlook for summer crops

Summer crops benefited from favourable weather conditions during the grain-filling period in the absence of drought and heat stress. The yield outlook has therefore been slightly increased.

Normal temperature conditions in August were followed by substantially warmer-than-usual weather during the first two dekads in September, with temperatures between 2 °C and 6 °C above the long-term average. The number of hot days, with maximum daily temperature above 30 °C, was generally below the seasonal average during the period analysed, except in coastal zones. Rainfall conditions were spatially highly diverse; wetter-than-usual conditions were recorded in northern and north-western Slovenia, as well as several coastal areas in Croatia. However, the main agricultural areas experienced normal or slightly drier-than-usual conditions, with the exception of south-western Slovenia where a substantial rainfall deficit has accumulated since the beginning of August. Rain events in August were commonly in the form of thunderstorms accompanied by hail and strong winds, locally resulting in substantial crop damage.

Warm conditions in September accelerated the development of summer crops, which have reached the ripening or maturity stage. The yield outlook for grain maize has been slightly increased due to generally favourable weather in the absence of drought and heat stress during the grain-filling period. Harvesting has started, with progress mainly depending on the weather in the coming weeks.





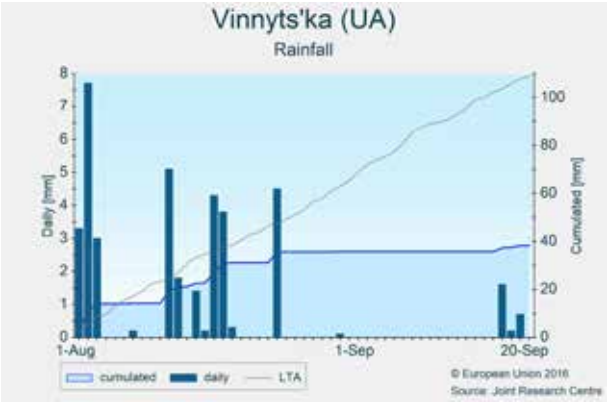
3.2 Black Sea area

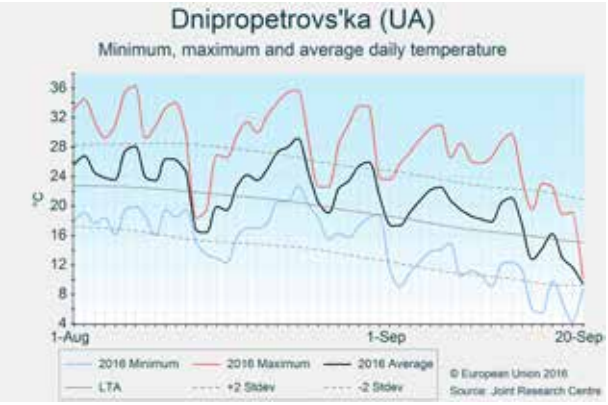
Ukraine

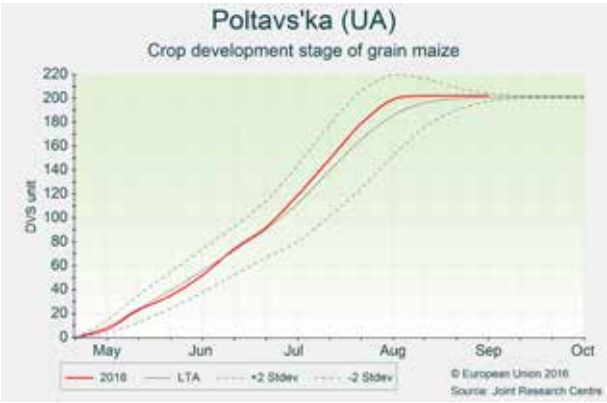
Positive outlook for grain maize

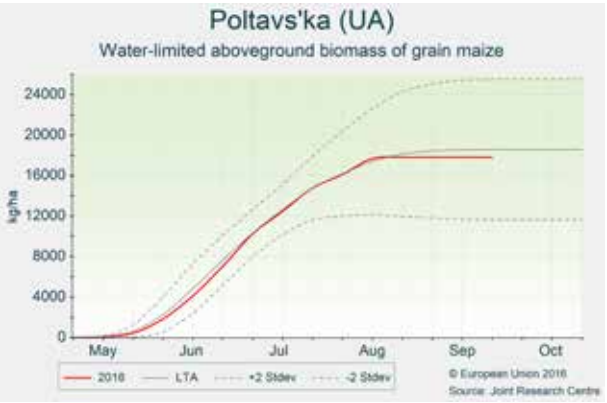
Temperatures remained above average since the beginning of August. A substantial rain deficit was observed in western oblasts. Agro-meteorological conditions were favourable in the main producing oblasts of grain maize, and the yield forecast is well above the five-year average.

Cumulated rainfall since August is unevenly distributed. The Western Oblast had less than 50 % of the average rainfall for the analysis period. There is less of a rain deficit in eastern, central and southern Oblasts, although the eastern half of Dnipropetrovs'ka also received less than 50 % of the average rainfall. Regarding temperatures, the period of analysis is one of the warmest (after 2010 and 2015) on our records, which date back to 1975. Temperatures were 2 °C above average in southern and western Oblasts and 1.5 °C above average in other regions. The rain deficit observed this summer in the main grain-maize-producing regions (Kievs'ka, Cherkaks'ka, Poltavs'ka) had no impact on the growth and yield formation of summer crops. As grain maize is advanced compared to an average year, plants were not exposed to water stress during the flowering and early grain-filling stages. In western oblasts, cumulated rainfall since April was much less than usual, and the prolonged rain deficit impacted summer crops. The share of the national production in these oblasts is small and will only have a slight impact on the yield at national scale. Thus the yield forecast of grain maize is well above the -year average but not at record levels due to the dry conditions in the western oblasts







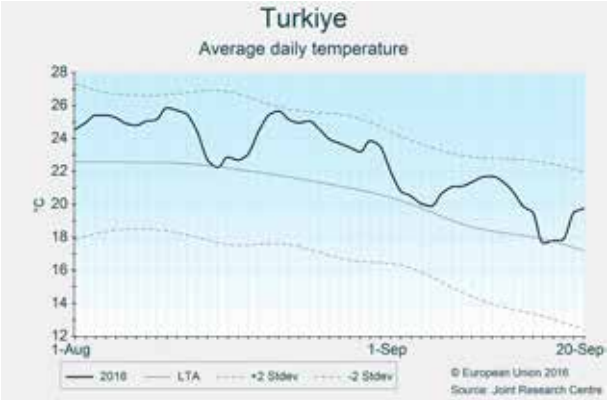


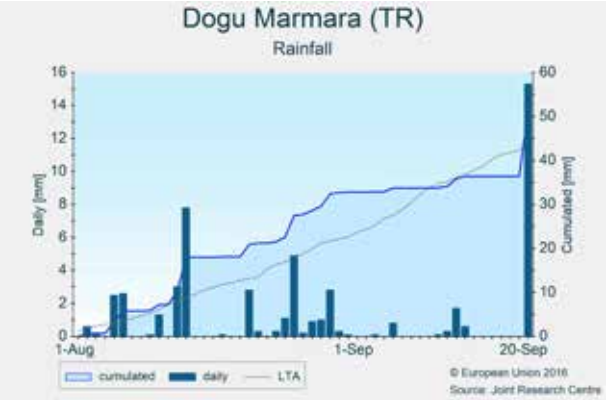
Turkey

Good yield outlook for grain maize

Weather conditions were generally favourable for the grain filling and ripening of grain maize, despite below-average precipitation in most parts of the country. Grain maize reached maturity, and harvesting has started in some areas. The yield forecast is above the five-year average.

During the period under consideration, temperatures fluctuated above the long-term average; only a few days, mainly in the western regions, were cooler than usual. Consequently, this period is ranked as the 7th warmest in our database (since 1975), albeit slightly cooler than in the corresponding periods in 2014 and 2015. Precipitation levels present a mixed picture in the country. The south-western and the Black Sea coastal regions presented above-average rainfall in August, followed by below-average precipitation in September. On the other hand, the regions of Bati Marmara (north-western), Guneydogu Anadolu (south-eastern) and Orta Anadolu (central) received very low levels of precipitation, and the cumulated values since the beginning of August remain far below the average. Grain maize in the southern regions is mainly irrigated and is progressing well, whereas the end of grain filling in the main non-irrigated areas in the north benefited from the August rainfall. Harvesting has already started in several southern regions and is expanding to the northern areas. Overall, the outlook for grain maize is positive and the forecast, based on scenario analyses, is above the five-year average.





3.3 European Russia and Belarus

European Russia

Outstanding yield expectations

Hot and dry weather characterised south-eastern Russia in August. In September, rainfall eased the situation in the Near Volga Okrug, but south-western areas remained dry. The harvest went well in southern Russia, since rainfall hampered the wheat and barley harvest only in northern regions. The yield outlook for grain maize is high.

In August, European Russia experienced warmer-than-usual weather conditions. A very strong positive thermal anomaly (4-7 °C) prevailed in the Southern and Near Volga Okrugs. The warm August accelerated the ripening of the spring cereals in the northern half of Russia. A perceptible cooling started in the last days of the month, and the daily temperatures for September returned close to the seasonal average.

During August, rain was concentrated in the western and northern regions of Russia, while the area between the Black Sea and the Caspian Sea, as well as most of the Near Volga Okrug, typically remained dry receiving less than 30 mm precipitation. In September, plentiful rains (40-80 mm) mitigated the dry soil conditions in Near Volga Okrug, but the water scarcity intensified in the Southern and North Caucasian Okrug.

The yield outlook for wheat and barley is exceptionally good. The dry weather conditions facilitated the good progress of the harvest in the southern regions. The rainy weather temporarily hampered the harvesting of winter and spring cereals only in some regions of the Central and North-western Okrugs. The dry and hot weather in the Near Volga Okrug compromised the biomass accumulation of maize, but grain maize yield expectations are positive at the country level. The sowing campaign of winter cereals is timely so far in the northern and eastern regions, but the current dry topsoil conditions in south-western regions raise some concern about the timely sowing and emergence of winter cereals.

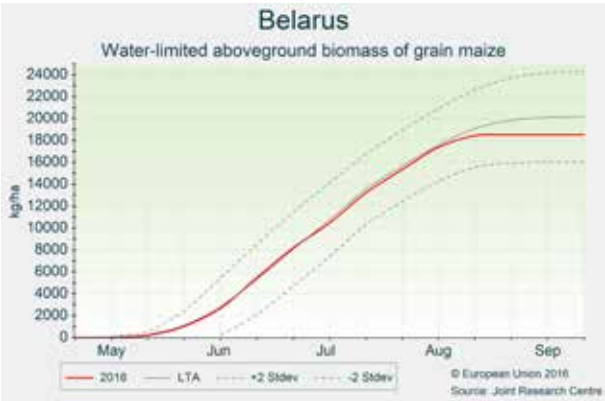
Belarus

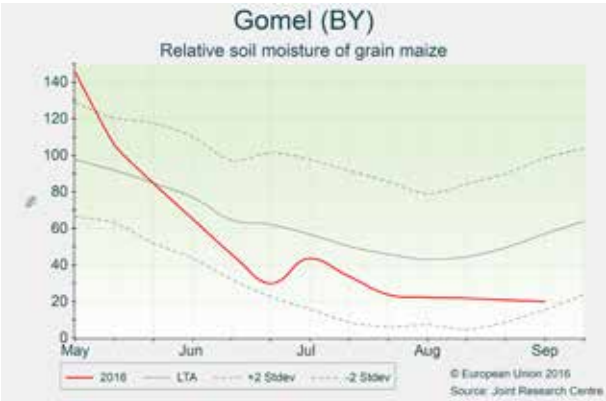
Grain maize yield forecast slightly reduced

The warm weather favourably accelerated the development of grain-maize crops. The soil moisture was below average, but mostly sufficient during the flowering and early grain-filling period.

Warmer-than-usual thermal conditions prevailed throughout Belarus during the review period (1 August-20 September). After the abundant rains of July, the precipitation tendency decreased, which led to a rain deficit of 40-70 mm in southern regions (since 1 August, compared to the seasonal average). The drier weather supported the successful completion of the winter wheat and spring barley harvests.

The warm weather favourably accelerated the development of grain-maize crops. The soil moisture was below average, but mostly sufficient during the flowering and early grain-filling period. Our model simulations indicate that soil water supply to crops is only affected in the Gomel region. The yield forecast for grain maize was slightly decreased to just below the five-year average.





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	**5.40**	5.60	- 10.5	- 3.6	5.02	**4.77**	4.72	- 5.1	+ 1.0
AT	5.70	**5.76**	5.39	+ 1.1	+ 6.7	5.54	**5.61**	5.38	+ 1.4	+ 4.3
BE	9.36	**7.80**	8.83	- 16.7	- 11.7	9.28	**7.90**	8.62	- 14.9	- 8.4
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	**4.87**	4.93	- 10.5	- 1.3
DE	8.09	**7.77**	7.81	- 4.0	- 0.6	7.17	**6.68**	6.61	- 6.8	+ 1.1
DK	7.95	**7.15**	7.34	- 10.1	- 2.7	6.11	**5.21**	5.78	- 14.8	- 9.9
EE	4.79	**3.81**	3.82	- 20.4	- 0.4	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	**5.52**	7.20	- 29.1	- 23.3	7.09	**5.46**	6.49	- 22.9	- 15.8
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	**9.84**	9.23	- 7.7	+ 6.7	8.58	**8.15**	7.71	- 5.0	+ 5.6
IT	3.93	**3.96**	3.89	+ 0.8	+ 1.8	3.91	**3.85**	3.72	- 1.7	+ 3.4
LT	5.24	**4.50**	4.53	- 14.0	- 0.5	4.00	**3.45**	3.46	- 13.8	- 0.4
LU	6.28	**6.44**	6.05	+ 2.4	+ 6.4	-	**-**	-	-	-
LV	5.03	**4.11**	3.90	- 18.4	+ 5.4	3.83	**2.72**	2.93	- 29.1	- 7.2
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	9.04	**8.88**	8.88	- 1.7	+ 0.0	6.43	**6.25**	6.66	- 2.8	- 6.2
PL	4.57	**4.26**	4.44	- 6.9	- 4.0	3.53	**3.60**	3.62	+ 2.1	- 0.5
PT	2.01	**2.30**	1.61	+ 14.2	+ 43.2	2.10	**2.32**	1.72	+ 10.6	+ 35.1
RO	3.82	**3.92**	3.44	+ 2.6	+ 13.8	3.45	**3.55**	3.10	+ 2.7	+ 14.5
SE	7.21	**6.65**	6.34	- 7.9	+4.8	5.25	**4.71**	4.80	- 10.1	- 1.9
SI	5.11	**5.06**	5.08	- 1.0	-0.4	4.63	**4.88**	4.56	+ 5.3	+ 7.1
SK	5.53	**4.95**	4.68	- 10.6	+ 5.7	4.82	**4.37**	4.10	- 9.4	+ 6.5
UK	8.98	**8.08**	7.89	- 10.0	+ 2.4	6.69	**6.08**	6.12	- 9.1	- 0.6

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	6.28	**5.63**	5.83	- 10.5	- 3.5	3.49	**3.33**	3.33	- 4.5	+ 0.1
AT	5.77	**5.82**	5.44	+ 0.9	+ 7.0	4.64	**4.96**	4.53	+ 7.0	+ 9.4
BE	9.36	**7.80**	8.83	- 16.7	- 11.7	-	**-**	-	-	-
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	**7.78**	7.83	- 4.0	- 0.5	4.64	**5.61**	5.23	+ 20.7	+ 7.1
DK	7.95	**7.15**	7.34	- 10.1	- 2.7	-	**-**	-	-	-
EE	4.79	**3.81**	3.82	- 20.4	- 0.4	-	**-**	-	-	-
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	**5.62**	7.34	- 29.0	- 23.4	5.62	**4.04**	5.25	- 28.1	- 23.1
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	**9.84**	9.23	- 7.7	+ 6.7	-	**-**	-	-	-
IT	5.41	**5.63**	5.43	+ 4.0	+ 3.6	3.31	**3.30**	3.18	- 0.3	+ 3.7
LT	5.24	**4.50**	4.53	- 14.0	- 0.5	-	**-**	-	-	-
LU	6.28	**6.44**	6.05	+ 2.4	+ 6.4	-	**-**	-	-	-
LV	5.03	**4.11**	3.90	- 18.4	+ 5.4	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	9.04	**8.88**	8.88	- 1.7	+ 0.0	-	**-**	-	-	-
PL	4.57	**4.26**	4.44	- 6.9	- 4.0	-	**-**	-	-	-
PT	2.01	**2.30**	1.61	+ 14.2	+ 43.2	-	**-**	-	-	-
RO	3.82	**3.92**	3.44	+ 2.6	+ 13.8	-	**-**	-	-	-
SE	7.21	**6.65**	6.34	- 7.9	+ 4.8	-	**-**	-	-	-
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	**8.08**	7.89	- 10.0	+ 2.4	-	**-**	-	-	-

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	**4.20**	4.12	+ 0.6	+ 1.9	6.13	**5.51**	5.57	- 10.1	- 1.2
AT	4.92	**4.37**	4.66	- 11.2	- 6.2	5.99	**6.33**	5.99	+ 5.7	+ 5.6
BE	-	-	-	-	-	9.28	**7.90**	8.62	- 14.9	- 8.4
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	**6.98**	6.92	- 9.2	+ 0.8
DK	5.96	**5.05**	5.67	- 15.3	- 11.0	6.76	**6.09**	6.31	- 9.9	- 3.4
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	**5.10**	5.97	- 21.5	- 14.5	7.30	**5.58**	6.69	- 23.5	- 16.6
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	**7.36**	7.21	- 4.7	+ 2.0	10.21	**9.37**	9.31	- 8.2	+ 0.7
IT	-	-	-	-	-	3.91	**3.85**	3.72	- 1.7	+ 3.4
LT	4.00	**3.45**	3.46	- 13.8	- 0.4	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-
LV	3.83	**2.72**	2.93	- 29.1	- 7.2	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	6.43	**6.25**	6.66	- 2.8	- 6.2	-	-	-	-	-
PL	3.30	**3.51**	3.49	+ 6.3	+ 0.5	4.13	**3.97**	4.10	- 3.8	- 3.2
PT	-	-	-	-	-	2.10	**2.32**	1.72	+ 10.6	+ 35.1
RO	2.38	**2.48**	2.35	+ 4.2	+ 5.6	3.90	**3.96**	3.40	+ 1.4	+ 16.3
SE	5.20	**4.65**	4.76	- 10.5	- 2.3	6.18	**5.71**	5.86	- 7.6	- 2.5
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	**5.67**	5.71	- 6.3	- 0.7	7.65	**6.83**	6.86	- 10.7	- 0.4

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	6.31	**6.84**	6.93	+ 8.5	- 1.3	4.00	**3.71**	3.75	- 7.1	- 1.1
AT	8.68	**11.12**	9.98	+ 28.1	+ 11.4	4.32	**4.58**	4.40	+ 5.8	+ 4.1
BE	11.87	**11.61**	10.96	- 2.2	+ 5.9	-	-	-	-	-
BG	5.41	**5.09**	5.62	- 5.9	- 9.4	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-
CZ	5.54	**8.27**	7.64	+ 49.4	+ 8.2	4.91	**5.10**	4.84	+ 4.0	+ 5.4
DE	8.72	**9.45**	9.95	+ 8.4	- 5.0	5.67	**5.65**	5.50	- 0.4	+ 2.7
DK	-	-	-	-	-	6.33	**5.93**	6.08	- 6.2	- 2.5
EE	-	-	-	-	-	3.83	**3.12**	3.00	- 18.4	+ 4.1
ES	11.30	**11.26**	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	**7.65**	9.11	- 8.5	- 16.1	4.71	**4.41**	4.84	- 6.5	- 8.9
GR	11.22	**11.12**	11.37	- 0.9	- 2.2	2.05	**1.91**	2.03	- 6.8	- 5.9
HR	6.49	**7.55**	6.01	+ 16.2	+ 25.5	-	-	-	-	-
HU	5.69	**7.98**	5.77	+ 40.2	+ 38.2	2.79	**2.77**	2.66	- 0.6	+ 4.3
IE	-	-	-	-	-	-	-	-	-	-
IT	9.72	**9.67**	9.28	- 0.5	+ 4.3	-	-	-	-	-
LT	4.81	**7.12**	6.38	+ 47.9	+ 11.5	2.78	**2.42**	2.37	- 12.9	+ 2.3
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	4.28	**3.32**	3.22	- 22.3	+ 3.3
MT	-	-	-	-	-	-	-	-	-	-
NL	10.82	**12.15**	10.79	+ 12.3	+ 12.7	-	-	-	-	-
PL	4.71	**6.68**	6.15	+ 42.0	+ 8.6	2.78	**2.69**	2.82	- 3.2	- 4.7
PT	8.45	**8.43**	8.30	- 0.3	+ 1.5	0.86	**0.95**	0.86	+ 11.2	+ 10.6
RO	3.19	**3.20**	3.80	+ 0.3	- 15.8	-	-	-	-	-
SE	-	-	-	-	-	6.34	**5.97**	6.02	- 5.8	- 0.8
SI	8.96	**8.65**	7.85	-3 .4	+ 10.1	-	-	-	-	-
SK	4.84	**7.26**	6.04	+ 50.1	+ 20.2	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	**4.12**	4.20	- 0.5	- 2.0	3.34	**3.20**	3.20	- 4.2	+ 0.0
AT	5.29	**5.62**	5.26	+ 6.4	+ 6.9	2.98	**3.03**	3.23	+ 1.8	- 6.2
BE	-	**-**	-	-	-	4.28	**4.00**	4.37	- 6.6	-8.5
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	**5.06**	5.41	- 1.3	- 6.5	4.28	**3.68**	3.94	- 14.1	- 6.7
EE	-	**-**	-	-	-	2.77	**2.32**	2.03	- 16.2	+ 14.5
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	**4.98**	5.30	- 8.0	- 6.1	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	**3.39**	3.31	- 11.8	+ 2.3	3.13	**2.56**	2.25	- 18.4	+ 13.4
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	3.33	**2.50**	2.31	- 25.1	+ 8.1
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	-	**-**	-	-	-
PL	3.52	**3.43**	3.58	- 2.7	- 4.3	2.85	**2.62**	2.80	- 8.1	- 6.4
PT	1.69	**1.94**	1.39	+ 14.8	+ 39.9	-	**-**	-	-	-
RO	3.48	**3.78**	3.37	+ 8.7	+ 12.2	2.51	**2.73**	2.29	+ 9.0	+ 19.3
SE	5.81	**5.56**	5.50	- 4.3	+ 1.1	3.80	**3.42**	3.06	- 10.1	+ 11.8
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	-	**-**	-	-	-	2.69	**2.86**	2.64	+ 6.6	+ 8.5
UK	4.78	**4.02**	4.11	- 15.9	- 2.3	3.56	**3.30**	3.49	- 7.3	- 5.5

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	**73.50**	71.80	+ 2.5	+ 2.4	32.13	**32.13**	32.08	+ 0.0	+ 0.1
AT	62.80	**77.31**	70.59	+ 23.1	+ 9.5	26.34	**32.63**	31.37	+ 23.9	+ 4.0
BE	85.08	**78.25**	77.81	- 8.0	+ 0.6	46.58	**43.00**	47.82	- 7.7	- 10.1
BG	-	**-**	-	-	-	14.95	**13.07**	13.51	- 12.6	- 3.3
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	59.38	**66.14**	64.00	+ 11.4	+ 3.3	22.26	**26.03**	26.72	+ 16.9	- 2.6
DE	72.17	**73.73**	71.85	+ 2.2	+ 2.6	43.81	**43.99**	44.29	+ 0.4	- 0.7
DK	66.90	**64.75**	63.97	- 3.2	+ 1.2	42.10	**41.97**	41.02	- 0.3	+ 2.3
EE	-	**-**	-	-	-	-	**-**	-	-	-
ES	95.30	**97.68**	89.32	+ 2.5	+ 9.4	31.14	**32.19**	30.59	+ 3.4	+ 5.2
FI	32.74	**37.97**	36.65	+ 16.0	+ 3.6	24.31	**27.11**	26.30	+ 11.5	+ 3.1
FR	87.50	**88.23**	89.15	+ 0.8	- 1.0	42.50	**40.00**	44.23	- 5.9	- 9.6
GR	-	**-**	-	-	-	24.25	**25.66**	25.31	+ 5.8	+ 1.4
HR	54.49	**63.06**	52.45	+ 15.7	+ 20.2	17.06	**17.80**	16.81	+ 4.3	+ 5.9
HU	57.66	**69.16**	53.96	+ 19.9	+ 28.1	22.65	**27.28**	24.19	+ 20.4	+ 12.8
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	57.01	**57.84**	55.93	+ 1.4	+ 3.4	27.55	**27.36**	26.09	- 0.7	+ 4.9
LT	50.61	**53.38**	51.70	+ 5.5	+ 3.3	17.00	**17.11**	16.23	+ 0.6	+ 5.4
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	20.12	**19.85**	18.33	- 1.4	+ 8.3
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	83.30	**81.86**	81.21	- 1.7	+ 0.8	42.69	**42.50**	44.08	- 0.4	- 3.6
PL	52.00	**53.45**	52.79	+ 2.8	+ 1.3	21.70	**22.62**	22.27	+ 4.2	+ 1.6
PT	-	**-**	-	-	-	18.62	**19.31**	17.84	+ 3.7	+ 8.2
RO	39.40	**43.87**	36.73	+ 11.3	+ 19.4	14.37	**14.81**	14.92	+ 3.1	- 0.7
SE	60.80	**64.66**	63.46	+ 6.3	+ 1.9	34.73	**33.23**	33.42	- 4.3	- 0.6
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	56.01	**65.34**	55.28	+ 16.6	+ 18.2	-	**-**	-	-	-
UK	66.50	**70.27**	70.19	+ 5.7	+ 0.1	40.20	**42.80**	39.91	+ 6.5	+ 7.2

Country	SUNFLOWER t/ha					GREEN MAIZE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	1.87	**1.97**	1.94	+ 5.4	+ 1.9	38.78	**42.13**	42.72	+ 8.6	- 1.4
AT	2.00	**2.76**	2.47	+ 38.4	+ 11.9	41.39	**47.88**	44.63	+ 15.7	+ 7.3
BE	-	-	-	-	-	-	-	-	-	-
BG	2.11	**2.11**	2.12	- 0.2	- 0.6	19.00	**19.25**	18.76	+ 1.3	+ 2.6
CY	-	-	-	-	-	-	-	-	-	-
CZ	2.05	**2.38**	2.29	+ 16.2	+ 3.9	29.13	**37.86**	36.54	+ 30.0	+ 3.6
DE	1.92	**1.98**	2.14	+ 3.4	- 7.4	41.36	**45.95**	44.35	+ 11.1	+ 3.6
DK	-	-	-	-	-	37.56	**40.73**	37.62	+ 8.4	+ 8.2
EE	-	-	-	-	-	-	-	-	-	-
ES	0.94	**1.07**	1.07	+ 14.6	- 0.1	43.91	**43.65**	41.40	- 0.6	+ 5.4
FI	-	-	-	-	-	-	-	-	-	-
FR	1.96	**2.14**	2.25	+ 9.1	- 5.1	38.37	**35.24**	42.94	- 8.1	- 17.9
GR	2.71	**2.45**	2.53	- 9.5	- 3.2	-	-	-	-	-
HR	2.73	**2.49**	2.54	- 8.6	- 1.9	32.80	**38.39**	32.14	+ 17.0	+ 19.4
HU	2.51	**2.89**	2.42	+ 15.2	+ 19.1	23.41	**30.71**	24.84	+ 31.2	+ 23.6
IE	-	-	-	-	-	-	-	-	-	-
IT	2.17	**2.21**	2.23	+ 1.8	- 0.9	48.66	**51.20**	50.79	+ 5.2	+ 0.8
LT	-	-	-	-	-	26.36	**34.57**	33.33	+ 31.1	+ 3.7
LU	-	-	-	-	-	41.17	**48.00**	45.88	+ 16.6	+ 4.6
LV	-	-	-	-	-	28.80	**28.19**	27.73	- 2.1	+ 1.6
MT	-	-	-	-	-	-	-	-	-	-
NL	-	-	-	-	-	36.73	**45.69**	43.14	-	-
PL	-	-	-	-	-	35.70	**46.93**	45.07	-	-
PT	1.03	**0.90**	0.75	- 13.2	+ 19.0	-	-	-	-	-
RO	1.76	**1.72**	1.81	- 2.2	- 4.8	26.95	**24.02**	25.80	- 10.9	- 6.9
SE	-	-	-	-	-	-	-	-	-	-
SI	-	-	-	-	-	48.70	**45.64**	42.10	- 6.3	+ 8.4
SK	2.31	**2.42**	2.33	+ 4.9	+ 3.9	22.95	**29.77**	27.04	+ 29.7	+ 10.1
UK	-	-	-	-	-	-	-	-	-	-

Note: Yields are forecast for crops with more than 10 000 ha per country
Sources: 2011-2016 data come from DG Agriculture short-term Outlook data (dated August 2016, received on 05/09/2016), Eurostat Eurobase (last update: 13/09/2016) and EES (last update: 10/08/2016)
2016 yields come from MARS CROP YIELD FORECASTING SYSTEM (output up to 20/09/2016)
*The EU-28 figures do not include green maize forecasts for Belgium, Ireland, Portugal, Sweden and the United Kingdom since recent data on yields was not available.

Country	WHEAT (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.43	**3.38**	3.47	- 1.4	- 2.5
TR	2.90	**2.69**	2.69	- 7.4	- 0.1
UA	3.88	**4.01**	3.52	+ 3.4	+ 14.0

Country	BARLEY (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.33	**3.51**	3.24	+ 5.3	+ 8.1
TR	2.90	**2.59**	2.65	-1 0.8	- 2.4
UA	2.95	**3.08**	2.57	+ 4.3	+ 19.8

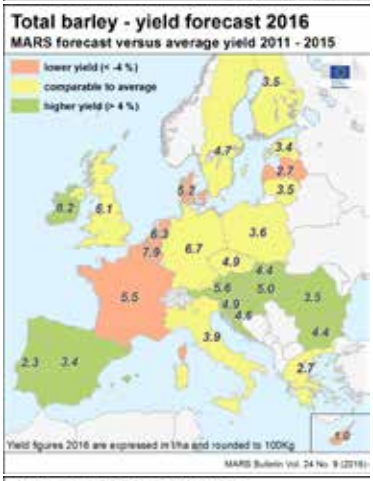
Country	GRAIN MAIZE (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	5.33	**5.31**	5.60	- 0.4	- 5.2
TR	9.30	**9.25**	8.39	- 0.6	+ 10.2
UA	5.71	**6.02**	5.77	+ 5.5	+ 4.3

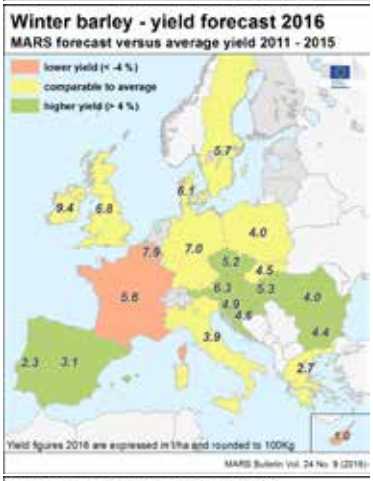
Note: Yields are forecast for crops with more than 10 000 ha per country
Sources: 2011-2015 data come from USDA, State Statistics Service of Ukraine, FAO, Turkish Statistical Office, PSD-online
2016 yields come from MARS CROP YIELD FORECASTING SYSTEM (output up to 20/09/2016)


Total 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 9 (2016)

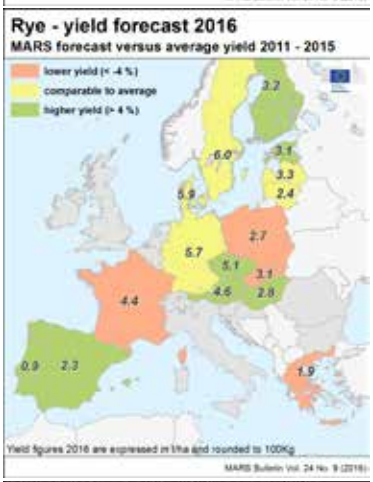

Durum wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)

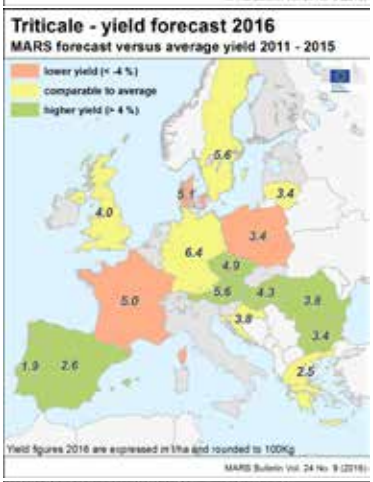

Soft wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)

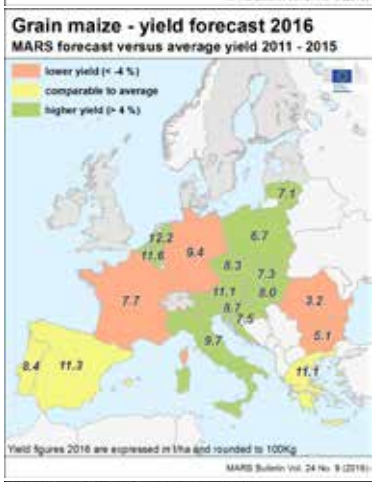

Total barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)

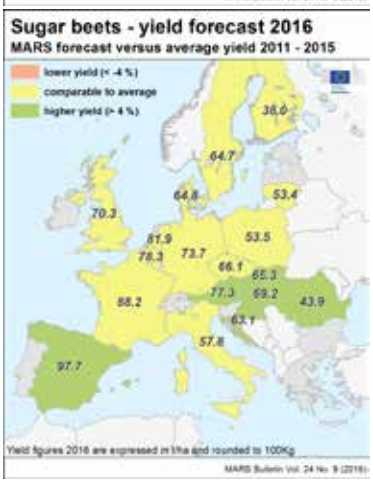

Winter barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)

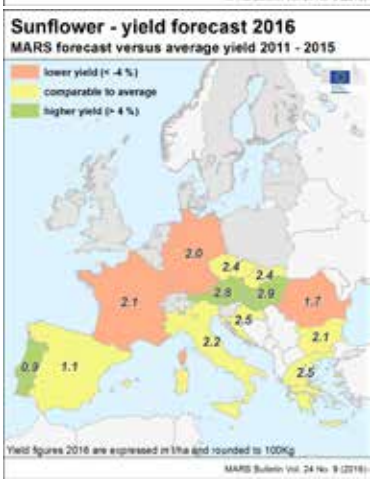

Spring barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)

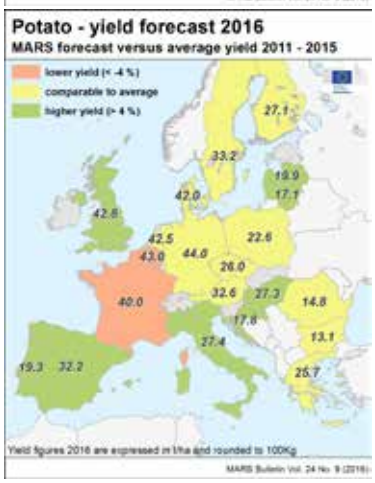

Rye - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg
MARS Bulletin Vol. 24 No 9 (2016)


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 9 (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 9 (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 9 (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 9 (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
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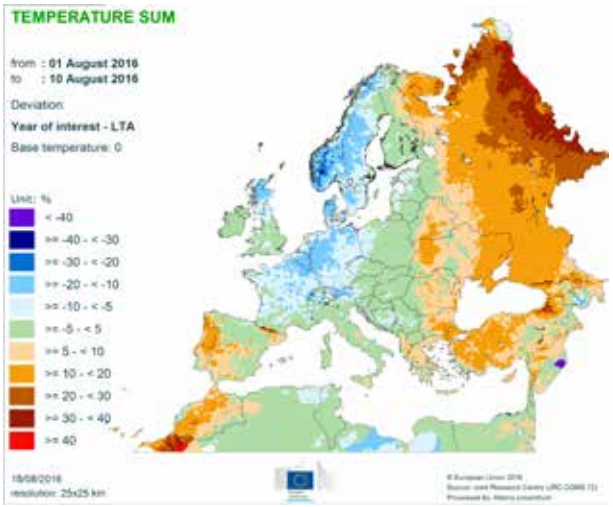
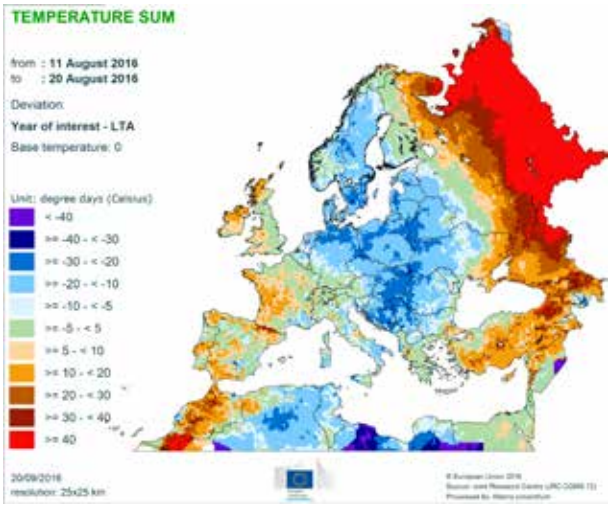
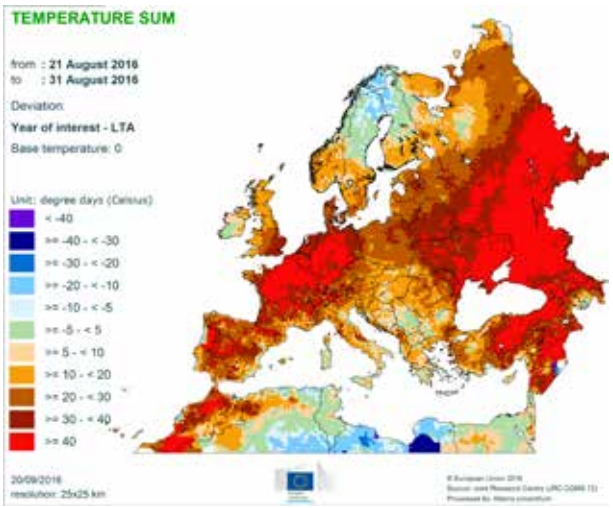
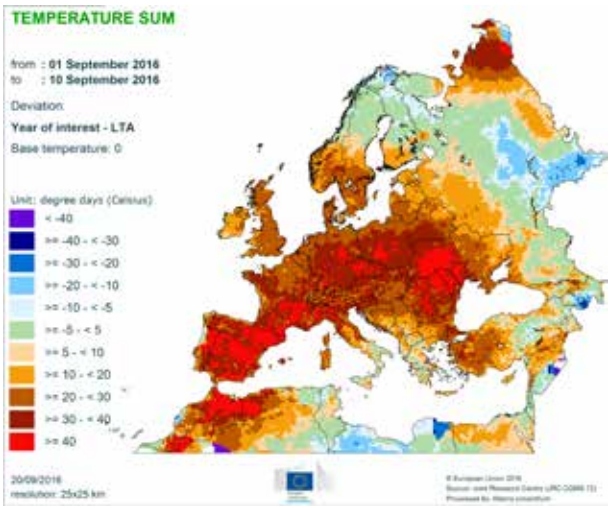
5. Atlas

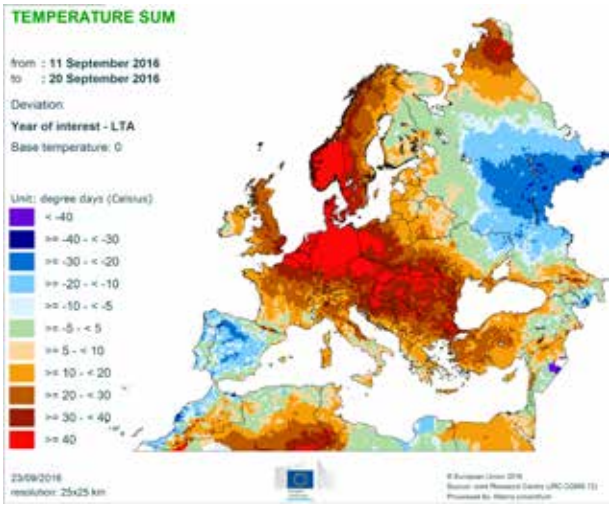
Temperatures

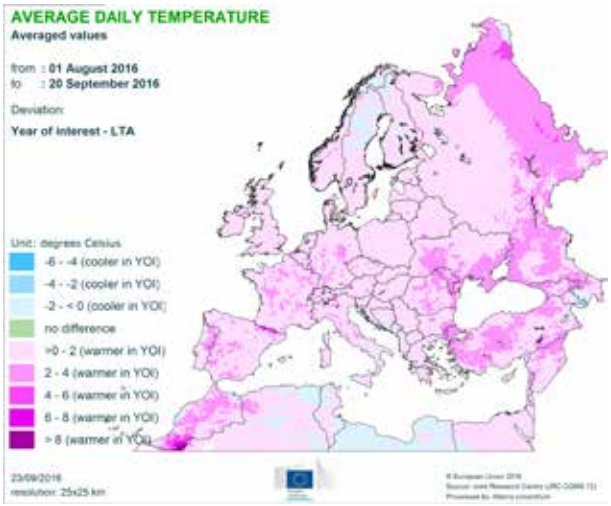




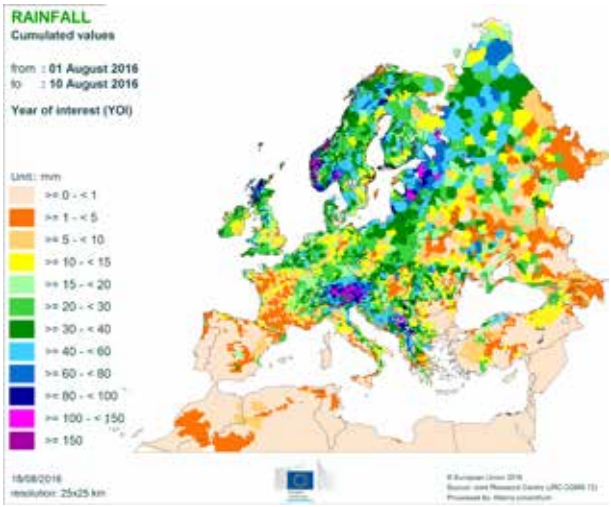


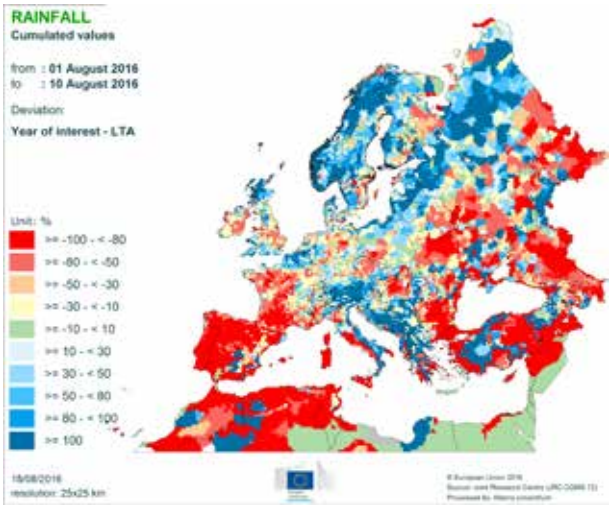


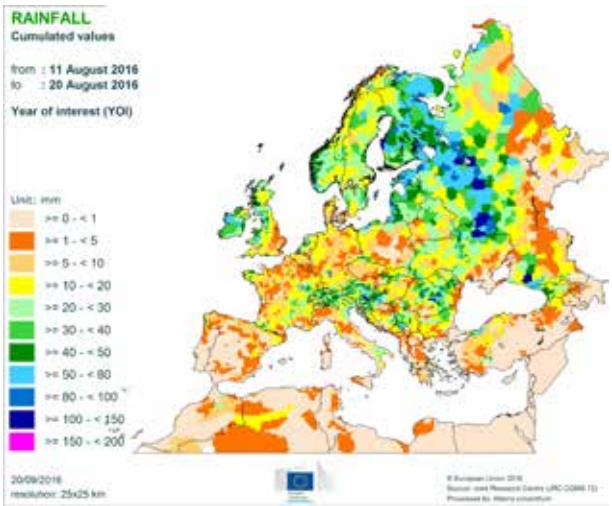


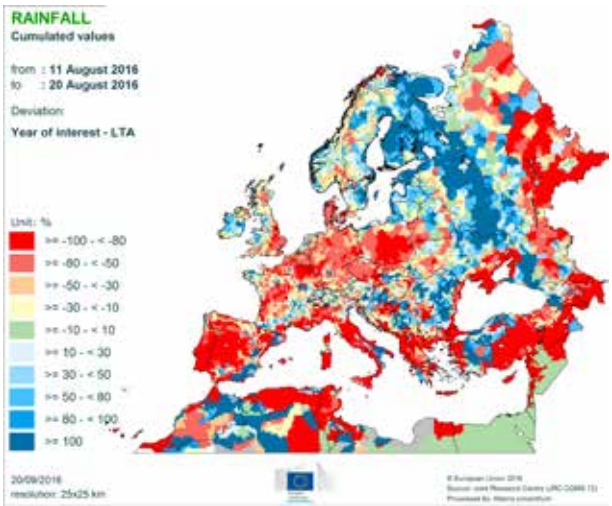


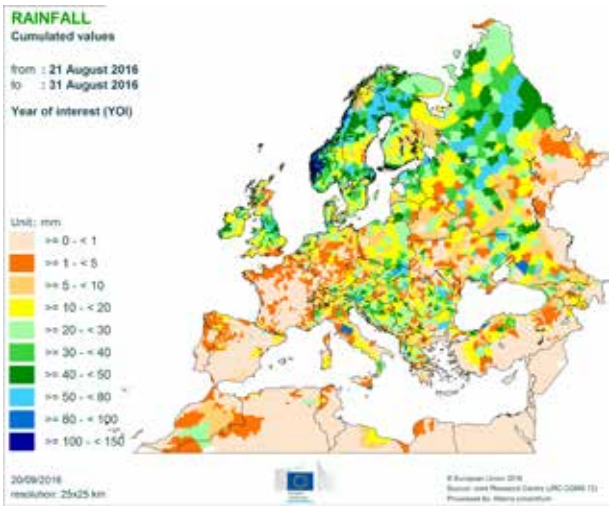
Precipitation

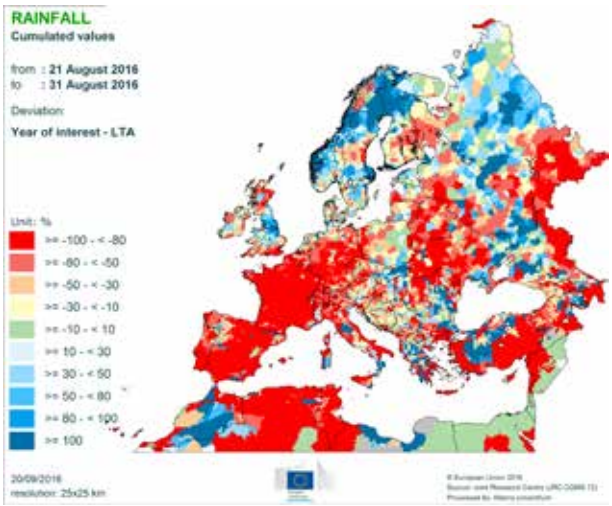


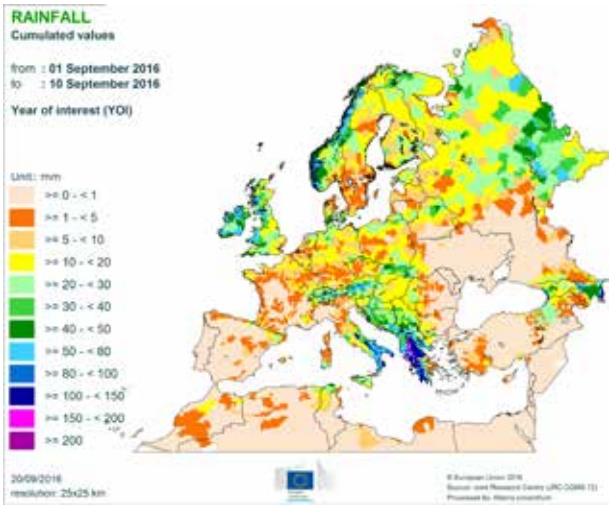


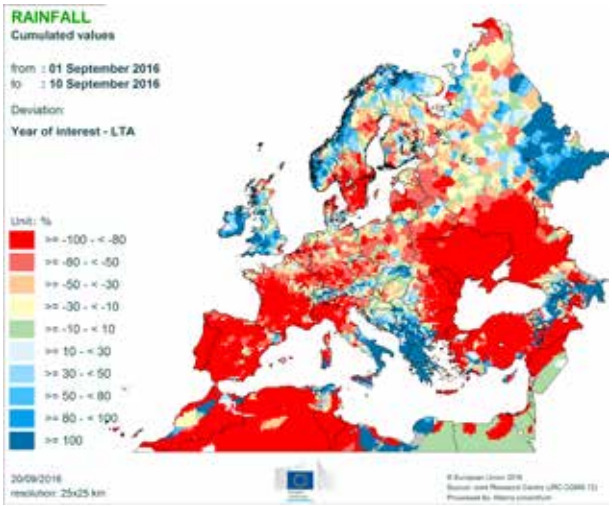


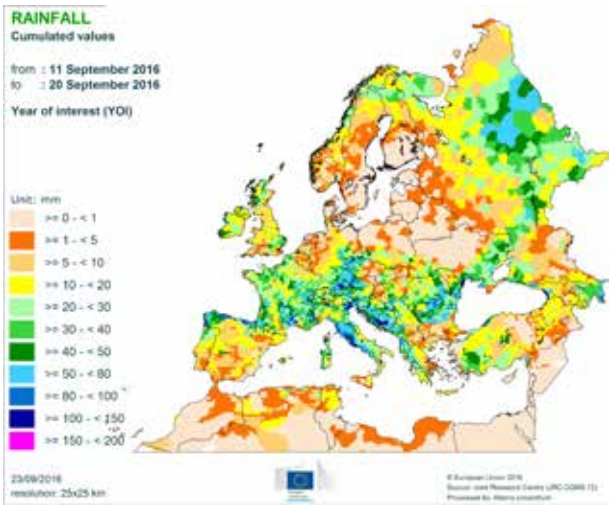


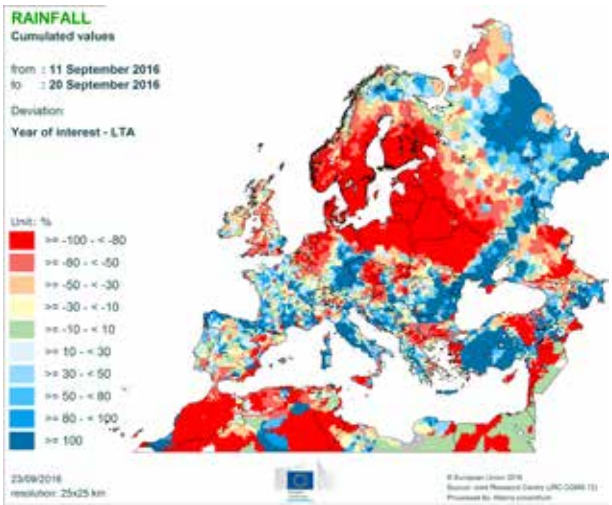




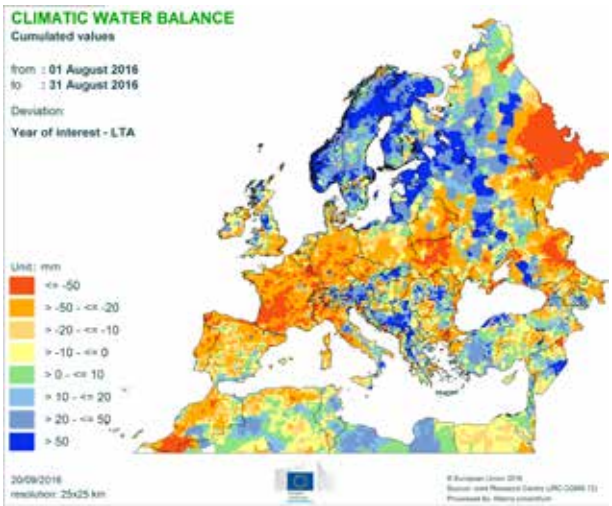


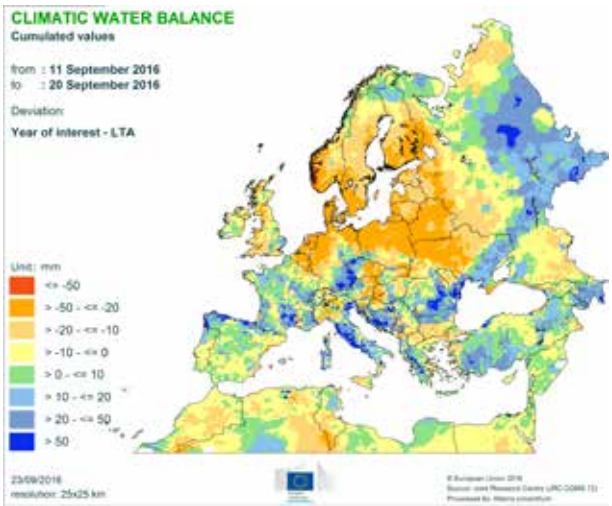




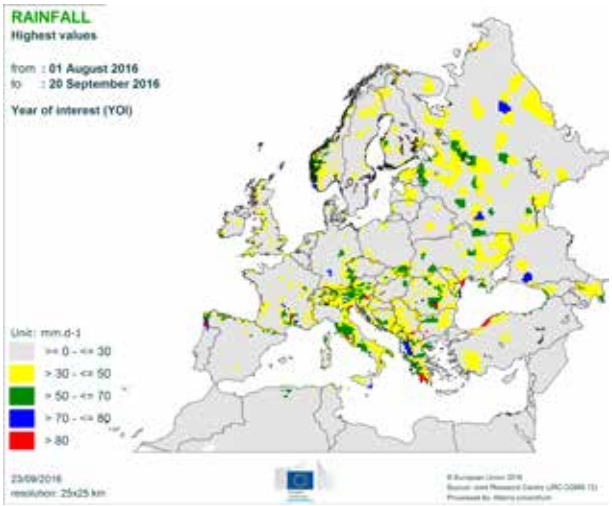


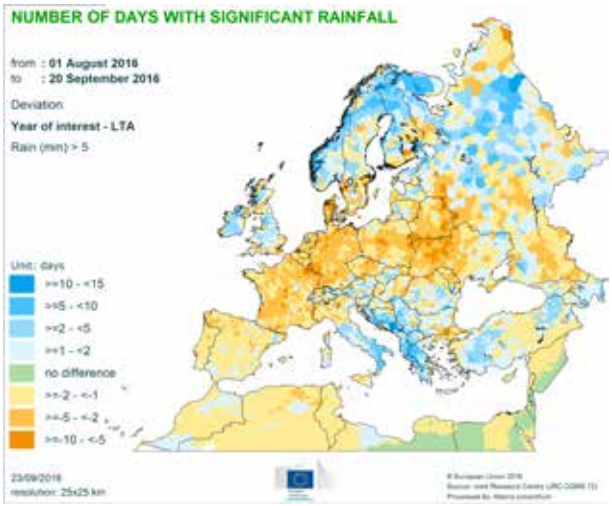
Climatic water balance

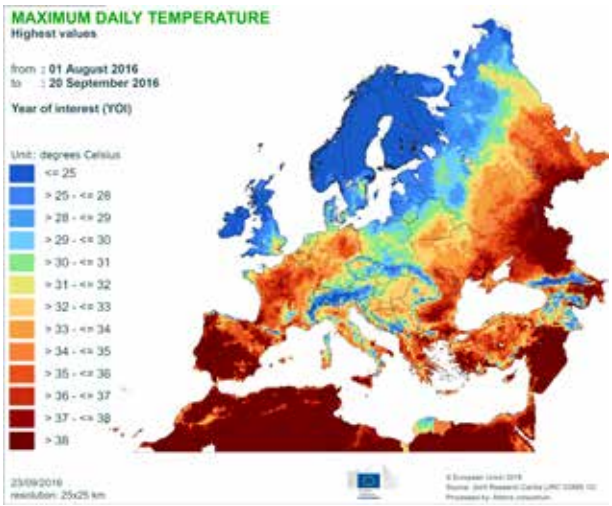


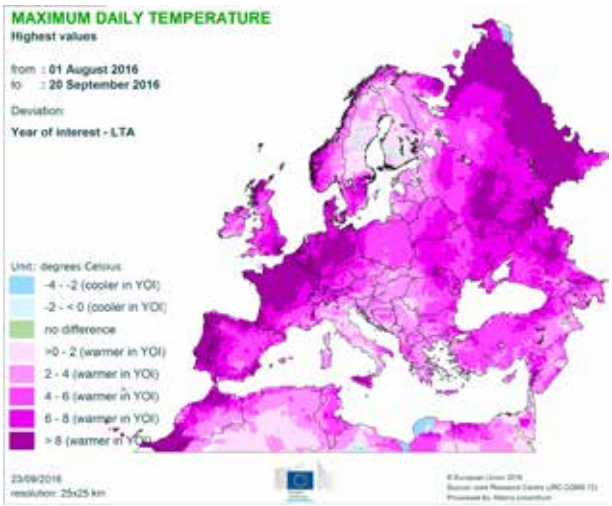


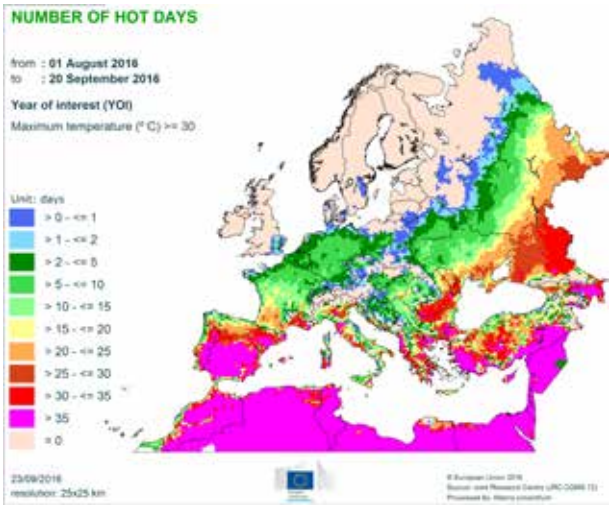
Weather events

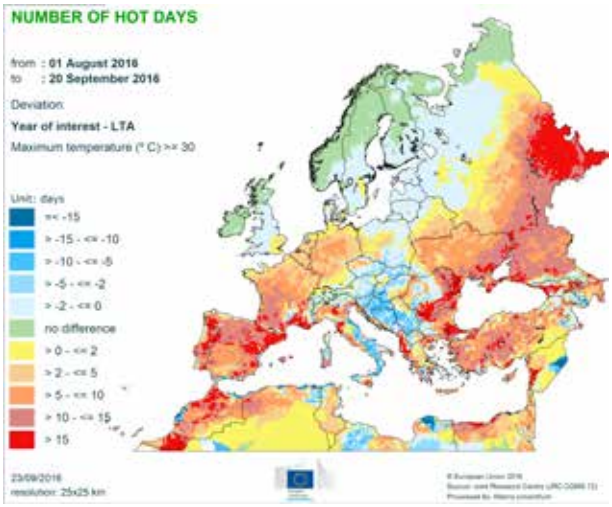




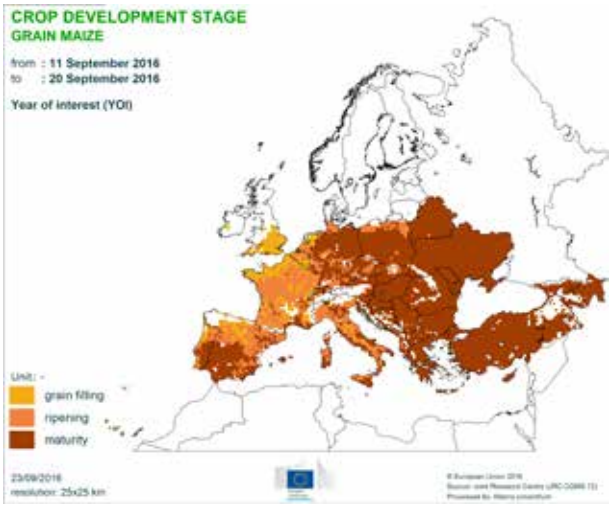


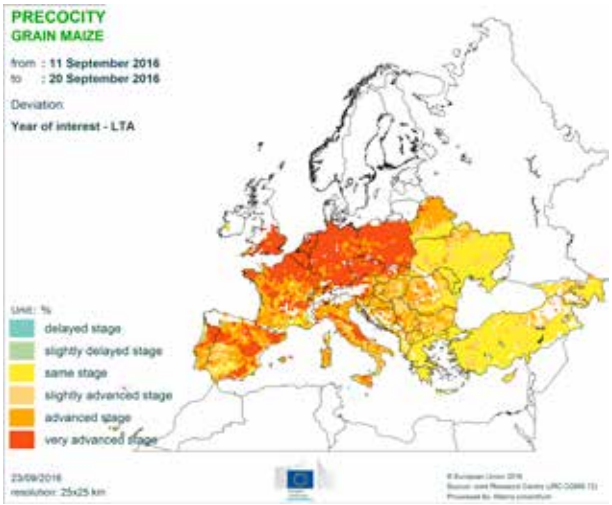


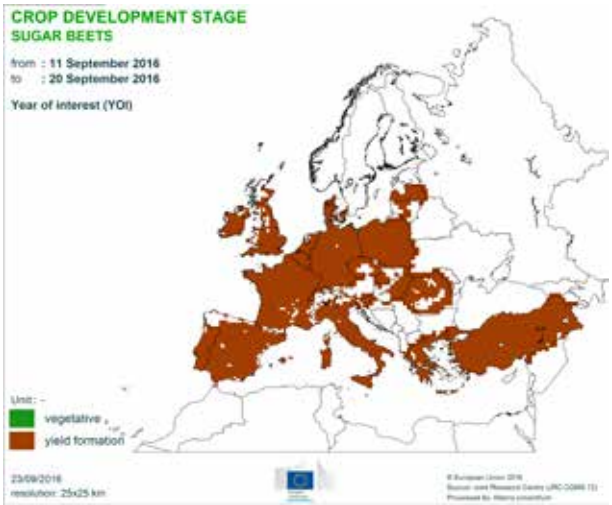


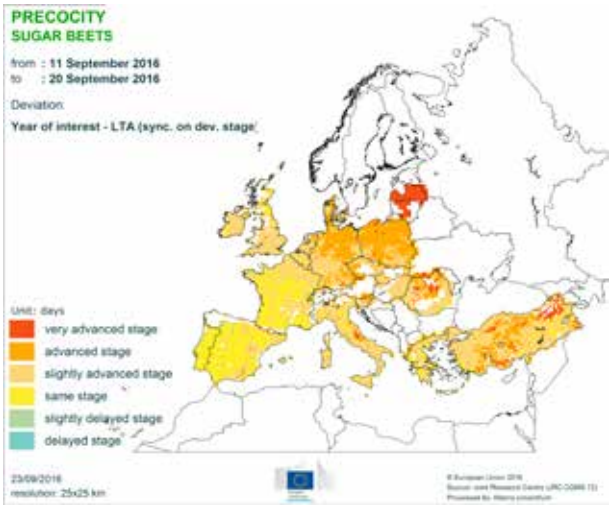


Crop development stages and precocity

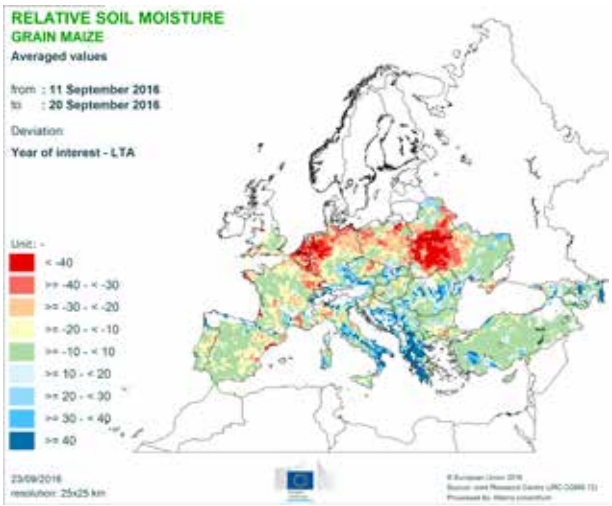


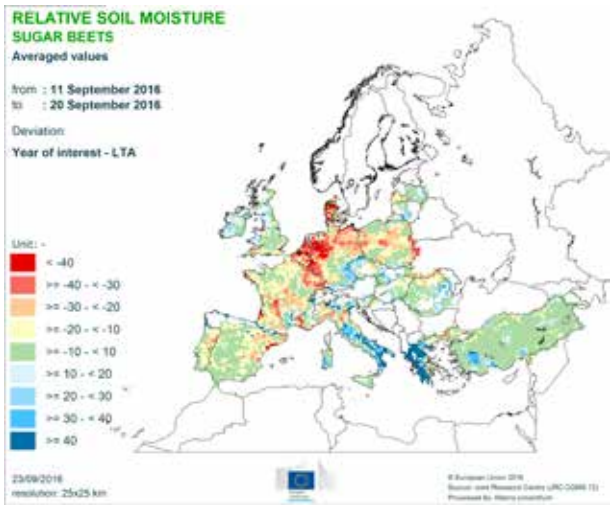




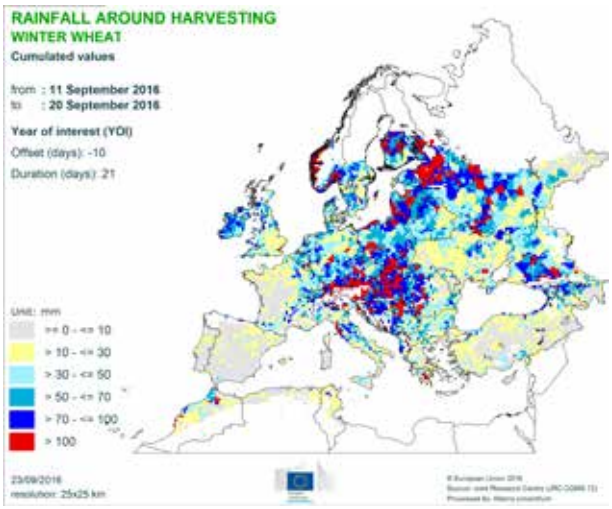


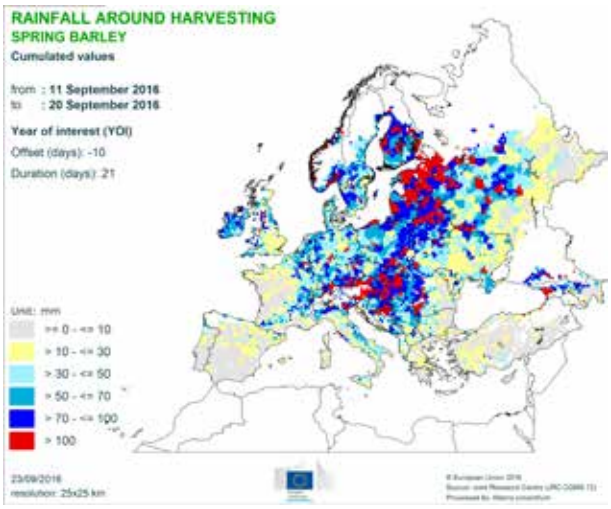
Relative soil moisture

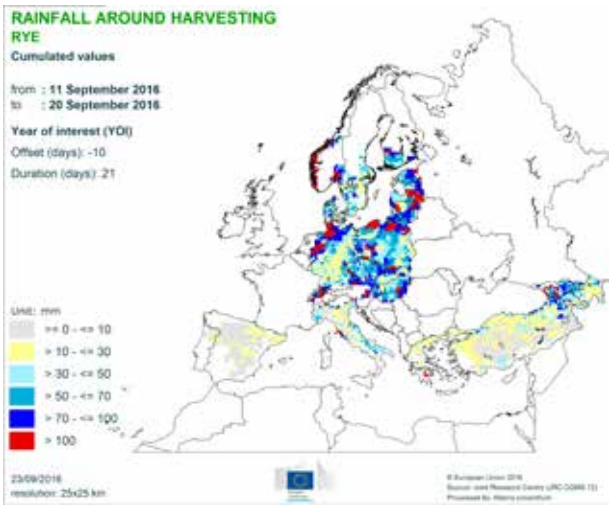


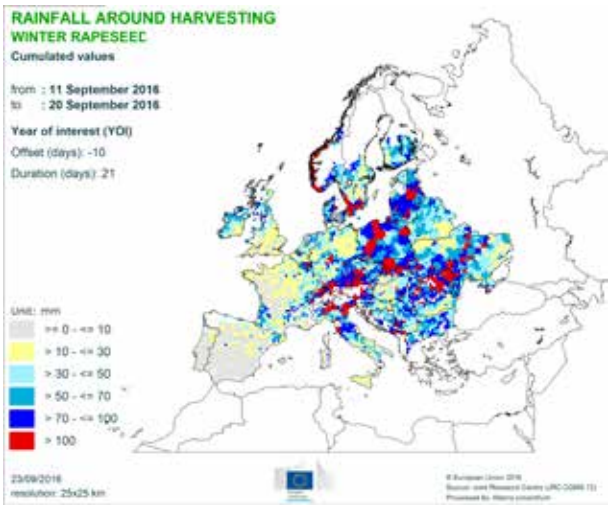


Rainfall around harvesting

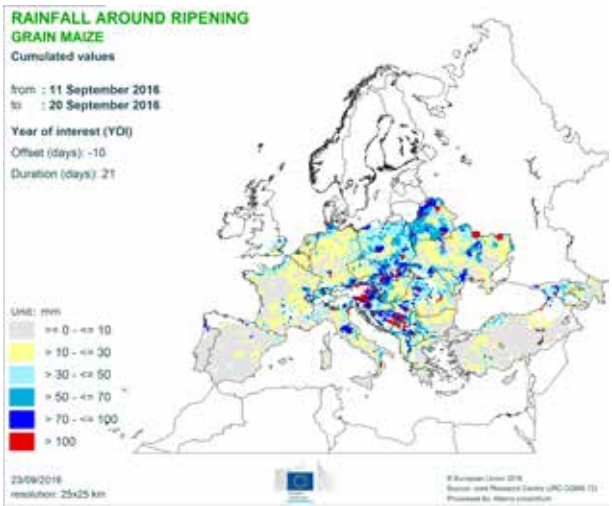


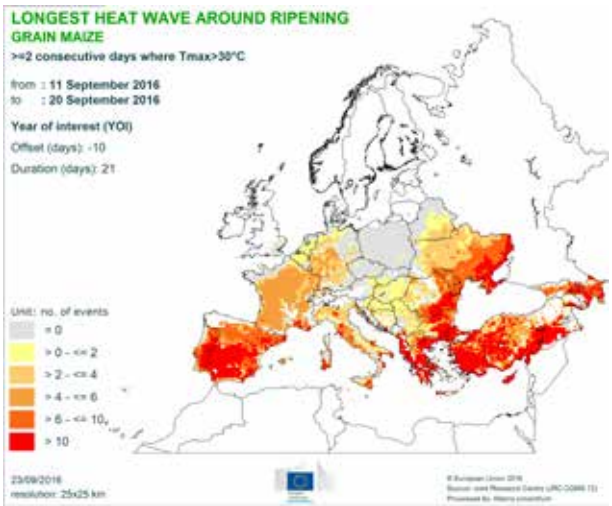


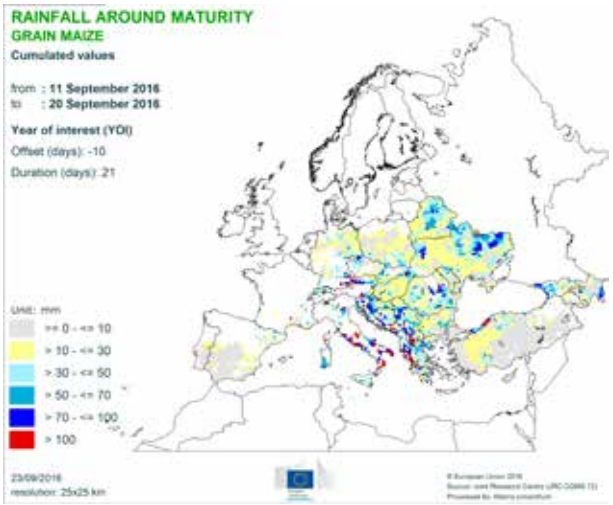


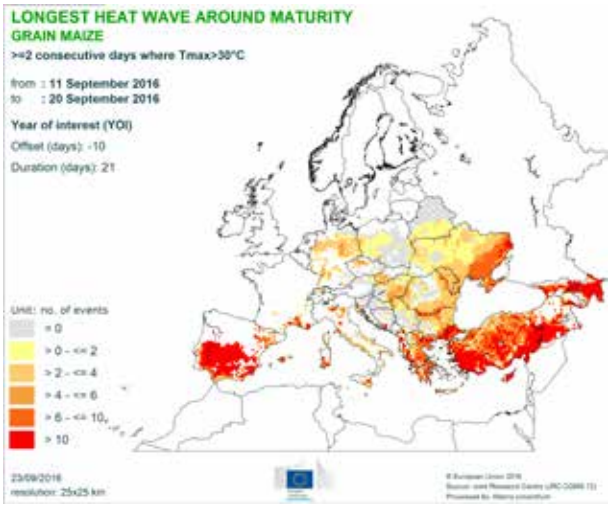


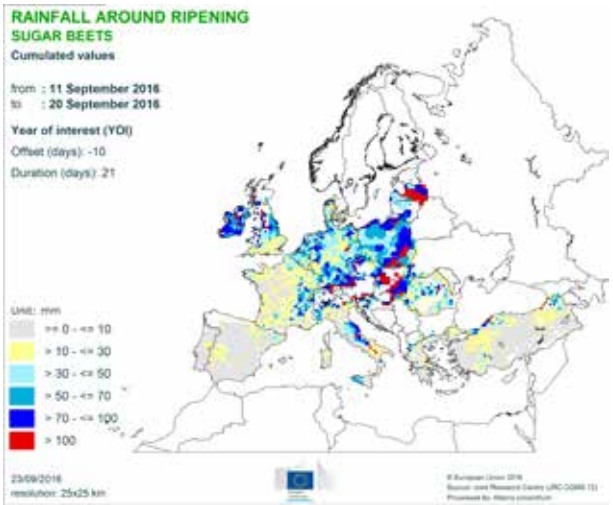
Rainfall and longest heat wave around certain crop development stages

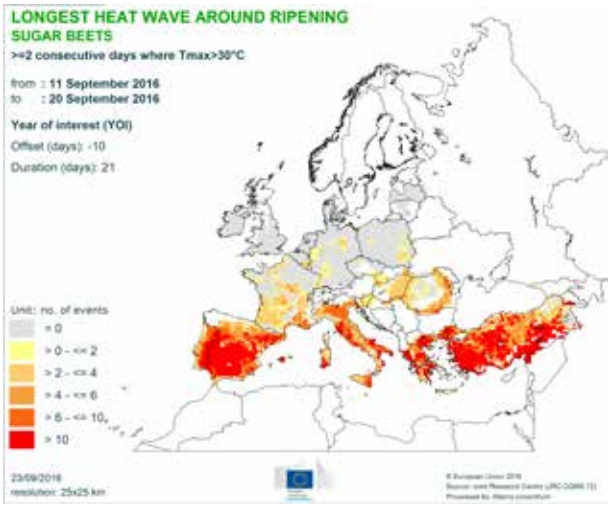





RAINFALL AROUND MATURITY
GRAIN MAIZE
Cumulated values
from : 11 September 2016
to : 20 September 2016
Year of interest (YOI)
Offset (days): -10
Duration (days): 21
UNIT: mm
>= 0 - <= 10
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
23/09/2016
resolution: 25x25 km


LONGEST HEAT WAVE AROUND MATURITY
GRAIN MAIZE
>=2 consecutive days where Tmax>30°C
from : 11 September 2016
to : 20 September 2016
Year of interest (YOI)
Offset (days): -10
Duration (days): 21
UNIT: no. of events
= 0
> 0 - <= 2
> 2 - <= 4
> 4 - <= 6
> 6 - <= 10
> 10
23/09/2016
resolution: 25x25 km


RAINFALL AROUND RIPENING
SUGAR BEETS
Cumulated values
from : 11 September 2016
to : 20 September 2016
Year of interest (YOI)
Offset (days): -10
Duration (days): 21
UNIT: mm
>= 0 - <= 10
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
23/09/2016
resolution: 25x25 km


LONGEST HEAT WAVE AROUND RIPENING
SUGAR BEETS
>=2 consecutive days where Tmax>30°C
from : 11 September 2016
to : 20 September 2016
Year of interest (YOI)
Offset (days): -10
Duration (days): 21
UNIT: no. of events
= 0
> 0 - <= 2
> 2 - <= 4
> 4 - <= 6
> 6 - <= 10
> 10
23/09/2016
resolution: 25x25 km

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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 and yield forecast	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

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Analysis and reports
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*MARS stands for Monitoring Agricultural Resources

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

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