

JRC MARS Bulletin

Crop monitoring in Europe

October 2021

Fair autumn weather

Good progress of harvesting and sowing activities

Fair autumn weather conditions in most parts of Europe allowed farmers to make good progress with the sowing of winter crops and the harvesting of summer crops, and benefited the summer crops that are still in the field during their final stages of development.

At EU level, our yield forecasts for most summer crops were revised slightly upward compared with the figures reported in September. Only the forecast for potatoes has slightly decreased, due to downward revisions for Germany, Lithuania and Greece.

In southern Romania, conditions for the sowing and emergence of winter crops were not favourable, as the drought conditions that persisted since late summer were only marginally alleviated by rain in October.

In Greece and southern Bulgaria an exceptional rain surplus in October caused delays to the harvest of the summer crops still in the field. Periods with very high rainfall were also experienced in parts of France and Belgium. These events caused some delay to harvesting and sowing activities, yet without raising serious concern. Temperatures well below seasonal values prevailed in large parts of European Russia, Ukraine and Belarus, without causing significant negative impacts on crops.

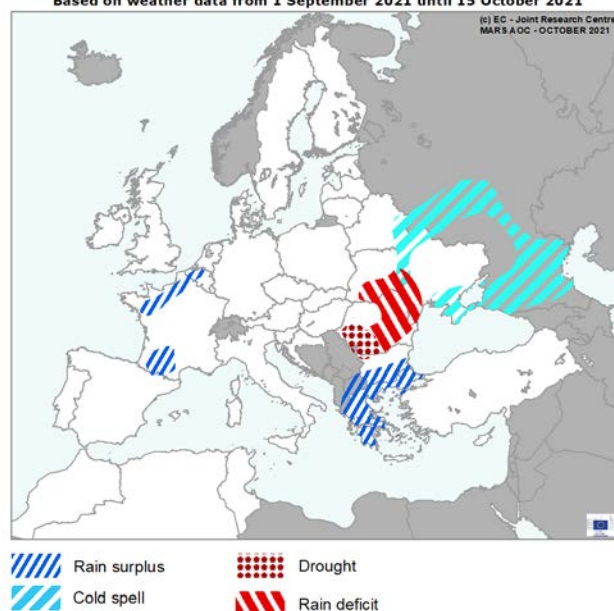
Contents:

1. Agrometeorological overview
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4. Country analysis
5. Crop yield forecasts
6. Atlas

Covers the period from 1 September until 15 October

AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 September 2021 until 15 October 2021



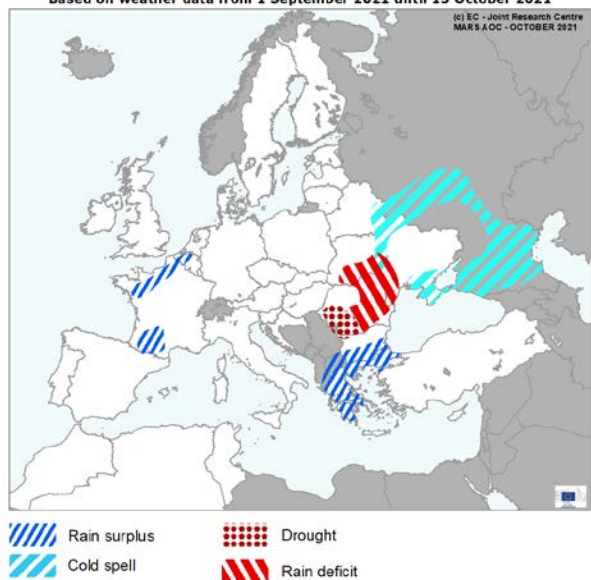
Crop	Yield t/ha				
	Avg 5yrs	September Bulletin	MARS 2021 forecasts	%21/5yrs	% Diff September
Grain maize	7.76	7.78	7.79	+ 0.4	+ 0.1
Potato	32.9	34.6	34.4	+ 4.7	- 0.5
Sugar beet	73.6	75.0	75.4	+ 2.4	+ 0.5
Sunflower	2.27	2.36	2.37	+ 4.1	+ 0.4
Soybean	2.93	2.96	3.00	+ 2.4	+ 1.4
Green maize	40.7	44.0	44.0	+ 8.0	+ 0.1

Issued: 25 October 2021

1. Agrometeorological overview

1.1 Areas of concern

AREAS OF CONCERN - EXTREME WEATHER EVENTS
Based on weather data from 1 September 2021 until 15 October 2021



The map above displays the meteorological events that occurred between 1 September and 15 October; the events reported in the September issue of our Bulletin are not repeated here.

Weather conditions in large parts of Europe were close to average and did not lead to significant concern.

However, in southern **Romania**, drought conditions that have been in place since late summer were only

marginally alleviated by rain that occurred in October, and the conditions for sowing and emergence of winter crops remain suboptimal. The (more recent) rain deficit in other parts of Romania, and in southern Ukraine had no significant negative impacts.

In **Greece** and southern **Bulgaria** an exceptional rain surplus was recorded in October delaying the harvest of the summer crops still in the field, and some associated losses are expected.

Southern **France** (mainly around mid-September), and north-western **France** and **Belgium** (in the first week of October) also experienced periods with very high rainfall. These events caused some delay to harvesting and sowing activities, yet without raising serious concern. In some of the above-mentioned areas the rains were welcomed as the soils had become very hard and dry due to the previous lack of rain.

Temperatures well below seasonal values prevailed in large parts of **European Russia, Ukraine** and **Belarus**, without causing significant negative impacts on crops.

1.2 Meteorological review (1 September – 15 October 2021)

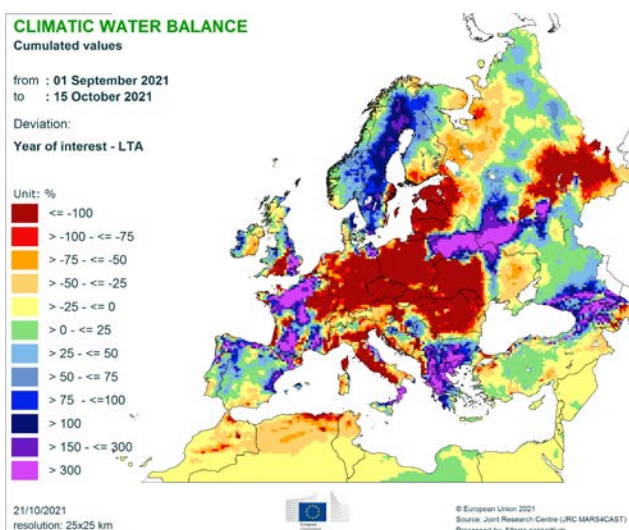
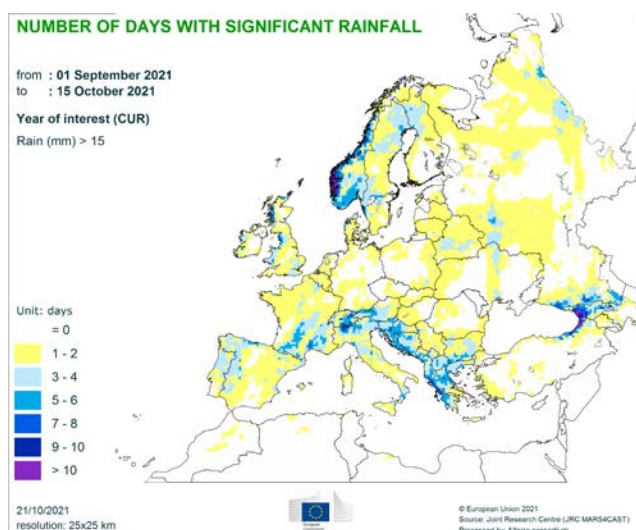
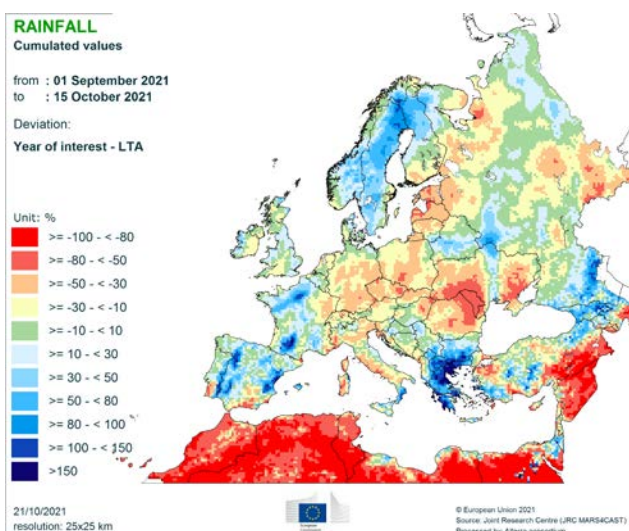
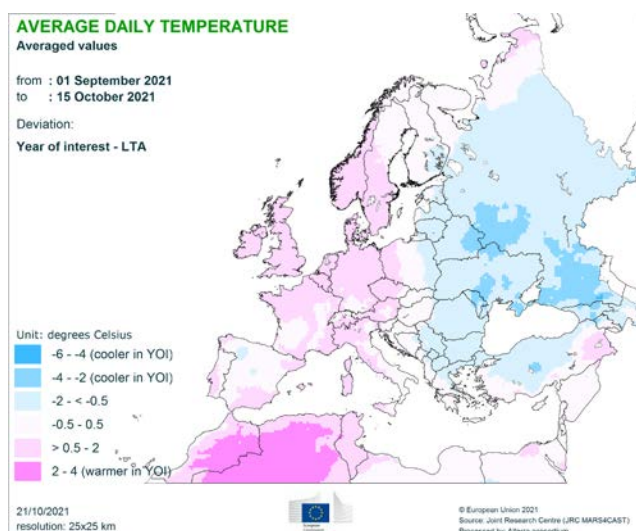
Slightly warmer-than-usual conditions were recorded in most of central and northern Europe, in large areas of the Iberian Peninsula, and in Italy. In these regions, daily mean temperature anomalies (with respect to the LTA) were mainly from +0.5 °C to +2 °C.

Slightly colder-than-usual conditions were mainly recorded in eastern and south-eastern Europe as well as in Russia. Daily mean temperature anomalies in these regions were mainly from -2 °C to 0.5 °C (-4 °C to -2 °C in two large areas of European Russia).

Wetter-than-usual conditions were mainly observed in a large region of south-eastern Europe, in the Scandinavian Peninsula, along the east coast of the Black

Sea, in some areas of the Iberian Peninsula and France. Anomalies of total precipitation ranged from +50% to +150% in these regions, and also above 150% in a large area of Greece.

Drier-than-usual conditions were mainly observed in a large region across Ukraine, Moldavia, and Romania, and in south-eastern Turkey. Anomalies in total precipitation ranged mostly from -100% to -80%. However, it is important to highlight the pronounced negative anomalies (higher than -100% the LTA) in the climatic water balance observed in most of central and eastern Europe, Italy and in a large area of European Russia.



1.3 Weather forecast

Weather conditions from 23 to 30 October will be mainly determined by two troughs crossing Europe that will favour intense precipitation events mainly over eastern Europe and the southern part of the central Mediterranean, the UK, the Scandinavian peninsula, and the Baltic countries. Colder conditions are also expected in eastern and northern Europe.

The Long-range weather forecast for November, December, and January points to likely-very likely to occur warmer-than-usual conditions in the western and central Mediterranean as well as in south-eastern Europe. Drier-than-usual conditions are likely to occur in the eastern Mediterranean.

2. Pastures in Europe – regional monitoring

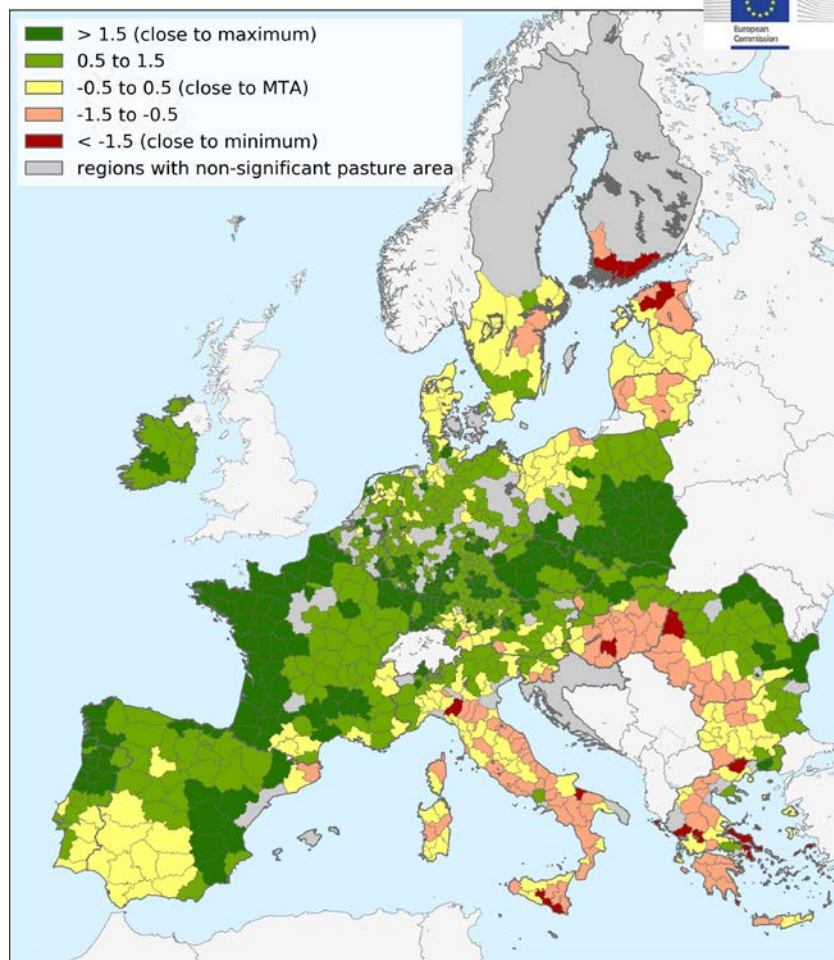
A good summer for pastures, except in south-eastern and north-eastern regions

This summer has been favourable for pastures in most of Europe. Marked exceptions are the Baltic Sea region and a large south-eastern region encompassing Italy, Greece, Bulgaria, Hungary and southern Romania.

Pasture Productivity Index

Period of analysis: 1 June - 30 September 2021

Index based on MODIS NDVI 10-day product.
Medium-term average (MTA) 2011-2020



The map above shows the pasture productivity index (PPI)¹ for the period 1 September to 15 October 2021.

After a favourable start to the season in spring, Finland and the Baltic countries experienced a succession of suboptimal conditions. High temperatures and low radiation prevailed in late June and the first half of July, extreme warm weather conditions reduced growth. Later, dry soils, followed by periods with excessive rainfall

created below average conditions for pastures. Finally, the colder than usual temperatures that characterized many areas from August until the end of the review period limited growth. Silage grass production is estimated to be variable across the countries.

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

Pastures in large parts of Italy, Bulgaria, Romania and Greece were negatively affected by periods of unusually hot and/or dry conditions. While Italy and Bulgaria started the summer season under normal conditions, August and September were hot and dry, causing persistent stress to the grass canopy. In southern Romania, stress conditions lasted for a longer period as these started with a dry July and went on for 3 continuous months, while favourable conditions prevailed in the east. Greece experienced a warmer- and drier-than-usual July, followed by a short, but very intensive period of exceptional heat and drought stress in August. In the first dekad of August, wildfires in central Greece burned about 93,000 ha, including almost 8,000 ha of grassland. However, grazing areas benefited from frequent rainfall events since then.

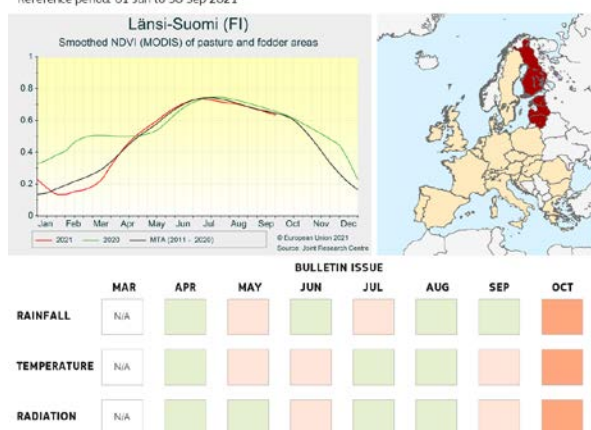
In Hungary, the summer weather conditions were overall unfavourable for pastures. Conditions improved somewhat in autumn even though rainfall continued to be below average.

It is worth mentioning that the southern and central Iberian Peninsula also experienced a dry summer, with little or no rainfall. However, these areas are marked as yellow on the map, as such conditions are not exceptional in this region.

Pastures in the large region spanning from the northern Iberian Peninsula to Poland, including France, Ireland, Germany, the Benelux countries, Austria, Czechia, Slovakia and Slovenia, benefited from moderate temperatures, with relatively few heat events and well-distributed (in some cases excessive) rainfall.

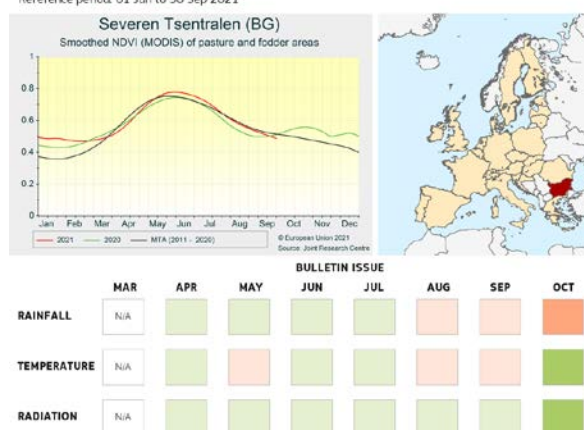
Finland and Baltic countries

Reference period: 01 Jun to 30 Sep 2021



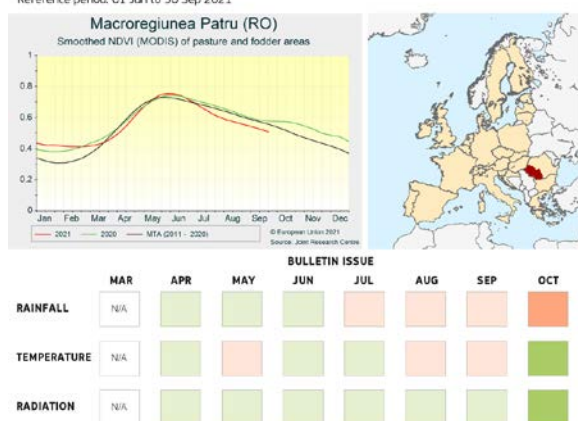
Bulgaria

Reference period: 01 Jun to 30 Sep 2021



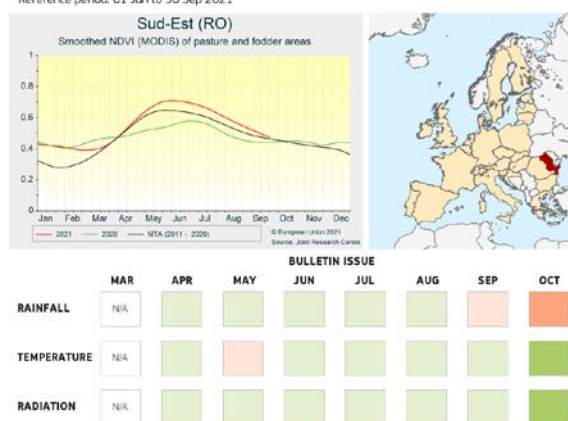
Romania - South

Reference period: 01 Jun to 30 Sep 2021



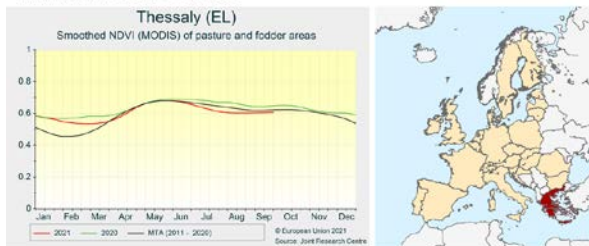
Romania - East

Reference period: 01 Jun to 30 Sep 2021



Greece

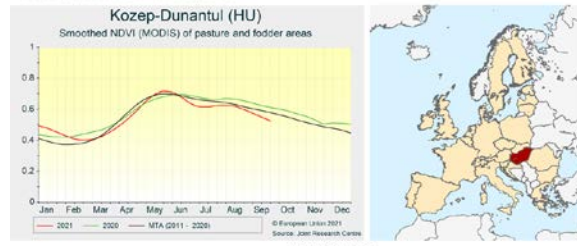
Reference period: 01 Jun to 30 Sep 2021



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

Hungary

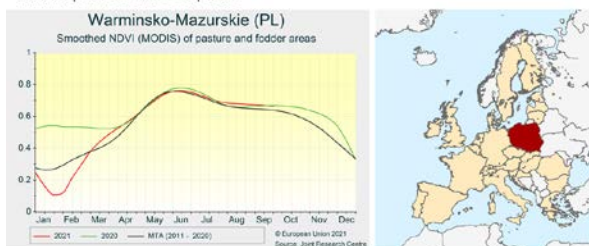
Reference period: 01 Jun to 30 Sep 2021



	BULLETIN ISSUE						
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RAINFALL	N/A						
TEMPERATURE	N/A						
RADIATION	N/A						

Poland

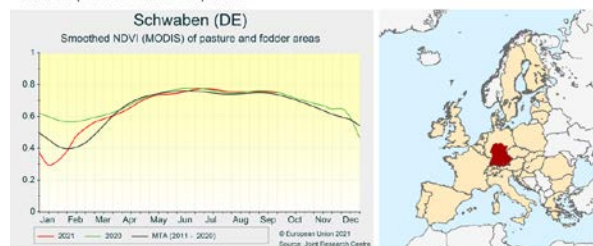
Reference period: 01 Jun to 30 Sep 2021



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

Germany - South

Reference period: 01 Jun to 30 Sep 2021



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

3. Sowing conditions

Winter cereals

Sowings started under favourable weather conditions and progressed without significant obstacles

The sowing campaign for winter cereals started under favourable conditions across Europe. While the beginning was slightly delayed in northern countries due to the difficult harvest of the preceding crops, sowings progressed well in September. In the Baltic countries, the sowing of winter cereals was completed by the end of September, within the optimal window and with favourable conditions for emergence. Similarly, in Sweden and Denmark, sowing progressed well during the dry September, and the rainfall in October created optimal conditions for early growth. In Finland, the weather of September helped to catch up with the delayed beginning of the sowing campaign and ensured a satisfactory emergence. In Ireland, Germany and the United Kingdom, September provided favourable conditions to start the campaign that is expected to be concluded in time. In the Benelux, sowing began in September, and the wet conditions observed in the first half of October should not prevent concluding the campaign as planned. In France and Poland sowings are ongoing under good conditions and progress is in line with the 5-year average. However, in Poland, the decreased temperatures in October could damage the emergence of the late sown wheat. In Czechia, Austria and Slovakia, weather conditions were adequate for sowing and early development of winter cereals, although recent rainfall events could have slowed

down the campaign regionally in eastern Slovenia and eastern Croatia. In Romania and Bulgaria, dry conditions slightly delayed the beginning of the sowing of winter wheat and barley, and although soil conditions improved after the rainfall of the second half of September, drier than usual conditions are limiting the germination and emergence in southern Romania and northern Bulgaria. In Hungary, good sowing conditions overall characterise the beginning of the sowing campaign. In Ukraine sowings progressed well under overall satisfactory conditions, despite the colder than normal temperatures.

In Spain and Portugal, sowing usually starts by mid-October, but favourable soil conditions allowed an early beginning in Portugal. In Italy and Greece, the optimal sowing window for cereals begins in November. In Italy, where the winter cereals sowings started in October, thanks to the beneficial rainfall at the end of September, more rainfall would help to ensure the emergence of the crops sown in advance. However, as sowing activities usually get underway from November onwards, rainfall does not currently represent a major limitation for the progress of the sowing activities that can be carried out on time. For durum wheat, it is still early for sowing. First sowing operations usually start during the last week of October.

Winter rapeseed

Fair sowing conditions in most of the main production regions

The rainy conditions of August in most northern and western European countries slightly delayed the start to rapeseed sowing. In Ireland, France, Belgium, Netherlands, western Germany, Denmark and Sweden, the sowing campaign started in August and was completed by the end of September. The soil moisture levels and temperatures in these regions were adequate/favourable for healthy emergence.

In northern central and north-eastern parts of Europe (Poland and the Baltic countries), high and frequent precipitation throughout August caused delays to the sowing of rapeseed. Moreover, excessively wet top soils and soil crusting (after heavy rains) impaired the emergence of sown rapeseed. September conditions were favourable for early development of rapeseed.

In Italy and in central Europe (Hungary, Bulgaria, Romania), soil moisture conditions were suitable for

sowing during most of August. Then during the first half of September, conditions were particularly dry. Consequently, sowings occurred mostly during the 2nd half of September and in the beginning October. As of mid-October, sowing is close to being finalised under favourable agrometeorological conditions.

In Ukraine, the sowing of rapeseed was almost concluded by the end of the first dekad of October, according to official statistics under favourable soil moisture conditions.

Overall, we estimate that sowing has been concluded within a suitable window in most parts of Europe. A significant increase in surface is expected in France, Germany (estimated +6% as compared to 2020-2021), Ireland, as well as in Ukraine.

4. Country analysis

4.1 European Union

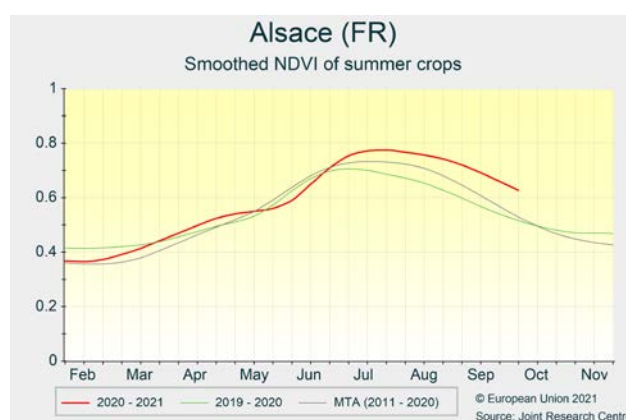
France

Continued positive outlook for summer crops

Temperatures were slightly above LTA during the review period, with anomalies ranging from +0.4°C in the southwest (e.g., Aquitaine) to +1.5°C in the north (e.g., Brittany). Abundant rainfall in September occurred in a large swath from the Pyrenees to the Ile-de-France, anomalies ranging from 50mm in the Paris area to 192 mm in south-western France. The first half of October was drier than usual in most parts of the country except for regions in north-western France.

The yield outlook for summer crops remains very positive, approaching the record levels of 2014 and 2017. The sunflower harvest is now almost finished. Soybeans benefited from the moderate temperatures during summer, with limited heat stress. The main concern remains the ripening of maize due to the accumulated delays in phenological development since the cold start to the season. The delay is greatest in north-eastern France

(up to one month). However, it is likely that the recent dry and warmer conditions in that region will help speed up grain maturing. The yield outlook for potatoes and sugar beet also remains positive. The sugar beet harvest campaign started at the end of September.

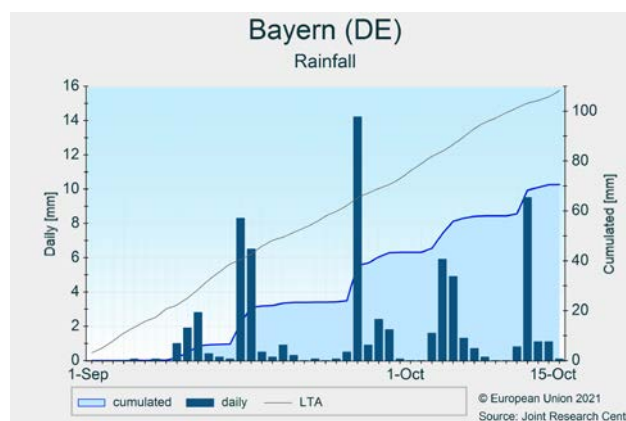


Germany

Dry period allows for good sowing progress

The period under review was decidedly drier than usual. While September still brought some rain all over Northern Germany, during October only regions along the northern sea coast received some noteworthy precipitation. Temperatures followed the normal course of the season and for most of the country, a clear radiation surplus is recorded. The dry conditions allowed farmers to proceed with the preparations and sowings of winter cereals as well as with the harvesting of maize, which is 2-3 weeks behind the long-time schedule, due to a somewhat slower development during July and August. In some higher altitude regions maize maturity has not been fully reached, but in general the yield prospects are good and we confirm the forecast from the previous bulletin which is well above the 5-year average. The calm autumn weather, with cool nights and above-average radiation, sustained good yield levels for sugar beet, here the

campaign has started and will continue until January. The forecast for potato has been slightly revised downwards to account stronger for the very wet summer conditions.



Poland

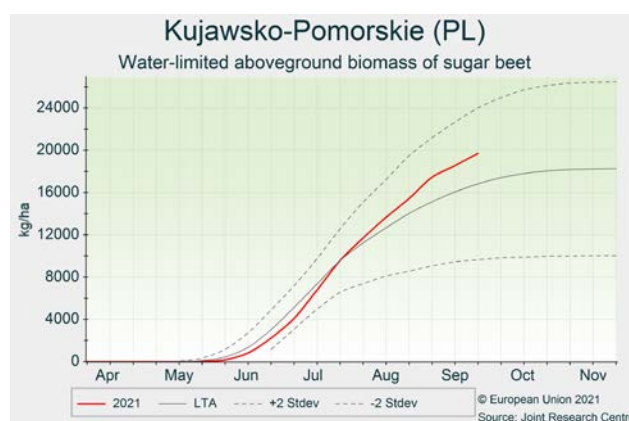
Favourable conditions for sugar beet and grain maize

During September, daily temperatures were around average (slightly above the LTA in the west and slightly below in the east). Early October brought colder temperatures with minima dropping locally below -5°C . The period under review (01 Sep – 15 Oct) was characterised by significantly below-average precipitation, except for eastern Poland where rainfall totals were around or above average. Soil moisture was adequate all over Poland due to a very wet end of August and some limited rainfall during the second dekad of September.

Regarding grain maize, the conditions were favourable for maturation and drying. The grain maize harvest is in full swing only now, approximately two weeks later than usual, with initial reports indicating satisfactory yields. For sugar beet, the agrometeorological conditions were also very favourable during the period under review, resulting in significant gains in storage organ accumulation and sugar contents. Conditions for sowing and early development of winter crops were generally favourable, too, resulting in

good progress of the sowing operations. However, some delays were noted for winter wheat sown after the late harvested maize.

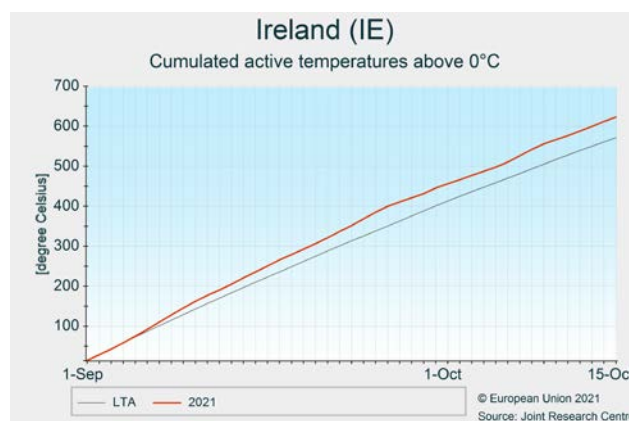
We maintain our positive yield outlook for grain maize, and increase our yield forecast for sugar beet.



Ireland

Favourable soil conditions for winter sowing

September was characterized by well-above average temperatures, and in October cumulated values were slightly above seasonal values. Rainfall was just below average with the lowest values observed in the Eastern areas. Spring barley harvests were almost completed at the beginning of September. Winter cereal planting was in full swing during the first dekad of October and slightly advanced in the East due to the lower rainfall. Soil conditions are adequate to conclude sowing in the optimal window. The harvesting of green maize started without significant problems. The yield forecasts remain practically unaltered compared to the September issue of the Bulletin.



Spain and Portugal

A cooler end to the summer season

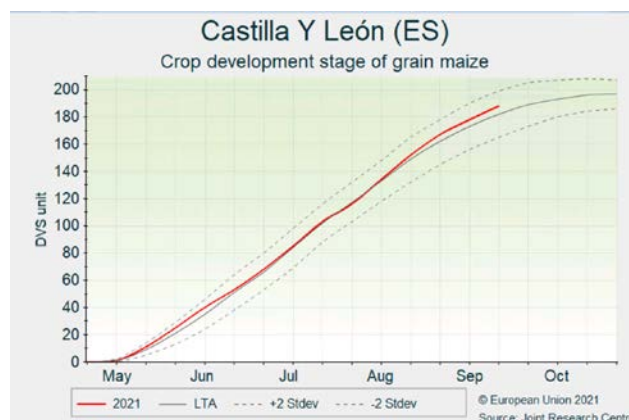
Temperatures returned to average throughout the peninsula, with a cold event in the first dekad of October. Rainfall returned in most parts of the Iberian Peninsula, with two main events (10-20 mm/day) covering the peninsula, resulting in cumulated values above the LTA for this review period.

Grain maize is in the ripening phase in *Castilla y León*. In the south, harvesting is on-going in *Alentejo*, *Extremadura* and *Castilla-la-Mancha*, and is completed in *Andalucia*. Potatoes are all harvested.

Reservoirs in the southern part of the Iberian Peninsula may start the 2022 year at very low storage, this should be carefully monitored in Spring 2022 to assess the potential impact to the crops.

The yield forecast for grain maize and green maize are unchanged at the 5-year average for Spain, and above the Italy

5-year average for Portugal. For potatoes, our yield forecast stays slightly below the 5-year average for Spain, and above average for Portugal.

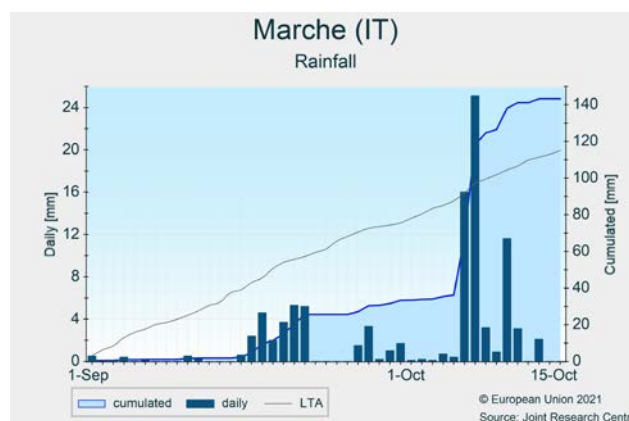


Italy

More rainfall needed for optimal winter sowings

In northern Italy the first 15 days of September were dry and warmer than usual. Then precipitation set in with around 50mm in two weeks. These conditions extended the duration of the late maize harvest but without negative effects since the weather turned dry again. Concerning winter crops, the rainfall was beneficial as it restored soil moisture just before the optimal sowing period. In central Italy, affected during summer by drought condition, rainfall was abundant in October (up to 100mm) and soil moisture levels in most of the regions are well restored. The warm anomalies of September and October led to evaporation above the average values and more rainfall would be welcome to guarantee an optimal start to the season. In southern Italy, dry and warm to hot conditions are still present and abundant rainfall will be

needed before the sowing period in November to allow for favourable germination.



Hungary

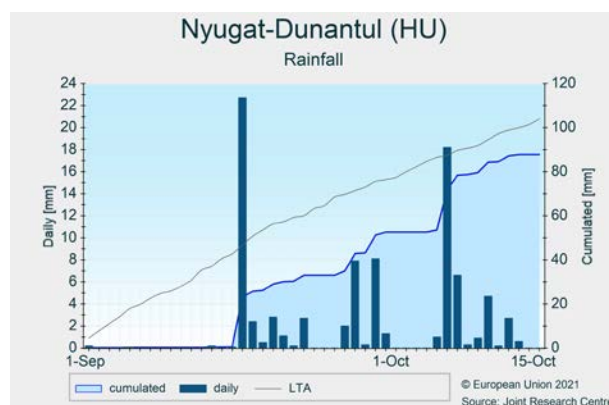
Continued negative outlook for summer crops

The first half of September was extremely dry, with no significant rain throughout the country. During the remaining part of the period under review, rainfall followed the LTA without recovering the deficit. Temperatures fluctuated around the LTA.

The wet and warm conditions in August were favourable for rapeseed sowing and emergence. However, the dry conditions in the first half of September were unfavourable for sowing and resulted in delayed emergence and gappy stands in fields that had already been sown. Recent rains improved crop status, but some fields might be re-sown with winter cereals. Winter cereal sowing is ongoing as normal. The rainfall since mid-September was very positive for the start to the winter crops season.

Sunflower harvest finished mid-October. The grain maize harvest is well advanced and should be completed by the

end of the month. Field reports confirm the negative yield outlook reported in earlier issues of the Bulletin, with the poorest results in south-eastern parts of the country.



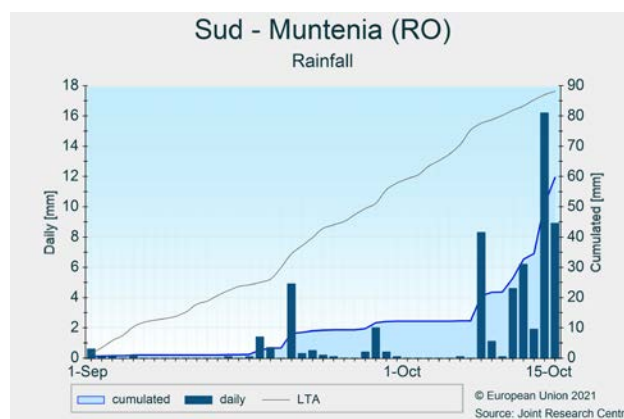
Romania

Persistent rain deficit in the south creates sub-optimal conditions for sowing and emergence

The period since the beginning of September was characterised by drier-than-usual conditions in most of Romania. The most pronounced rainfall deficit was recorded in southern and eastern Romania, where rainfall was less than half of the LTA. The lack of rainfall further intensified drought conditions in southern and south-western Romania.

Minimum temperatures recorded remained above 0 °C in the major agricultural areas during the analysis period. The harvesting campaign of summer crops has been largely finalised. The winter cereals sowing campaign is progressing well in central, northern and north-eastern parts of Romania. The continued drought in the southern

and south-western parts of the country provide sub-optimal conditions for germination and emergence.



Bulgaria

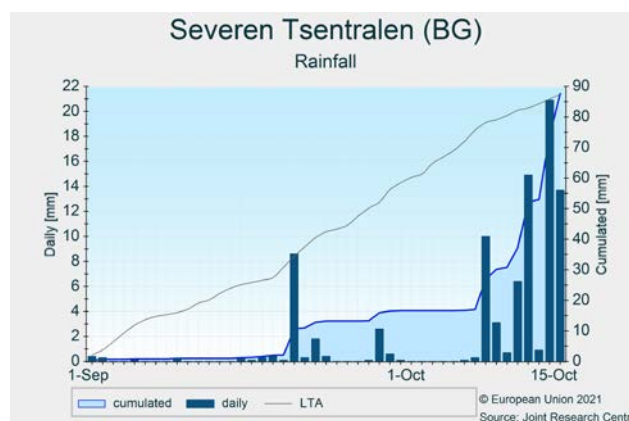
The sowing campaign for winter cereals is progressing well

Bulgaria recorded rainfall surplus in the southern part of the country, while a mild rainfall deficit was recorded in the north. Rainfall cumulates ranged from 30 mm in the north to 150 mm in the south of the country.

Even though the period was slightly colder-than-usual in most of the country, minimum air temperatures remained above 0 °C in the main agricultural regions.

The harvesting campaign of summer crops has been largely finalised, while the winter cereals sowing campaign is ongoing. Despite the long-term lack of rainfall in northern Bulgaria, recent rains improved moisture conditions of the upper soil layer, thus creating beneficial conditions for the germination and emergence of winter cereals. Overall, the sowing campaign for winter cereals is progressing well. However, in the north, substantially more

rainfall will be needed in the coming weeks to ensure adequate crop establishment.



Austria, Czechia, and Slovakia

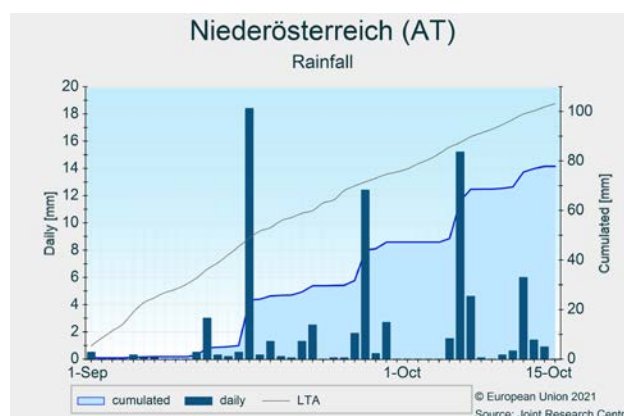
Favourable end of season conditions for summer crops and harvesting

September was characterised by a predominance of slightly above-average temperatures in all countries; colder-than-usual conditions have set in since the beginning of October. Overall, during the period under review, rainfall was significantly below the LTA in Czechia and northern Slovakia, and below average in Austria.

Favourable agrometeorological conditions allowed for sowing of winter crops, and harvest operations of maize, potatoes and sugar beets to be conducted efficiently. Despite below-average rainfall, total soil moisture levels were adequate for establishment of winter crops thanks to scattered rainfall events.

Our model simulations indicate that maize biomass and storage organs are above average seasonal values in Czechia and north-eastern Austria, and around average

values in Slovakia. The yield expectations are unchanged as compared to the previous Bulletin and remain mostly below last year's results.



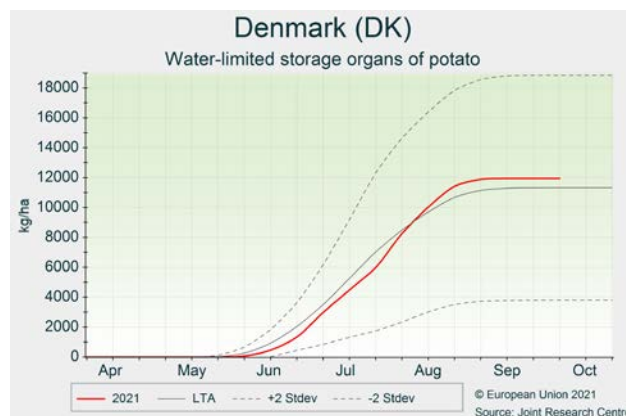
Denmark and Sweden

Winter sowings progressed under good conditions

Normal or warmer-than-usual thermal conditions prevailed during the period, with cumulated active temperatures ($T_{base}=0^{\circ}\text{C}$) slightly above the long term average and global radiation slightly below. Rainfall was absent during the first dekad of September, after which cumulated values increased and remained above average from the end of September until mid-October.

The harvest of spring cereals finished in mid-September with variable yields, which in general remained close to the average, and poorer quality. The dry period observed in September was favourable to concluding the harvest and the sowing of winter cereals. Rainfall in the period was sufficient to ensure emergence of the newly sown crops. Our simulation results suggest good yields of potatoes and sugar beet that benefitted from the recent rainfall.

The yield forecasts for potatoes, sugar beet and green maize have been revised upwards compared with the previous bulletin.



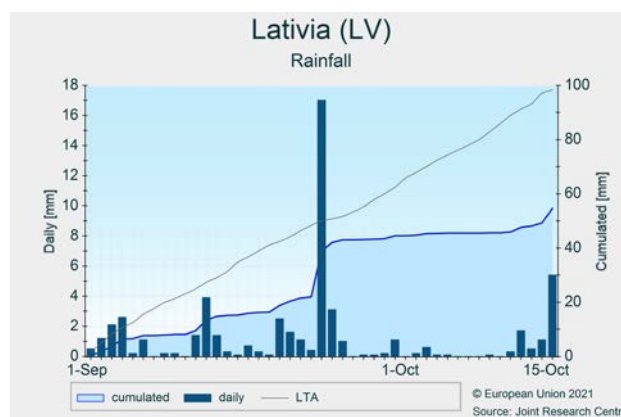
Finland, Lithuania, Latvia and Estonia

Trouble free winter sowing despite delayed harvest

The period of review was colder than usual in all countries. Rainfall was below the LTA, and radiation prevailed close to the LTA or below, despite the relatively dry conditions. In the Baltic countries, sowing of winter cereals was completed by the end of September, within the optimal time window. The rainfall events that occurred at the end of September were beneficial for the establishment of crops. In Finland, the delayed harvest of spring cereals slowed down the sowing of winter cereals in August, but progressed well in September and emergence is estimated to be satisfactory. Rapeseed, sown as planned in August, emerged well.

The harvesting of potatoes, sugar beet, and grain maize is ongoing with variable yields prospects. The yield forecasts remain practically unchanged for grain maize compared to the September Bulletin, but were revised downwards

for potato and sugar beet crops in the Baltic countries due to the prolonged dry conditions.



Belgium, Luxembourg and the Netherlands

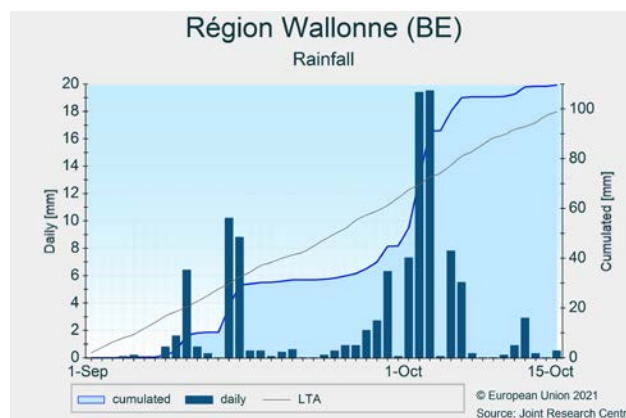
Uneven progress of harvesting and sowing

Above-average temperatures prevailed in September, but temperatures dropped at the end of the month, after which they remained around average in the northern half of the Netherlands and just below average in other parts of the region. Rainfall presented a clear gradient, from about 20% below the LTA in the northernmost parts of the Netherlands, to about 20% above the LTA in south-western Belgium. However, all regions, experienced a distinctly wet period during the last days of September and the first week of October.

Sugar beet and maize crops benefited particularly from the relatively warm and sunny conditions in September. Consequences for sowing and harvesting activities were mixed. In many areas with loamy or clayey soils, the rainy period in October was welcomed to soften the hard and dry soils, which hampered the harvesting of sugar beet and potatoes as well as soil preparation and sowing of winter crops. However, the activities could then only resume at a normal pace after the first dekad of October,

when the soils had sufficiently drained. Nevertheless, overall, the pace of these activities has been fair compared to previous years.

Our yield forecasts for summer crops have remained essentially the same, with a slight upward revision for green maize in Belgium and Luxembourg.



Greece

Good maize grain quality expected, moderate concerns for potato yields

While September remained rather dry throughout Greece, rainfall was exceptionally high in the first half of October, causing concern to harvesting conditions especially in the north of the country (e.g. *Central Macedonia* region). Daily average air temperatures decreased over time, following the seasonal trend, with some variation of warmer and colder days, still within normal range and being far from hampering crops at the end of the growing cycle.

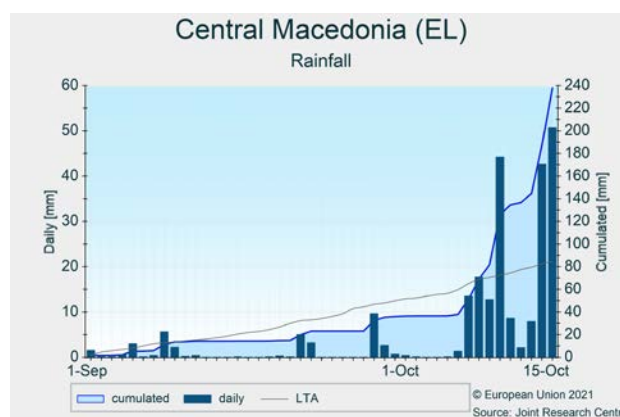
Overall, our analysis of satellite imagery (fAPAR) and simulated crop growth confirms biomass accumulation around the average level for summer crops. The harvest of summer crops has generally progressed well this season and can be considered almost completed for maize and sunflower, but slightly hampered for potatoes and delayed for rice. Maize harvest is about to end in northern Macedonian regions of Greece and is already completed in all the other areas; good grain quality is expected, but some concerns remain regarding quantity in view of the prolonged heat stress during flowering, as reported in the previous outlook.

Regarding potatoes, unless soils properly dry out in northeastern Greece (*Eastern Macedonia and Thrace*),

potato harvest will not fully conclude in due time, leading possibly to some loss in tuber production.

Rainfall led also to a delay in the rice harvest; however, for this crop good grain quality and average yields are expected. Sunflower harvest finished without major obstacles.

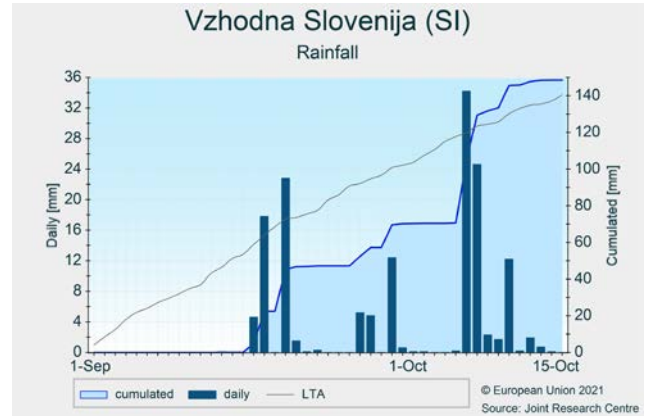
Our yield outlook confirms the forecast of September above the 5-year average for maize and around or slightly below average for sunflower; only for potatoes is our forecast moderately revised downward below the last 5-year average.



Slovenia and Croatia

The sowing campaign for winter cereals is progressing well despite recent rainfall

Slovenia and Croatia recorded normal rainfall cumulates in the eastern parts of both countries, while a slight lack of rainfall characterised western Slovenia and Adriatic Croatia. The rainfall episodes were distributed unevenly through the analysis period, with rainfall largely absent during the first half of September. The harvesting campaign of summer crops is in its final phase, while the winter cereals sowing campaign is ongoing. Recent colder weather and rainfall events might have regionally caused some delays in sowing, but there is sufficient time to finalise the campaign satisfactorily.



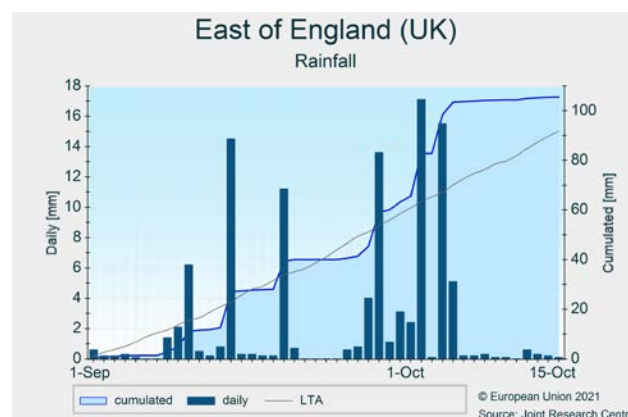
4.2 United Kingdom

Good progress of sowing of winter cereals

Above-average temperatures prevailed in September, but temperatures dropped at the end of the month after which they fluctuated around the LTA during the remainder of the review period. Rainfall was mainly above the LTA in the main cropland areas in the eastern half of the country, and somewhat below the LTA in most areas in the west. Relatively dry periods occurred in the beginning of September and in mid-September, and (more markedly) after 5 October.

The frequent rainfall during most of the review period hampered the sowing of winter cereals. However, sowing progress greatly accelerated after the first week of October. In many regions, sowing is currently advanced compared to previous years. Soil moisture and temperature conditions have been favourable for

germination and early crop establishment. Earlier-sown rapeseed stands are generally also in good condition.



4.3 Black Sea Area

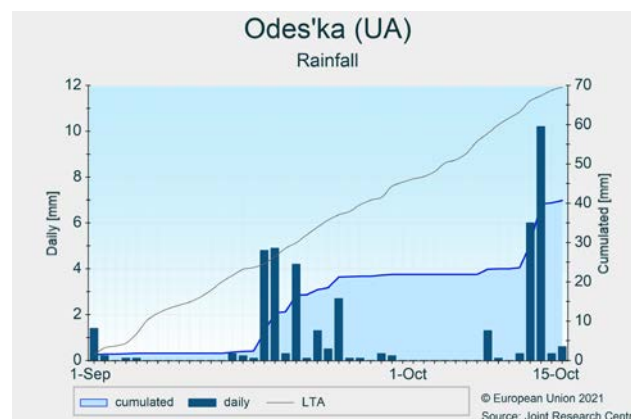
Ukraine

Favourable conditions for harvesting and sowing

In September, Ukraine experienced colder-than-usual temperatures, accompanied by below-average precipitation especially in the southern half of the country. Since early October, significantly drier-than-usual conditions (~80% compared with LTA) prevailed, and more pronounced below-average temperatures were observed especially in the *oblasts* in the south west (eg. Odes'ka Oblast, Vinnyts'ka oblast) where daily minima dropped close to 0°C for few days.

The dry conditions allowed the harvest of summer crops to take place under good conditions and no yield losses are expected. According to the Ministry of Agriculture, around 70% of the sunflower seeds and the soybean fields were harvested by mid-October. Around 25% of the grain maize fields were also harvested. The sowing of

winter rapeseed is almost completed, while 40% of the planned winter cereals area remains to be sown.

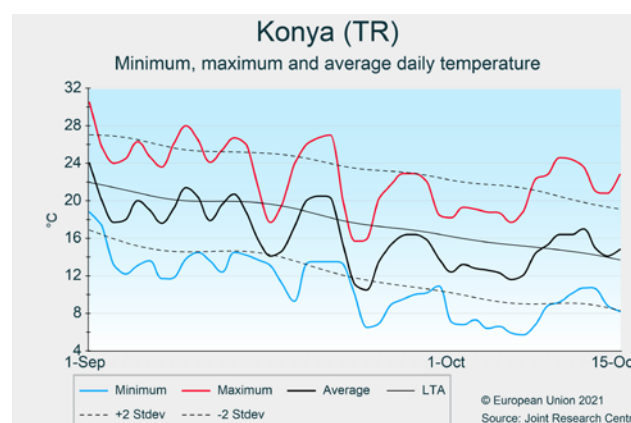


Turkey

Difficult summer season closed with average yield

Since mid-September cooler-than-usual conditions have prevailed in large parts of central and northern regions. Rainfall was average (15mm to 80mm) but in central Anatolian and in Mediterranean regions most of the precipitation was concentrated only around mid-September. More well-distributed precipitation is observed in western and northern Turkey. September was predominantly favourable for the latest stages of summer crops: rainfall and average temperature sustained grain filling even in the regions where irrigation was less available. By mid-October harvest activities are almost finished, except for southeastern regions where the end is

expected by November. Winter crop sowings usually start from mid-November when rain is more frequent.



4.4 European Russia and Belarus

European Russia

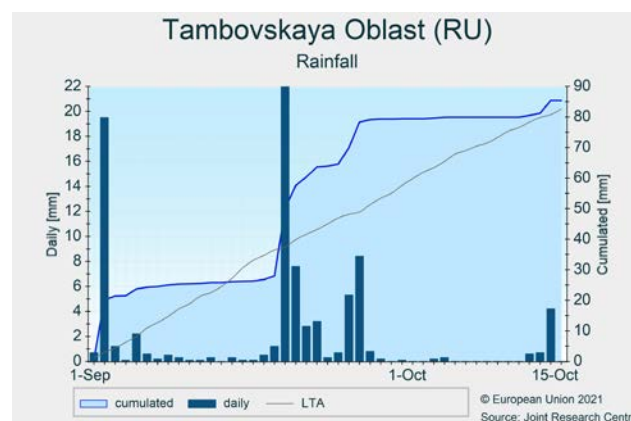
Fair conditions for sowing and emergence

In September, most of European Russia experienced abundant and frequent rainfall, especially in the Central Okrugs and in the south-western parts (i.e. the Southern and the North-Caucasian okrugs). This caused a delay in the harvest of the grain maize and in the sowing campaign of winter crops. Only the Volga okrug experienced slightly below average precipitation.

Since early October, significantly drier-than-usual conditions prevailed in most of the regions, with precipitation mostly below 20% of the LTA, resulting in an acceleration of the fieldworks. According to the Russian ministry of agriculture, by 15 October, 43% of the grain maize fields were harvested and around 15 million hectares were sown with winter crops.

Colder-than-usual temperatures prevailed during the period under review. September was characterised by significantly below-average temperatures (locally -4°C compared with the LTA) in several oblasts from the Volga

and the north-western okrugs. Since early October, the cold has moved to the central okrug and to the south-western parts, where daily minima dropped below 0°C for a few days.



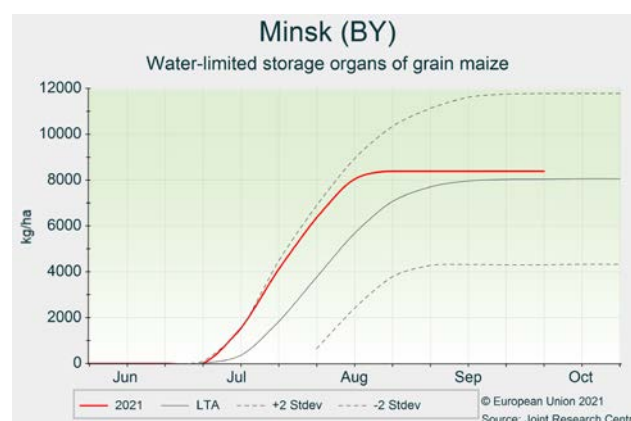
Belarus

Sowing of winter crops and harvest of maize interrupted by rainy weather

Temperatures were colder than usual during the period under review, especially in the east where daily average temperature anomalies reached -2°C to -4°C . Total precipitation was significantly above average in most of the country, concentrated on the second and third dekads of September. Soil moisture levels were generally adequate for sowing and early development of winter crops. However, regionally heavy rainfall temporarily impaired field operations.

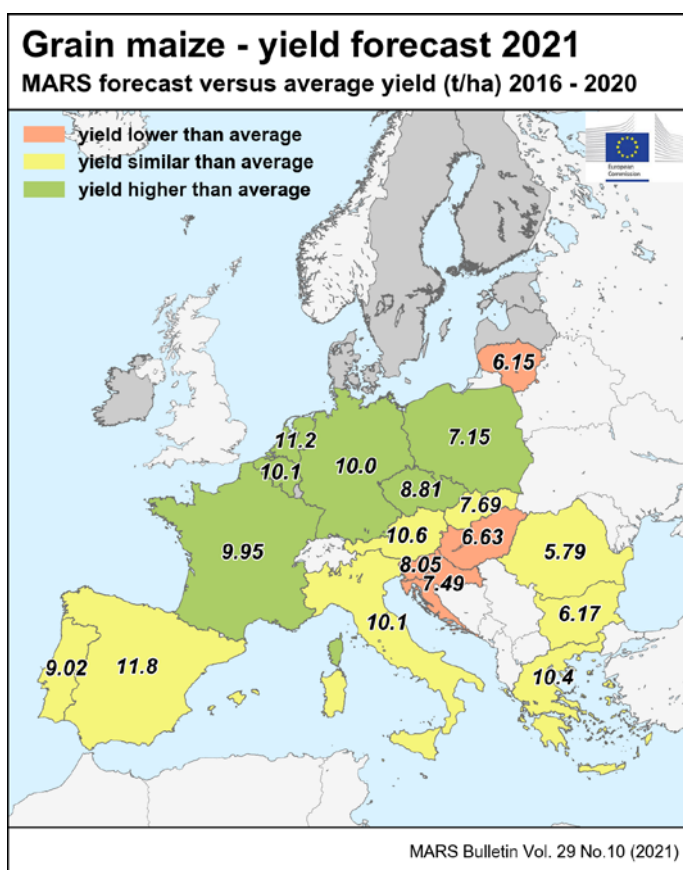
The generally cold and rainy weather did not favour optimal grain maturation and drying of maize. Our model indicates around-average biomass and storage organ accumulation in western and central regions and below-average values in eastern Belarus. The close-to-average

yield outlook of the last bulletin for grain maize is maintained.

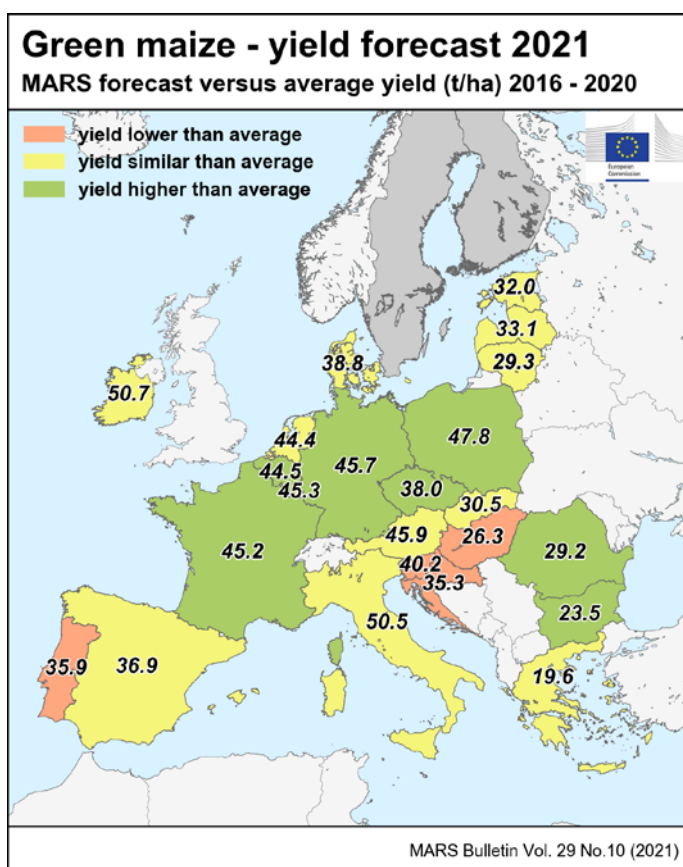


5. Crop yield forecast

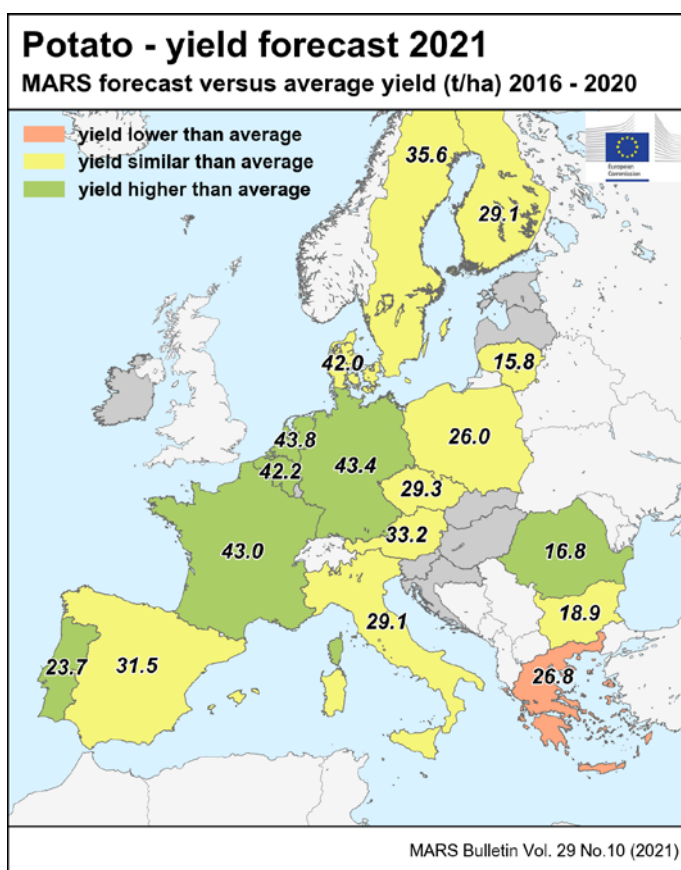
Country	Grain maize (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	7.76	7.32	7.79	+ 0.4	+ 6.4
AT	10.6	11.3	10.6	+ 0.1	- 6.5
BE	9.63	7.67	10.1	+ 5.4	+ 32
BG	6.36	5.10	6.17	- 3.1	+ 21
CY	—	—	—	—	—
CZ	8.09	9.46	8.81	+ 8.8	- 6.9
DE	9.36	9.59	10.0	+ 7.2	+ 4.6
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	10.3	9.89	10.4	+ 1.1	+ 5.1
ES	11.7	12.3	11.8	+ 1.1	- 3.4
FI	—	—	—	—	—
FR	8.73	8.03	9.95	+ 14	+ 24
HR	8.39	8.96	7.49	- 11	- 16
HU	8.12	8.62	6.63	- 18	- 23
IE	—	—	—	—	—
IT	10.3	11.2	10.1	- 2.1	- 10
LT	6.83	6.95	6.15	- 10	- 12
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	9.81	10.7	11.2	+ 15	+ 4.8
PL	6.59	7.10	7.15	+ 8.4	+ 0.6
PT	8.81	9.22	9.02	+ 2.4	- 2.1
RO	5.65	4.11	5.79	+ 2.4	+ 41
SE	—	—	—	—	—
SI	9.23	10.8	8.05	- 13	- 25
SK	7.58	8.58	7.69	+ 1.5	- 10



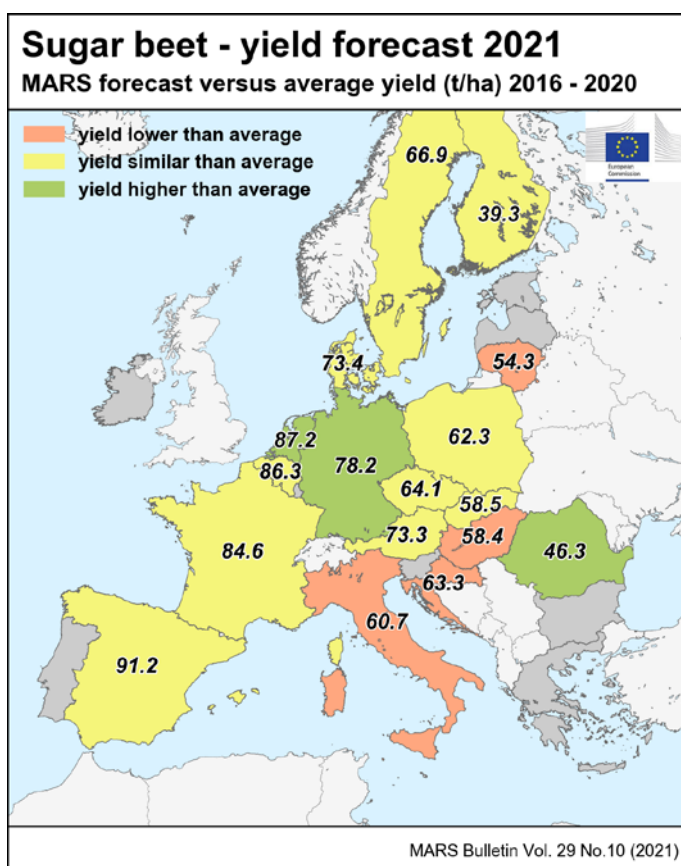
Country	Green maize (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU*	40.7	41.3	44.0	+ 8.0	+ 6.5
AT	47.0	49.2	45.9	- 2.5	- 6.9
BE	39.0	39.4	44.5	+ 14	+ 13
BG	21.8	21.1	23.5	+ 7.8	+ 12
CY	—	—	—	—	—
CZ	36.0	39.1	38.0	+ 5.3	- 2.8
DE	41.4	42.4	45.7	+ 11	+ 7.8
DK	37.8	32.8	38.8	+ 2.7	+ 19
EE	32.5	35.0	32.0	- 1.5	- 8.6
EL	20.1	19.9	19.6	- 2.7	- 1.6
ES	36.9	36.9	36.9	+ 0.0	- 0.1
FI	—	—	—	—	—
FR	40.0	38.9	45.2	+ 13	+ 16
HR	39.0	41.9	35.3	- 10	- 16
HU	30.8	33.7	26.3	- 15	- 22
IE	50.6	47.4	50.7	+ 0.2	+ 6.9
IT	51.6	54.5	50.5	- 2.2	- 7.4
LT	29.4	28.5	29.3	- 0.3	+ 3.0
LU	45.1	45.8	45.3	+ 0.5	- 1.0
LV	33.1	34.1	33.1	+ 0.0	- 2.7
MT	—	—	—	—	—
NL	43.0	43.7	44.4	+ 3.4	+ 1.6
PL	45.3	45.4	47.8	+ 5.5	+ 5.3
PT	37.7	43.9	35.9	- 4.9	- 18
RO	26.6	24.6	29.2	+ 9.7	+ 18
SE	—	—	—	—	—
SI	46.5	49.8	40.2	- 14	- 19
SK	31.3	34.3	30.5	- 2.3	- 11



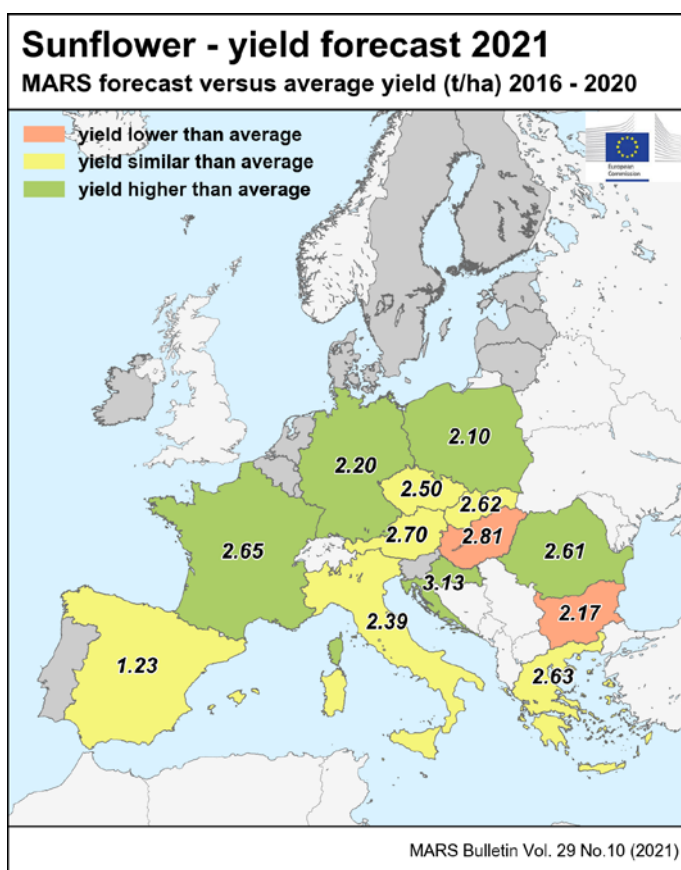
Country	Potato (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	32.9	33.3	34.4	+ 4.7	+ 3.3
AT	32.3	36.5	33.2	+ 2.7	- 9.1
BE	40.0	40.4	42.2	+ 5.5	+ 4.5
BG	18.5	19.3	18.9	+ 2.6	- 1.9
CY	—	—	—	—	—
CZ	28.3	29.2	29.3	+ 3.6	+ 0.3
DE	41.6	42.8	43.4	+ 4.2	+ 1.3
DK	41.6	44.0	42.0	+ 1.1	- 4.5
EE	—	—	—	—	—
EL	28.3	28.7	26.8	- 5.3	- 6.6
ES	31.6	31.4	31.5	- 0.3	+ 0.3
FI	28.6	30.2	29.1	+ 1.6	- 3.8
FR	40.9	40.4	43.0	+ 5.3	+ 6.4
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	29.1	30.3	29.1	+ 0.1	- 4.0
LT	15.5	15.7	15.8	+ 1.6	+ 0.2
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	42.0	42.7	43.8	+ 4.3	+ 2.6
PL	25.7	25.2	26.0	+ 1.4	+ 3.1
PT	21.6	23.4	23.7	+ 10	+ 1.6
RO	16.1	15.4	16.8	+ 4.4	+ 8.9
SE	34.6	36.4	35.6	+ 3.1	- 2.2
SI	—	—	—	—	—
SK	—	—	—	—	—



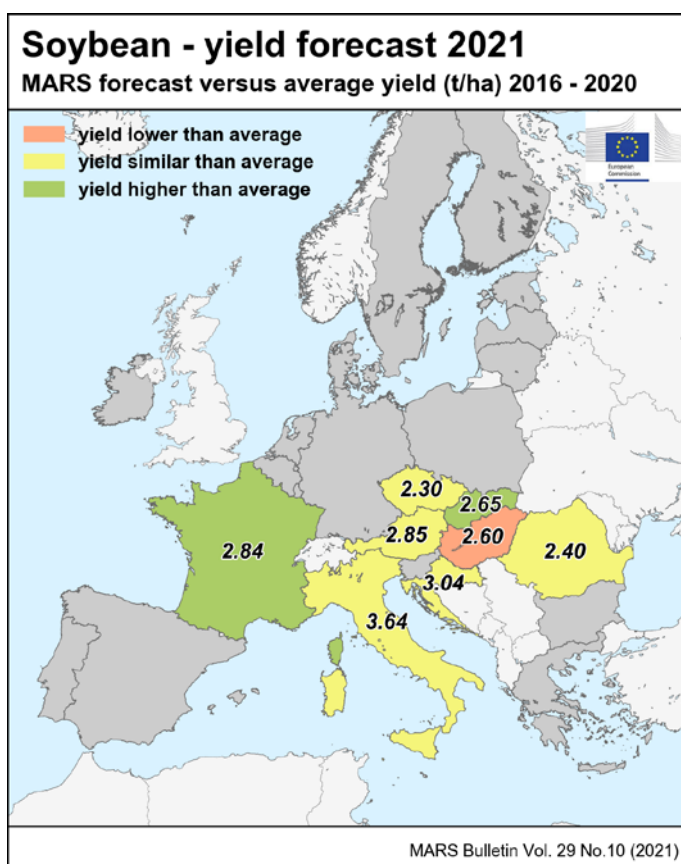
Country	Sugar beets (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	73.6	67.5	75.4	+ 2.4	+ 12
AT	74.2	79.5	73.3	- 1.3	- 7.8
BE	84.8	84.3	86.3	+ 1.7	+ 2.3
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	63.1	61.5	64.1	+ 1.6	+ 4.1
DE	73.9	74.2	78.2	+ 5.7	+ 5.4
DK	72.0	77.1	73.4	+ 1.9	- 4.7
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	88.3	88.1	91.2	+ 3.3	+ 3.5
FI	39.2	38.5	39.3	+ 0.2	+ 2.1
FR	82.3	62.5	84.6	+ 2.8	+ 35
HR	66.4	74.0	63.3	- 4.6	- 15
HU	62.7	60.4	58.4	- 6.9	- 3.4
IE	—	—	—	—	—
IT	66.8	67.2	60.7	- 9.0	- 9.6
LT	62.3	67.8	54.3	- 13	- 20
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	82.9	82.1	87.2	+ 5.2	+ 6.1
PL	61.7	57.9	62.3	+ 1.0	+ 7.6
PT	—	—	—	—	—
RO	39.1	34.2	46.3	+ 18	+ 35
SE	64.9	68.0	66.9	+ 3.2	- 1.6
SI	—	—	—	—	—
SK	60.6	60.4	58.5	- 3.3	- 3.1



Country	Sunflower (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	2.27	1.99	2.37	+ 4.1	+ 19
AT	2.74	2.39	2.70	- 1.6	+ 13
BE	—	—	—	—	—
BG	2.28	2.10	2.17	- 4.9	+ 3.7
CY	—	—	—	—	—
CZ	2.52	2.58	2.50	- 1.0	- 3.2
DE	2.05	2.06	2.20	+ 7.3	+ 6.8
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.72	2.52	2.63	- 3.4	+ 4.3
ES	1.21	1.36	1.23	+ 2.0	- 9.2
FI	—	—	—	—	—
FR	2.27	2.05	2.65	+ 17	+ 29
HR	2.98	3.10	3.13	+ 5.2	+ 1.1
HU	2.93	2.75	2.81	- 4.0	+ 2.0
IE	—	—	—	—	—
IT	2.41	2.43	2.39	- 0.8	- 1.6
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	1.87	2.07	2.10	+ 12	+ 1.5
PT	—	—	—	—	—
RO	2.46	1.70	2.61	+ 6.1	+ 54
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.72	2.53	2.62	- 3.6	+ 3.5



Country	Soybean (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
EU	2.93	2.80	3.00	+ 2.4	+ 7.2
AT	2.97	2.96	2.85	- 3.8	- 3.5
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	2.24	2.33	2.30	+ 3.0	- 1.3
DE	—	—	—	—	—
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	—	—	—	—	—
FI	—	—	—	—	—
FR	2.54	2.17	2.84	+ 12	+ 31
HR	2.98	3.10	3.04	+ 1.9	- 2.0
HU	2.80	2.90	2.60	- 7.3	- 10
IE	—	—	—	—	—
IT	3.55	3.77	3.64	+ 2.4	- 3.6
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	2.35	1.85	2.40	+ 2.0	+ 30
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.45	2.53	2.65	+ 8.2	+ 4.8



Country	Wheat (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	3.40	3.94	3.44	+ 1.1	- 13
TR	2.80	2.97	2.78	- 0.7	- 6.3
UA	4.00	3.80	4.64	+ 16	+ 22
UK	8.05	7.16	8.21	+ 2.0	+ 15

Country	Barley (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	2.83	3.35	2.46	- 13	- 27
TR	2.66	2.65	2.62	- 1.7	- 1.3
UA	3.25	3.22	3.77	+ 16	+ 17
UK	6.11	5.91	6.28	+ 2.7	+ 6.2

Country	Grain maize (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	5.69	5.03	5.58	- 2.0	+ 11
TR	9.42	9.41	9.62	+ 2.1	+ 2.2
UA	6.52	5.62	7.65	+ 17	+ 36
UK	—	—	—	—	—

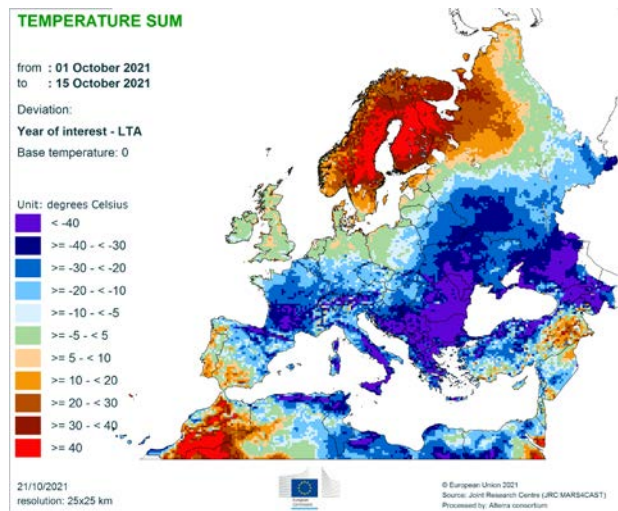
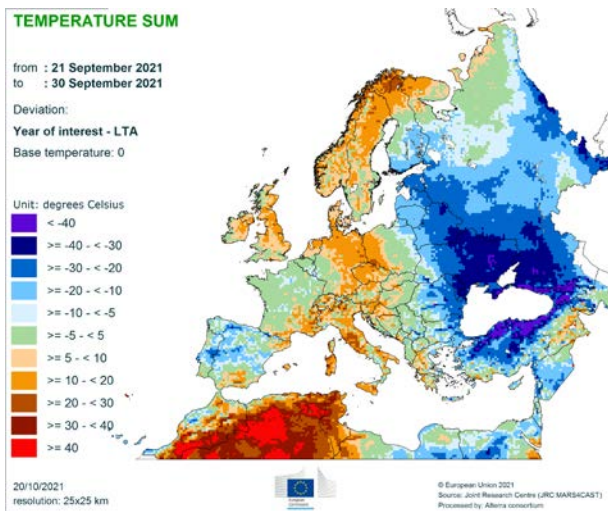
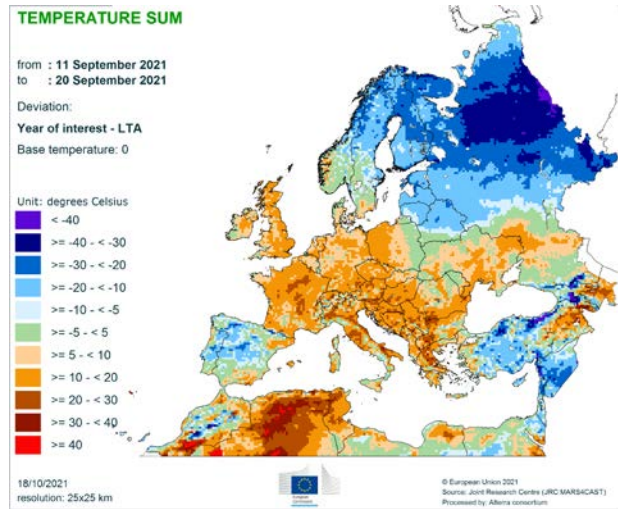
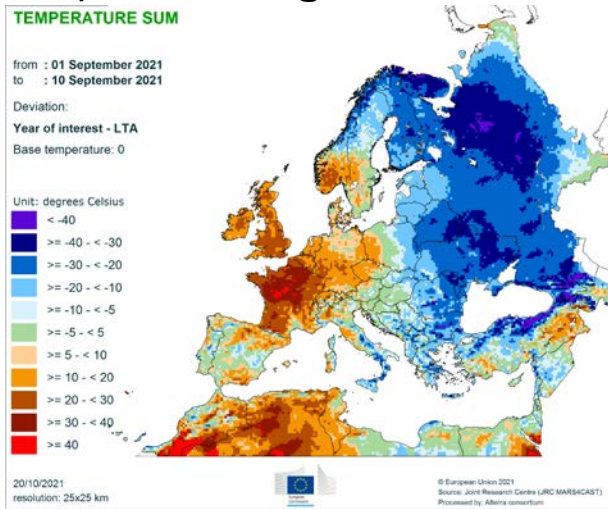
Country	Soybean (t/ha)				
	Avg 5yrs	2020	MARS 2021 forecasts	%21/5yrs	%21/20
BY	—	—	—	—	—
TR	4.33	4.42	4.53	+ 4.6	+ 2.6
UA	2.25	2.05	2.59	+ 15	+ 27
UK	—	—	—	—	—

NB: Yields are forecast for crops with more than 10 000 ha per country with sufficiently long and coherent yield time series.

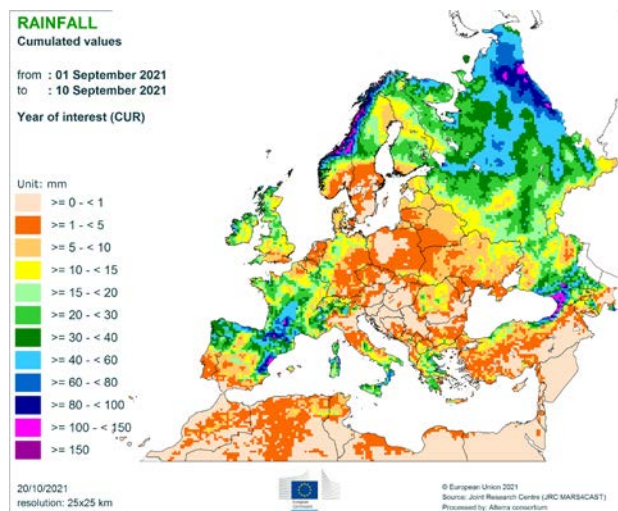
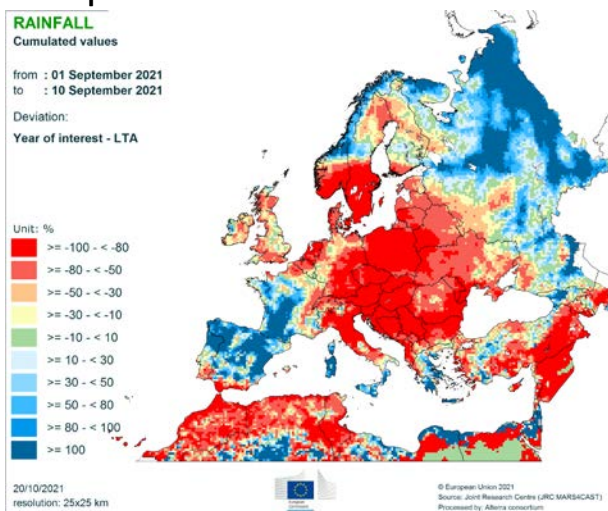
Sources: 2016-2021 data come from DG Agriculture and Rural Development short-term-outlook data (dated September 2021, received on 06.10.2021), Eurostat Eurobase (last update: 13.10.2021) and EES (last update: 15.11.2017).
 Non-EU 2016-2020 data come from USDA, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 13.10.2021), Ministry for Development of Economy, Trade and Agriculture of Ukraine, FAO and PSD-online.
 2021 yields come from MARS Crop Yield Forecasting System (output up to 10.10.2021).
 EU aggregate after 1.2.2020 is reported.
 The column header '%21/5yrs' stands for the 2021 change with respect to the 5-year average(%). Similarly, '%21/20' stands for the 2021 change with respect to 2020(%).
 * The EU figures do not include green maize forecasts for Sweden since recent data on yields were not consistent.

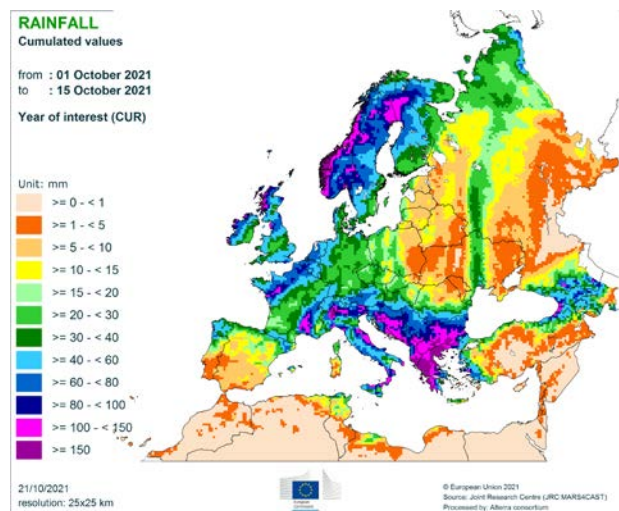
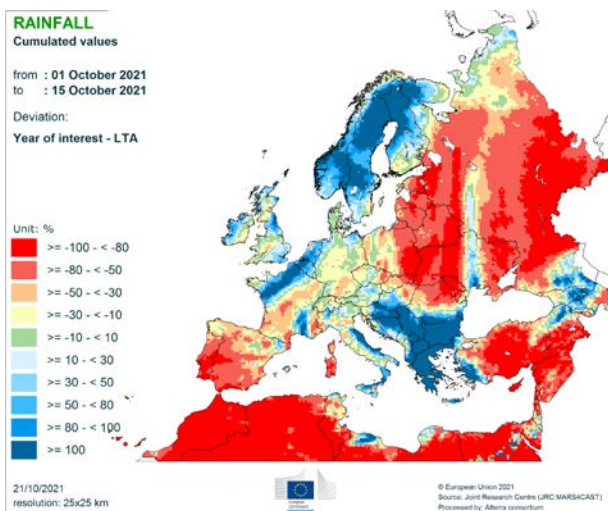
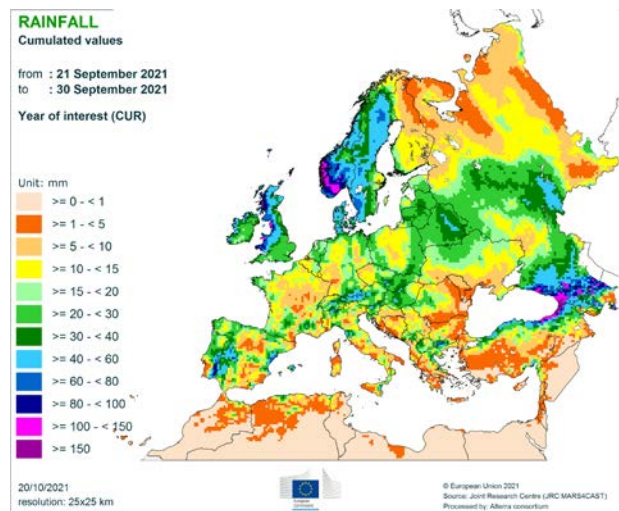
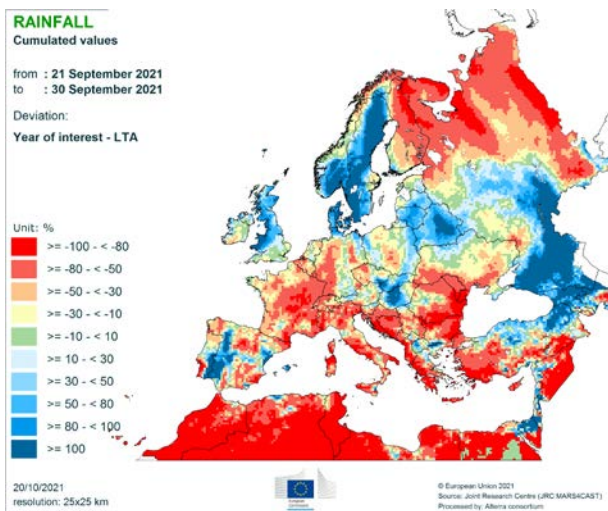
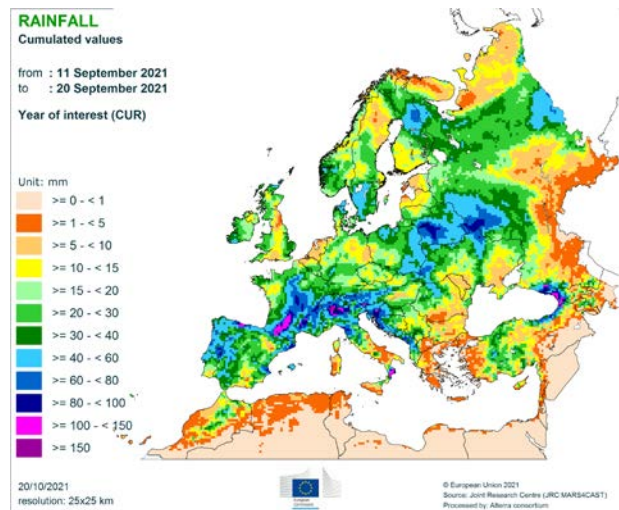
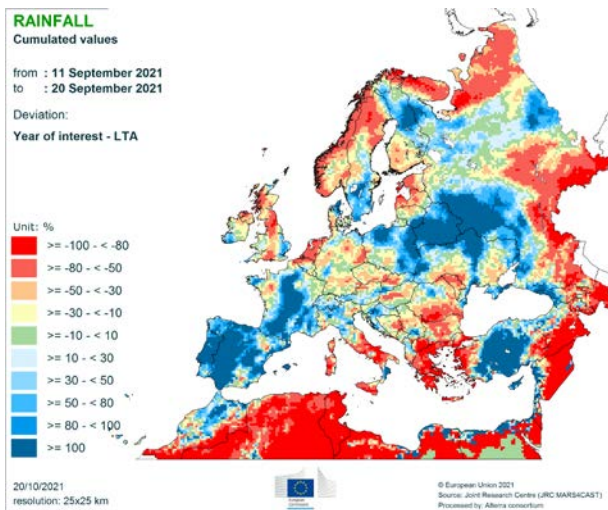
6. Atlas

Temperature regime

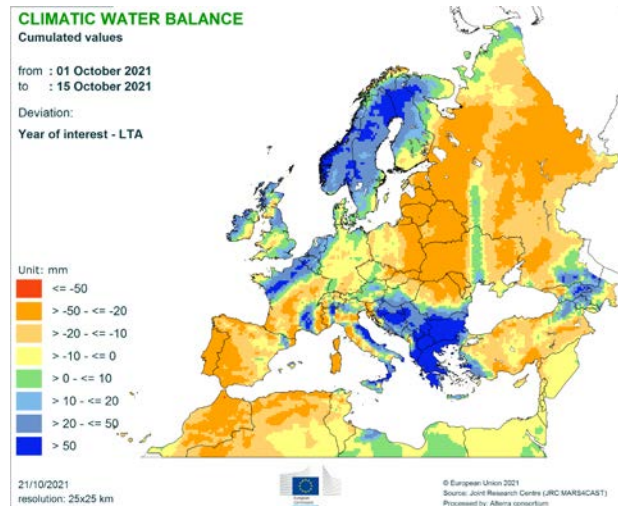
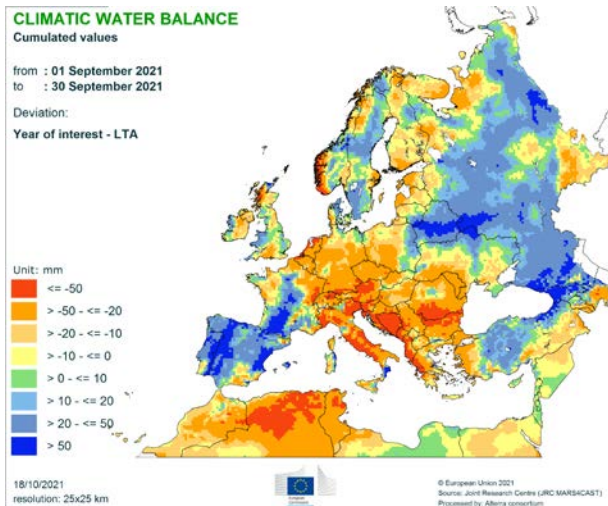


Precipitation

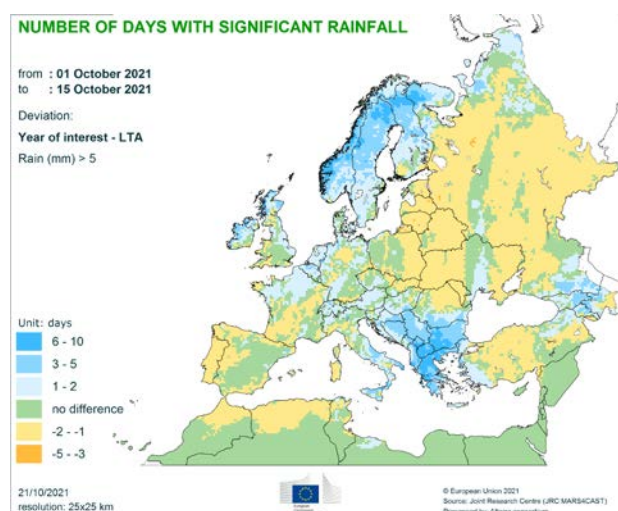
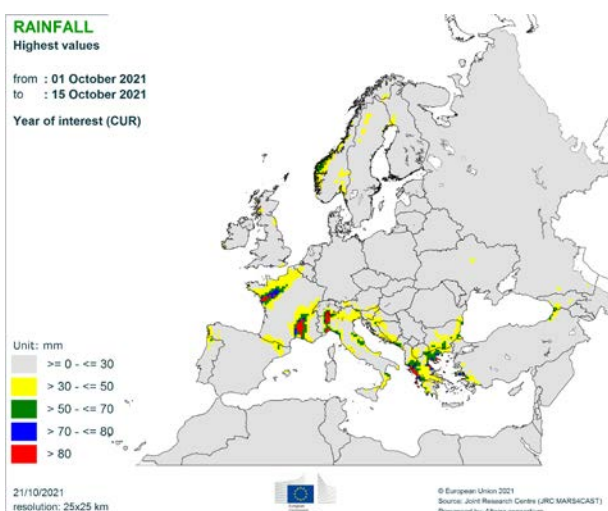
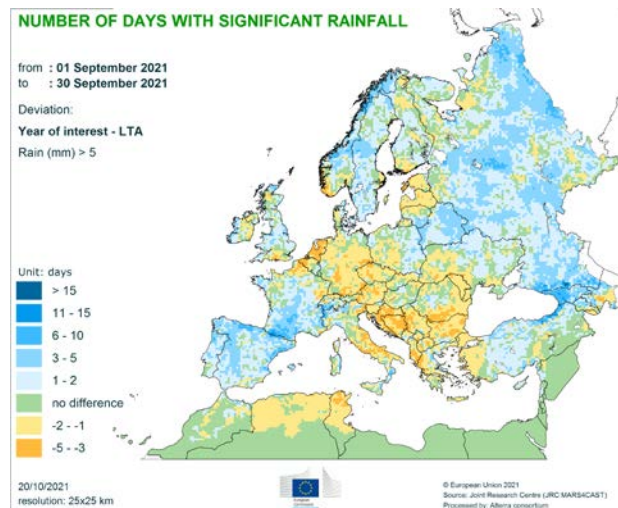
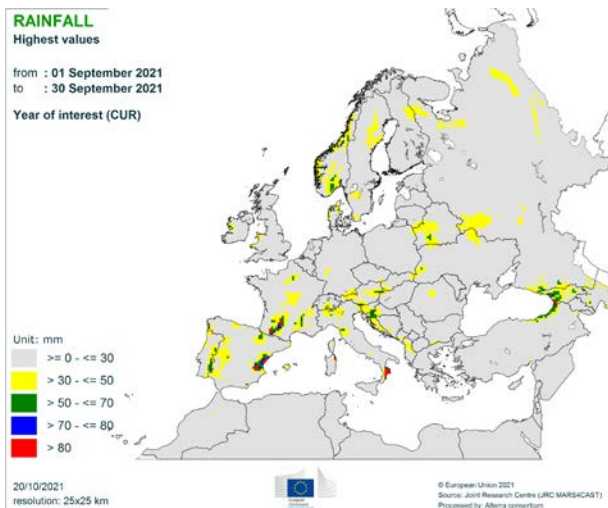


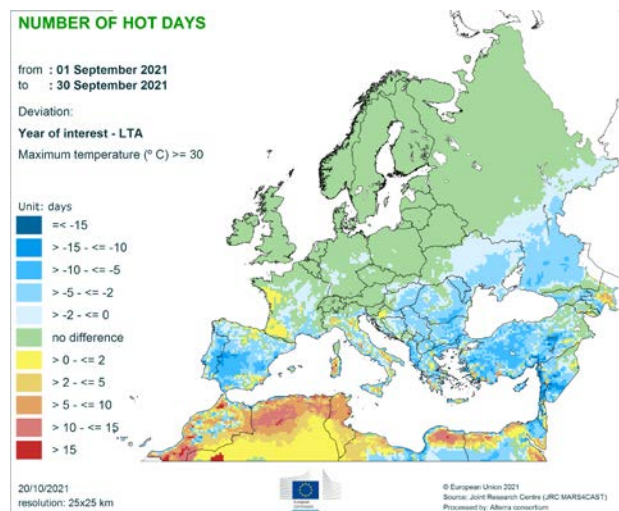
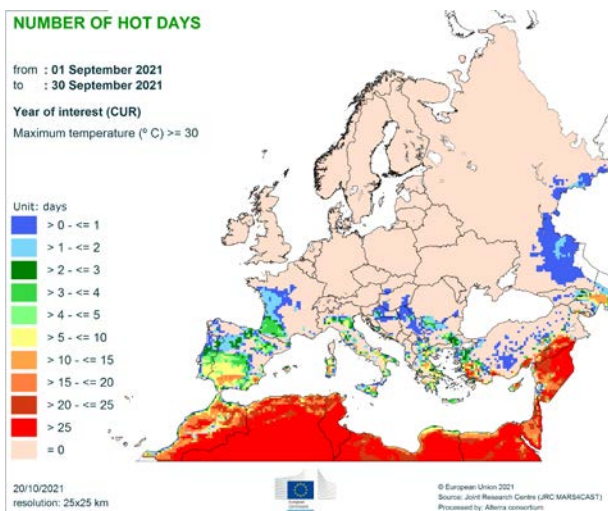
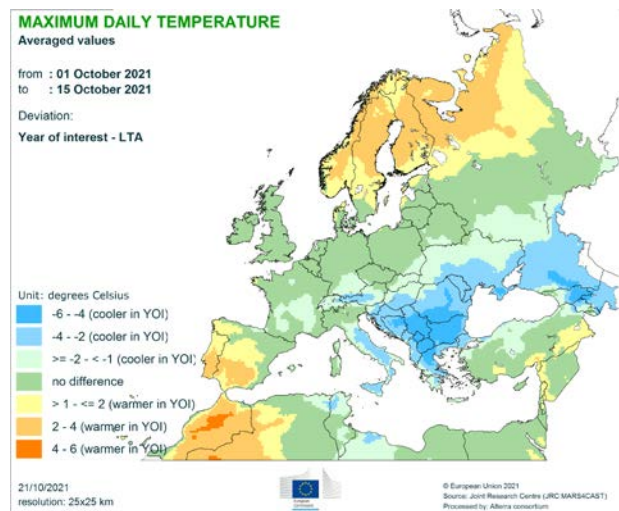
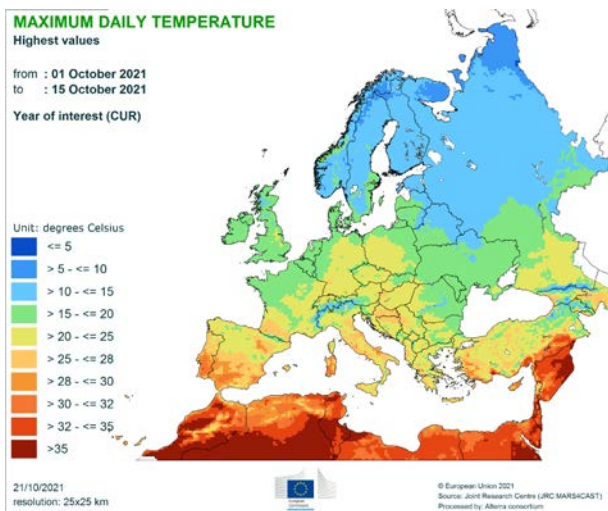
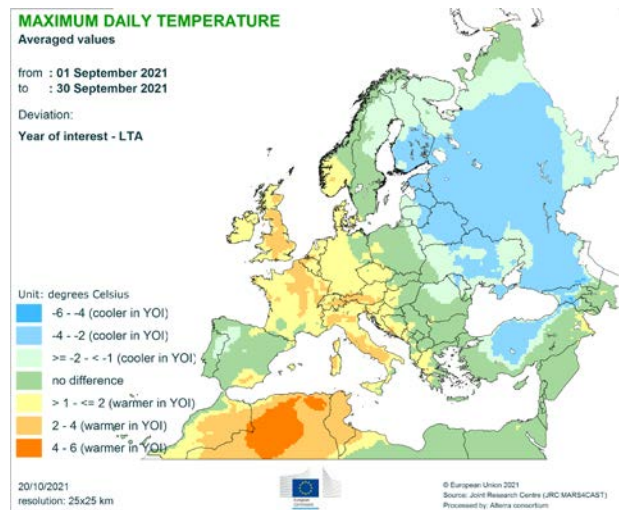
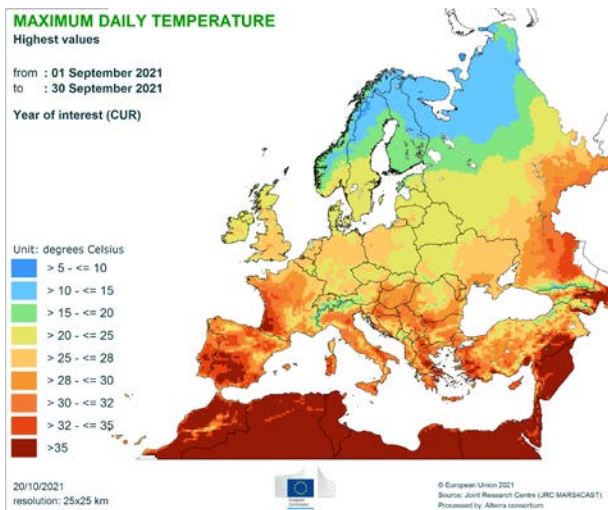


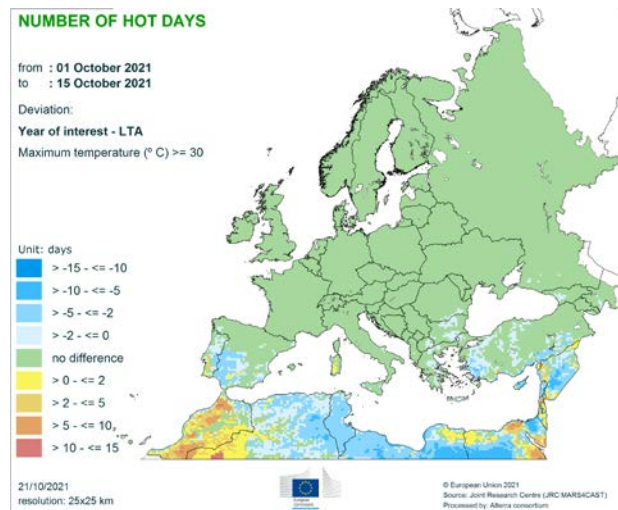
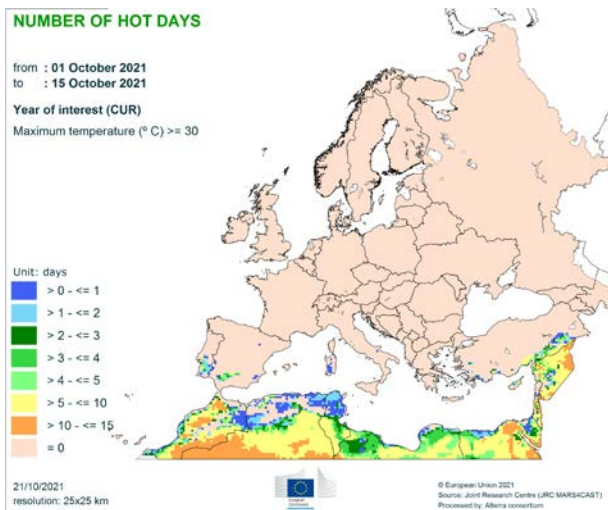
Climatic water balance



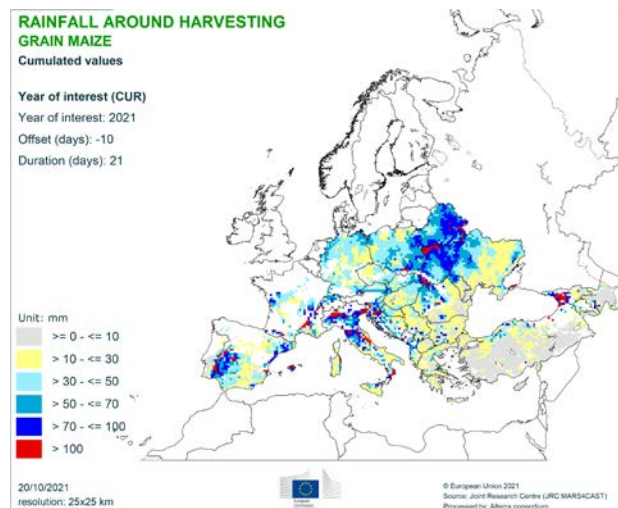
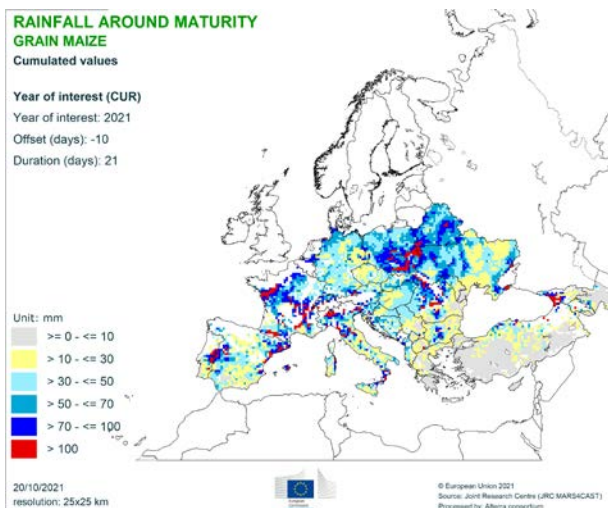
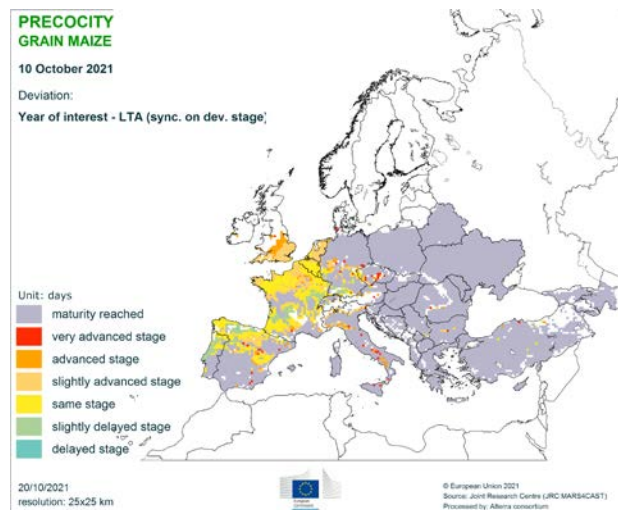
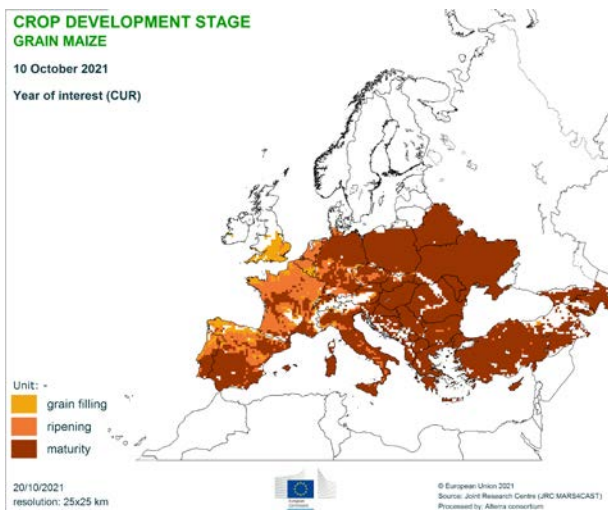
Weather events



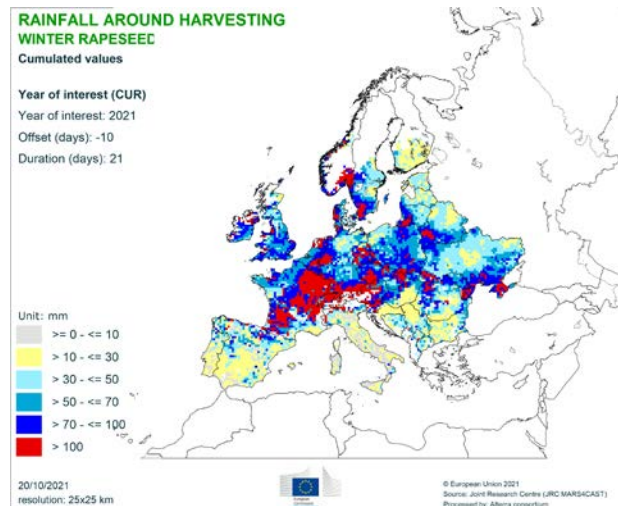
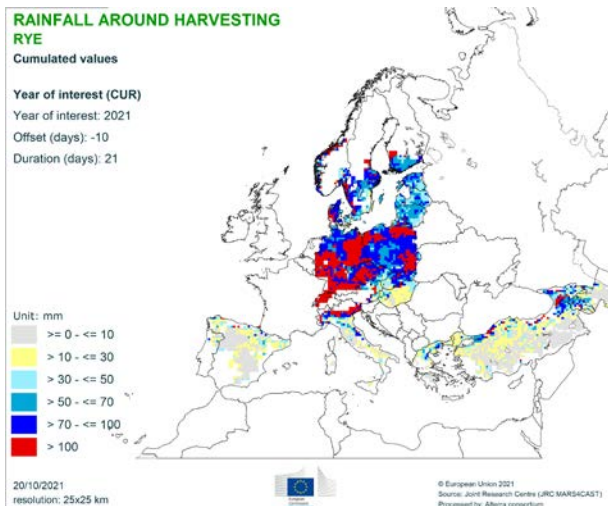
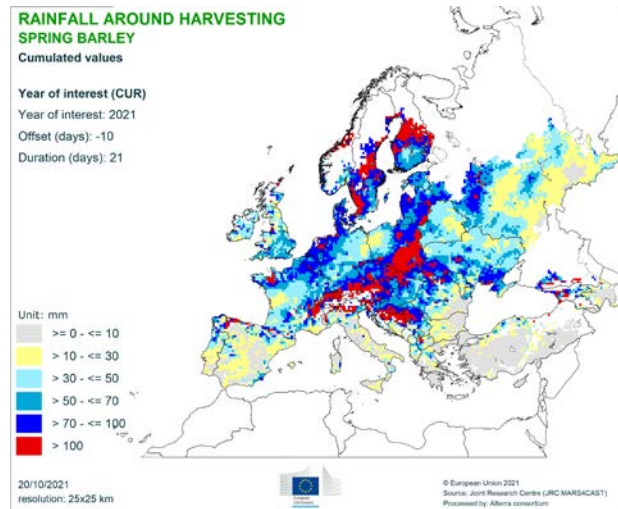
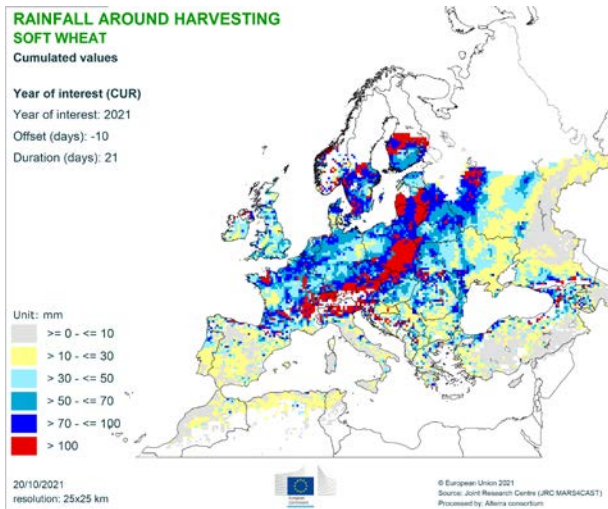




Maize



Rainfall around harvesting



JRC MARS Bulletins 2021

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

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Analysis and reports

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Technical note

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

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