



JRC MARS Bulletin

Crop monitoring in Europe

October 2016

Contrasting end-of-season weather conditions

Delays to summer crop harvesting and winter sowing are mostly manageable

The overall cereal yield forecast at the EU-28 level of the September bulletin is maintained, and remains below the five-year average. The forecast for EU-28 grain maize was revised slightly downwards, whereas the forecasts for potato, sugar beet and sunflower crops were revised slightly upwards.

This analysis period was marked by contrasting weather conditions. Among the outstanding weather phenomena were the persistent dry conditions, which in France marked the end of a difficult season. These conditions also hampered the sowing of winter cereals in France, western Germany and the Benelux countries due to overly dry seedbeds, and negatively impacted emergence.

By contrast, heavy rains in the first half of October are responsible for a marked rain surplus in Poland and south-eastern Europe. These rains somewhat delayed part of the harvest of grain maize and the sowing of winter cereals in Bulgaria, Hungary, Romania and Ukraine, but benefited the emergence of earlier-sown winter crops.

AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 20 September 2016 until 15 October 2016



Rain surplus

Rain deficit

Crop	Yield t/ha				
	Avg 5yrs	September Bulletin	MARS 2016 forecasts	% Diff 16/5yrs	% Diff September
TOTAL CEREALS	5.32	5.16	5.16	-2.9	+0.0
Total Wheat	5.60	5.40	5.40	-3.6	+0.0
<i>soft wheat</i>	5.83	5.63	5.62	-3.6	-0.2
<i>durum wheat</i>	3.33	3.33	3.34	+0.3	+0.3
Total Barley	4.72	4.77	4.76	+0.9	-0.2
<i>spring barley</i>	4.12	4.20	4.20	+1.9	+0.0
<i>winter barley</i>	5.57	5.51	5.48	-1.6	-0.5
Grain maize	6.93	6.84	6.82	-1.6	-0.3
Rye	3.75	3.71	3.78	+0.9	+1.9
Triticale	4.20	4.12	4.18	-0.6	+1.5
Rape and turnip rape	3.20	3.20	3.21	+0.4	+0.3
Potato	32.22	32.13	32.35	+0.4	+0.7
Sugar beet	71.83	73.50	73.82	+2.8	+0.4
Sunflower	1.94	1.97	1.99	+2.8	+1.0

Issued: 21 October 2016

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Crop yield forecasts

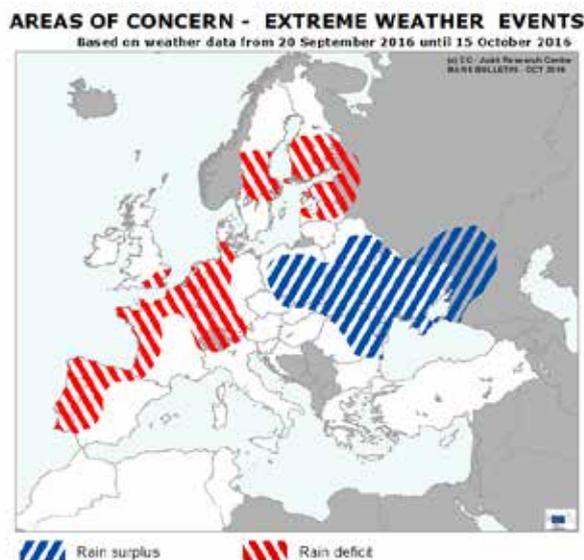
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Atlas

1. Agro-meteorological overview

1.1. Areas of concern

The map on the right depicts the main weather events between 20 September and 15 October. Among the outstanding weather phenomena were the persistent dry conditions, which in France marked the end of a difficult season. This also hampered the sowing of winter cereals in France, western Germany and the Benelux countries due to overly dry seedbeds and negatively impacted emergence. By contrast, heavy rains in the first half of October are responsible for a marked rain surplus in Poland and south-eastern Europe. These rains delayed part of the harvest of grain maize and the sowing of winter cereals in Bulgaria, Hungary, Romania and Ukraine, but benefited the emergence of earlier-sown winter crops.



1.2. Meteorological review (1 September-15 October)

The first half of September was among the warmest on record in large parts of western and central Europe, with positive temperature anomalies of up to 6 °C. Maximum temperatures of between 32 °C and 34 °C were recorded in central France, Italy, northern Germany, the Benelux countries, the western Black Sea region, the southern part of European Russia and central Turkey. Even higher values were recorded in southern France, the Iberian peninsula and southern Turkey.

During the first days of October, unusually warm weather conditions prevailed in the southern half of Russia, the Caucasus region, Turkey, Spain and the Maghreb countries, with temperature anomalies of up to 7 °C.

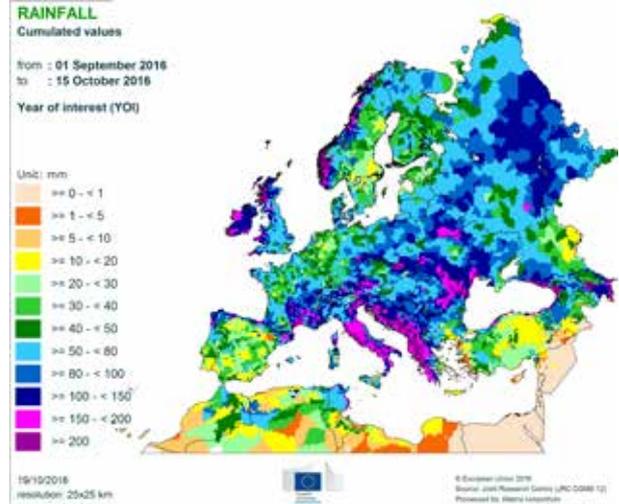
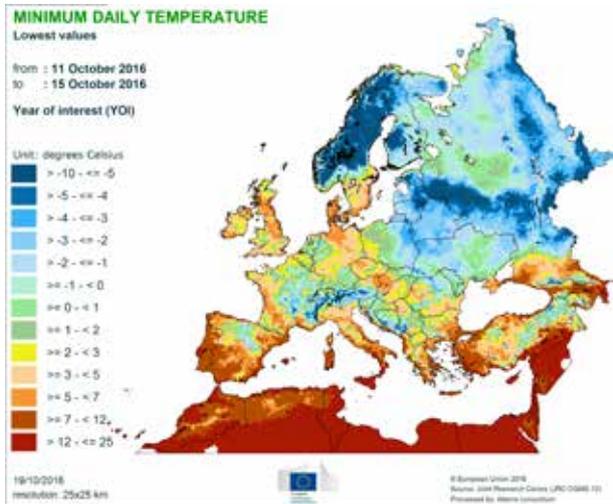
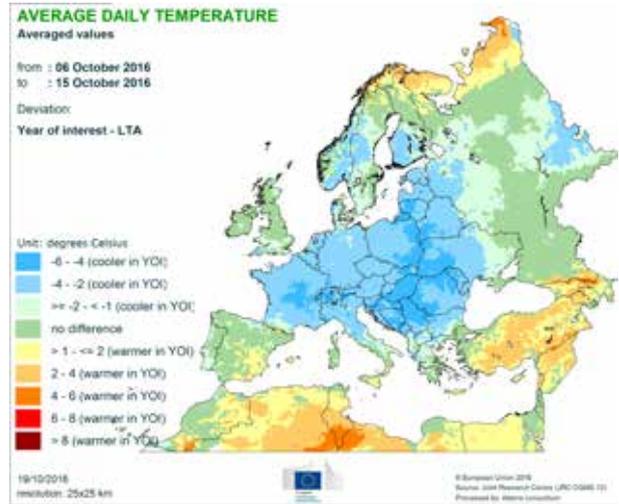
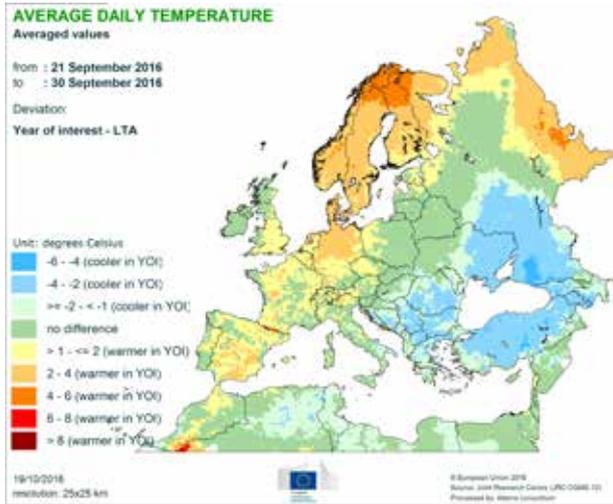
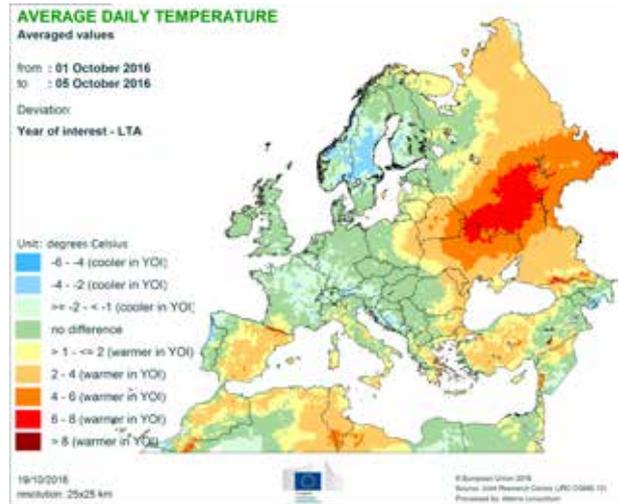
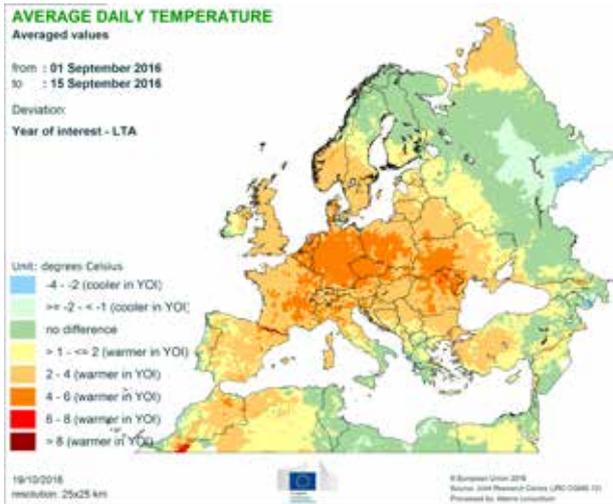
A cold weather anomaly (of as much as 5 °C) during the last decad of September was experienced in the Black Sea region, covering the Balkan peninsula, western Ukraine, south-western Russia and Turkey.

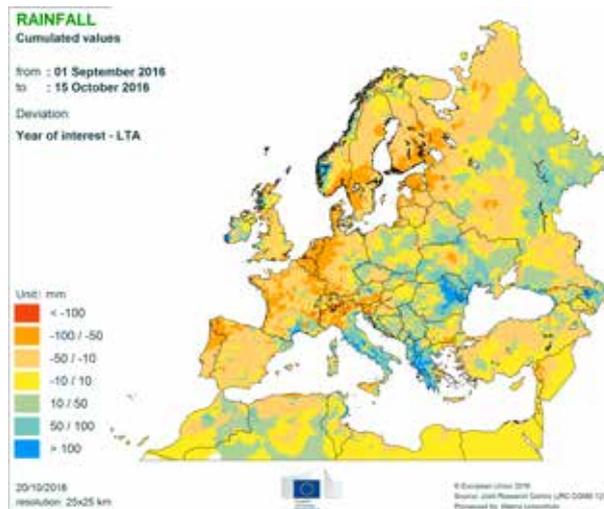
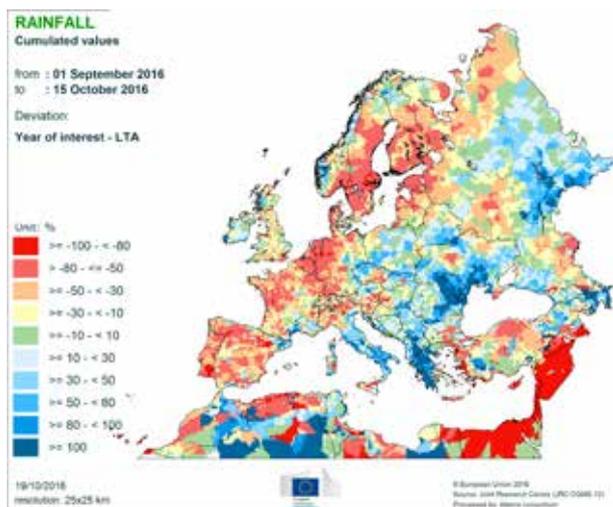
Between 5 and 15 October, daily mean temperatures remained below the average by 2 to 5 °C in extended central areas of Europe, including France, southern Scandinavia, the Black Sea region, Bulgaria and northern Italy. In

the last days of this period, a cold air intrusion caused frost events (with temperatures typically between -3 and -7 °C) in northern and eastern Europe.

A precipitation surplus, with rainfall cumulates exceeding the seasonal average by 50 %, was recorded during September in Ireland, Scotland, Norway, southern Italy, the Balkan peninsula (especially in Greece), the Black Sea region, south-eastern Russia and some parts of the Maghreb region. In October, abundant precipitation, typically twice the seasonal average, occurred in southern France, most of Italy, the Balkan peninsula, eastern central Europe, southern Belarus and Ukraine.

Unusually dry conditions were observed in a wide band from the Iberian peninsula to northern Russia. The precipitation deficit was around 50 mm in Portugal, northern Spain, north-western France, northern Italy, western Germany, the Benelux countries, southern Scandinavia and the Baltic states. This period proved to be among the driest on record for these areas. Rainfall also remained less than half of the long-term average in northern and western Turkey, some areas north-east of the Caucasus mountain range and along the southern Mediterranean coastline.





2. European Union — sowing conditions

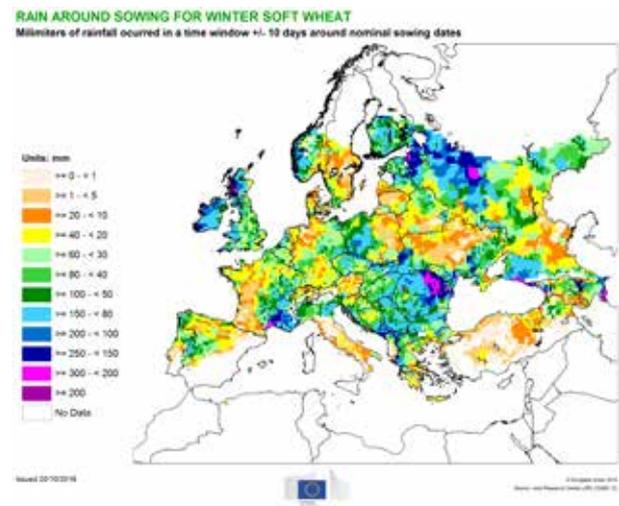
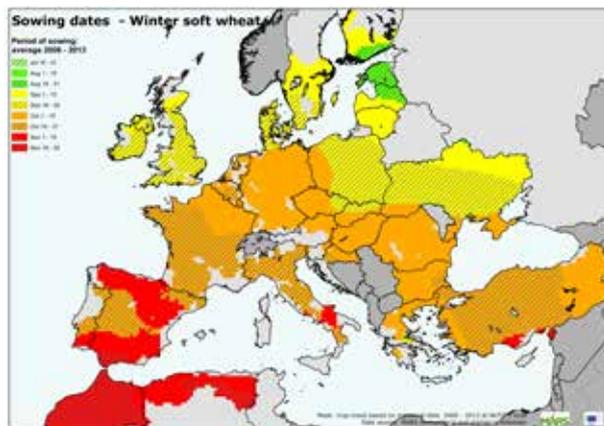
Winter soft wheat, durum wheat, winter barley and rye

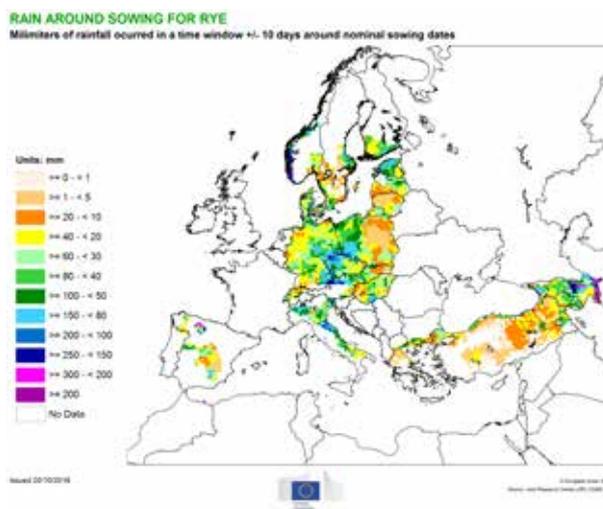
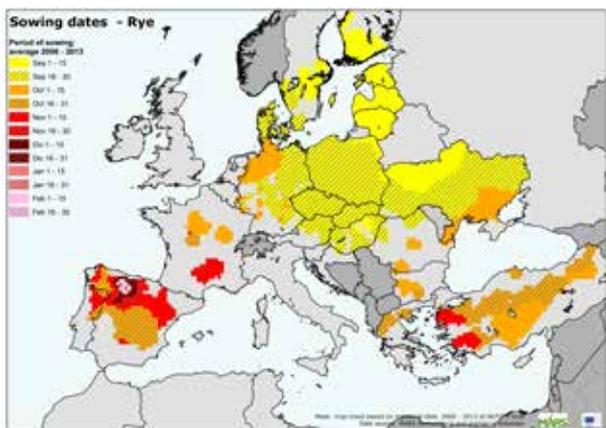
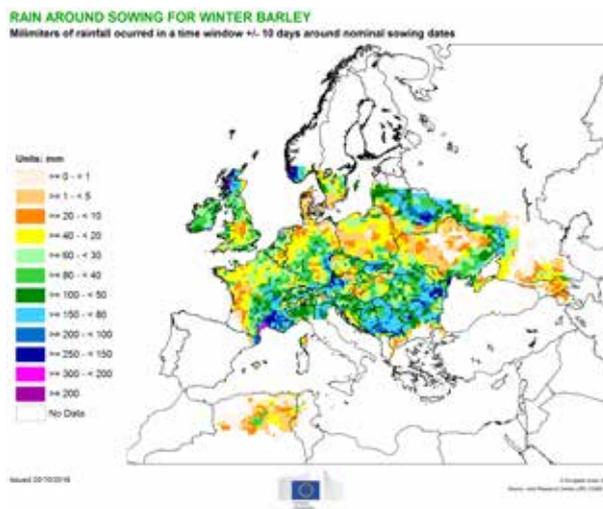
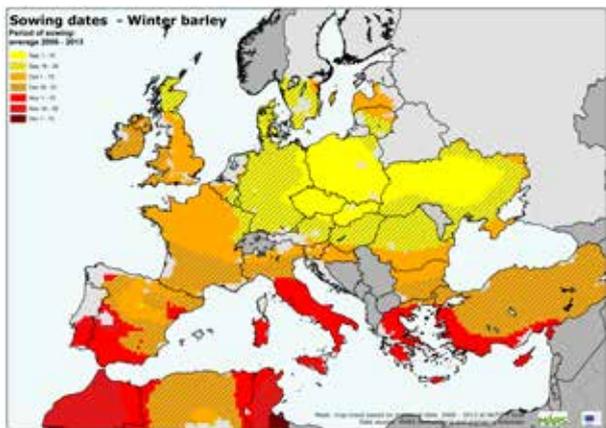
Overall fair progress despite some hiccups; for durum wheat, sowing will start shortly in the main producing regions.

In the United Kingdom, the sowing of winter cereals progressed well and has now practically been completed thanks to the relatively dry weather conditions. In Poland, conditions for the sowing and emergence of winter crops have mostly been favourable. In large parts of Germany, the Benelux countries and northern and western France, overly dry soil conditions have delayed sowing activities, but this situation has improved since the last days of the review period, and sowing activities can still be accomplished on time. Abundant rains in large parts of eastern Europe during the first half of October hampered the sowing of winter cereals, especially in Romania. Sowing activities are still ongoing and, so far, the delays are perceived to be manageable. In southern France, Italy, the Iberian peninsula and Turkey, the sowing campaign has only just started or has not yet started.

For durum wheat, sowing will start shortly in the main producing regions. In Italy, the sowing of durum wheat in the centre-north of the country (*Toscana, Umbria*) usually starts at the end of October. Rainfall from 1 October has been close to the average, and this will benefit the rapid progression of preparatory activities. In the southern regions

(*Puglia, Basilicata*) and *Sicilia*, the sowing of durum wheat often starts in November. Soil moisture in these regions is currently higher than average, as the first half of September was exceptionally humid. This should not be a concern for November sowing activities if weather conditions in the second half of October remain close to the norm. Sowing usually starts by the end of October in the main producing regions of Spain. Currently, soil moisture is low, after a rather dry end to the summer. In *Andalucía*, some heavy rainfall was registered in mid October, and this could affect the start of preparatory activities. By contrast, rainfall is needed in *Aragón* during the second half of October to increase soil moisture, which would favour soil preparation and help avoid constraints during crop emergence. In the south of France, the precipitation registered in the second week of October would be positive for the sowing of durum wheat, which should start in two weeks' time. In Greece, cumulated precipitation is above average, mainly concentrated in two episodes in the first half of September and mid October. Soil moisture is higher than usual but does not currently represent a major limitation for sowing activities, which usually get underway from November onwards.



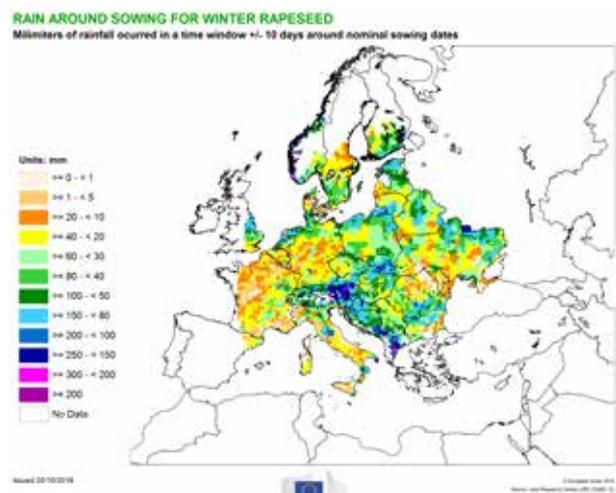
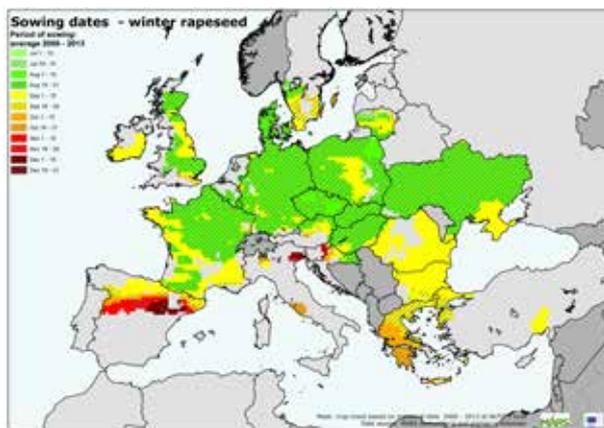


Winter rapeseed

Mediocre sowing and emergence conditions in France and Germany

Precipitation was clearly below average from mid August to mid September in large parts of France and Germany, the two main EU-28 producers of rapeseed. As a consequence of the dry conditions, part of the rapeseed was not sown at all in France. The region most impacted was *Lorraine*. *Rhône-Alpes*, *Auvergne* and *Bourgogne* were impacted to a lesser extent. In most areas where rapeseed was sown, emergence was delayed due to the dry conditions, and the heterogeneity is high within fields and regions. In north-western France, farmers delayed sowing until mid September; all regions are impacted except for western Brittany. Conditions were similar in Germany, especially in the north and east of the country, where enduring dry conditions often prevented rapeseed

from emerging properly. This is especially the case on heavy soils, which were already dry at the time of sowing. The early establishment of rapeseed was not optimal, and many fields show uneven crop development. In Poland, the EU's third main producer, weather facilitated a more adequate progression of sowing activities, and problems related to dry soils are encountered to a lesser extent in western and central parts of the country. The country has seen plentiful rain in the last days, which has been beneficial to crop establishment. In the United Kingdom, conditions are rated as being average and rapeseed is quite well established, but there is currently high pest and disease pressure.



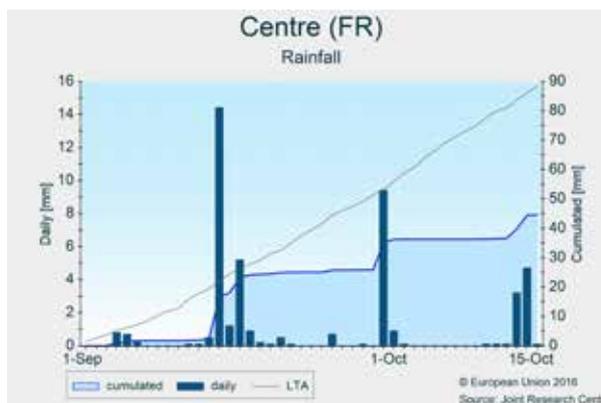
3. Country analysis

3.1. European Union

France

Persistent dry conditions mark the end of a difficult season

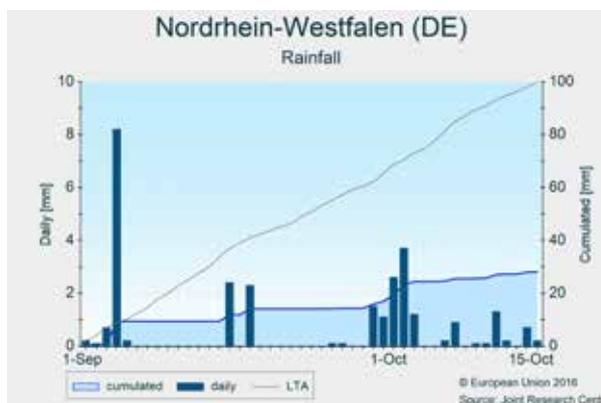
September was warmer and drier than usual, despite some rainfall in mid September. The dry conditions delayed part of the winter cereal sowing activities. The first half of October was colder than the seasonal average, and rainfall was recorded in mid October. Maize and sunflower yields are well below the average due to the dry conditions observed this summer, completing an exceptionally negative season. Grain maize crop conditions are very heterogeneous, as the impact of drought depends on soil types and irrigation. Part of the maize crops originally destined for grain maize production will be converted into green maize. The potato yield forecast is also well below the average, mainly due to the excessively humid conditions at the beginning of the season, which increased the disease pressure.



Germany

Persistent dry period complicates sowing activities

Exceptionally warm and dry conditions, predominantly in the first half of September, led to problems in field preparation activities and the sowing of winter crops, particularly rapeseed. Rapeseed emergence was also hampered due to the dry seedbeds. Sugar beet and potato harvests were hampered as the soil was too dry for tubers to be harvested, and irrigation was needed to increase soil moisture. Maize matured rapidly and our maize forecast was revised downwards compared to the last bulletin due to the continued dry conditions after flowering. October has so far been rainier than September, especially in eastern Germany, but there is still a considerable rainfall deficit since September, particularly in *Niedersachsen*, *Nordrhein-Westfalen*, *Rheinland-Pfalz*, *Saarland* and *Baden-Wuerttemberg*. However, significant rainfall amounts are forecast for the most affected regions in the coming days, which will help to replenish the soils and improve crop stands before winter.



Poland

Positive yield outlook and end of season

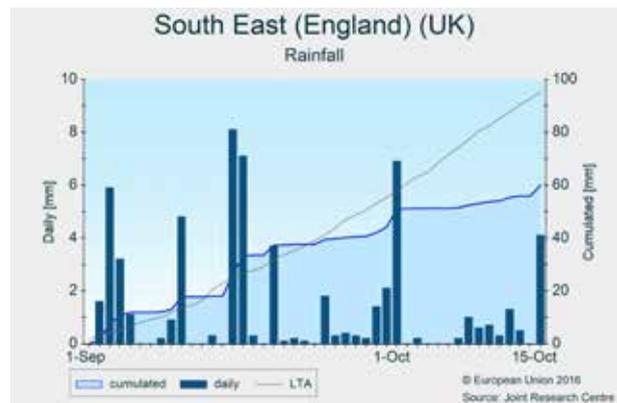
September was warmer and much drier than the seasonal average, with only sparse rainfall. By contrast, substantial rainfall was recorded and temperatures were colder than average since the beginning of October. Conditions for the sowing and emergence of winter crops have mostly been favourable. Crop yield forecasts are higher than the five-year average. Potatoes and sugar beets benefited from good conditions throughout the season, as did green maize and grain maize. The humid conditions since 1 October interrupted part of the harvest of grain maize, but no impact is expected on yields.



United Kingdom and Ireland

Good end-of-season conditions in the United Kingdom, overly wet in Ireland

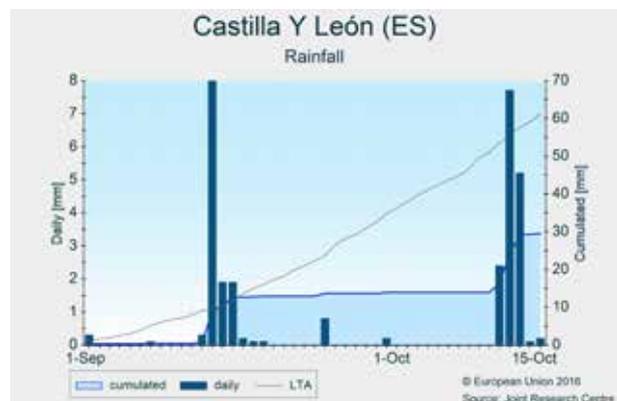
September was characterised by well-above-average temperatures, whereas average or slightly below-average temperatures prevailed in the first half of October. Rainfall was below average in the United Kingdom, with sufficient windows with suitable conditions for the harvesting of sugar beets and potatoes. The sowing of winter crops was completed on time, especially in the important cropland regions in south-eastern United Kingdom. There are concerns, however, regarding the high pressure of weeds, pests and disease in newly establishing crop stands. In Ireland, rainfall continued to be above average and frequent until the beginning of October, after which the remaining cereals could finally be harvested and the sowing of winter crops could partly be accomplished (until 14 October, when rains resumed again). The yield forecast for sugar beets and potatoes remains practically unaltered compared to the previous bulletin.



Spain and Portugal

Average yields for summer crops

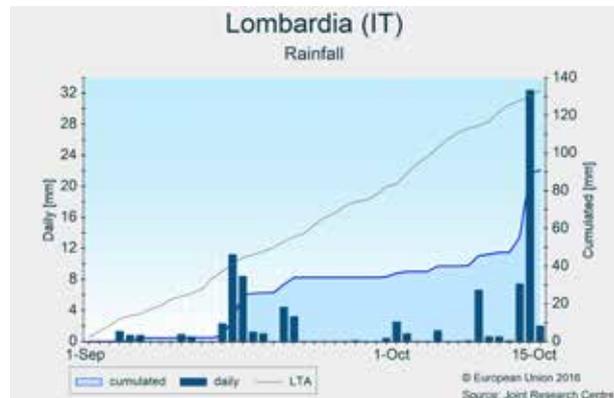
Weather conditions from September to mid October were warmer and drier than usual in most of the Iberian peninsula. The summer crop season is coming to an end. Grain maize has reached maturity in all regions, and the harvest is completed in the southern half of the peninsula. Late-season varieties of sugar beets and potatoes are being harvested in Castilla y León under dry, favourable weather conditions. Yields are average with respect to previous years, as summer crop growth did not experience any major limitations.



Italy

Grain-maize harvesting campaign completed with above-average yield outlook

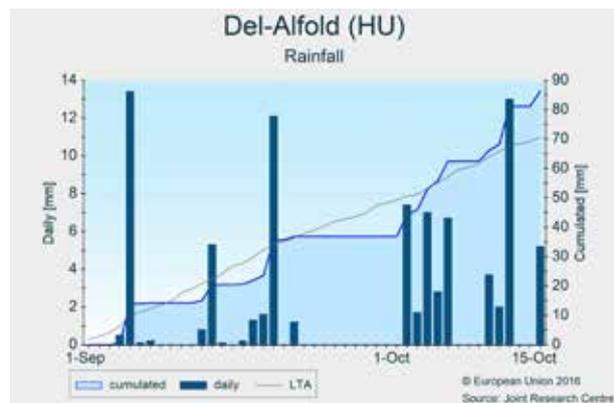
The first two decads of September were warmer than usual in central and northern Italy, with temperature anomalies of between 2 and 4 °C compared to the long-term average. A cold-weather anomaly prevailed in these regions during the first half of October. A rainfall deficit was recorded in north-western Italy; rainfall cumulates in *Lombardia*, the western part of *Emilia-Romagna* and central *Piemonte* did not exceed 80 mm. Weather conditions in these important cropland regions were favourable for the summer crops' harvesting campaign. The yield forecast for grain maize remains slightly above the five-year average.



Hungary

Good harvest campaign progressing well

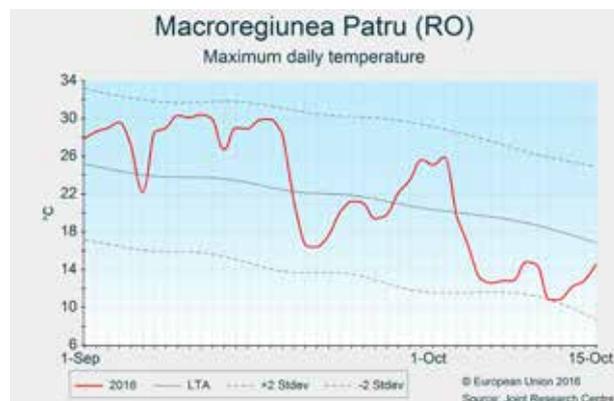
The exceptionally warm first 20 days of September were followed by colder-than-usual weather until mid October. Precipitation was below or near average in most of Hungary, except some areas of southern and north-eastern Hungary, where the rainfall totals reached 80-110 mm. Infrequent rains and warm weather conditions during the first two decads of September facilitated the harvest of sunflowers and potatoes. In late September and October, the relatively cold and wet weather somewhat hampered the harvesting of sugar beets and maize, and increased the probability of fungal infections and degradation of maize grain quality. Nevertheless, exceptionally high yields are forecast for all summer crops, and our previous positive outlook is maintained, as the yield losses of this harvest campaign are not expected to be significant.



Romania

Moderate yield outlook due to summer drought

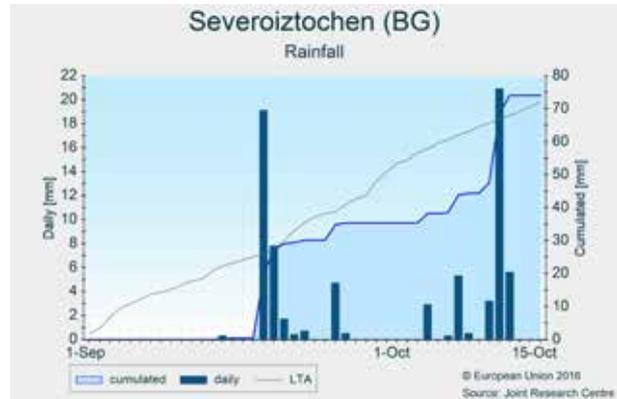
Romania experienced extraordinarily warm weather until 20 September. In the southern regions, 10 to 15 hot days ($T_{max} > 30$ °C) were observed during this period, and 5 to 10 events even occurred in the northern part of the country. Some moderate precipitation was recorded in western Romania during the first half of the month, while elsewhere there was no or hardly any precipitation, which created excellent conditions for the harvest. Considerable rainfall between 18 and 20 September hampered the harvest throughout the country. After a mild start, October proved to be quite cold and precipitation became frequent and plentiful in eastern and southern Romania, which led to deteriorating harvesting conditions for sugar beets and maize. The yield forecast for summer crops remains low due to inadequate water-supply conditions during the summer months. In late August and early September, dry topsoil conditions allowed for the timely sowing of winter rapeseed, though the preparation of the seedbed was difficult. Beneficial rains after mid September were favourable for emergence and early development.



Bulgaria

Rainfall temporarily delayed the harvest of summer crops

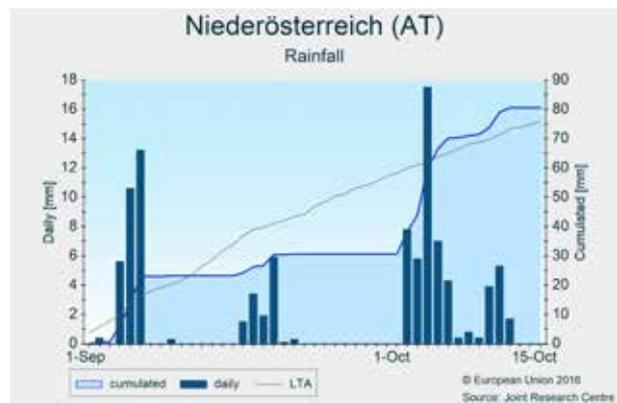
In the first two decads of September, daily temperatures typically exceeded the long-term average by 2 to 4 °C, but then dropped sharply, leading the last decad of the month to be colder than usual. The last days of September and the first days of October were marked by a positive thermal anomaly of around 2 °C, but cold weather dominated until mid October. Abundant daily rainfall events (> 20 mm) occurred after mid September in the northern half of Bulgaria, hampering the harvest of the summer crops in numerous places. Fortunately, long dry windows between the wet periods allowed the harvest to progress, and no harvest losses are expected. The intense precipitation events may also have delayed sowing activities, but played a positive role in the replenishment of the soil. The below-average yield forecast was maintained for all crops, given the hot and dry conditions during the summer months.



Austria, Slovakia and the Czech Republic

Exceptionally warm first two decads of September

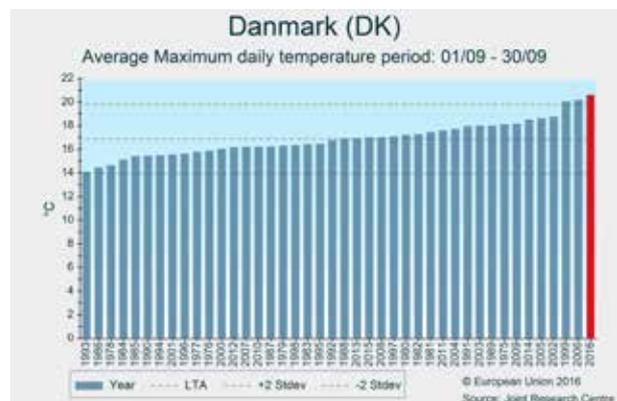
The first two decads of September were the warmest on record (since 1975), with temperature anomalies of between 2 and 6 °C above the long-term average. September was characterised by substantial rainfall deficit in southern and north-eastern Austria and the eastern half of the Czech Republic. The first half of October brought a cold weather anomaly with average or slightly above-average rainfall. Warm weather in September accelerated summer crop ripening. The harvesting campaign was regionally (especially in Slovakia) interrupted by rainy and cold weather in the first half of October. The yield outlook for summer crops remains above the five-year average.



Denmark and Sweden

Very warm September

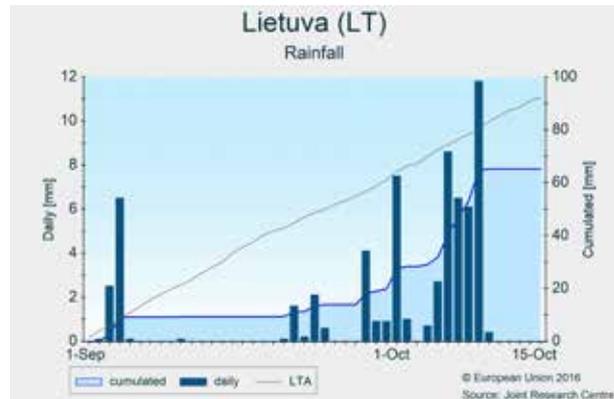
In both countries, temperatures in September fluctuated consistently above the long-term average, and were greatly above average for a period of four to five days around mid September. September 2016 is ranked as the warmest for Denmark and the second warmest for Sweden in our database (i.e. since 1975), and was almost completely dry in both countries. These conditions allowed the harvesting of wheat, barley, triticale and rye to be completed by the first days of September in both countries. Recorded yields are well below last year's high levels, and below the five-year average. In October, conditions remained cooler than usual, with several rainfall events that were interspersed with appropriate dry windows. The harvesting of sugar beets is underway, with a good yield outlook at country level. The potato harvest is almost finished, and our forecast suggests slightly below-average yields in Denmark, and slightly above-average yields in Sweden.



Finland, Lithuania, Latvia and Estonia

Favourable conditions for harvesting activities

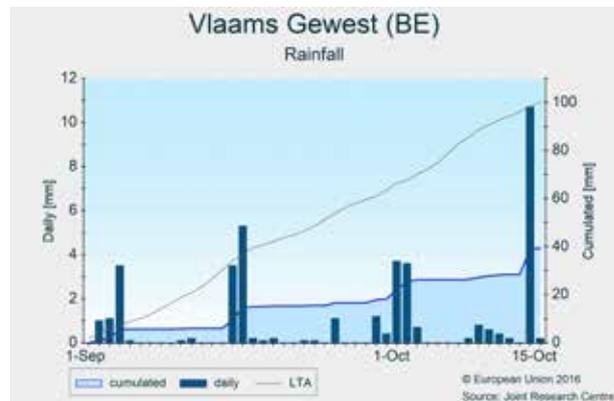
September was characterised by a predominance of above-average temperatures in all countries, but colder-than-usual conditions have set in since the beginning of October. Overall, rainfall was very scarce during the period under review. These rain-free weeks allowed the harvest of maize, potatoes and sugar beets to be completed under favourable conditions. The sowing of winter crops, which had been delayed, also benefited from these conditions and has practically been completed. Furthermore, rainfall events that occurred during October in Lithuania and Latvia (countries with the higher share of winter crops) were very beneficial for the establishment of crops.



Belgium, the Netherlands and Luxembourg

Unusually dry conditions delay winter sowings and harvesting of potato and sugar beets

With the exception of coastal areas, the period from 1 September to 15 October was the driest and one of the sunniest on record (since 1975). September was one of the warmest months, but below-average temperatures prevailed during the first half of October. The unusually dry and sunny conditions hampered the harvesting of potato crops and sugar beets, but were beneficial to the quality of the harvest. In several cases, irrigation was used to increase soil moisture contents in order to soften hard topsoils. Recent rains have improved the situation, but the potato harvest is still ongoing and is particularly late in eastern Belgium. Dry seedbeds also delayed the sowing of winter crops, and early sown stands (in particular oilseed rape) were impacted unless irrigated. The yield forecasts for summer crops remain practically unchanged compared to those of the September bulletin.



Greece and Cyprus

Low yields and delayed harvesting of grain maize

In Greece, temperatures during the first two decades of September fluctuated mainly above the long-term average, but after that they dropped to slightly below-average or average levels. Some intensely rainy days occurred during the first decade of September in several parts of the country (as reported in our September bulletin), but after that precipitation was scarce. The harvesting of sunflowers was completed by the end of September. Grain maize harvesting started by the end of August in some regions, but was interrupted at the beginning of September due to the aforementioned intense rainfalls; it started again after mid September but was interrupted again a couple of times. Currently, it is at the final stage but not yet completed. Yield forecasts, which are based on scenario analyses, are set at below-average levels. In Cyprus, temperatures have been mainly above average since 1 September, whereas rainfall has been sparse, with just a couple of rainy days.



Slovenia and Croatia

Warm September conditions accelerated the summer crop harvest

The first two decads in September were among the warmest on record, with temperature anomalies generally between 2 and 4 °C above the long-term average. By contrast, a cold-weather anomaly persisted during the first half of October. Precipitation was below average in Slovenia and the central part of Croatia, whereas average to above-average rainfall cumulates were recorded elsewhere in Croatia. Weather conditions in September were favourable for the start of the summer crop harvesting campaign. Field preparation for the sowing of winter crops was delayed in Slovenia due to dry soil conditions in September, but this situation improved following rainfall in the first half of October. The winter cereal sowing campaign is therefore currently underway. The summer crop yield outlook remains well above the five-year average, except for sunflowers in Croatia, where slightly below-average yields are forecast.



3.2. EU rice-producing Member States

Italy and France

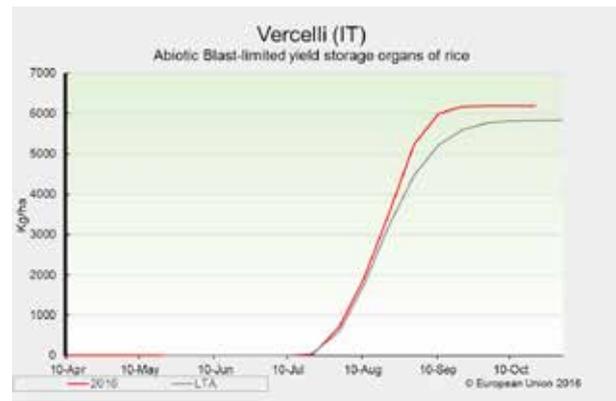
Moderately positive season for rice

Overall, meteorological conditions were favourable for the cultivation of rice in the main producing areas of France (*Languedoc-Roussillon* and *Provence-Alpes-Côte d'Azur*) and Italy (*Piemonte* and *Lombardia*).

In Italy, after a warmer-than-usual first half of July, daily temperatures dropped and remained close to seasonal values during the second half of July and most of August. Hence, neither heat waves nor cold damages were registered during the critical phase of flowering. As precipitation was slightly lower than average and was well distributed during most of the growing cycle, the risk of fungal infection was close to normal. In the last decade of August and practically throughout September, both temperatures and radiation were above average, thus creating beneficial conditions for grain filling, ripening and harvesting activities. Our yield forecast remains practically unchanged since it was already set above the five-year average in the previous bulletin.

Rice crops in France benefited from above-average temperatures and seasonal rains, but more especially from unusually

high radiation during the flowering and grain-filling phases. Therefore, the forecast was revised slightly upwards, and remains above the five-year average.



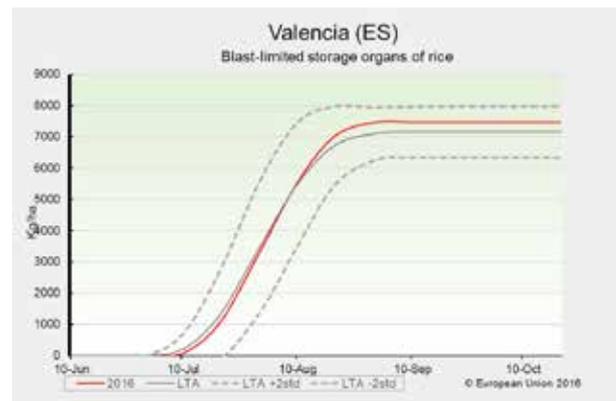
Spain and Portugal

Average yields expected

Weather conditions in the main rice areas in the east of the Iberian peninsula (*Comunidad Valenciana*, *Cataluña*) have been generally favourable during most of the summer. Temperatures in July and August were slightly below average. Moreover, remote sensing imagery reveals that crop photosynthesis was close to the average during that period, indicating that crops did not suffer any significant water stress. During the first half of September, temperatures were moderately higher than usual, favouring the rapid maturation of grain. Yield expectations of the rice harvest, which can be considered complete, are favourable and close to the results of previous years.

In the south-west (*Andalucía*, *Extremadura* and *Alentejo*), summer has been warmer than usual. Temperatures from July to the first half of September were systematically 1-2 °C above average, and this has favoured rice, especially in the Guadalquivir marshes, where it was sown late due to overly wet soil conditions in May. There, the crop progressively recovered from the significant delay in development, and is currently maturing. The harvest is underway since the first

week of October, and should be concluded by the end of the month. In the whole of the south-west of the peninsula, rice conditions during the grain-filling phase were close to normal, and therefore yield expectations are average.



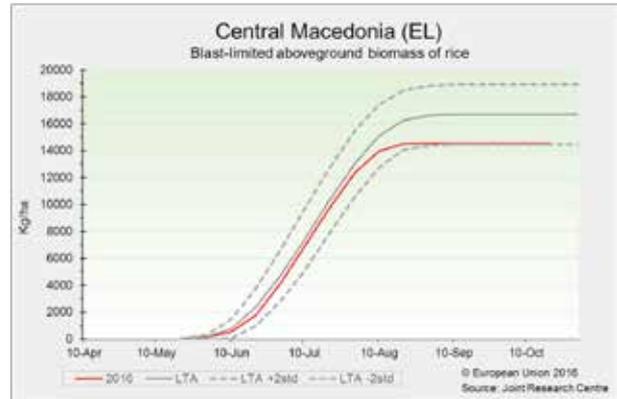
Greece and Bulgaria

Below-average yield outlook

In *Central Macedonia*, the main rice-producing area of Greece, conditions were mixed throughout the growing season. During June and July, above-average temperatures and below-average precipitation prevailed. At the beginning of August and the beginning of September, intensive rainfall occurred that caused an excess of water in rice fields and consequent yield losses. Rainfall in October delayed harvest activities, and cases are reported of pre-harvest sprouting. According to our model simulations, biomass and grain formation are below average, and the forecast is for below-average yields.

In Bulgaria's rice-producing areas, temperatures fluctuated mainly above average, and rainfall events were evenly distributed during summer, as well as in September and October. These conditions increased the risk of fungal disease in several areas, and the model simulates that risk in the northern producing areas is far above the long-term average. Simulated blast-limited biomass is below average. Harvesting

in Bulgaria is still ongoing with delays due to rainfall. The yield forecast is below average.

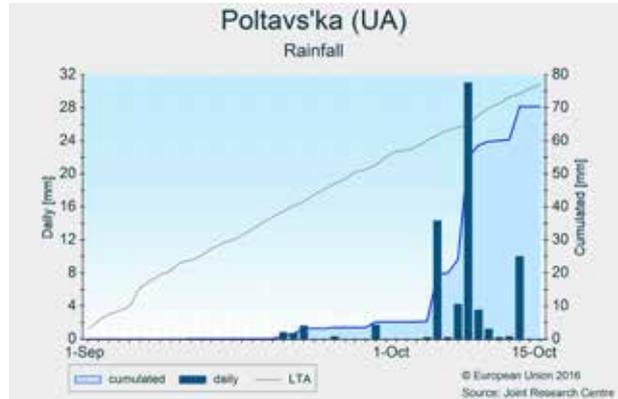


3.3. Black Sea area

Ukraine

Positive maize outlook maintained

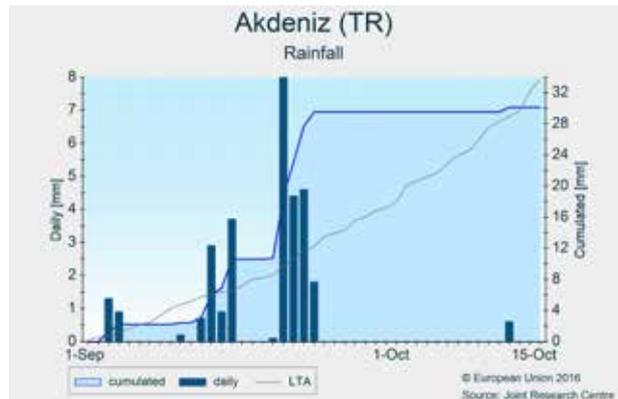
The first half of September was substantially warmer than usual, and no rainfall was recorded. Temperatures were close to the average until 11 October. While only sparse rainfall was recorded during the second half of September, all regions received heavy rains during the first half of October. These latter rains delayed part of the harvest of grain maize but benefited the emergence of winter crops sown in September. As the last rains were followed by cold temperatures since 12 October, the emergence of late-sown winter crops has currently slowed down. Overall, grain maize benefited from good conditions during the season, sporadically impacted by drought, so the yield is forecast to be mostly above average but slightly below the highest record value.



Turkey

Good yields for grain maize

In Turkey, above-average temperatures prevailed during the first two decads of September and the first two decads of October. Exceptionally, towards the end of September temperatures were consistently below average, and several rainfall events occurred during that period. This hampered the harvesting of grain maize for a few days. October was almost dry throughout the country, and the harvesting of grain maize progressed without any problems. Currently, the harvest is about to be completed and the reported yields are high. Our forecast for grain maize, which is based on scenario analyses, is set at slightly below the level of last year, which was the fourth consecutive record year.



3.4. European Russia and Belarus

European Russia

Exceptional grain maize yield is expected

Considering the review period as a whole (1 September–15 October), near-average thermal conditions characterised Russia, although the southern part of the *Near Volga Okrug* in the second decad of September and the south-western part of Russia in the last decad of September were significantly colder than usual. An extreme positive thermal anomaly (up to 7 °C) characterised the southern half of the country during the first decad of October. Mid October brought perceptible cooling and the first significant frost events (T_{min} between –3 and –7 °C) in most of Russia, except in the areas between the Black Sea and the Caspian Sea. Precipitation was scarce in most of the *Central Okrug* and regions along the coastline of the Caspian Sea. Above-average and locally intense rainfall was experienced in the *Krasnodarskiy* and *Stavropolskiy Krays*, *Rostovskaya* and *Volgogradskaya Oblasts*, and the *Near Volga Okrug*. Wet topsoil conditions may have hampered the sowing of winter wheat in these main producing regions. The harvest

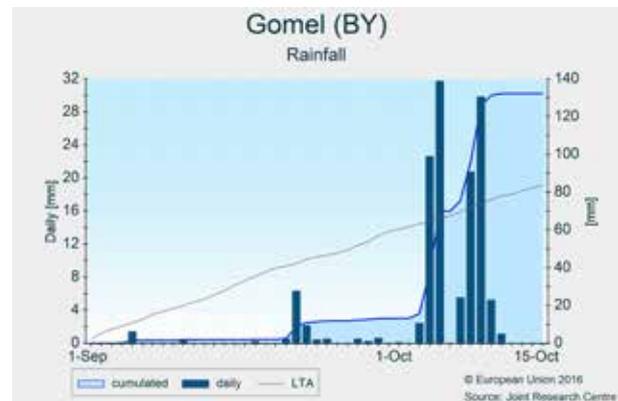
of grain maize was slowed down, but the yield expectations remain at a record high.



Belarus

Favourable September for sowing winter wheat

Warmer-than-usual thermal conditions were recorded in Belarus during the review period (1 September–15 October). The first half of September in particular indicated a large positive anomaly and was the warmest on record. In September, precipitation was sparse in the southern and western part of Belarus, where only 10–30 mm of rainfall was measured. In the first decad of October, abundant (60–120 mm) precipitation was experienced in the southern half of Belarus (in the *Brest*, *Gomel* and *Grodno* regions). The dry conditions in September were favourable both for the harvesting of grain maize and for the sowing of the majority of winter wheat, but field activities were suspended since the beginning of October due to overly wet topsoils in the main agricultural regions. Grain maize yields are forecast to be below the five-year average as a consequence of the dry conditions in most of southern Belarus during this summer.



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
EU28	6.03	5.40	5.60	-10.4	-3.6	5.02	4.76	4.72	-5.2	+0.9
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	5.06	4.10	+11.7	+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	+20.3	+14.7	2.46	3.42	2.73	+39.1	+25.2
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	-23.4	7.09	5.46	6.49	-22.9	-15.8
GR	2.99	2.92	2.99	-2.3	-2.3	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	7.97	7.71	-7.1	+3.3
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	3.65	3.62	+3.5	+0.8
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	3.59	3.10	+3.8	+15.7
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	5.95	6.12	-11.1	-2.8

Country	SOFT WHEAT t/ha					DURUM WHEAT t/ha				
	2015	2016	Avg 5yrs	% 16/15	% 16/5yrs	2015	2016	Avg 5yrs	% 16/15	% 16/5yrs
EU28	6.28	5.62	5.83	-10.5	-3.6	3.49	3.34	3.33	-4.4	+0.3
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	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
EU28	4.14	4.18	4.20	+ 0.9	- 0.6	3.34	3.21	3.20	- 3.9	+ 0.4
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	3.57	3.58	+ 1.3	- 0.3	2.85	2.75	2.80	- 3.4	- 1.6
PT	1.69	1.94	1.39	+ 14.8	+ 39.9	-	-	-	-	-
RO	3.48	3.78	3.37	+ 8.7	+ 12.2	2.50	2.73	2.29	+ 9.3	+ 19.5
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
EU28	71.89	73.82	71.83	+ 2.7	+ 2.8	32.85	32.35	32.22	- 1.5	+ 0.4
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	-	-	-	-	-	14.96	13.07	13.52	- 12.7	- 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	74.86	71.85	+ 3.7	+ 4.2	43.81	43.99	44.29	+ 0.4	- 0.7
DK	66.90	64.21	63.97	- 4.0	+ 0.4	42.10	41.97	41.02	- 0.3	+ 2.3
EE	-	-	-	-	-	-	-	-	-	-
ES	95.87	97.68	89.44	+ 1.9	+ 9.2	31.87	32.19	30.73	+ 1.0	+ 4.8
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	25.35	+ 5.8	+ 1.2
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	53.97	+ 19.9	+ 28.1	22.65	27.28	24.18	+ 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	22.55	22.27	+ 3.9	+ 1.3
PT	-	-	-	-	-	18.62	19.31	17.84	+ 3.7	+ 8.2
RO	39.14	41.57	36.70	+ 6.2	+ 13.3	13.81	14.81	14.82	+ 7.3	- 0.1
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	69.00	70.96	70.59	+ 2.8	+ 0.5	49.00	43.03	41.52	- 12.2	+ 3.6

Country	SUNFLOWER t/ha					GREEN MAIZE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU28	1.87	1.99	1.94	+ 6.2	+ 2.8	38.76	41.59	42.71	+ 7.3	- 2.6
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	2.20	2.12	+ 4.5	+ 4.0	19.00	20.22	18.76	+ 6.4	+ 7.8
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	44.39	44.35	+ 7.3	+ 0.1
DK	-	-	-	-	-	37.56	40.63	37.62	+ 8.2	+ 8.0
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	42.95	- 8.1	- 18.0
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	24.83	+ 31.2	+ 23.7
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	46.88	44.95	-	-
PT	1.24	0.90	0.80	- 27.8	+ 12.4	-	-	-	-	-
RO	1.77	1.72	1.81	- 2.7	- 4.9	26.95	24.02	25.80	- 10.9	- 6.9
SE	-	-	-	-	-	-	-	-	-	-
SI	-	-	-	-	-	48.70	47.18	42.10	- 3.1	+ 12.1
SK	2.31	2.42	2.33	+ 4.9	+ 3.9	22.95	29.77	27.04	+ 29.7	+ 10.1
UK	-	-	-	-	-	-	-	-	-	-

Country	RICE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU28	6.70	6.88	6.70	+ 2.7	+ 2.7
AT	-	-	-	-	-
BE	-	-	-	-	-
BG	5.45	5.28	5.42	- 3.2	- 2.7
CY	-	-	-	-	-
CZ	-	-	-	-	-
DE	-	-	-	-	-
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	7.75	7.83	7.62	+ 1.1	+ 2.9
FI	-	-	-	-	-
FR	4.61	5.38	5.09	+ 16.7	+ 5.9
GR	7.71	7.69	7.81	- 0.2	- 1.5
HR	-	-	-	-	-
HU	3.36	3.26	3.46	- 3.0	- 6.0
IE	-	-	-	-	-
IT	6.45	6.74	6.54	+ 4.5	+ 3.0
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	6.40	6.17	6.01	- 3.7	+ 2.5
RO	4.48	4.18	4.45	- 6.6	- 5.9
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	-	-	-	-	-
UK	-	-	-	-	-

Note: Yields are forecast for crops with more than 10 000 ha per country (for rice more than 1 000 ha per country).

Sources: 2011-2016 data come from DG Agriculture and Rural Development's short-term outlook data (dated September 2016, received on 11.10.2016), Eurostat Eurobase (last update: 11.10.2016) and EES (last update: 23.9.2016).
2016 yields come from the Mars Crop Yield Forecasting System (output up to 20.10.2016).

* The EU-28 figures do not include green maize forecasts for Belgium, Ireland, Portugal, Sweden and the United Kingdom since recent data on yields were 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	4.23	3.52	+ 9.0	+ 20.3

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	- 10.8	- 2.4
UA	2.95	3.24	2.57	+ 9.7	+ 26.0

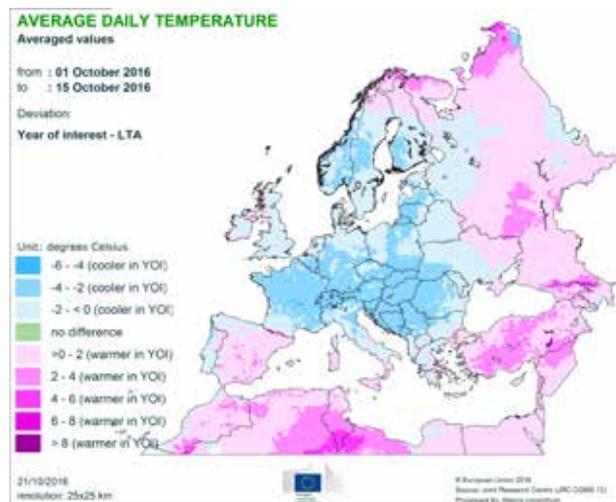
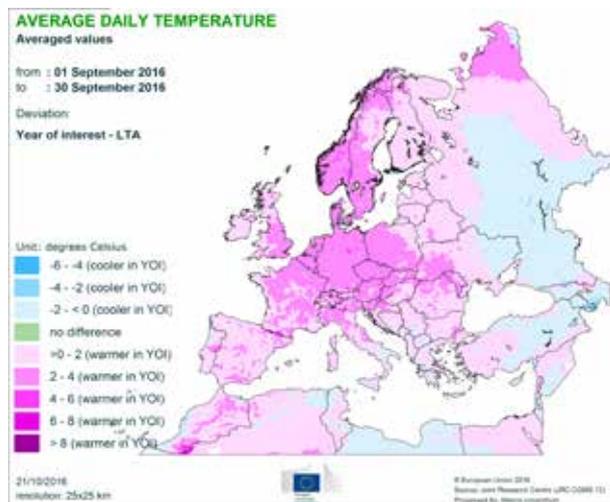
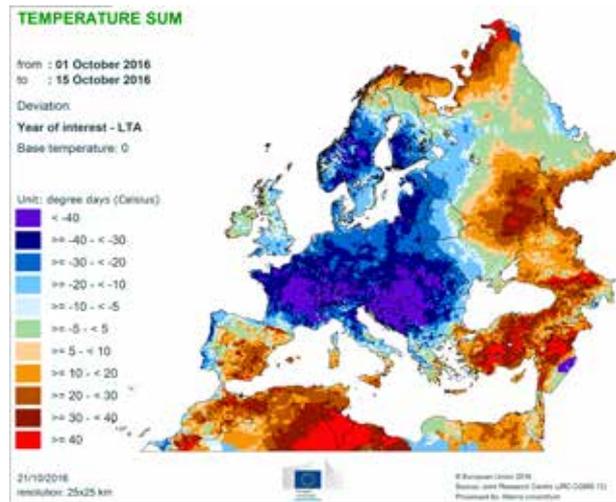
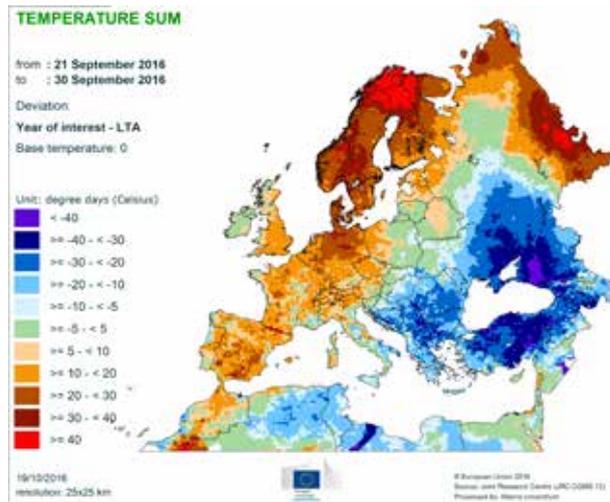
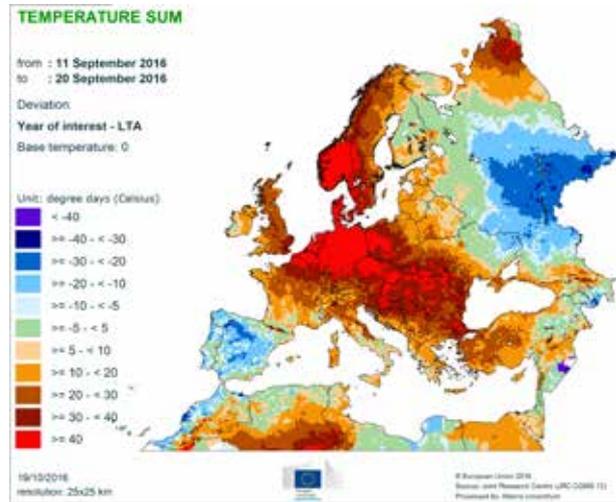
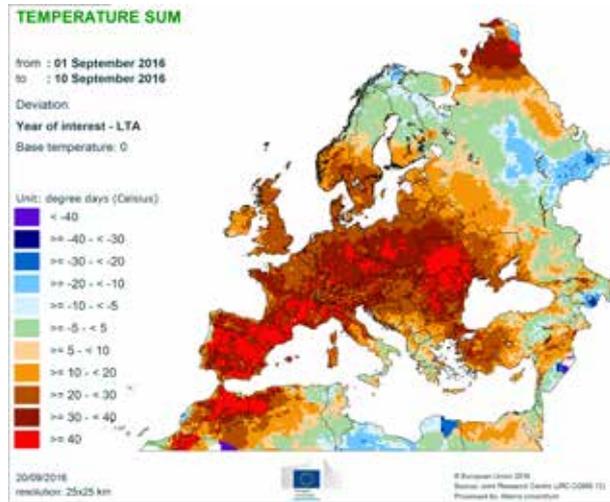
Country	GRAIN MAIZE (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	5.33	5.31	5.60	- 0.4	- 5.2
TR	9.30	9.17	8.39	- 1.4	+ 9.3
UA	5.71	6.02	5.77	+ 5.5	+ 4.3

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

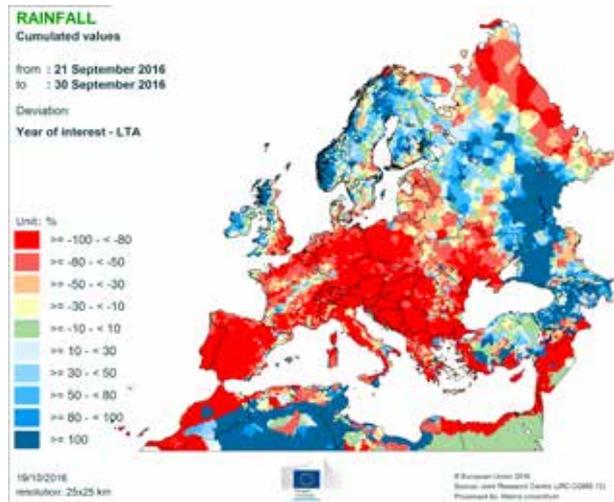
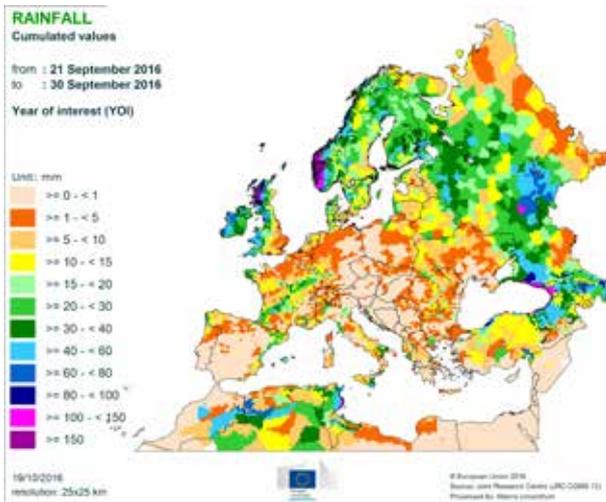
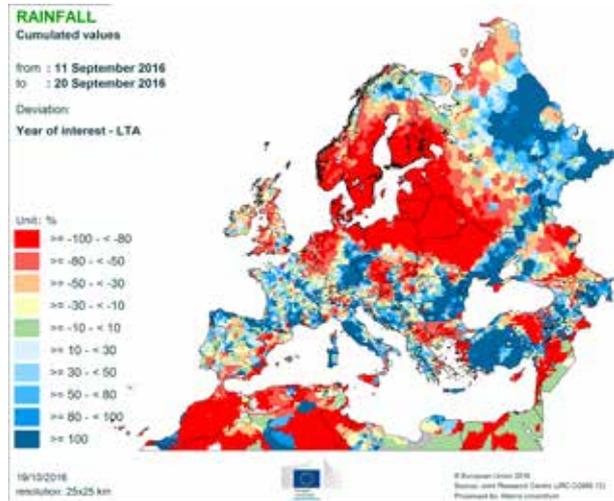
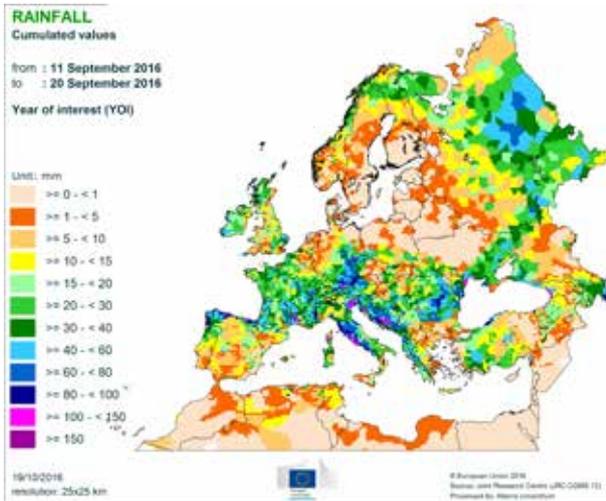
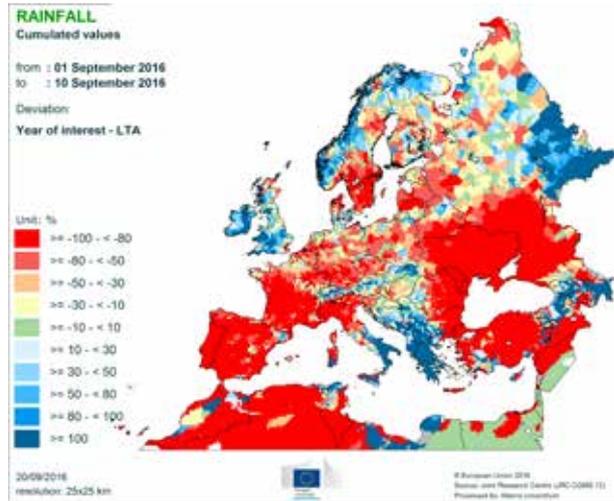
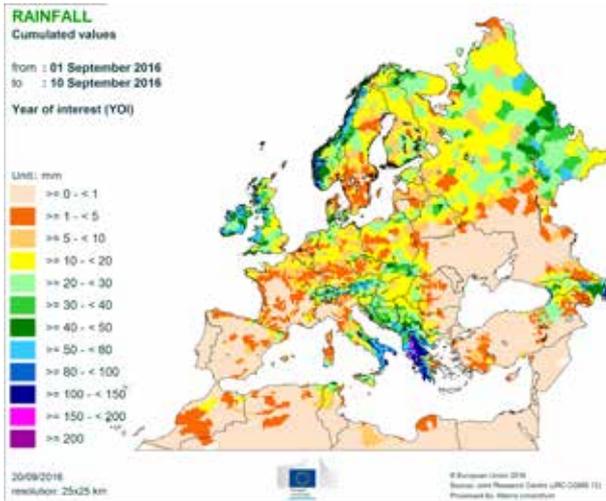
Sources: 2011-2015 data come from USDA, State Statistics Service of Ukraine, FAO, Turkish Statistical Office, PSD Online. 2016 yields come from the Mars Crop Yield Forecasting System (output up to 20.10.2016).

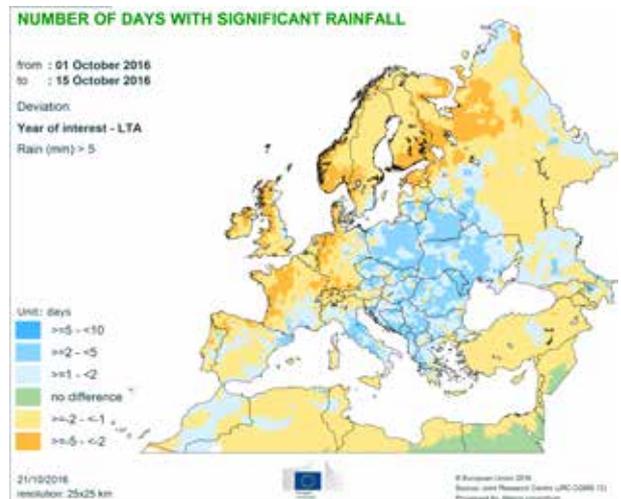
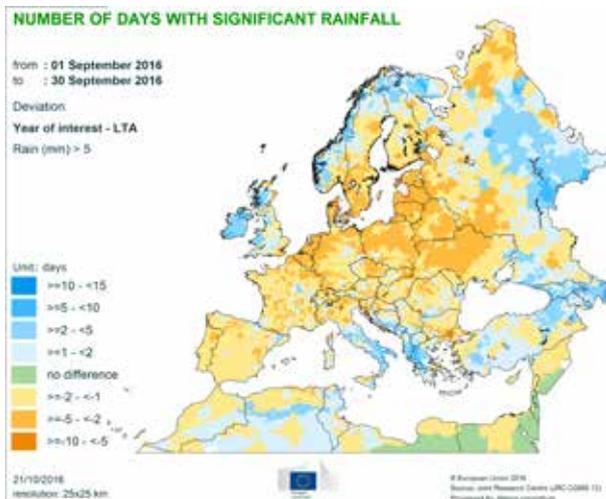
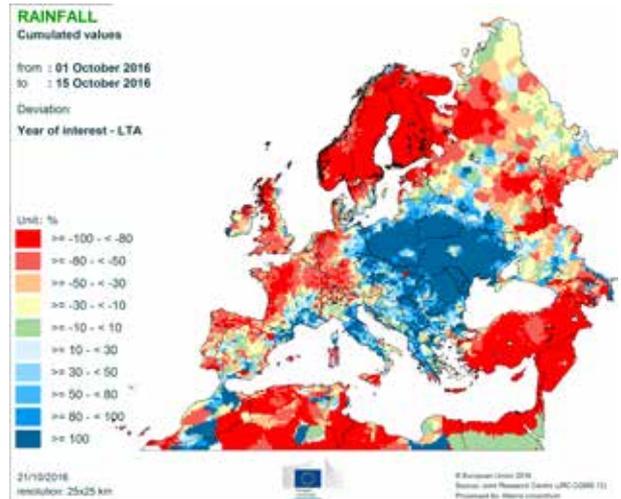
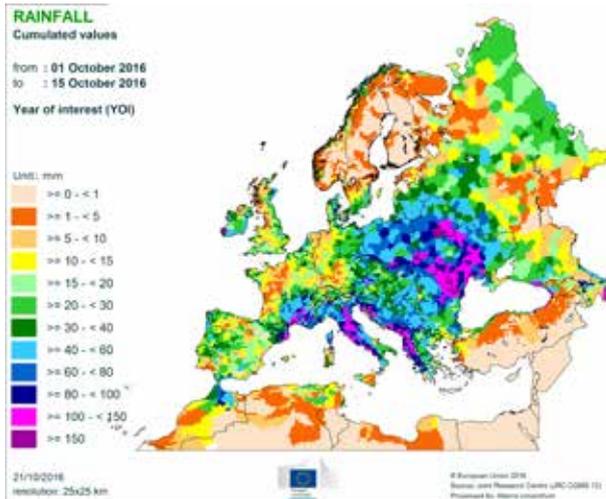
5. Atlas

Temperatures

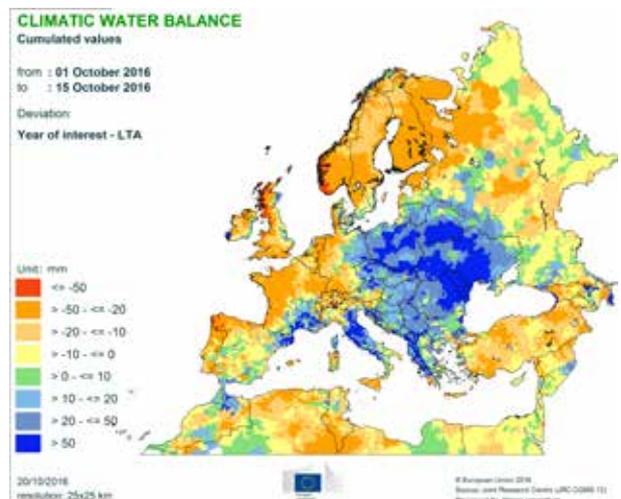
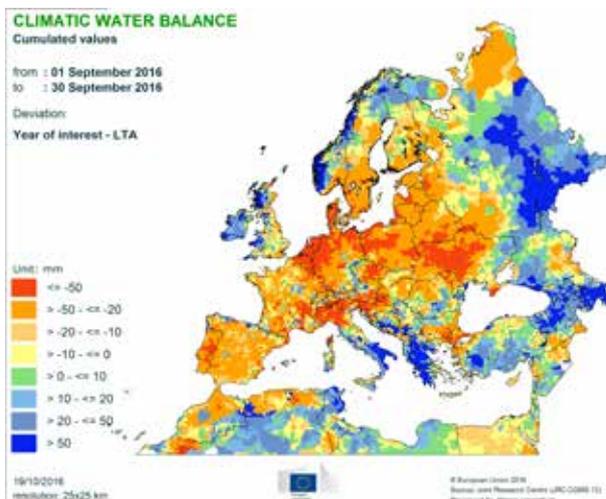


Precipitation

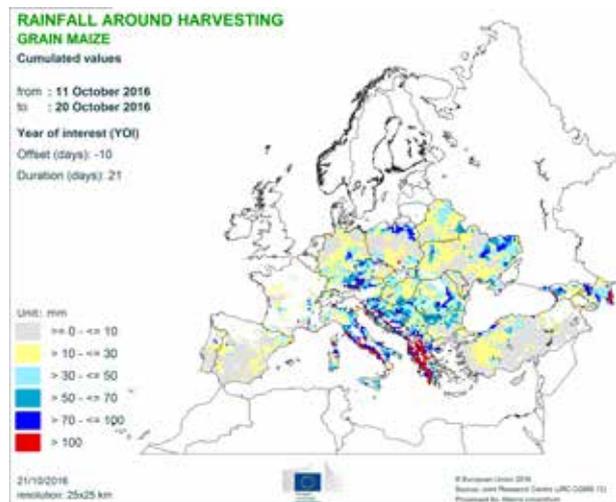
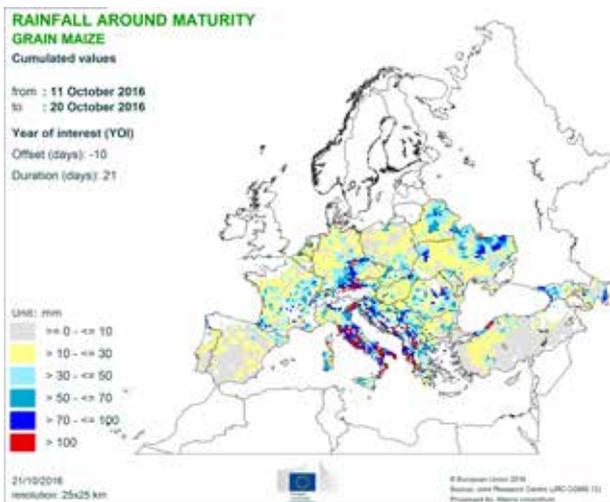
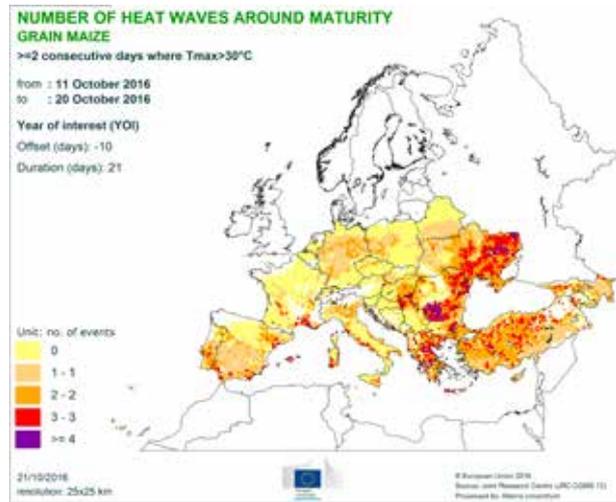
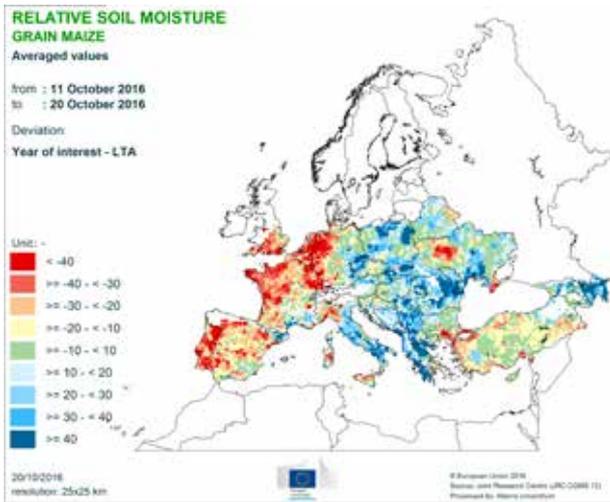
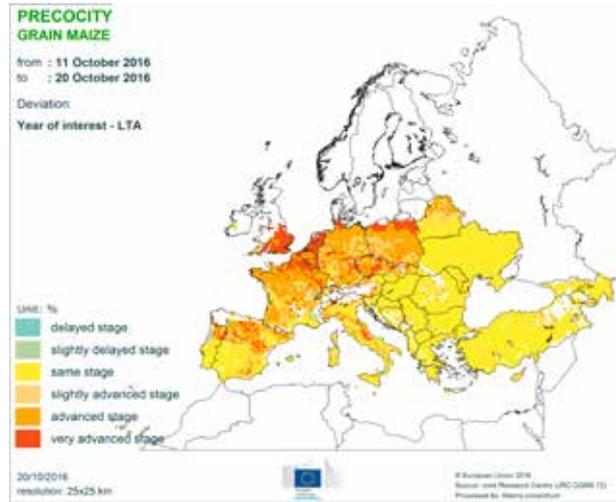
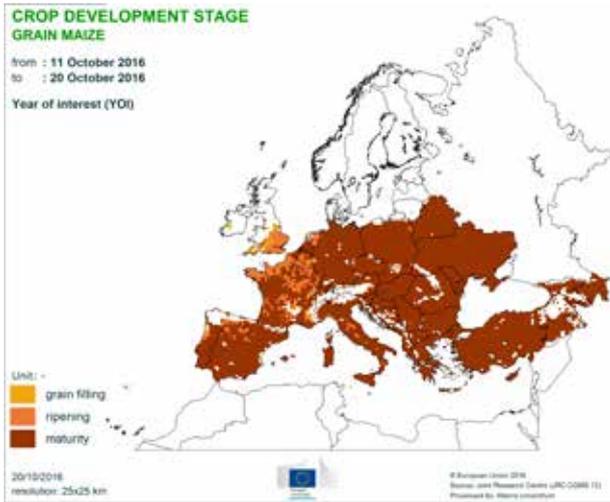




Climatic water balance



Maize



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 and yield forecast	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

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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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