European Commission

Period covered: 1 April - 20 May
Issued: 21 May 2013

Crop Monitoring in Europe

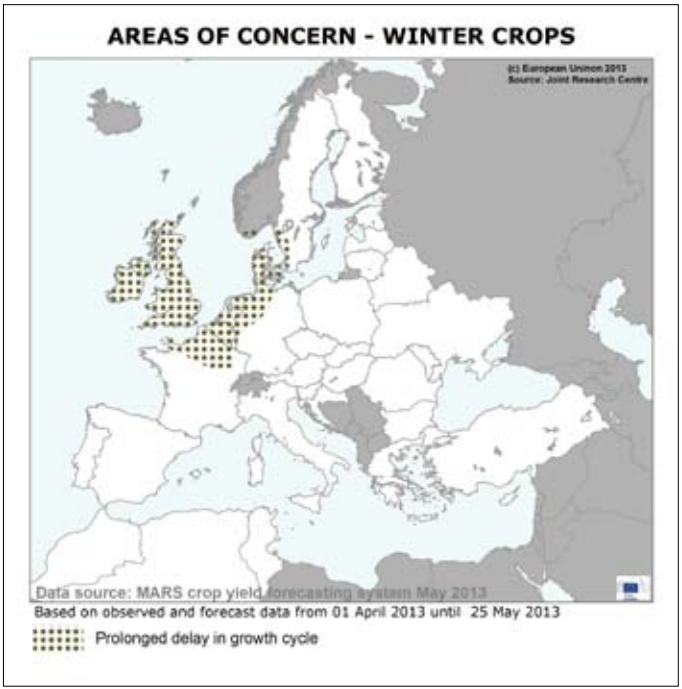
MARS BULLETIN Vol.21 No. 5 (2013)

Crops recuperated much of the previous delay

Temperatures increased in western Europe, boosting vegetation growth. Remote sensing indicators suggest a much more favourable outlook now than a few weeks ago, although there is still a noticeable delay in crop development of winter cereals notably in the British Isles and Benelux countries.

In general, the current prospects for EU-27 yields remained close to the average. Compared to our last forecasts, soft wheat has been slightly revised downwards at the EU-27 level, mainly due to lowered yield expectations for the UK and Ireland, as well as for the Baltic countries, Hungary, the Czech Republic, Poland and Denmark. In contrast, for winter barley, a major upward revision for Spain (by 25%) and minor increases (<1%) for large producers such as Germany and France, largely compensated the downward revision of forecasted yields in many small and some medium-sized producer countries. The forecast for spring barley at the EU-27 level was revised upwards by almost 4%, again mainly thanks to the good performance in Spain.

Forecasted rapeseed yields were revised slightly downwards for the EU-27, mainly due to a more negative outlook for the UK, Romania, Hungary and Slovakia, which was not compensated by the improved forecast for Poland and the slight improvement for Germany.



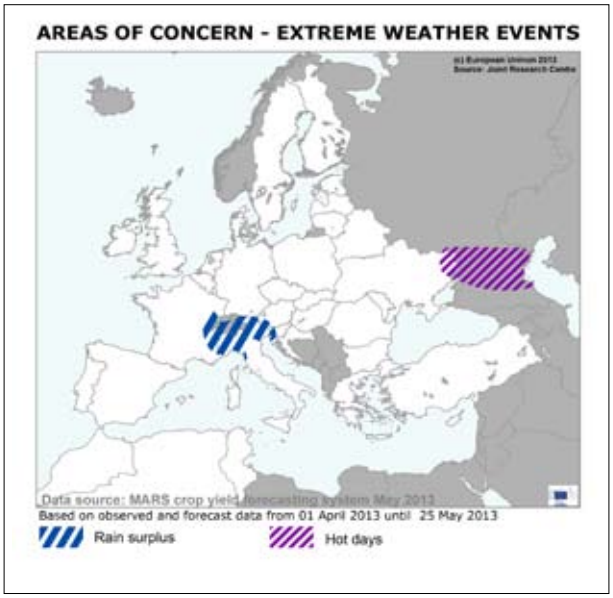
Crop	Yield t/ha				
	2012	MARS 2013 forecasts	Avg 5yrs	%13/12	%13/5yrs
TOTAL CEREALS	4.83	**5.10**	5.04	+5.6	+1.2
Total Wheat	5.17	**5.31**	5.37	+2.6	-1.2
soft wheat	5.41	**5.54**	5.63	+2.3	-1.7
durum wheat	3.15	**3.34**	3.21	+6.1	+4.2
Total Barley	4.35	**4.56**	4.38	+4.6	+4.0
spring barley	3.87	**4.09**	3.82	+5.9	+7.2
winter barley	5.23	**5.29**	5.26	+1.1	+0.6
Grain maize	5.91	**6.87**	6.97	+16.3	-1.3
Rye	3.70	**3.58**	3.33	-3.3	+7.4
Triticale	4.12	**4.02**	4.06	-2.3	-0.8
Other cereals	3.16	**3.32**	2.99	+5.0	+10.8
Rape and turnip rape	3.10	**3.06**	3.04	-1.3	+0.7
Potato	30.70	**31.58**	30.69	+2.9	+2.9
Sugar beet	70.28	**70.83**	70.00	+0.8	+1.2
Sunflower	1.65	**1.77**	1.82	+7.8	-2.6

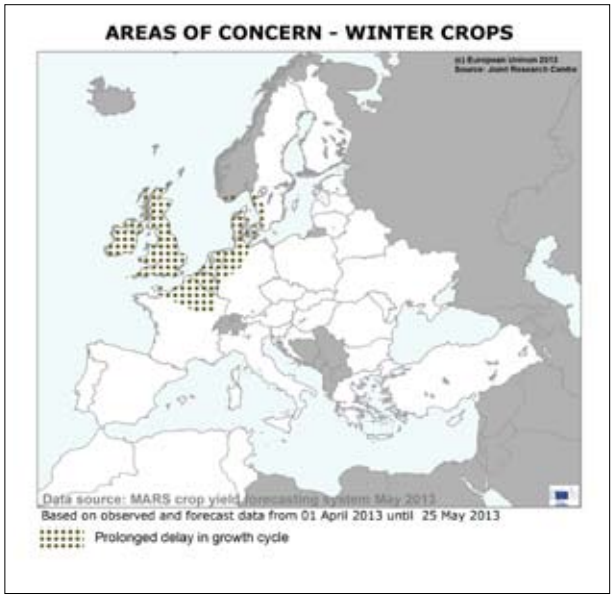
issued: 17 May 2013

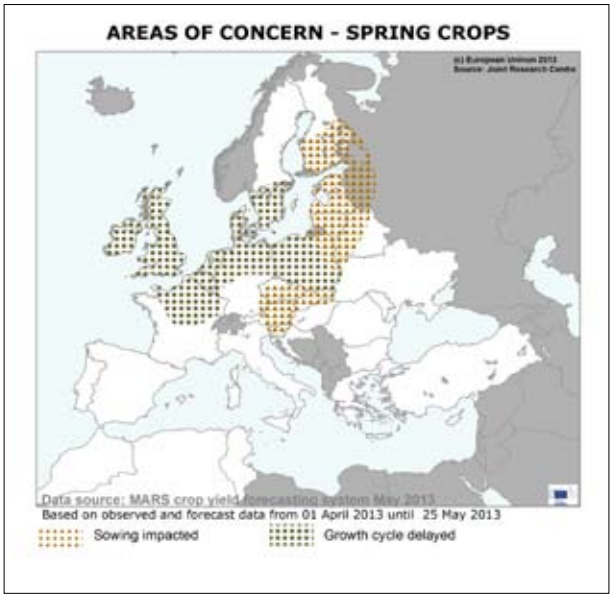
Joint Research Centre

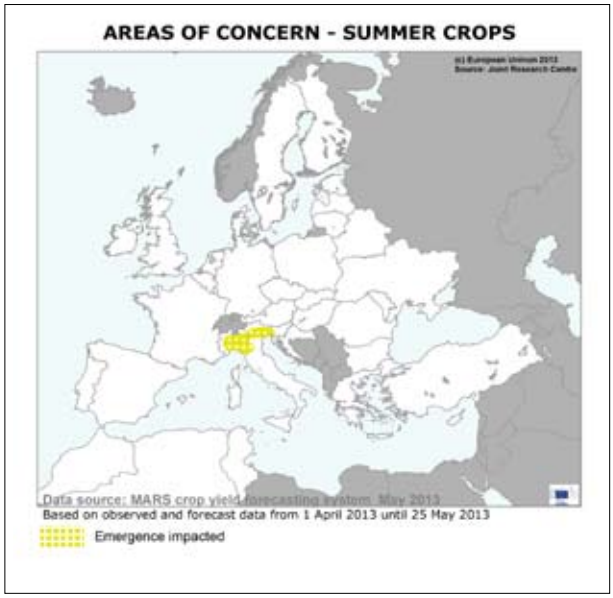
1. Agro-meteorological overview

After the first ten days of April, temperatures recorded were warmer than usual in southern and eastern Europe. In many regions of eastern Europe, winter crops recuperated the previous delay. Above-average precipitation was recorded in Ireland, Scotland, eastern France, Slovenia, the Czech Republic, southern Poland, Slovakia and also in the eastern part of Balkan Peninsula. The sowing of spring crops was delayed in most of Europe due to abundant rainfall and persistent snow. From 16 May onwards warmer-than-usual conditions are expected over eastern and northern Europe. Maximum daily temperatures in the southwestern part of Russia could exceed 30°C in the coming days. Significantly colder-than-usual weather is forecast for western Europe and the western Mediterranean region. Abundant rainfall is likely to occur in northern Italy and surrounding regions. Rainfall amount will also exceed the long-term average in parts of central and western Europe.







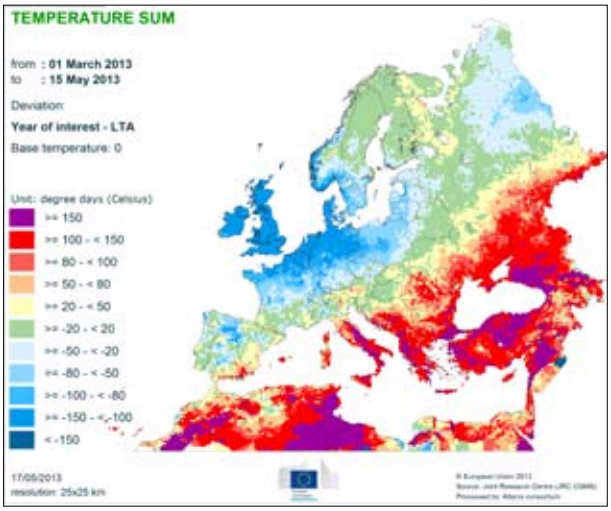


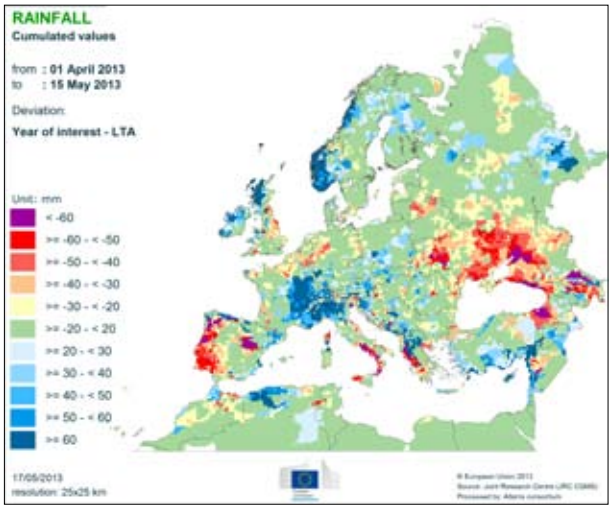
Observed temperatures

During the first dekad of April, colder-than-normal temperatures were recorded in northern and central Europe. The minimum temperatures during this period did not reach positive values in Germany, Poland, Denmark, the Czech Republic, northern Ukraine, Belarus and Russia. After this period, the temperature increased to above average all over Europe. In particular, the last dekad of April was warmer than the long-term average by 4°C to 6°C in central and southern Italy, the Balkan Peninsula, Romania, Slovakia, southern Poland, Bulgaria, Hungary and Ukraine. In some areas of these regions temperatures reached 30°C in the last days of April. On the contrary, negative average temperature anomalies in the range of 2°C were recorded in Spain, France, the Benelux countries, western UK, Denmark, Latvia and western Russia. During the first dekad of May, higher-than-usual temperatures were recorded in southern and eastern Europe, with average temperatures 2°C to 4°C above the long-term average, and 4°C to 6°C more than normal in the countries around the Black Sea. The strong positive thermal anomalies recorded during the analysis period in southern and eastern Europe contributed to an increased temperature sum (Tbase=0°C), which regionally exceeded the long-term average by more than 100 degree days. On the contrary, the cumulated active temperatures (Tbase=0°C) since the beginning of March remained below the long-term average by 100 to 80 GDD, resulting in a delayed winter and spring crop development mainly in northern Germany, Poland, northern France, the Benelux countries, Denmark, the UK, the Czech Republic and the Baltic countries.

Observed rainfall

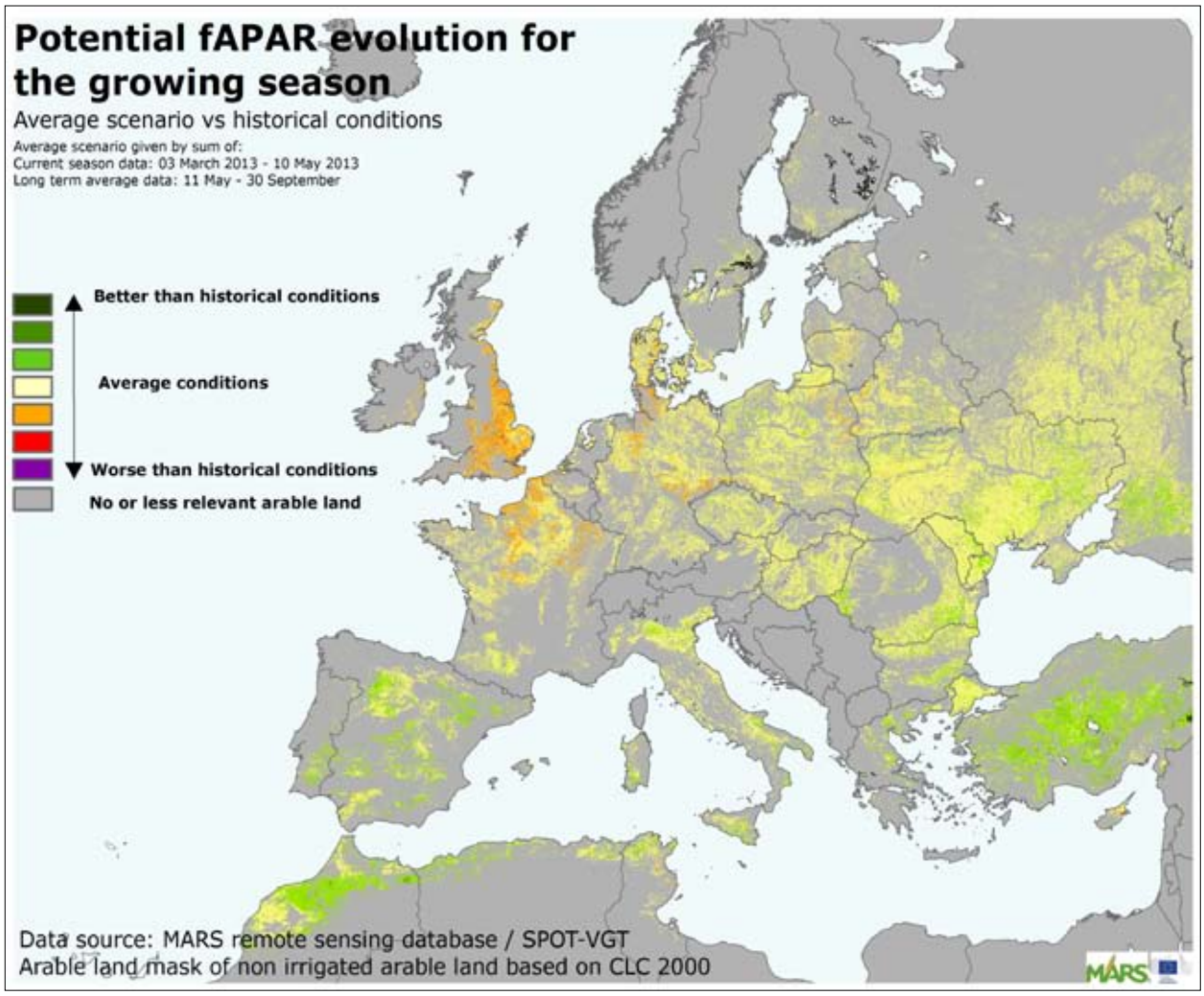
In April, precipitation exceeded the long-term average by more than 50 mm in Ireland, Scotland, northern Italy, eastern France and the eastern coast of Spain. Lower-than-usual precipitation occurred in England, Wales, northern France, the Benelux countries, northern Germany, Denmark, central and southern Italy, Portugal and Ukraine. In most of southern Italy, Spain, Romania, Bulgaria and Ukraine the total rainfall during the first weeks of May did not exceed 10 mm. During this period above-average precipitation was still observed mainly in Ireland, Scotland, eastern France, Slovenia, the Czech Republic, southern Poland, Slovakia and also in eastern part of Balkan Peninsula. The wet conditions recorded in central Europe, during the period of analysis, affected the sowing of spring crops. The persistent snow in April determined a strong delay in spring sowing in the Baltic countries.





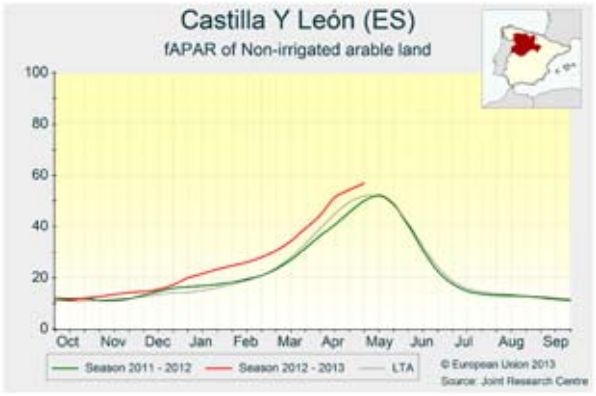
2. Remote Sensing analysis – observed canopy conditions

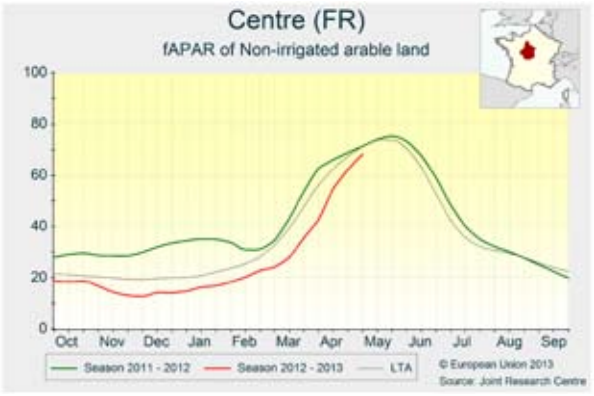
Persistent lack of biomass accumulation in Western Europe. Good canopy development in Spain and the Black Sea areas.

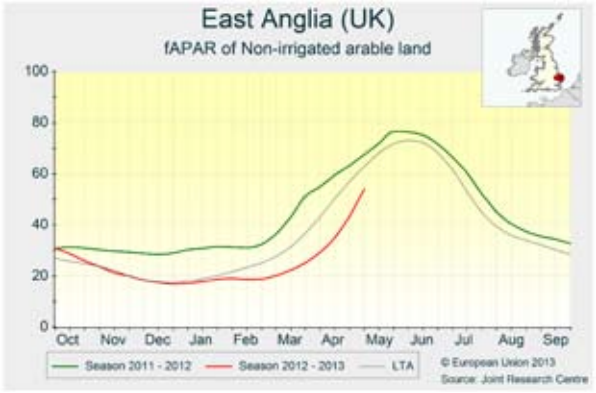


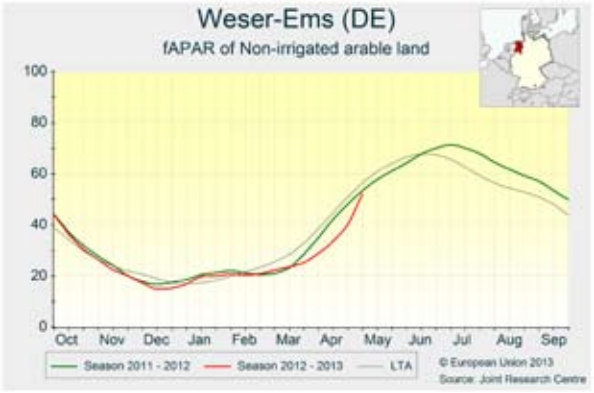
The map displays global biomass accumulation until the end of the growing season and, therefore, evaluates whether or not the ongoing season is developing close to normal. The cumulated Fraction of Absorbed Photosynthetically Active Radiation (fAPAR) values for the end of the season were computed using the observed fAPAR values from 1st March 2013 to 10 May 2013, and adding historical average fAPAR values from 11 May to 30 September. The fAPAR cumulated values obtained were compared with the three historical series (minimum, maximum and average).

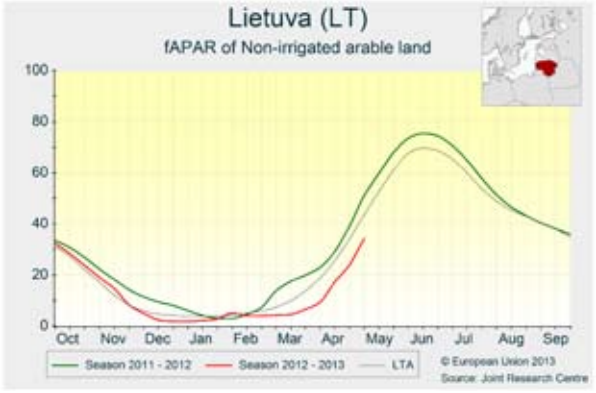
Across the **Iberian Peninsula**, crop canopy development is optimal and the seasonal biomass accumulation is foreseen quite above the average for a large share of the cultivated land (e.g. *Castilla y Léon*). In Italy, winter crops in northern regions recovered to normal phenological stages. Canopy in central and northern regions of **France** (e.g. *Centre*) benefited from the seasonal temperatures of late April: winter crops recovered the phenological delay to almost normal stages. In the **United Kingdom**, the lag of crop growth and biomass accumulation were only partially recovered (e.g. *East Anglia*) in the latest period but remain quite below average; a reduction in the yield of winter crops is plausible. In **Germany**, green vegetation received a boost in the past ten days and recovered the previous development delay (e.g. *Weser-Ems*). Overall biomass accumulation still displays negative anomalies, mainly in the northern regions. Winter crops in the **Baltic** and **eastern countries** are back to normal values because of a steep increase in the growth rate, especially in the past ten days. The negative anomalies (e.g. in **Latvia**) between the current fAPAR values and the average are once more due to the delay in spring crop sowing and canopy development. In **Romania** and **Bulgaria** (e.g. *Severn Tsentralen*), the biomass accumulation values are quite above average. The anticipated boost in vegetation growth has led to a significant increase in water demand which has, to date, not been met with sufficient precipitation. In **Ukraine**, winter crop development is advanced and biomass accumulation is above average, as can be seen in the fAPAR graph for the *Dnipropetrovs'ka* region. In **Turkey** (e.g. *Konya*), favourable climatic conditions persist since the winter period, and good yield expectations are forecast.

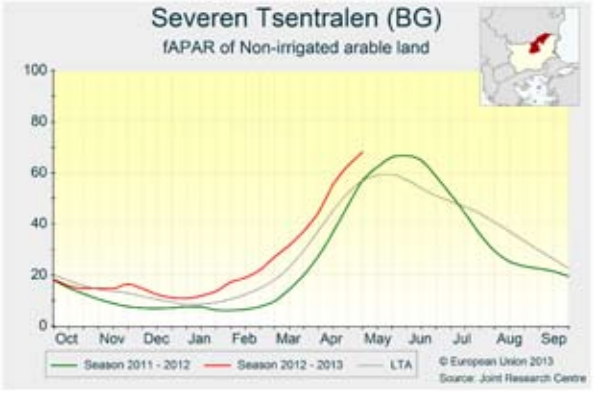

Castilla Y León (ES)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre

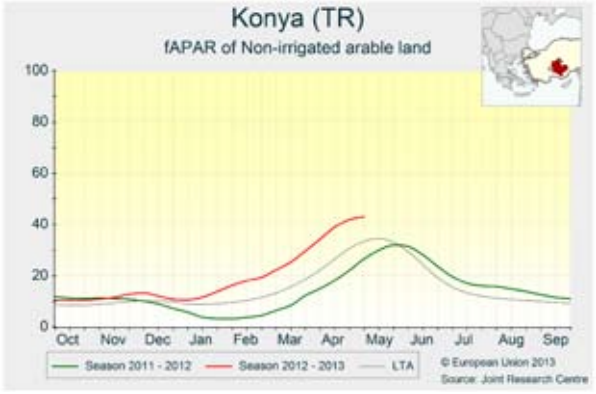

Centre (FR)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


East Anglia (UK)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Weser-Ems (DE)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Lietuva (LT)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Severen Tsentralen (BG)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Konya (TR)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Dnipropetrovs'ka (Ukraine)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre

3. Spring crops – sowing conditions

Spring Barley

The sowing of spring barley was delayed in most of Europe due to cold temperatures and persistent snow. Meteorological conditions resulted in delayed sowing in Germany and Poland, but crop development now is progressing due to more favourable temperatures and rainfall events in the past days. Abundant rainfall during the sowing period in Hungary, Romania and Ukraine hampered field operations and hence delayed sowing. Most of central Europe (Austria, the Czech Republic, Slovakia) also experienced delayed sowing due to cold temperature but have since recouped due to net increase in temperature in April. In Spain and Turkey, sowing took place under normal weather conditions. In Italy, sowing was delayed due to cold temperatures, but overall growth conditions are now back to normal in terms of temperature development and rainfall distribution.

Grain Maize

Spain and Italy received abundant precipitation during the maize sowing period. This had a moderate impact on the sowings in Spain and caused significant delays in in northern Italy (Piemonte, Lombardia). In Greece, sowing conditions were favourable due to warm air temperatures and suitable soil moisture. In the eastern parts of Europe, after a difficult period of cold and wet conditions, the first half of May presented an appropriate sowing window. However, wet conditions in Hungary and Poland seem to have delayed sowing by one or two weeks. It is expected that the sowing in the western parts of Europe will be completed by the end of May. Indeed, although the temperature conditions in these countries are appropriate for sowing, occasional rainfall may delay the accessibility and the preparation of the fields.

Sugar beet

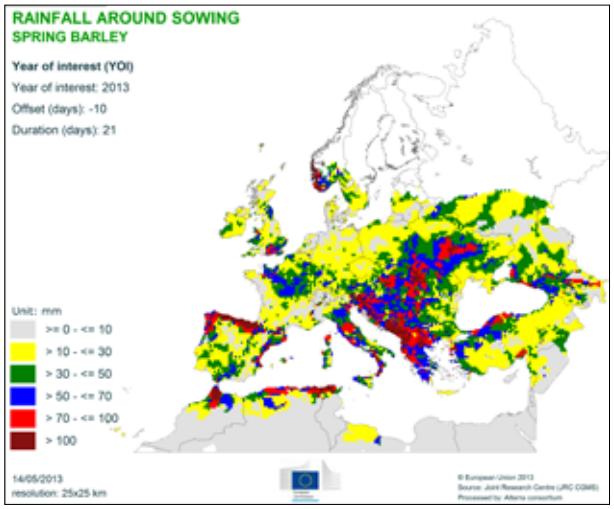
Sugar beet sowing was delayed by up to three weeks in most of Europe's major producing areas: in the northern regions due to cold temperatures until mid-April and in the southern regions mainly due to overly wet conditions. However, sowing conditions were generally favourable in Turkey and southern Russia. The rather dry conditions that prevailed around the sowing period affected germination and crop establishment in northern regions, such as most of the UK, northern France, the Netherlands, northern Germany, Poland and the Ukraine. However, current conditions and the short-term weather outlook are generally favourable for growth and development. Early canopy development is seen to be an important determinant for high sugar beet yields. Therefore, it will be difficult to achieve top yields in the areas which experienced serious setbacks. Good yields can still be produced, however, if favourable weather conditions continue to prevail.

Sunflowers

In the major European sunflower areas, the winter was extended to mid-April with cold temperatures and abundant rainfall delaying the start of sunflower sowing. In Romania, Hungary and Bulgaria, snow cover melted on the 28 and 29 March, followed by humid conditions with at least 30 mm of rain during the first half of April. Sowing conditions were favourable after mid-April with no significant rainfall. In Spain (Castile and León and Andalucia) and France (Midi-Pyrénées and Poitou-Charentes) temperatures increased above the long-term average and rainfall stopped during the second dekad of April, leading to favourable conditions for sowing. Ukraine had good conditions for sowing at the beginning of April with no rainfall. Even if sunflower sowing is delayed, cumulated rainfall may have replenished soil moisture in most productive areas. The delayed sowing may eventually impact yields if water availability tends to decrease during the flowering stage.

Potato

Similar to other spring-sown crops, the start of potato planting was delayed in Europe's main producing areas, due to cold or overly wet conditions until the beginning of April. Planting speeded up rapidly, however, when conditions improved, and in general the bulk of the planting was completed within the normal window. In some northern European countries, such as Poland, planting is still underway, partly because farmers decided to expand their potato acreage at the expense of spring cereals. The delays in early - sowing and below-average soil temperatures during germination are likely to lead to later harvesting, but yields are generally not expected to be seriously affected.


RAINFALL AROUND SOWING
SPRING BARLEY
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Year of interest: 2013
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Duration (days): 21
Unit: mm
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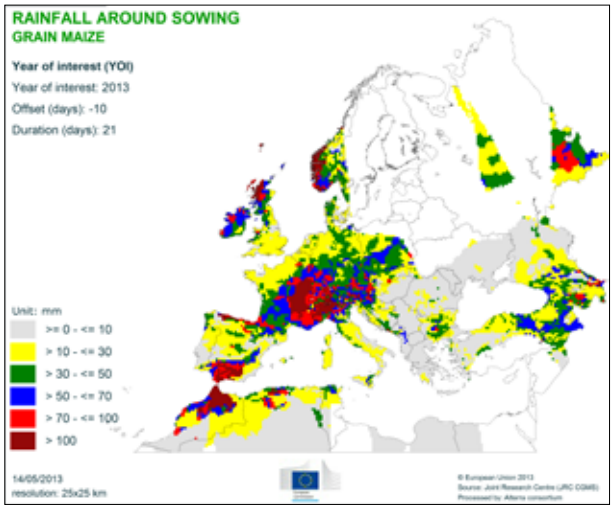
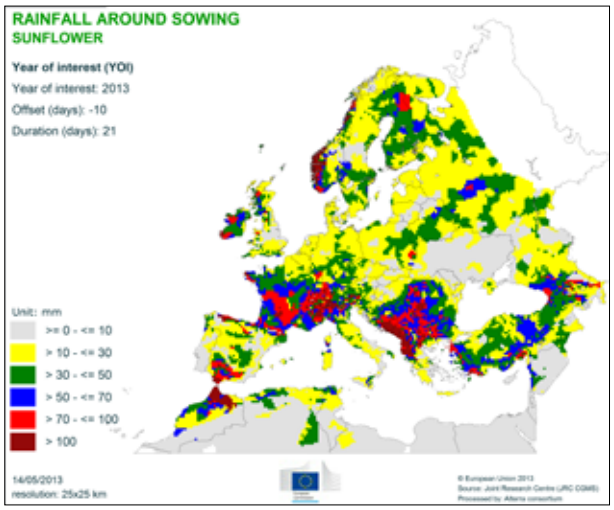
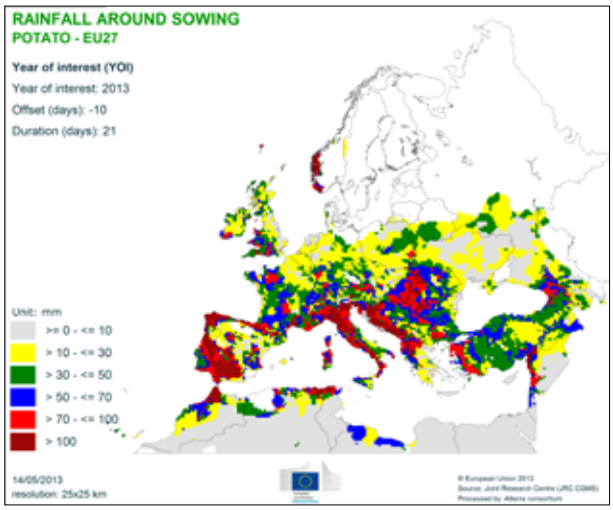
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
14/05/2013
resolution: 25x25 km


RAINFALL AROUND SOWING
GRAIN MAIZE
Year of interest (YOI)
Year of interest: 2013
Offset (days): -10
Duration (days): 21
Unit: mm
>= 0 - <= 10
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
14/05/2013
resolution: 25x25 km


RAINFALL AROUND SOWING
SUNFLOWER
Year of interest (YOI)
Year of interest: 2013
Offset (days): -10
Duration (days): 21
Unit: mm
>= 0 - <= 10
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
14/05/2013
resolution: 25x25 km


RAINFALL AROUND SOWING
POTATO - EU27
Year of interest (YOI)
Year of interest: 2013
Offset (days): -10
Duration (days): 21
Unit: mm
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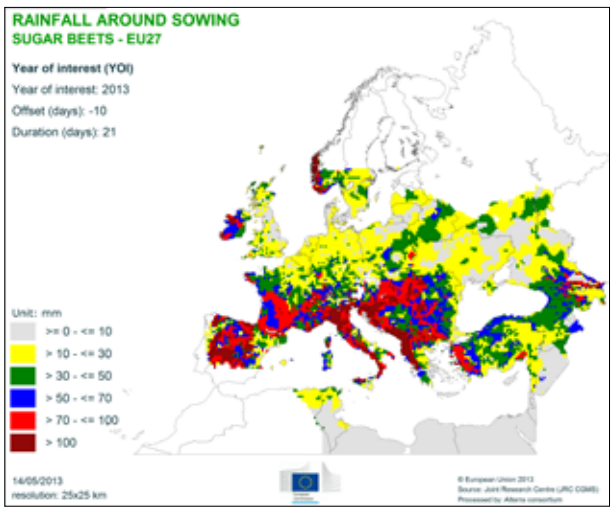
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
14/05/2013
resolution: 25x25 km


RAINFALL AROUND SOWING
SUGAR BEETS - EU27
Year of interest (YOI)
Year of interest: 2013
Offset (days): -10
Duration (days): 21
Unit: mm
>= 0 - <= 10
> 10 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 100
> 100
14/05/2013
resolution: 25x25 km

4. Country analysis

4.1 European Union

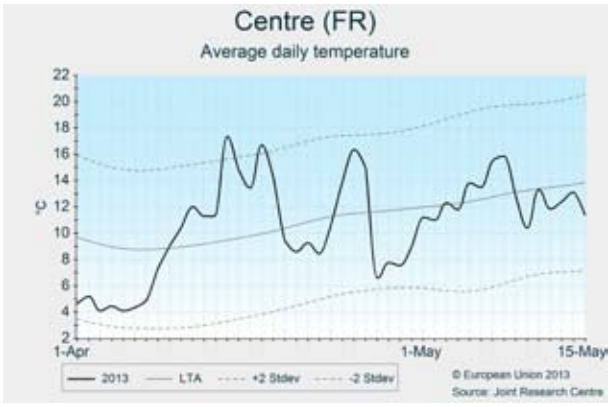
In general, the current prospects for EU-27 yields remained close to the average. Compared to our last forecasts, soft wheat has been slightly revised downwards at the EU-27 level, mainly due to lowered yield expectations for the UK and Ireland, as well as for the Baltic countries, Hungary, the Czech Republic, Poland and Denmark. These downward revisions were not compensated by the increased yield forecasts for the Iberian Peninsula. In contrast, for winter barley, a major upward revision for Spain (by 25%) and minor increases (<1%) for large producers such as Germany and France, largely compensated the downward revision of forecasted yields in many small and some medium-sized producer countries. Together, this resulted in a practically unaltered overall EU-27 forecast for this crop. The forecast for spring barley at the EU-27 level was revised upwards by almost 4%, again mainly thanks to the good performance in Spain. Spring barley yields were also revised upwards for Poland, but downwards for Hungary, Estonia, Ireland and Romania. Forecasted rapeseed yields were revised slightly downwards for the EU-27, mainly due to a more negative outlook for the UK, Romania, Hungary and Slovakia, which was not compensated by the improved forecast for Poland and the slight improvement for Germany.

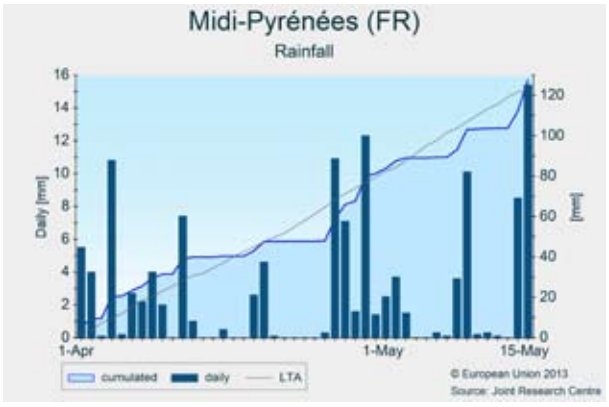
France

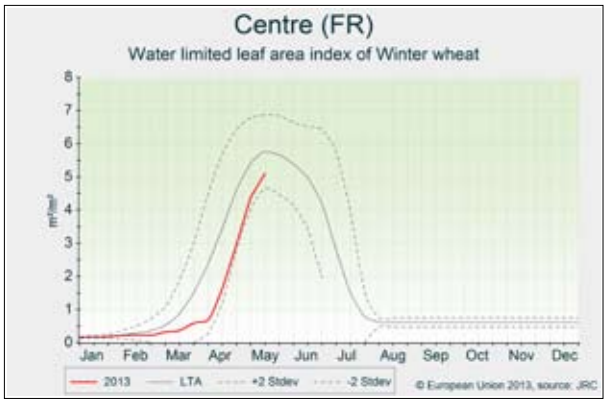
Winter crop development speeds up after a cold start to the season

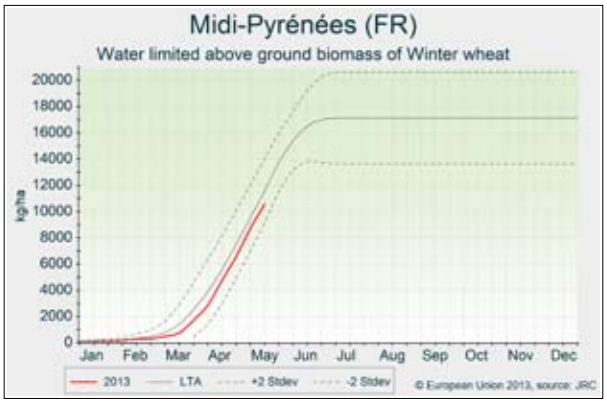
Temperatures increased from mid-April, benefiting crop development. Recent rainfall in the southern half of the country has created favourable conditions for winter cereals.

In the northern half of France cold temperatures extended up to the first dekad of April with daily temperatures at on average 3°C below seasonal values. Temperatures increased definitively during the second dekad of April in all regions, boosting vegetation growth. Remote sensing indicators suggest a much more favourable outlook in the northern half of the country than a few weeks ago, although there is still a noticeable delay in crop development of winter cereals compared to the average, of about 10 days for *Centre*, *Pays de la Loire* and up to 20 days for *Champagne-Ardennes* and *Picardie*. The southern regions had accumulated substantial rainfall from the start of the season, and crops are benefiting from it depicting a positive scenario of water availability during the flowering phase. Yield expectations for winter crops remain still slightly below average due to the delay in their development. Forecasts for durum wheat have been revised higher due to the abundant precipitation in the south. Sowing conditions for summer crops were generally favourable. Early sunflower sowings have been delayed to mid-April in *Poitou-Charentes*, however, as a result of the abundant rainfall experienced from mid-March.









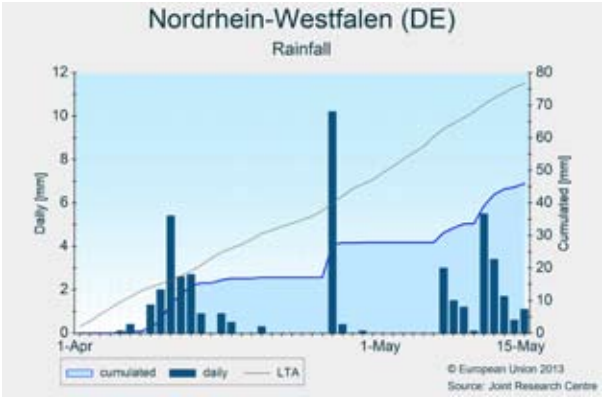
Germany

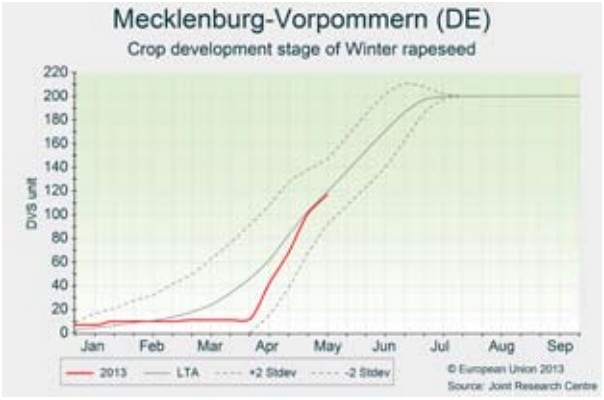
Crop development is catching up, average yields are forecast

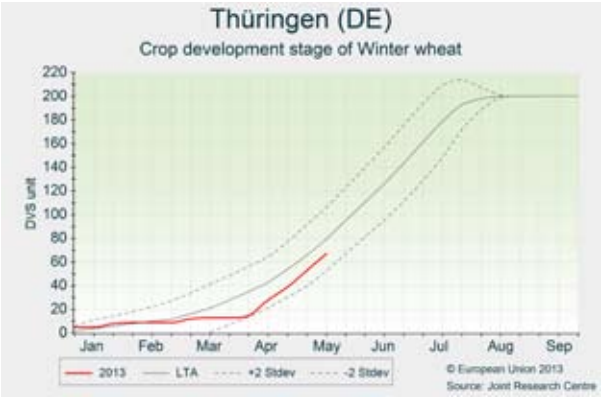
The significant delay at the end of March has mostly been recuperated and a boost in vegetative growth has been observed since mid-April. Spring sowing started with a slight delay but the weather was favourable for a prompt germination. Lack of precipitation in north-west Germany is a concern but beneficial rains are forecast for the region.

With the late arrival of spring in the second half of April, accumulated temperatures are now about average all over Germany and crop growth has partially recuperated the delay. Winter wheat development simulations show a delay of only one dekad, and rapeseed development stages are simulated as being average.

April was a particularly dry month in *Nordrhein-Westfalen*, *Niedersachsen* and *Schleswig-Holstein*, which are missing precipitation since the beginning of the year. On the positive side this means less disease pressure, but rain is now urgently needed to prevent yield losses. Drier-than-usual conditions also persisted in *Mecklenburg-Vorpommern* and *Brandenburg*, but in those regions the overall precipitation since the beginning of the year is close to average. Winter wheat is now at the heading stage, but total biomass accumulation is rather low, having also been affected by the fast growth of the past dekads. The yield forecast is now close to average based on a scenario analysis identifying the yield levels of the most similar years, but could possibly improve if no adverse weather conditions occur. The same is true for barley, with forecasted yields close to average. Rapeseed, which is at the flowering stage, so far undisturbed by rains, and shows in general a good leaf expansion despite the rapid growth rates since mid-April. The yield forecast has been slightly raised compared to the last bulletin and is in line with last year's yield level.







Poland

Mild weather with average rainfalls

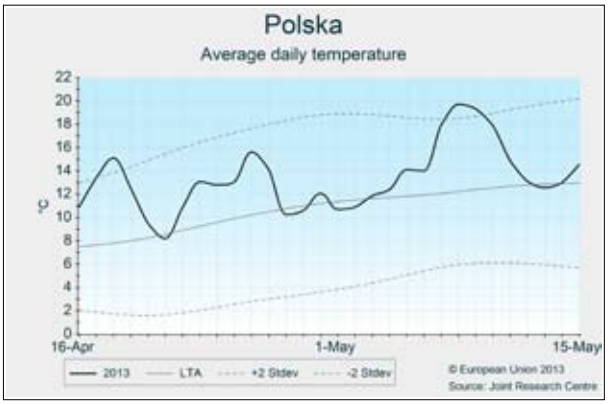
Mild weather and average rainfall stimulated crop growth and development and created good conditions for the sowing of summer crops and for late spring sowing. Winter crops, especially rapeseed, also responded well to the improved weather conditions but yield indicators are still below average.

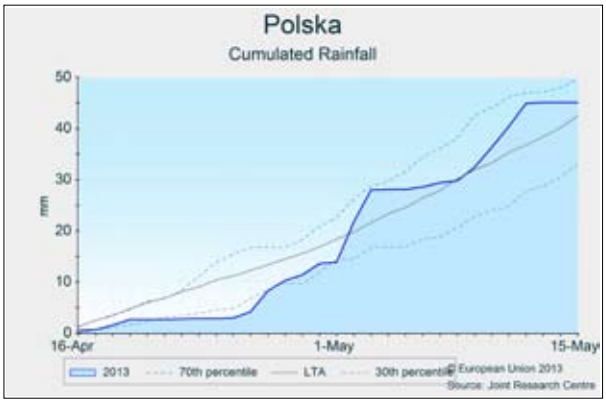
Temperatures across the country were milder than average and rainfall accumulation was about average. However, some

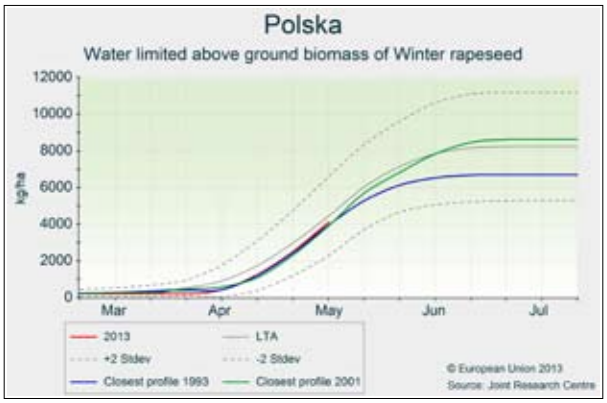
regions such as *Opolskie*, *Lodzkie* and *Dolnoslaskie* received higher amounts of rainfall while the *Kujawsko-Pomorskie* and *Warminsko-Mazurskie* regions received less. The rainfall pattern was favourable for the sowing of summer crops and for for late spring sowing.

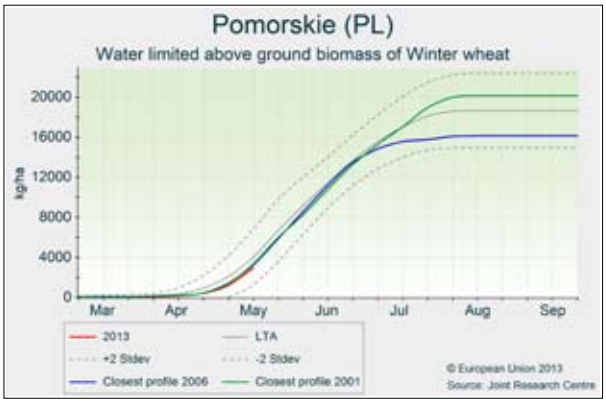
Winter crops reacted to the milder weather with accelerated growth and development. Rapeseed shows the highest growth rates, while winter cereals are still delayed. Moreover, the milder weather and sufficient rainfall enables crops to partially recover from the long period of low temperatures and reduced growth rates experienced in winter and early spring. The weather forecast predicts a continuation of the favourable conditions. Spring crop development is delayed due to the late sowing. Summer crops are in the initial stages of development.

Our forecast for winter and spring crops is now based on crop simulations. The predicted yields for winter cereals are slightly lower than in our last forecast except for soft wheat. The spring crops that were sown in optimal agronomic conditions are early in the season and average yields are forecast. Summer crops forecasts are based on the trend.







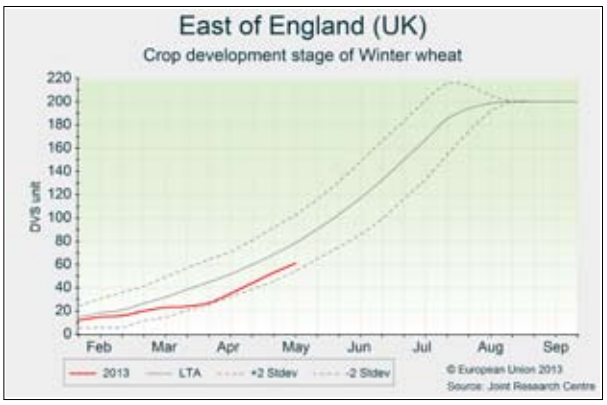


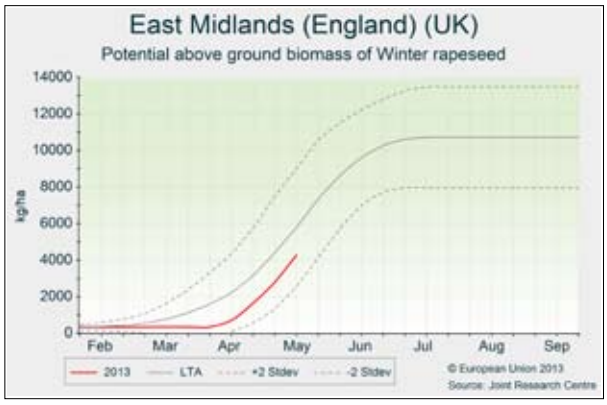
United Kingdom and Ireland

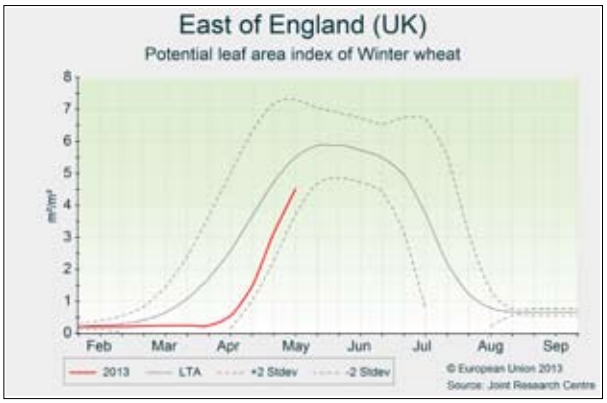
Delay in the growth cycle maintained

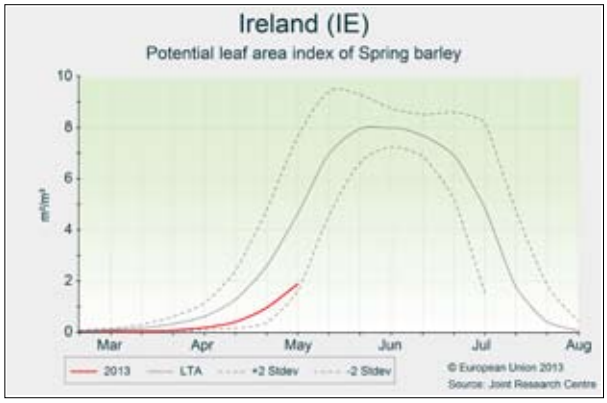
Growth cycle remains delayed for all crops leading to high uncertainty in yield forecasts

Meteorological conditions for the period reviewed are characterised by average temperatures, above-average precipitation in Ireland and Scotland, below-average precipitation in England and Wales, and above-average solar radiation, particularly in the East. These conditions have allowed for a steady growth, but crops continue to lag 2-3 weeks behind with respect to both crop development and biomass accumulation, and it remains unclear as to whether or not they can catch up. Crop growth and development are particularly retarded in Ireland. External reports in England also indicate great disparity in winter crop status between early and late-sown fields. The former were strong enough to withstand the adverse winter/spring conditions while the latter are struggling, have limited-yield potential and have partly been abandoned or replaced by spring/summer crops. For rapeseed the area estimate has already been revised downwards. The yield forecast has been revised downwards for rapeseed in the UK, for winter barley in Ireland and for wheat in both Ireland and the UK. It is acknowledged that the unusual conditions translate into high uncertainty of these forecasts. For spring crops, the estimates based on the trend are maintained.









Spain and Portugal

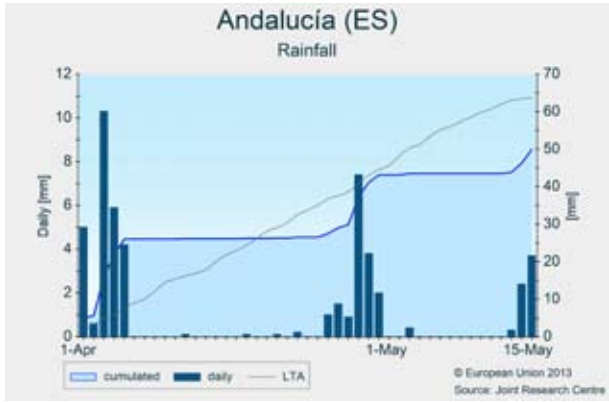
High yield potential for winter cereals

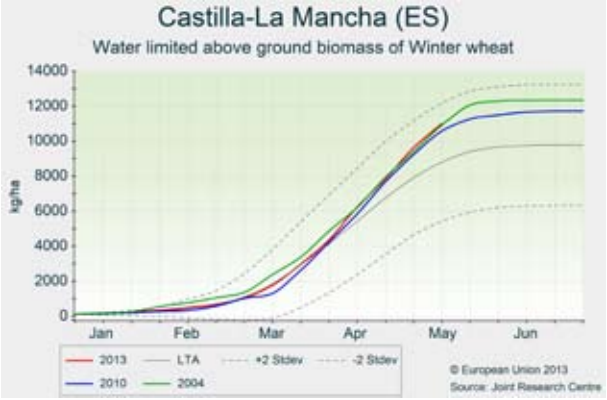
Seasonal temperatures with low precipitation have been registered, favouring the development of cereals after one of the most humid early spring periods. Winter crops exhibit high vegetative vigour and yield expectations are quite positive.

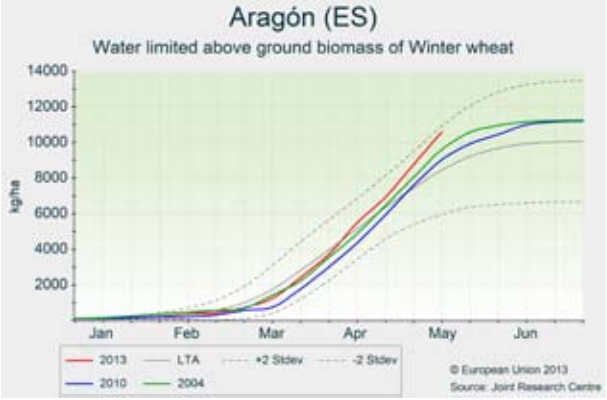
After a very humid month of March, meteorological indicators returned to seasonal values from the second half of April. Mild temperatures characterised the past month, with a punctual decrease in the last week of April. In general, rainfall levels from April onwards have been slightly lower than usual, which was positive for southern regions – *Castilla La Mancha*, *Andalucía*, *Alentejo* – where abundant rainfall in early spring had left overly wet soils. The sowing of summer crops was completed in all regions.

The outlook for cereals is therefore quite positive. Durum wheat, currently in the grain-filling stage, presents growth levels that are substantially higher than usual, and yields are expected to be significantly higher than the average of the past few years, despite local damages in *Andalucia* associated with excess precipitation. Very high yields potentials are also observed for soft wheat and barley, especially in *Castilla La Mancha* and *Aragon* where leaf area development largely exceeds the average values. These positive expectations have to be confirmed in June.

Grain maize is currently completing emergence, favoured by positive weather conditions. The high levels of water currently stored in reservoirs (85% of the total capacity, on average) ensure water availability to fulfil irrigation needs during the summer period.







Italy and Slovenia

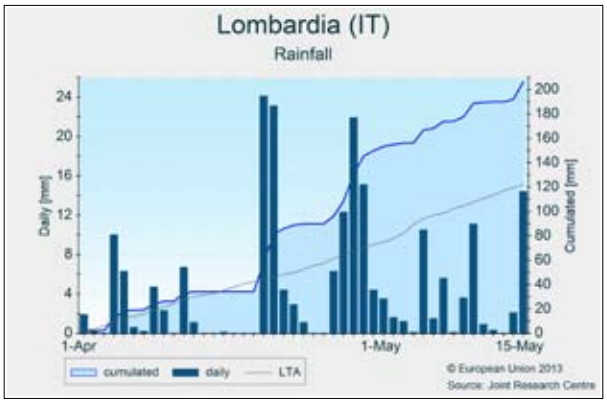
Favourable outlook for winter crops in central and southern Italy

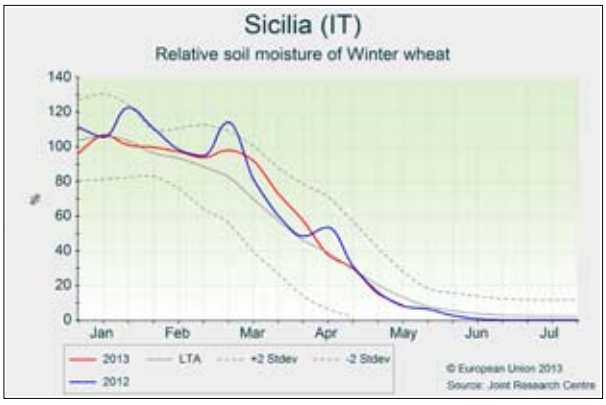
Maize sowing in northern Italy has been delayed due to abundant precipitation. Cumulated active temperatures above the average allowed for a good development of winter crops.

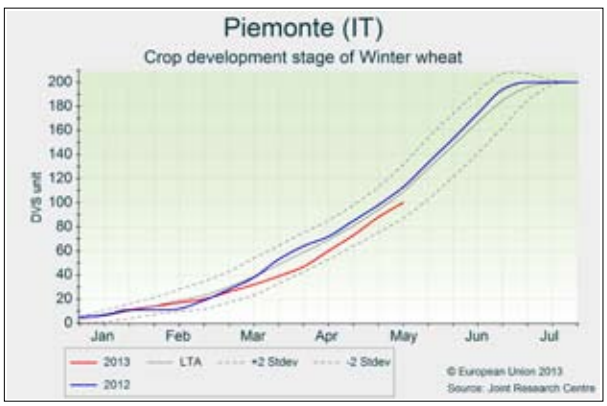
During the period from 15 April to 12 May, cumulated rainfall was about 80% above the long-term average in northern Italy and Slovenia. In *Piemonte*, *Lombardia, Friuli-Venezia Giulia* and Slovenia more than 100 mm of cumulated rainfall was recorded.

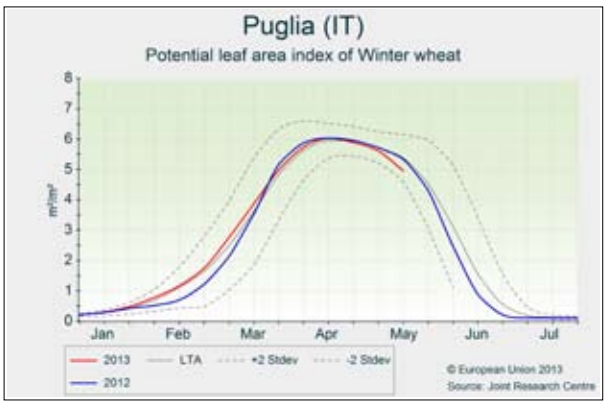
The average temperatures recorded were above the long-term average (by 2 to 4°C) in all regions. As a consequence, the cumulated active temperatures (Tbase=0°C) for the period under consideration were above average by 50 to 80 GDD in northern Italy and Slovenia, and by 80 to 100 GDD in central and southern Italy.

The previous delay in winter crop development has been compensated for, except for in *Piemonte* and *western Lombardia* where a slight delay is still recorded. In northern Italy and Slovenia, simulated leaf area index and cumulated potential biomass remain below average. In central and southern Italy, the simulated leaf area index is close or above average, and crop growth indicates a favourable yield outlook. Winter wheat and barley are finishing flowering in northern regions, while in central and southern Italy ripening is beginning in some fields. Good soil moisture until the first dekad of April provided









good growing conditions for durum wheat in southern Italy. The coming weeks will be crucial to determine kernel size and weight. The abundant rainfall during the spring sowing period in northern Italy hampered field operations and delayed maize sowing, mainly in *Piemonte* and *Lombardia*.

The forecast yield for winter crops remains close to average, according with our model and to remote sensing observations. The current yield forecasts of winter crops are based on scenario analyses. For the other crops, only trends were used at this stage for making yield forecasts.

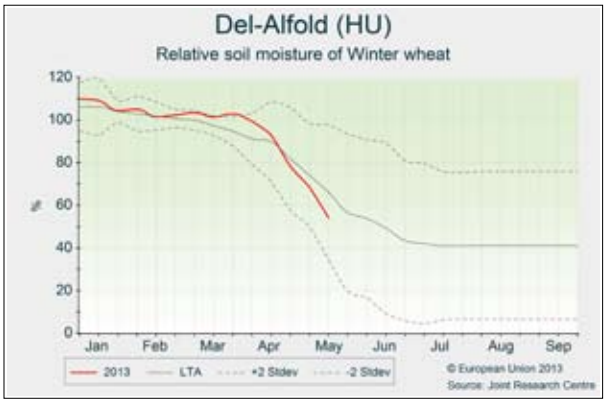
Hungary

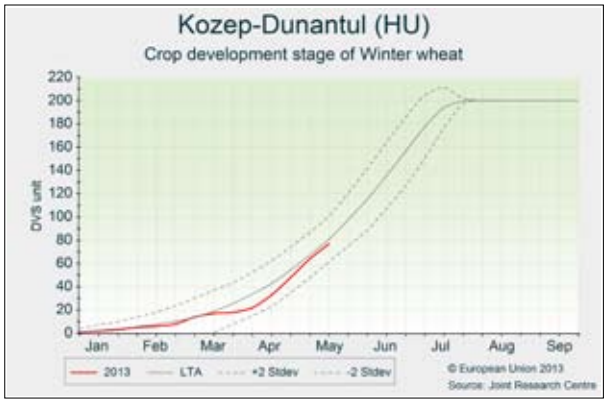
Delay in the winter crop growth has decreased

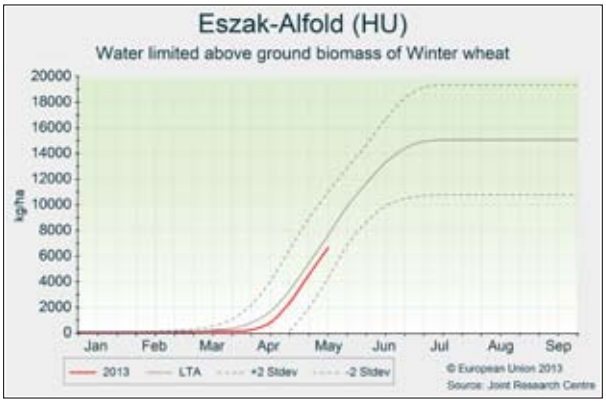
Warm and dry weather provided good conditions for sowing spring and summer crops with little delay, except for winter barley. The emergence was quick, and the phenological development of winter crops has caught up. A delayed growing season is expected for spring barley. The leaf area and the biomass accumulation of winter cereals are at or slightly above average. Further rain will be needed in May to maintain or increase the currently near-average yield potential.

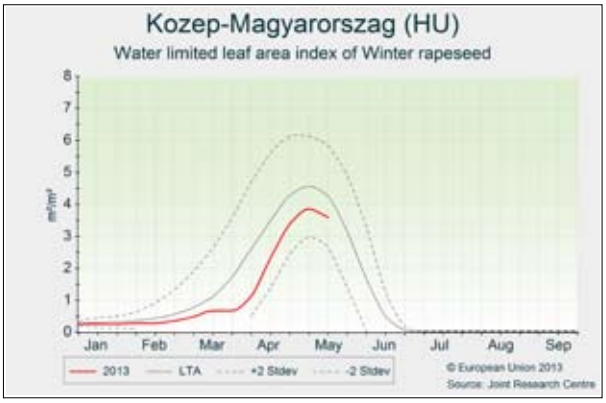
Meteorological conditions for the period reviewed are characterised by above-average temperatures and scarce precipitation. The daily mean temperatures fluctuated above the average values by 4 to 5°C. Daily maximum temperatures were over 20°C in mid-April and approached 30°C in the last days of April and first days of May, but returned to normal levels in mid-May. Precipitation was scarce until 5 May, when intensive rainfall events reached the central part of Hungary, while the western and especially the eastern territories remained dry. The increased evaporation speeded up the drying of the soil surface, enabling mechanical cultivation and helping to decrease the delay in the sowing of spring crops.

The soil moisture for the winter cereals decreased rapidly. For the summer crops, the water reserve of the subsoil is intact and plentiful. The development and growth of winter cereals was accelerated due to the positive thermal anomaly and reached near seasonal levels. The canopy expansion and biomass accumulation of winter rapeseed is below average, however, and the yield expectations for this crop are slightly below the trend. Cold conditions in March prevented the sowing of spring barley during the optimal planting window. As a consequence, emergence suffered a delay until April and yields are likely to be affected negatively due to the shifted crop cycle.









Romania

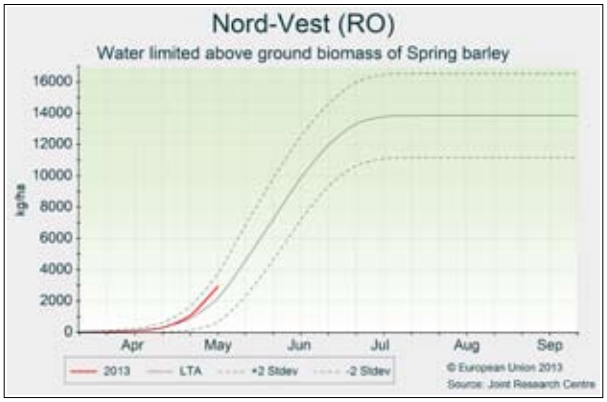
Scarce rainfall causes stress to winter crops

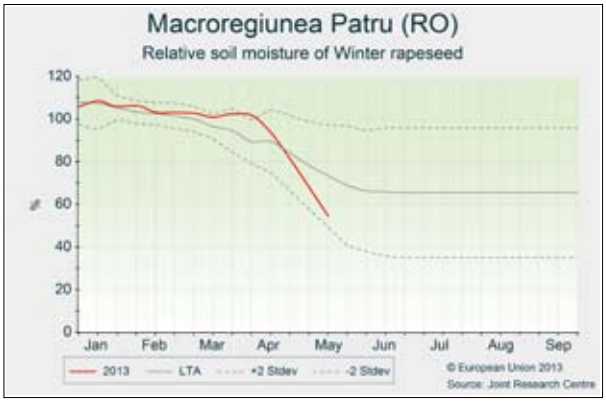
It was warmer than usual during the period under review, and crop development was consequently accelerated by approximately one week. The climatic water balance is showing an increasing deficit due to scarce rainfall and the high potential evapotranspiration. The soil moisture decreased sharply and only partly fulfils the water needs of winter crops in mid-May. Simulated crop canopy expansion and biomass accumulation of winter crops are near average.

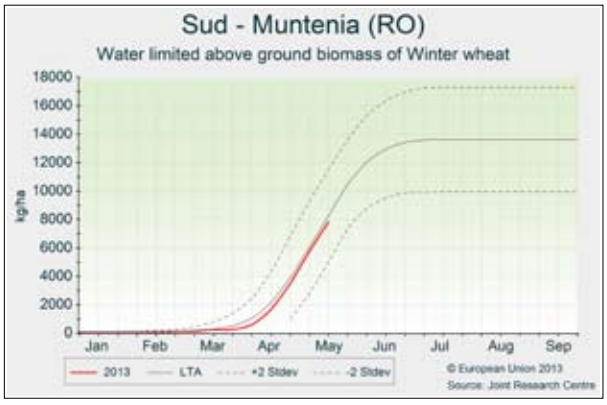
Daily temperatures continuously exceeded the long term average and in the last days of April, with temperatures being registered of over 30°C. The active temperature sum (Tbase=0°C) gained a significant surplus of 100 to 130 GDD from mid-April to mid-May. After the abundant precipitation events of early spring, rain stopped after 15 April. The precipitation remained below 10 mm for most of the country, with no rainfall being registered in the eastern part of Romania and some additional spots. The consistent reduction of soil moisture was the result of the higher-than-seasonal water consumption of plants due to high temperatures and irradiation levels. Having no rain in the second half of May will intensify the water stress during the grain filling stage of winter cereals and rapeseed, negatively affecting the further evolution of the season and the yield outlooks.

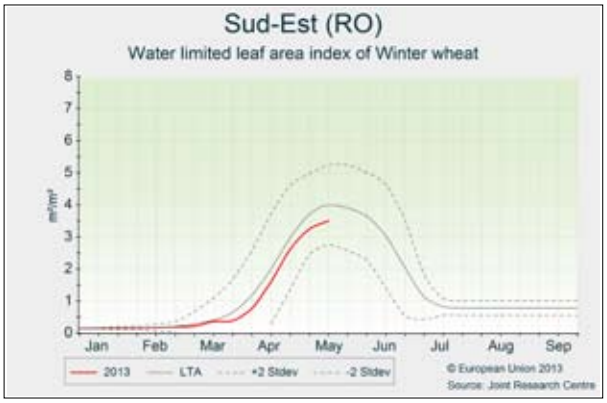
Winter crops indicate a slightly advanced phenological development. The sowing of spring crops was delayed due to the overly wet first half of April. The drier weather conditions experienced later allowed for sowing, but now more rain is needed for appropriate germination and early development of spring crops. Simulated leaf area index and biomass are close to average. In southern regions, the difference of NDVI profiles between the current year and the long-term average shows a positive difference of more than 5%.

The yield forecast was based on crop simulation. Our previous forecast was revised slightly downwards - it is still close to the average but further downward revision is possible if water shortage persists.







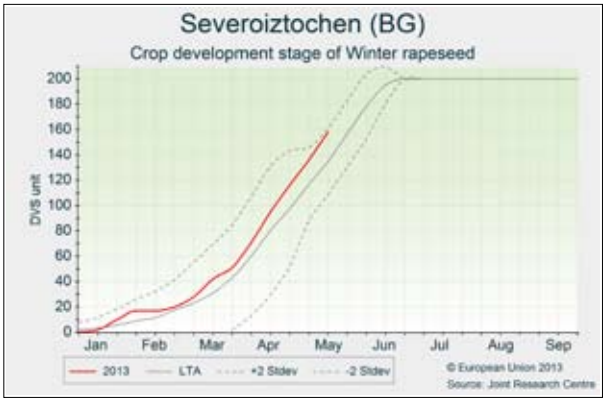


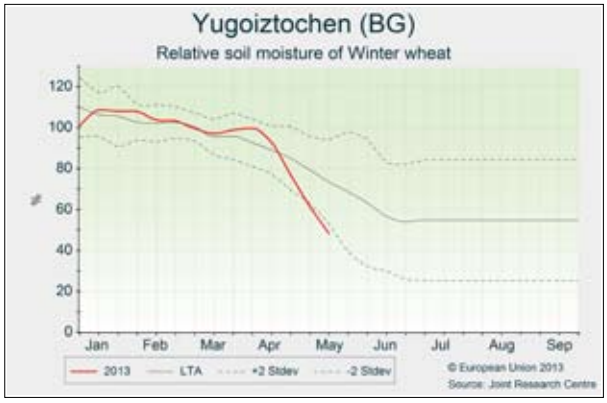
Bulgaria

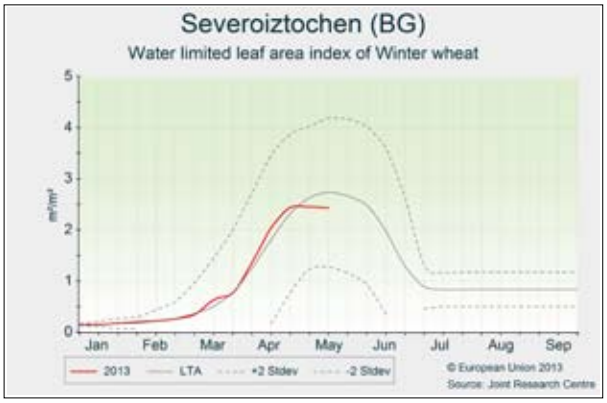
Good crop conditions, but delicate situation due to possible water shortages

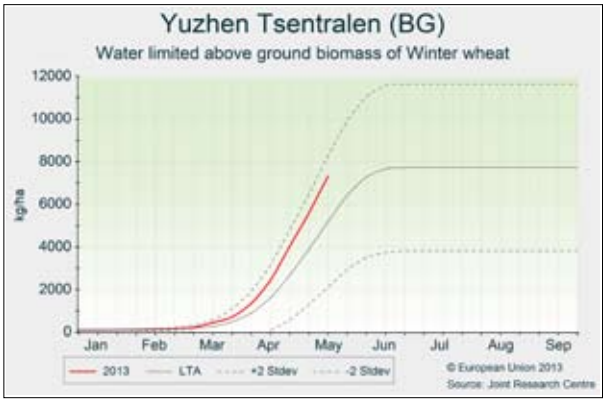
Dry, sunny and warm weather characterised Bulgaria during the period of review. Irradiation levels exceeded the long-term average by 20%. The crop development is significantly advanced, by 1-2 weeks. The water limited biomass accumulation of winter crop is remarkably high, but crop canopy development slowed down. If abundant rainfall does not occur, the current yield outlook must be revised downwards in June.

Thermal conditions were near average at the beginning of the considered period, but subsequent significant warming led to unseasonably high temperatures during the third dekad of April, setting new record values. The temperature sum also indicates a significant surplus over Bulgaria, with an 80 to100 GDD surplus since 1 April. Rainfall was scarce and the precipitation sum remained below 10 mm for most of Bulgaria. In smaller zones of central and western areas the rainfall reached 15-30 mm, which is still well below average. Consequently, winter crops' soil moisture content decreased sharply. The soil water reserves are still adequate for the winter cereals, but rain is needed soon to maintain the above-average yield expectations. The development of winter crops is 1-2 weeks early and biomass accumulation is above average (especially in the southern and eastern regions), though the analysis of *Severo-Zapaden* region indicates a below-normal crop state. Satellite images confirm the good crop conditions, but rains are needed for the period of yield formation. The warm and dry weather provided favourable soil and weather conditions for the planting of summer crops.









Austria, the Czech Republic and Slovakia

Winter crop yield forecast below average. Sowing delayed

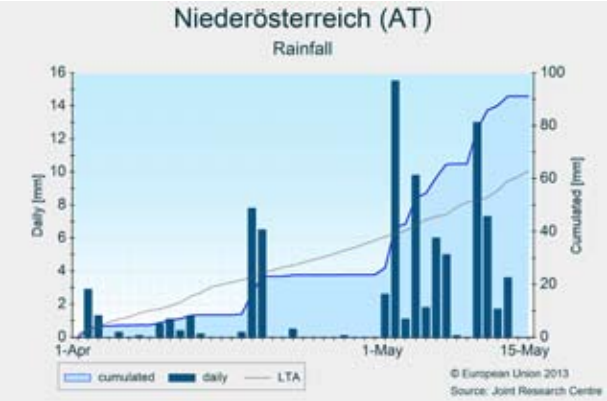
Winter crop yields could be partially compromised due to the high levels of rainfall since the start of the year and the cold temperatures at the end of March. Soils might be too wet for spring and summer crop sowing.

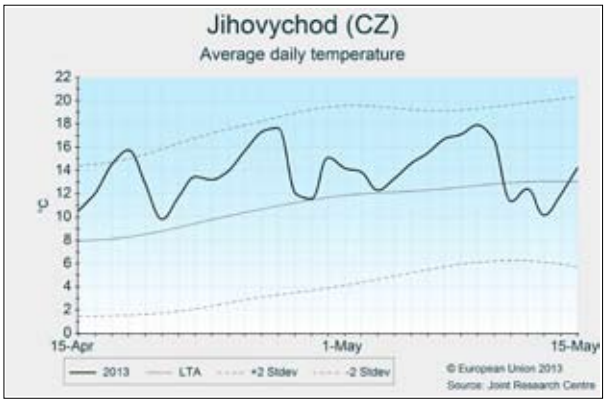
Average temperatures were above the long-term average during the last two weeks of April and the first week of May. Thermal time accumulation returned to normal conditions and winter crops regained almost all the development delays registered in March-April. In general, rainfall since the start of the year was well above the long-term average. The precipitation during the first two weeks of May and the rainfall expected for the coming days will further saturate the soils.

According to the observed meteorological conditions, the only favourable window for spring and summer crop sowing was during the last week of April. The expected precipitation might make it difficult to conduct further sowing.

Our models simulate a significant reduction in biomass and leaf area index for all winter crops. In addition, due to the high levels of rainfall, fungal sources of inoculum could be high at the flowering stage, giving rise to high levels of disease pressure. Rainfall observed during the flowering of winter rapeseed might hamper pollination, with unfavourable consequences on yields.

Concerning spring and summer crops, it is too early to forecast any negative impact of the delayed sowings. Therefore, trend values are confirmed.



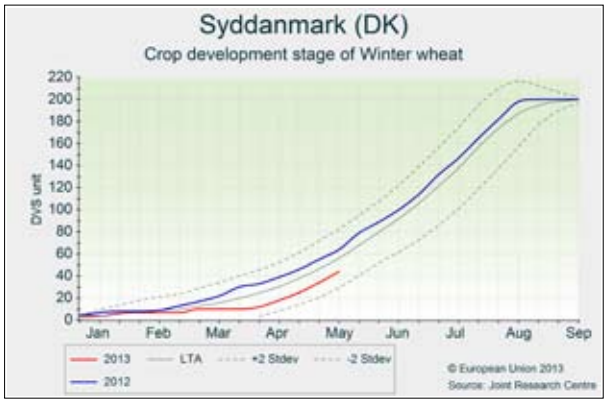


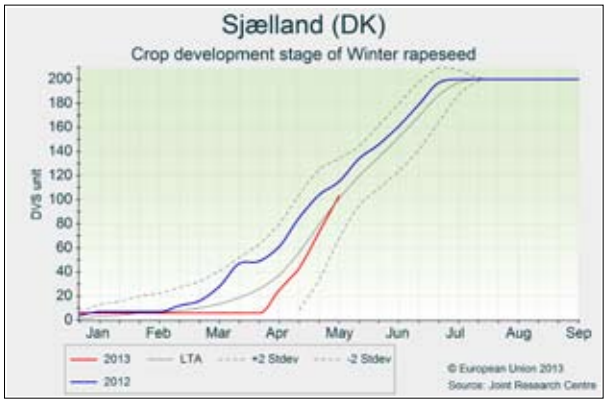
Denmark and Sweden

Winter crops yield forecast below or close to average. Spring sowing delayed

Cumulated active temperatures continued to be below average. The coming weeks will be crucial for the flowering of winter crops and the emergence of spring crops.

During the period from 15 April to 13 May, average temperatures in Denmark and Sweden were above or close to average, even though below-average temperatures were recorded from 25 April to 6 May. The cumulated active temperatures (Tbase=0°C) remained below or around the long-term average in Denmark and slightly above average in western Sweden (+20 to +50 GDD). Computer simulations suggest a two-week delay for winter wheat development stages, while rapeseed development stages are simulated to be average. After a very dry March, growth conditions improved during the period of analysis by significant rainfall and the





high values of global radiation. Winter wheat is now at the heading stage but total biomass accumulated remains lower than usual, as confirmed by remote sensing. The forecasts for winter wheat and winter barley are now set slightly below average based on a scenario analysis. Rapeseed has started flowering and in general shows good leaf expansion. The yield forecast is around average. For the other crops, only trends were used at this stage.

Finland and the Baltic countries

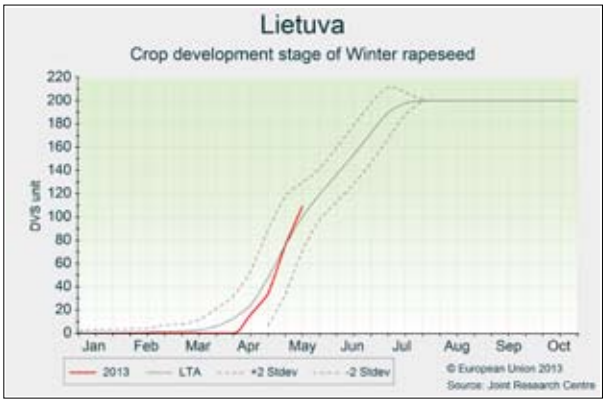
Good weather conditions promote winter crops growth

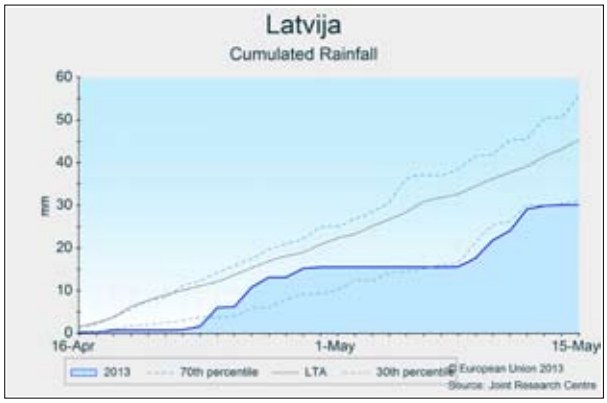
After a long winter and early spring of persistent low temperatures the region experienced slightly above average temperatures. The winter crops respond with higher growth rates, particularly rape seed.

Temperatures across the whole region were higher than in the previous period and, overall, temperatures as well as solar radiation were slightly above the long-term average. Rainfall continues persistently below average, however; particularly in Lithuania, Latvia, Estonia and Southern Finland (*Etelä*), but it increases towards the north. Nevertheless, this prolonged period of low rainfall in most of the region, has not adversely affected the soil water balance and there is enough soil water for good crop growth.

The present weather conditions create a good environment for accelerated growth and development of the winter crops. Winter wheat indicators are still below average but quickly approach the long-term average, particularly in Lithuania. Winter rape seed crop development and biomass accumulation already achieved higher than average values in Lithuania and Latvia. The rapid growth and development of winter crops, after the prolonged winter, should be followed with proper crop nutrition to realise yield potentials. The majority of the spring crops were planted towards the end of the sowing period and it is still early to evaluate their growth and development.

Our forecast for winter crops is now based on crop simulations, which suggest that the balance of the long winter followed by the current quick growth results in slightly lower yields than the trend based values of the previous bulletin. The spring crops yield forecast is still based on trend values.



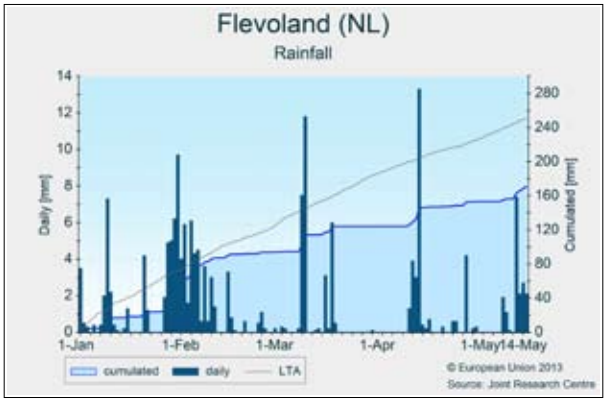


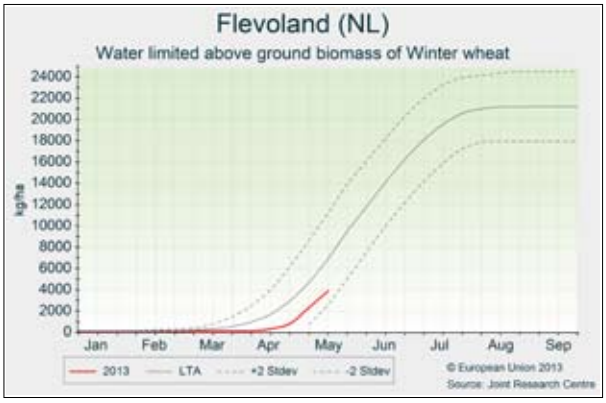
Belgium, the Netherlands and Luxembourg

Crop growth still lagging behind

Near-normal temperatures during the period analysed allowed winter crops to accelerate growth and development, but the delays caused by the preceding cold spell were not fully compensated. There were delays in the sowing of spring crops, the establishment of which was locally hampered by lack of rain around sowing.

After the cold spell in March, the above-average temperatures that were registered towards the end of the previous review period continued into the second dekad of April and then dropped to levels around or just below average. As a consequence, the delays in the winter crop cycles could only be partly recovered. Biomass accumulation continues to lag behind. Spring crops were sown with a delay of 10 to 20 days. Rainfall has been persistently below the long-term average but this should not have affected the growth of deep-rooting winter cereals. Locally, however, dry and windy conditions are reported to have had negative effects on the germination and early development of spring-sown crops. Although the situation does not seem to be optimal, analysis of past years with similar conditions indicates that crops can still recover to average or higher-than-average yields. All forecasts have therefore been maintained based on the trend, with the exception of rapeseed, which was revised downwards, since there is less time for it to recover.





Greece and Cyprus

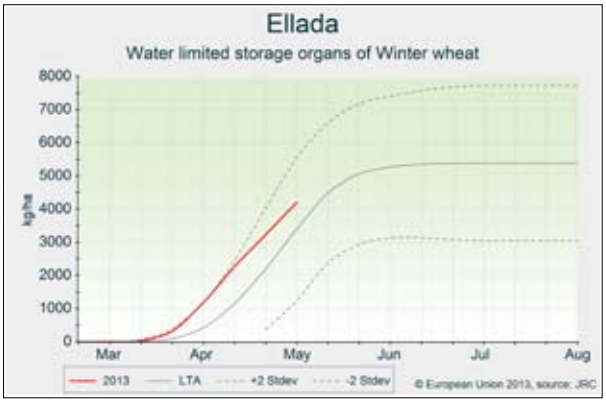
Warm and dry

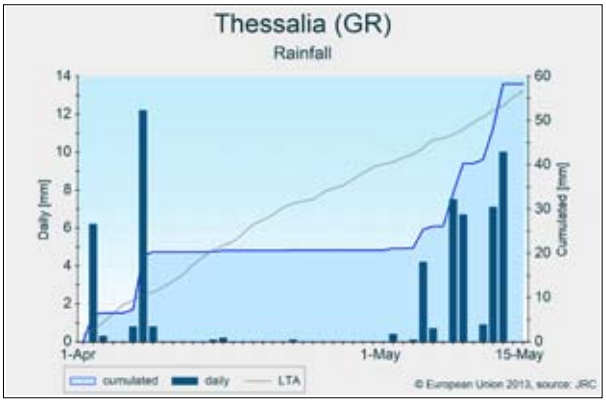
Very warm and dry conditions for the main agricultural areas of Greece slow the growth of winter cereals. On the other hand, precipitation in Cyprus seems to have a limited effect on yields.

In Greece, the period considered was characterised by warm and dry conditions. Recorded temperature values were 6-8°C higher than the long-term average for almost the whole country lasting from 25 April to 7 May. The high pressure system brought cloud-free conditions and thus high solar radiation and only a little precipitation. Cumulated rainfall was lower than the long-term average in the main agricultural areas of the country, except for the region of West Macedonia. However, recent rains could be beneficial for winter wheat as it is in grain filling stage.

Our model indicates that crop development is advanced compared to the long-term average. However, soil moisture values are below the long-term average and further precipitation will be needed to sustain good yields. Therefore, compared to our last Bulletin the wheat yield forecast has been revised downwards, but is still close to the long-term average. The same applies to winter barley. Yield forecasts for potato, rye and sunflower crops are the same as in the previous Bulletin. Under prevailing weather conditions, an average yield is anticipated for grain maize, however, the final yield is still subject to uncertainties as the crop is at early growth stage.

In Cyprus, similarly to Greece, temperatures were much higher than the long-term average from 25 April to 7 May. Precipitation occurred before and after this period. Even though the amounts of rainfall were significant, their benefit to yields is limited because the life cycle for winter cereals is nearly over in Cyprus. Therefore, compared to our last Bulletin the crop yield forecast was revised only slightly upwards.





Croatia

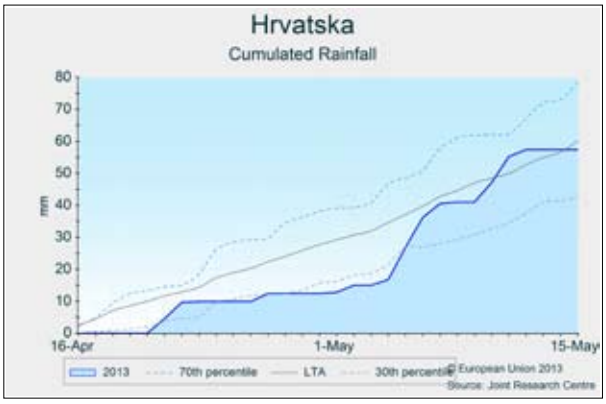
Good weather for crop growth and development

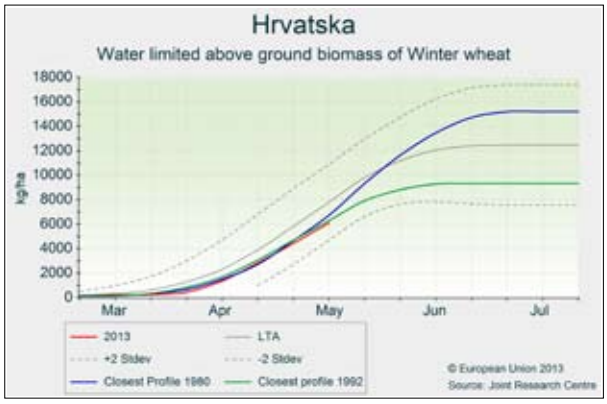
Above-average temperatures promote crop development, but biomass accumulation lags behind.

During the period analysed, Croatia experienced above-average temperatures that accelerated crop development. Rainfall was slightly below average, which allowed normal access to the fields that had been over-saturated during the previous periods of abundant rainfall, for completion of spring field activities. Solar radiation, as a result of the decrease in rainfall and cloudiness, was slightly higher than average.

The winter crops responded to the milder weather with an acceleration of their phenological development. This, however, is not automatically accompanied by accelerated growth, and biomass accumulation for winter wheat and winter rapeseed remain below average. Comparison with similar years, however, shows that there is still a possibility of good yields if favourable weather conditions persist. Our model shows good early development for spring and summer crops.

Our forecast is now based on crop growth simulations. The estimated yields for winter cereals and rapeseed are revised slightly downwards compared to our last forecast.





4.2 Black Sea Area

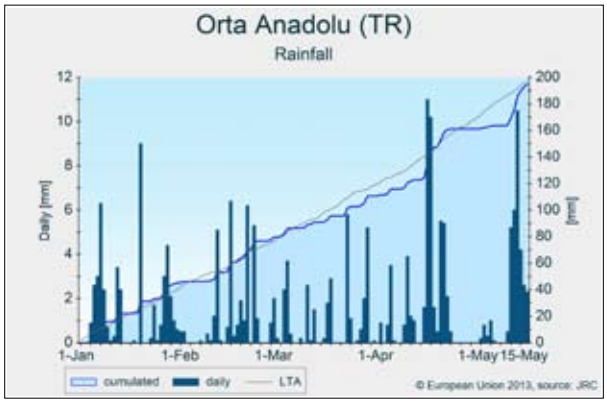
Turkey

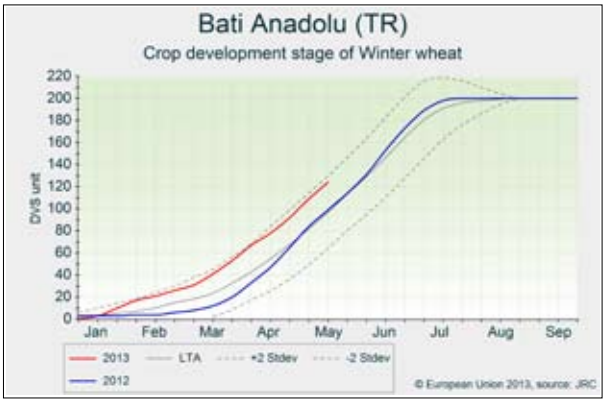
Very good weather conditions prevails for crop growth and development

Temperature development, solar radiation and rainfall distribution increase the likelihood of a good year in terms of crop yields.

The time window considered in the present analysis registers favourable temperature development, a favourable water balance, and above-average cumulated solar radiation in the main wheat - and barley-producing areas of the country (i.e. central Anatolian regions) where these crops are in the grain-filling stage. These conditions lead to expectations that crop yields will be good. Moreover, crop development is well advanced compared to last year's situation, as reflected by the above-average green biomass accumulation inferred from satellite images. Therefore, yield forecasts for these crops are above the 5-year-average values.

The prevailing weather conditions are also favorable for maize crop development. However, the final yield is still subject to uncertainties as the crop is at the emergence stage.





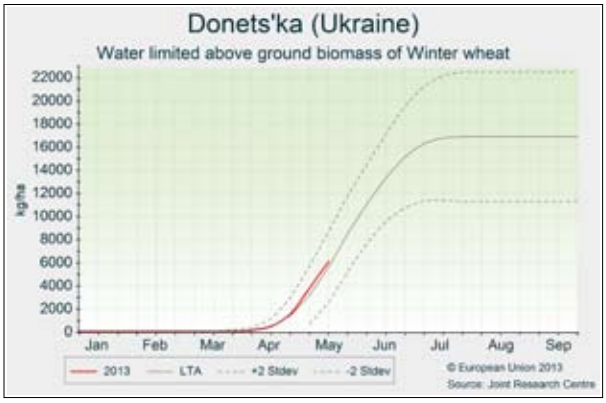
Ukraine

Winter wheat yield forecast was slightly revised down due to lack of rainfall

Crop phenological development has speeded up due to above-average temperatures and is very advanced in southern areas. Most of Ukraine received only very little rainfall since mid-April, leading to low soil water reserves under the winter crops. The actual yield outlook for wheat remains positive, but rain is needed to realise the good expectations.

The average temperature was 2 to 4°C higher than usual for most of Ukraine, and up to 4 to 5°C higher in south western areas. From the end of April, extremely high daily temperatures of almost 30°C were recorded. Rains became scarce and remained below 5 mm in most of the country, except some smaller spots along the western and northern borders where 15-30 mm precipitation was recorded. Significant areas in the central and southern zones received no rainfall at all.

The long winter and overly wet soil conditions during early spring prevented the timely sowing of spring barley and sugar beets in the northern and western regions, while elsewhere sowing was carried out on or even before schedule. After mid-April the dry weather conditions were favourable for the sowing of maize and sunflowers. We based the yield forecast



for spring and summer crops on the historical trend because it is still very early in the season.

For winter crops, the yield forecast is based on crop growth simulation models. These show that crop development is considerably advanced in the southern regions, where winter wheat has reached the flowering stage. In the western and northern provinces, however, crop development is delayed and wheat is still in the heading phase. Simulations indicate an unfavourable deficit in the soil moisture content of winter cereals, therefore the yield expectations of winter cereals was slightly lowered. The sharp contrasts between the southern and eastern areas on the one hand and the northern and western areas on the other are clearly visible on remote sensing images.

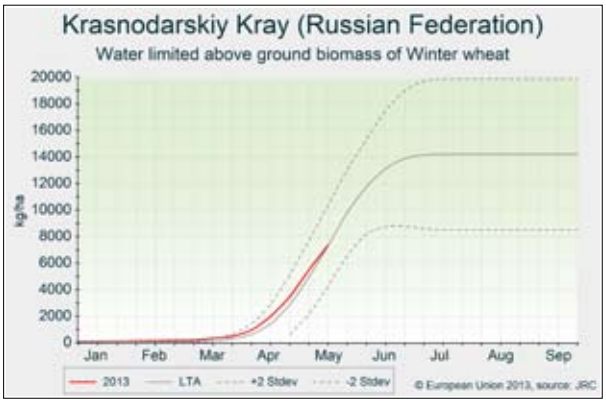
4.3 European Russia and Belarus

European Russia

Weather is favourable for sowing, and winter crops are in good condition

The temperature was higher than average for most of Russia from the beginning of April. Precipitation remained below the long-term average in southwest European Russia, while the eastern territories received moderately more rainfall than usual. So far the wheat yield expectations are above average, but, for winter wheat, a normal water supply is crucial during the yield formation stage in May as precipitation in June tends to have little benefit to the final yield.

The past month was characterised by near-normal but variable thermal conditions until 25 April, when temperatures increased to 3-5°C above average in southern and southwest Russia, the main winter-wheat-growing region. Precipitation remained below average in southwest Russia resulting in favourable sowing conditions. The sowing of spring crops was considerably early and is progressing faster than in other years. Exceptionally accelerated crop development has been observed especially in a zone between the Black and Caspian Seas due to the high temperature accumulation. According to our simulations, winter wheat is flowering and, in smaller areas north of the Caucasus, grain filling has started. Due to inadequate rainfall and the increased water consumption of winter cereals, the soil moisture dropped below average in most of southern Russia. Nevertheless, the modelled winter wheat results show good biomass accumulation. This is confirmed by the positive difference between the NDVI profiles for the current year with respect to both the previous year and the long-term average.



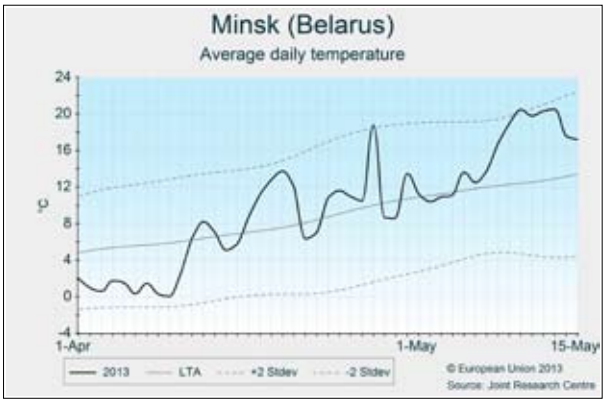
Belarus

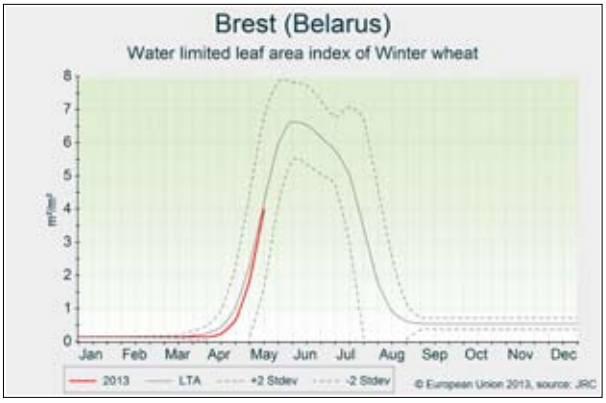
Good conditions after a prolonged winter

Thermal conditions and rainfall are favourable to crop development. Crops are catching up after the substantial delays caused by cold temperatures at the end of March and beginning of April.

Weather conditions improved after a prolonged winter which was characterised by average temperatures 6°C below the long-term average and snow cover persisting until the first dekad of April. Since mid-April, average temperatures remained above 4°C all over the country, with only two days with temperatures slightly below 0°C being recorded in the province of Vitebsk. Soil moisture conditions are also favourable. Hence, even though the start of the season was delayed, conditions since mid-April are favourable to crop growth.

According to model calculations, winter wheat development is now close to normal and this is confirmed by remote sensing indicators. Consequently, the yield forecasts for winter wheat are close to the historical trend. Considerable changes are still possible, however, depending on meteorological conditions over the coming weeks. Spring barley sowing was delayed, but good thermal conditions during the early phenological stages have helped the crops to catch up. Conditions for maize sowing are good since the last dekad of April, and sowing is expected to be carried out on time.





4.4 Maghreb

Morocco, Tunisia and Algeria

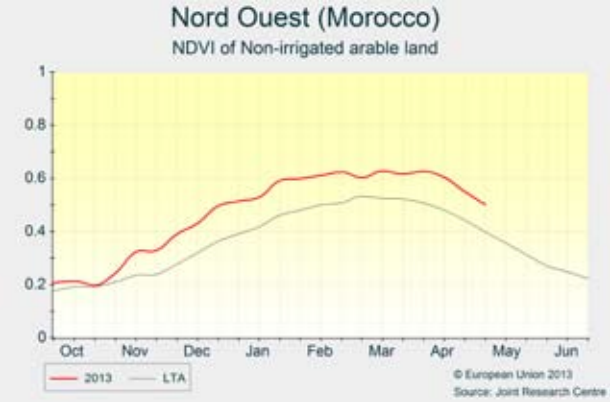
Good prospects in Morocco and Algeria, average prospects in Tunisia

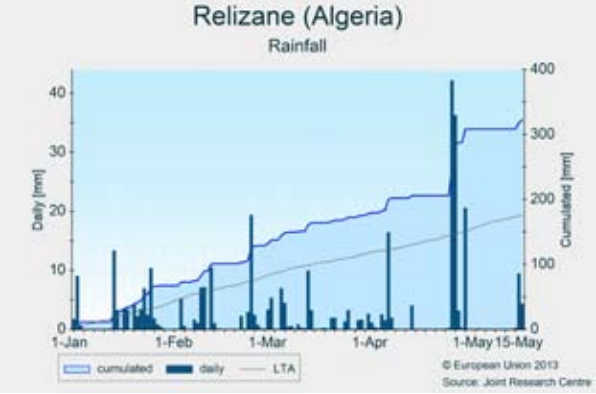
There has been less rain than usual over Morocco during the past month, but soil moisture levels remain above average. Algeria has continued to receive above average rainfall. Tunisia has received some rainfall in the north, but drought conditions have continued in the Centre and South.

Conditions across much of Morocco remain positive. Although there has been less rainfall than the long-term average over the past month, soil moisture levels are still sufficiently high. Remote sensing indicators suggest a very good crop yield year – vegetation greenness is higher than average, and canopy growth started earlier and lasted longer than average.

Algeria has continued to receive more rainfall during the past month. Seasonal totals are well above average. Remote sensing indicators are also good, especially in the west, where NDVI profiles show a pattern similar to that described for Morocco, with longer seasons and higher peaks than usual.

The north of Tunisia has also received some rainfall during the past month (though modelled soil moisture availability is lower than average). Conditions in the Centre and South remain very dry.





5. Crop yield forecasts

Country	TOTAL WHEAT (t/ha)					SOFT WHEAT (t/ha)					DURUM WHEAT (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU27	5.17	**5.31**	5.37	2.6	-1.2	5.41	**5.54**	5.63	2.3	-1.7	3.15	**3.34**	3.21	6.1	4.2
AT	4.14	**5.06**	5.13	22.2	-1.3	4.19	**5.1**	5.17	21.8	-1.3	3.07	**4.07**	4.34	32.6	-6.3
BE	8.27	**8.79**	8.74	6.3	0.6	8.27	**8.79**	8.74	6.3	0.6	-	-	-	-	-
BG	3.92	**3.93**	3.74	0.1	5.1	3.86	**3.9**	3.72	0.9	4.8	5.85	**4.92**	4.49	-15.9	9.7
CY	1.94	**2.09**	1.95	7.4	7.2	-	-	-	-	-	1.94	**2.09**	1.95	7.4	7.2
CZ	4.39	**4.98**	5.23	13.4	-4.9	4.39	**4.98**	5.23	13.4	-4.9	-	-	-	-	-
DE	7.33	**7.48**	7.49	+2,0	-0.2	7.34	**7.49**	7.5	+2,0	-0.2	4.92	**5.3**	5.35	7.9	-0.8
DK	7.46	**6.99**	7.29	-6.3	-4.1	7.46	**6.99**	7.29	-6.3	-4.1	-	-	-	-	-
EE	3.97	**3.21**	3.14	-19.2	+2,0	3.97	**3.21**	3.14	-19.2	+2,0	-	-	-	-	-
ES	2.37	**3.35**	2.94	41.7	14.1	2.66	**3.5**	3.19	31.6	9.8	1.09	**2.69**	2.08	147.5	29.5
FI	3.76	**3.87**	3.74	+3,0	3.5	3.76	**3.87**	3.74	+3,0	3.5	-	-	-	-	-
FR	7.2	**6.91**	7.03	-4,0	-1.7	7.36	**7.06**	7.2	-4,0	-1.9	5.45	**5.05**	5.06	-7.4	-0.3
GR	2.42	**2.67**	2.74	+10,0	-2.9	2.83	**2.84**	2.99	0.2	-5.3	2.31	**2.62**	2.66	13.4	-1.7
HU	3.73	**3.99**	4.1	6.9	-2.5	3.74	**3.99**	4.1	6.9	-2.6	3.7	**4,00**	3.8	7.9	5.1
IE	8.53	**8.31**	8.83	-2.5	-5.9	8.53	**8.31**	8.83	-2.5	-5.9	-	-	-	-	-
IT	4.07	**3.97**	3.82	-2.4	4.1	5.85	**5.57**	5.38	-4.8	3.5	3.26	**3.24**	3.13	-0.8	3.4
LT	3.93	**3.72**	3.82	-5.4	-2.7	3.93	**3.72**	3.82	-5.4	-2.7	-	-	-	-	-
LU	5.82	**5.97**	6.11	2.6	-2.4	5.82	**5.97**	6.11	2.6	-2.4	-	-	-	-	-
LV	3.8	**3.64**	3.53	-4.1	3.3	3.8	**3.64**	3.53	-4.1	3.3	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	8.74	**8.71**	8.69	-0.2	0.3	8.74	**8.71**	8.69	-0.2	0.3	-	-	-	-	-
PL	4.12	**4.17**	4.18	1.3	-0.1	4.12	**4.17**	4.18	1.3	-0.1	-	-	-	-	-
PT	0.86	**2.07**	1.48	140.5	39.5	0.86	**2.07**	1.48	140.5	39.5	-	-	-	-	-
RO	2.55	**2.99**	2.95	17.4	1.5	2.55	**2.99**	2.95	17.4	1.5	-	-	-	-	-
SE	6.27	**5.82**	5.85	-7.1	-0.3	6.27	**5.82**	5.85	-7.1	-0.3	-	-	-	-	-
SI	5.44	**4.75**	4.78	-12.6	-0.6	5.44	**4.75**	4.78	-12.6	-0.6	-	-	-	-	-
SK	3.38	**3.8**	4.05	12.4	-6.2	3.38	**3.8**	4.05	12.2	-6.2	-	-	-	-	-
UK	6.68	**7.68**	7.66	14.9	0.2	6.68	**7.68**	7.66	14.9	0.2	-	-	-	-	-
HR	*5.34*	***4.66***	*4.86*	*-12.7*	*-4,0*	*5.34*	***4.66***	*4.86*	*-12.7*	*-4,0*	-	-	-	-	-

Country	TOTAL BARLEY(t/ha)					SPRING BARLEY(t/ha)					WINTER BARLEY (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU27	4.35	**4.56**	4.38	4.6	+4,0	3.87	**4.09**	3.82	5.9	7.2	5.23	**5.29**	5.26	1.1	0.6
AT	4.28	**4.77**	4.83	11.5	-1.3	3.19	**4.19**	4.08	31.3	2.7	5.29	**5.28**	5.61	-0.2	-5.7
BE	7.95	**8.6**	8.43	8.1	+2,0	-	-	-	-	-	7.95	**8.6**	8.43	8.1	+2,0
BG	3.64	**3.6**	3.66	-1.2	-1.6	3.83	**2.89**	2.97	-24.5	-2.5	3.64	**3.65**	3.69	0.3	-1.1
CY	1.71	**1.56**	1.44	-8.5	8.5	-	-	-	-	-	1.71	**1.56**	1.44	-8.5	8.5
CZ	4.31	**4.14**	4.41	-4.1	-6.1	4.4	**4.19**	4.35	-4.7	-3.5	4.07	**3.95**	4.56	-2.8	-13.2
DE	6.16	**6.2**	6.11	0.6	1.6	5.51	**5.04**	5.06	-8.5	-0.4	6.49	**6.53**	6.48	0.6	0.8
DK	5.5	**5.36**	5.3	-2.6	1.1	5.35	**5.24**	5.14	-2,0	+2,0	6.41	**5.77**	5.95	-10,0	-3.1
EE	2.38	**2.5**	2.5	5.2	0.2	2.38	**2.5**	2.5	5.2	0.2	-	-	-	-	-
ES	2.23	**3.36**	2.74	50.5	22.9	2.28	**3.39**	2.8	49.1	21.1	2,00	**3.2**	2.4	+60,0	33.5
FI	3.48	**3.58**	3.41	2.9	5.2	3.48	**3.58**	3.41	2.9	5.2	-	-	-	-	-
FR	6.74	**6.47**	6.48	-4,0	-0.2	6.66	**6.15**	6.23	-7.6	-1.3	6.79	**6.6**	6.59	-2.8	0.2
GR	2.48	**2.47**	2.45	-0.3	+1,0	-	-	-	-	-	2.48	**2.47**	2.45	-0.3	+1,0
HU	3.6	**3.7**	3.71	2.9	-0.3	3.19	**2.87**	3.3	-10.2	-13.3	3.83	**4.14**	3.96	8.1	4.6
IE	6.53	**6.85**	6.92	4.8	-1.1	6.11	**6.67**	6.62	9.1	0.7	8,00	**7.9**	8.52	-1.2	-7.3
IT	3.79	**3.62**	3.59	-4.3	+1,0	-	-	-	-	-	3.79	**3.62**	3.59	-4.3	+1,0
LT	3,00	**3.07**	2.9	2.3	5.8	3,00	**3.07**	2.9	2.3	5.8	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LV	2.5	**2.63**	2.49	5.1	5.5	2.5	**2.63**	2.49	5.1	5.5	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	6.7	**6.11**	6.22	-8.7	-1.7	6.7	**6.11**	6.22	-8.7	-1.7	-	-	-	-	-
PL	3.59	**3.47**	3.3	-3.3	5.2	3.55	**3.38**	3.15	-4.7	7.5	3.85	**3.82**	3.98	-0.9	-4.2
PT	0.73	**1.87**	1.52	155.9	23.2	-	-	-	-	-	0.73	**1.87**	1.52	155.9	23.2
RO	2.37	**2.54**	2.73	7.3	-6.8	1.94	**2.01**	2.03	3.5	-1.3	2.6	**2.74**	3.12	5.3	-12.3
SE	4.6	**4.37**	4.36	-4.9	0.3	4.54	**4.35**	4.31	-4.3	0.8	6.99	**5.18**	5.48	-25.9	-5.4
SI	4.72	**4.28**	4.21	-9.2	1.8	-	-	-	-	-	4.72	**4.28**	4.21	-9.2	1.8
SK	3.24	**3.4**	3.5	+5,0	-2.8	3.25	**3.46**	3.49	6.3	-1,0	3.18	**3.02**	3.6	-4.9	-16.2
UK	5.52	**5.54**	5.73	0.3	-3.4	4.94	**5.25**	5.3	6.2	-1,0	6.42	**6.36**	6.41	-0.9	-0.8
HR	*4.14*	***3.86***	*3.96*	*-6.9*	*-2.5*	-	-	-	-	-	*4.14*	***3.86***	*3.96*	*-6.9*	*-2.5*

Country	GRAIN MAIZE (t/ha)					RYE (t/ha)					TRITICALE (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU27	5.91	**6.87**	6.97	16.3	-1.3	3.7	**3.58**	3.33	-3.3	7.4	4.12	**4.02**	4.06	-2.3	-0.8
AT	9.72	**10.67**	10.48	9.8	1.8	3.9	**3.96**	3.96	1.5	0.1	4.7	**4.78**	4.99	1.6	-4.4
BE	12.02	**12.34**	11.99	2.6	2.9	-	**-**	-	-	-	-	**-**	-	-	-
BG	3.73	**4.99**	4.78	33.8	4.3	-	**-**	-	-	-	2.72	**3.38**	3.16	24.2	6.8
CY	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
CZ	7.15	**7.77**	7.69	8.7	1.1	4.79	**4.15**	4.5	-13.3	-7.8	4.46	**3.69**	4.29	-17.3	-14,0
DE	8.78	**9.6**	9.6	9.3	+0,0	5.48	**5.23**	4.99	-4.6	4.8	6.04	**5.62**	5.79	-7,0	-2.9
DK	5.62	**-**	5.22	-	-	6.2	**5.42**	5.35	-12.7	1.3	5.41	**5.21**	5.17	-3.7	0.7
EE	-	**-**	-	-	-	3.55	**2.72**	2.68	-23.5	1.4	-	**-**	-	-	-
ES	10.71	**10.63**	10.54	-0.7	0.9	1.6	**2.13**	1.98	+33,0	7.9	1.68	**2.29**	2.24	36.2	2.2
FI	-	**-**	-	-	-	2.91	**2.72**	2.71	-6.4	0.5	-	**-**	-	-	-
FR	9.18	**9.27**	9.24	0.9	0.3	5.05	**4.67**	4.92	-7.5	-5.1	5.58	**5.26**	5.41	-5.6	-2.6
GR	10.61	**10.79**	10.79	1.7	+0,0	2.11	**2.3**	2.08	9.1	10.6	-	**-**	-	-	-
HU	3.56	**5.62**	6.08	57.7	-7.6	2.25	**2.32**	2.2	3.3	5.6	3.11	**3.88**	3.27	24.8	18.9
IE	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
IT	8.74	**9.21**	9.23	5.3	-0.2	-	**-**	-	-	-	-	**-**	-	-	-
LT	6.5	**7.24**	5.84	11.4	23.9	2.7	**2.36**	2.38	-12.7	-0.9	3.39	**2.81**	2.92	-17.1	-3.7
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	3.1	**2.77**	2.97	-10.6	-6.7	2.7	**2.36**	2.48	-12.5	-4.7
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	11.3	**12.19**	11.92	7.9	2.2	-	**-**	-	-	-	-	**-**	-	-	-
PL	6.74	**6.51**	6.39	-3.4	+2,0	2.75	**2.55**	2.52	-7.4	0.9	3.36	**3.38**	3.41	0.7	-0.8
PT	7.39	**7.34**	7.09	-0.6	3.6	0.9	**0.92**	0.92	2.1	-0.1	0.87	**1.53**	1.32	75.8	15.9
RO	1.96	**3.46**	3.49	76.5	-0.9	-	**-**	-	-	-	2.98	**3.41**	3.03	14.6	12.5
SE	-	**-**	-	-	-	6.07	**5.7**	5.76	-6,0	-1.1	5.72	**4.8**	4.99	-16,0	-3.8
SI	7.64	**8,00**	8.01	4.8	+0,0	-	**-**	-	-	-	-	**-**	-	-	-
SK	5.64	**6.16**	6.72	9.2	-8.4	3.13	**2.72**	2.89	-13.3	-6.2	-	**-**	-	-	-
UK	-	**-**	-	-	-	-	**-**	-	-	-	3.57	**3.9**	4.03	9.2	-3.2
HR	*6.95*	***7.12***	*6.99*	*2.4*	*1.9*	-	**-**	-	-	-	*3.44*	***3.1***	*3.59*	*-10.1*	*-13.8*

Country	RAPE AND TURNIP RAPE (t/ha)					POTATO (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU27	3.1	**3.06**	3.04	-1.3	0.7	30.7	**31.58**	30.69	2.9	2.9
AT	2.67	**2.84**	3.06	6.3	-7.3	30.55	**32.43**	32.51	6.2	-0.2
BE	3.93	**4.02**	4.09	2.4	-1.7	45.42	**46.26**	45.73	1.9	1.2
BG	2.02	**2.74**	2.33	35.4	17.4	10.15	**16.87**	15.1	66.2	11.8
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	2.76	**2.82**	2.9	2.1	-2.9	27.98	**27.2**	27.01	-2.8	0.7
DE	3.69	**3.82**	3.71	3.6	+3,0	44.76	**43.69**	43.69	-2.4	+0,0
DK	3.75	**3.6**	3.64	-4.1	-1.1	42.13	**39.85**	39.98	-5.4	-0.3
EE	1.89	**1.83**	1.59	-3.2	15.4	-	**-**	-	-	-
ES	1.8	**2.1**	1.81	16.9	16.4	30.06	**30.23**	29.71	0.6	1.8
FI	1.28	**1.26**	1.36	-1.7	-7.4	23.65	**27.41**	26.37	15.9	+4,0
FR	3.41	**3.32**	3.45	-2.5	-3.5	40.87	**43.77**	43.43	7.1	0.8
GR	-	**-**	-	-	-	25.47	**26.61**	25.6	4.5	3.9
HU	2.46	**2.16**	2.33	-12,0	-7,0	23.13	**25.07**	25.46	8.4	-1.5
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	2.58	**2.38**	2.33	-7.8	+2,0	25.43	**24.69**	24.9	-2.9	-0.8
LT	2.43	**1.9**	2.05	-22,0	-7.4	17.11	**15.36**	14.95	-10.2	2.8
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	2.65	**2.38**	2.25	-10.2	5.9	19.57	**16.97**	17.61	-13.3	-3.7
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	45.18	**44.93**	45.43	-0.6	-1.1
PL	2.59	**2.98**	2.6	14.9	14.4	24.24	**22.63**	21.36	-6.7	5.9
PT	-	**-**	-	-	-	14.71	**16.37**	15.33	11.3	6.8
RO	1.6	**1.6**	1.7	0.1	-5.7	10.76	**14.36**	14.09	33.4	1.9
SE	2.57	**2.7**	2.73	5.1	-0.9	32.55	**31.78**	31.58	-2.4	0.6
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	1.99	**1.87**	2.24	-5.8	-16.3	-	**-**	-	-	-
UK	3.4	**3.32**	3.47	-2.2	-4.3	35,00	**40.5**	41.45	15.7	-2.3
HR	*2.67*	***2.56***	*2.62*	*-4,0*	*-2.3*	*14.73*	***18.05***	*16.56*	*22.5*	*+9,0*

Country	SUGAR BEETS (t/ha)					SUNFLOWER (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU27	70.28	**70.83**	70,00	0.8	1.2	1.65	**1.77**	1.82	7.8	-2.6
AT	63.22	**70.19**	69.88	+11,0	0.4	2.27	**2.58**	2.69	13.5	-4.1
BE	73.68	**77.23**	78.39	4.8	-1.5	-	**-**	-	-	-
BG	-	**-**	-	-	-	1.78	**1.92**	1.91	7.9	0.7
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	63.26	**61.89**	59.91	-2.2	3.3	2.31	**2.33**	2.35	0.9	-1,0
DE	69.36	**67.89**	67.57	-2.1	0.5	2.33	**2.12**	2.12	-9.3	+0,0
DK	64.92	**62.57**	60.52	-3.6	3.4	-	**-**	-	-	-
EE	-	**-**	-	-	-	-	**-**	-	-	-
ES	88.71	**93.71**	85.6	5.6	9.5	0.81	**1.07**	1.1	32.2	-3,0
FI	34.67	**40.53**	38.38	16.9	5.6	-	**-**	-	-	-
FR	87.52	**92.32**	89.16	5.5	3.5	2.32	**2.39**	2.42	3.1	-1.3
GR	58.98	**59.82**	64.73	1.4	-7.6	1.28	**1.46**	1.46	14.2	+0,0
HU	43.86	**49.34**	54.52	12.5	-9.5	2.15	**2.21**	2.29	2.9	-3.6
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	54.92	**57.07**	56.14	3.9	1.7	1.66	**2.22**	2.13	33.7	4.3
LT	52.24	**51.46**	46.49	-1.5	10.7	-	**-**	-	-	-
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	78.86	**79.24**	76.95	0.5	+3,0	-	**-**	-	-	-
PL	58.25	**54.27**	52.94	-6.8	2.5	-	**-**	-	-	-
PT	-	**-**	-	-	-	0.56	**0.62**	0.57	10.5	7.8
RO	26.93	**35.29**	34.76	31.1	1.5	1.37	**1.43**	1.53	4.2	-6.7
SE	55.78	**56.63**	56.99	1.5	-0.6	-	**-**	-	-	-
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	45.41	**56.21**	56.35	23.8	-0.2	2.19	**2.04**	2.21	-6.8	-7.8
UK	70,00	**67.46**	67.72	-3.6	-0.4	-	**-**	-	-	-
HR	*39.1*	***52.81***	*51.14*	*+35,0*	*3.3*	*2.68*	***2.99***	*2.7*	*11.7*	*10.7*

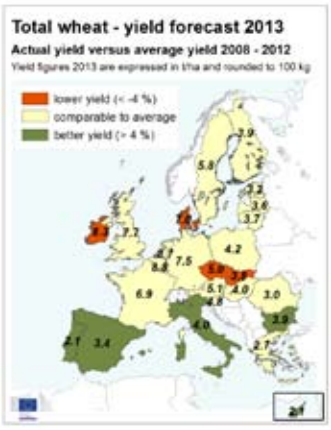
Notes: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2008-2013 data come from DG AGRICULTURE short term Outlook data (dated April 2013, received on 03/05/2013), EUROSTAT Eurobase (last update: 19/04/2013) and EES (last update: 15/04/2013)
2013 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 20/05/2013)

Country	WHEAT (t/ha)					BARLEY (t/ha)					GRAIN MAIZE (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
BY	3.5	**3.39**	3.44	-3.2	-1.5	3.23	**3.24**	3.24	0.4	0.2	5.26	5.95	**5.17**	13,00	+15,0
DZ	1.76	**1.73**	1.5	-1.8	15.9	1.54	**1.61**	1.36	4.3	18.6	-	-	**-**	-	-
MA	1.24	**1.88**	1.58	51.2	18.7	0.63	**1.26**	1.13	99.5	11.1	-	-	-	-	-
TN	1.93	**1.62**	1.86	-15.8	-12.5	1.16	**0.95**	1.26	-18,0	-24.4	-	-	**-**	-	-
TR	2.67	**2.65**	2.52	-0.7	5.3	2.58	**2.54**	2.42	-1.5	5.2	7.38	7.23	**7.23**	-2,00	+0,0
UA	2.8	**2.84**	3.12	1.6	-8.8	2.11	**2.12**	2.39	0.3	-11.4	4.79	5.3	**5.09**	10.7	4.1

Morocco	Yield (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs
durum wheat	1.18	**1.85**	1.67	56.8	10.7
soft wheat	1.26	**1.89**	1.68	49.8	12.6

Notes: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2008-2013 data come from FAO, PSD-online, INRA Maroc, Min AGRI Tunisia and DSASI Algeria
2013 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 25/05/2013)

Yield maps


Total wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

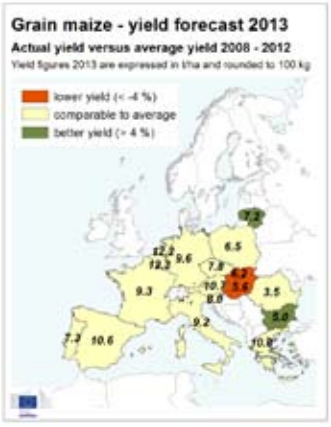

Soft wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Durum wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Total barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

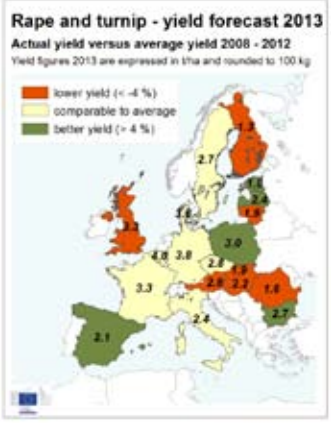

Spring barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

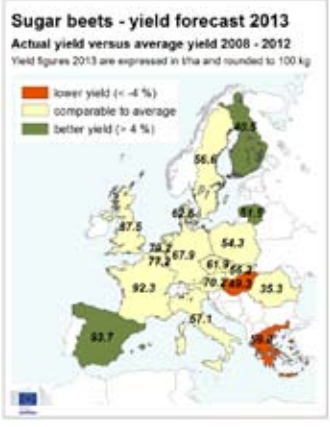

Winter barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

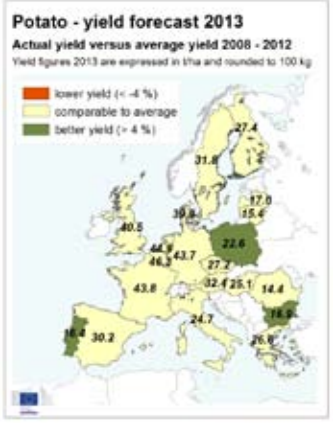

Grain maize - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Rye - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Triticale - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Rape and turnip - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

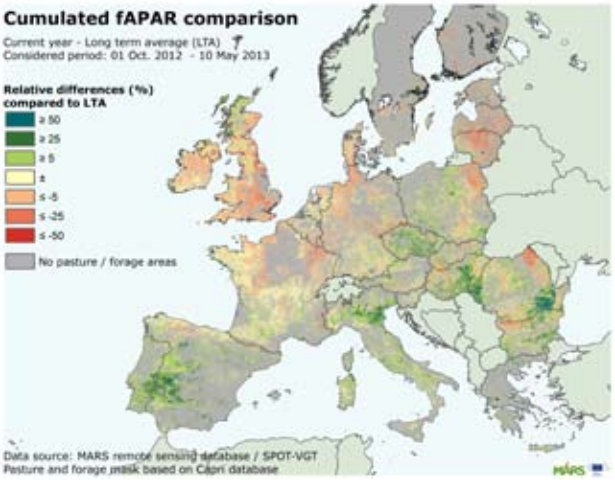

Sugar beets - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

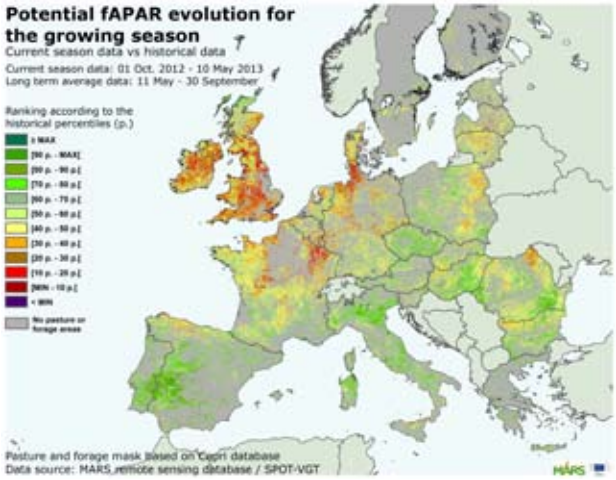

Potato - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

6. Pastures in Europe – Regional monitoring

Low biomass accumulation in the northern half of Europe, positive outlook for the Mediterranean and Black Sea area

A cold start to the season has significantly limited the production of biomass in the northern half of Europe. Temperatures have been continuously below seasonal values in northern France, Germany, the United Kingdom and Poland, delaying pastures development by almost three weeks compared to an average year. However, the general increase in temperatures observed from the second half of April has permitted a partial recovery of pasture growth in these countries. On the contrary, the Mediterranean Basin and the Black Sea area had a very positive start to the season. Abundant rainfall and adequate temperatures facilitated high production levels in the Iberian Peninsula, southern Italy, and Romania.





High production levels in the Mediterranean Basin

In **Spain** and **Portugal**, the production levels in the *Dehesa* area (*Extremadura*, *Alentejo* and some provinces of *Andalucia* and *Castilla y Léon*) are among the highest of the past 15 years, favoured by warm temperatures during winter and the exceptional rainfall received between February and April. In northern regions, pastures exhibit accumulation levels close to those of an average year, but the perspectives for the mid-season are optimistic as well, thanks to the abundant precipitation received during the past two months.

Italy also presents higher-than-usual biomass accumulation in pastures, favoured by mild temperatures and continuous rainfall registered from January onwards, especially in the southern regions of *Campania*, *Basilicata* and *Sicilia*. In the north, the pasture areas of *Lombardia* and *Piemonte* are still recovering from the cold meteorological conditions of early spring, but the outlook is positive for the next month, as soil water availability is above seasonal values.

Development delays in western Europe

In addition to the overly wet conditions experienced during autumn in the **UK** and **Ireland**, cold temperatures in March and April resulted in significant delays of about three weeks in the development of pastures. Consequently, biomass accumulation in grasslands is among the lowest of the past 10 years. Temperatures increased in the first weeks of May, allowing for a gradual recovery of production levels. Weather conditions in the second half of May and June will be crucial to determining yield potentials. In the **Benelux** countries, production levels have also been significantly limited by cold and rainy weather.

In **France**, northern regions were also affected by chilly temperatures, but pastures are starting to recuperate. Also in the east, below-seasonal temperatures limited pasture development, although the rainfall registered from January to April depict a favourable scenario of water availability for the summer. The Atlantic Basin – *Poitou-Charentes, Pays de la Loire* – and central regions – *Limousin, Auvergne* – are exhibiting production levels close to the average, which are expected to increase in the next weeks as water stored in the soil is adequate after a humid first quarter of the year.

Increasing biomass production in central Europe

Adverse weather conditions for pasture development have been observed in northern **Germany** up to mid-April, with average daily temperatures lower than 5°C, and scarce rainfalls compared to an average season. This has produced a significant delay in the growing season resulting in low biomass accumulation compared with the long-term average. The perspectives are therefore negative in these regions, but weather conditions during the next month, especially if significant rainfall occurs, could improve pastures yield potential.

On the contrary, in the southern regions of Bayern, and also in **Austria**, the **Czech Republic** and **Slovakia**, mild temperatures and sufficient rainfall registered from the second half of April have contributed to accelerate growth and biomass production in these areas is gradually recovering. The outlook in this area is positive for the next month.

Low production levels in eastern Europe

Biomass accumulation of the current season is among the lowest of the past 10 years in the major producing regions of **Poland**, **Lithuania**, **Latvia** and **Estonia**. Pastures were dramatically affected by cold temperatures in March and April, when the growing season starts in these countries. In the past three weeks, temperatures have increased and reached seasonal values. Production levels are expected to improve slowly during the second half of May.

Cold temperatures at the start of the season in northern Europe

In **Denmark**, **Sweden** and **Finland** the start of the pasture season usually takes place during April. This year, however, cold temperatures during the past two months have delayed their development. Weather conditions improved during in the second half of April with temperatures that were slightly warmer than usual, thus allowing for a progressive increase in biomass production. The expectations in these countries remain average, as pasture growth can recover if temperatures continue to rise in May and June.

Good start of the season in the Black Sea area

Temperatures have been warmer than usual from the start of the year in **Romania**, with the exception of episodic drops in the second half of March. Mild temperatures were accompanied by abundant precipitation in March and April, favouring a rapid development of pastures, and an increase in the production levels. Biomass accumulation, as indicated by remote sensing observations, is therefore substantially above that of an average year. Rainfall during June will be critical to confirm these good expectations.


Extremadura (ES)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
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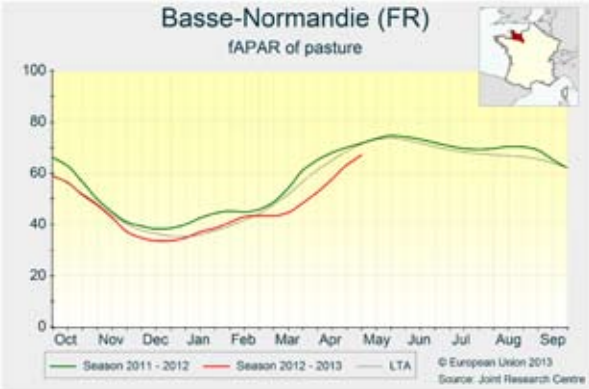
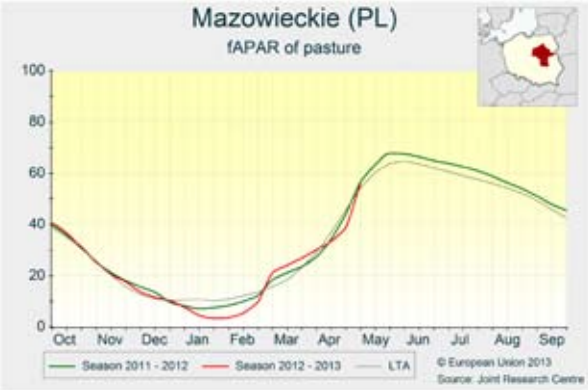
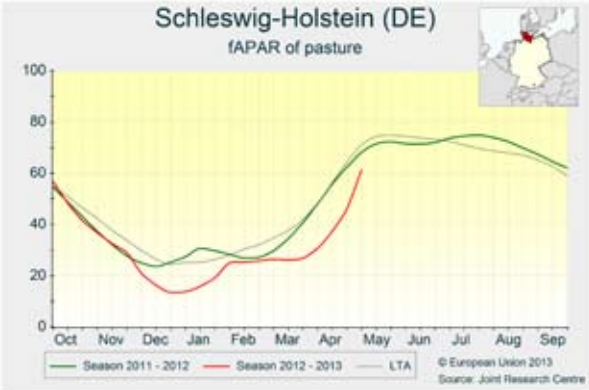
Source: Joint Research Centre


Basse-Normandie (FR)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Mazowieckie (PL)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Schleswig-Holstein (DE)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
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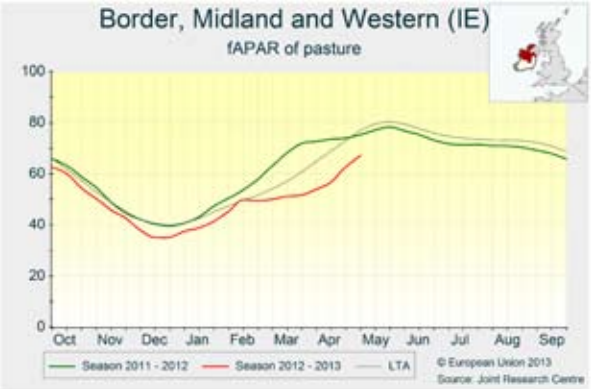
Source: Joint Research Centre


Border, Midland and Western (IE)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
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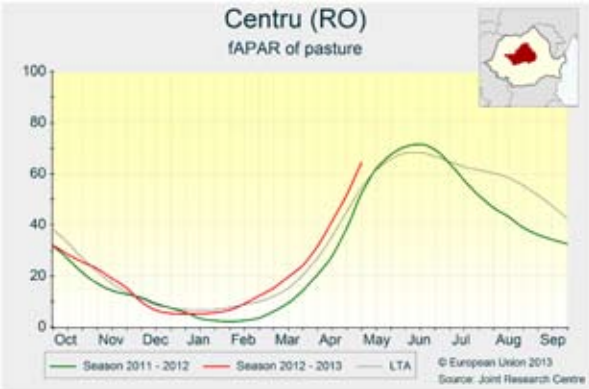
Source: Joint Research Centre


Centru (RO)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
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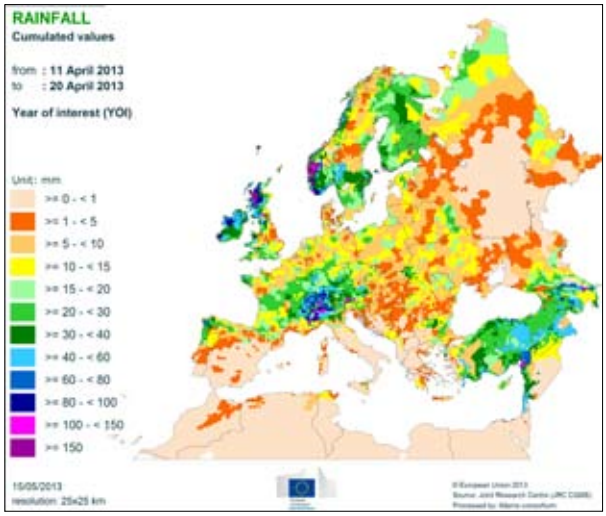
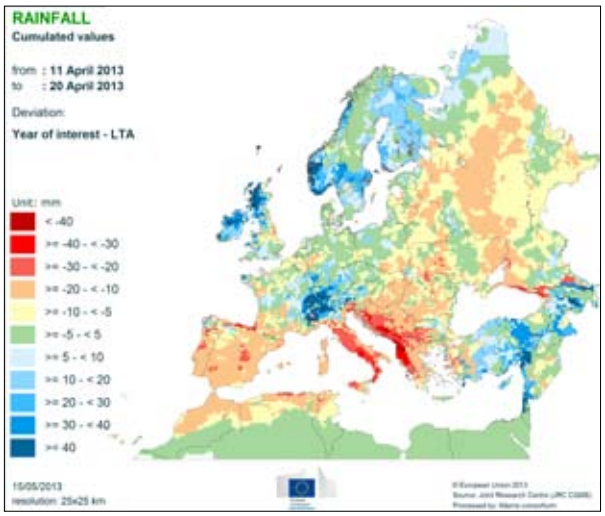
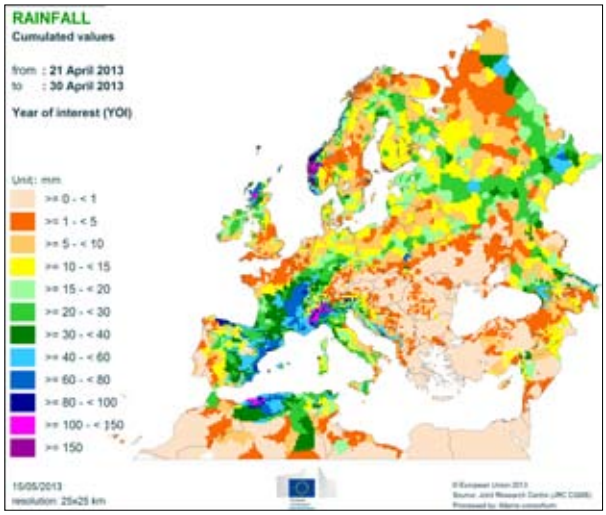
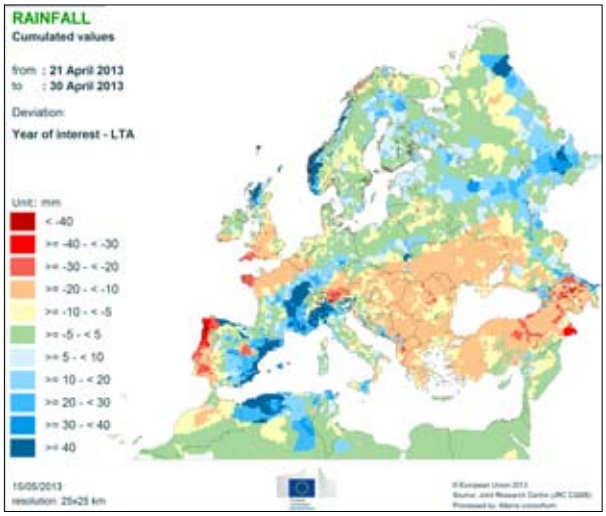
7. Atlas maps

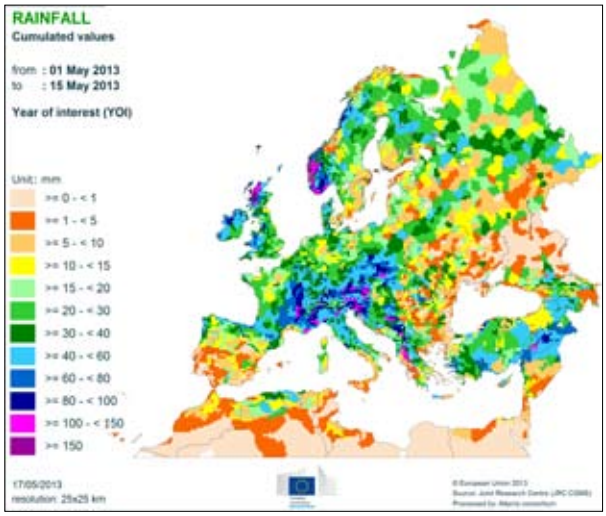
Precipitation

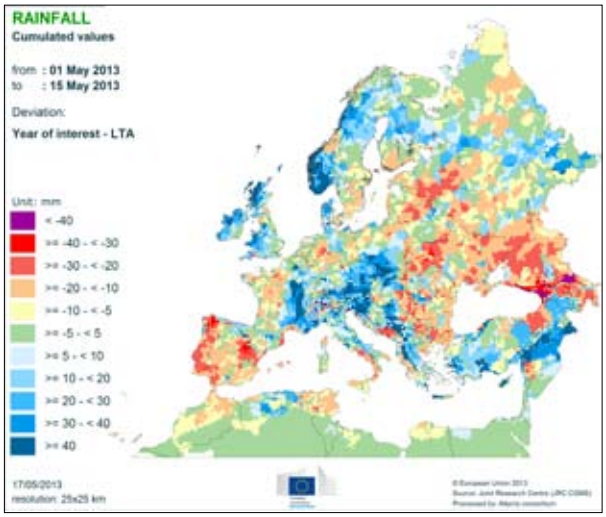




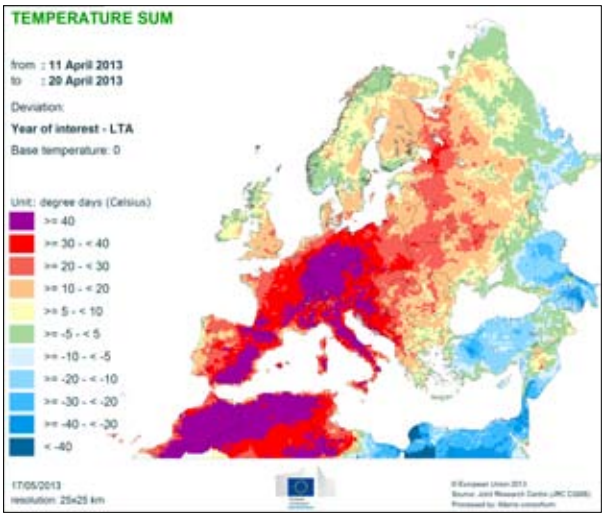


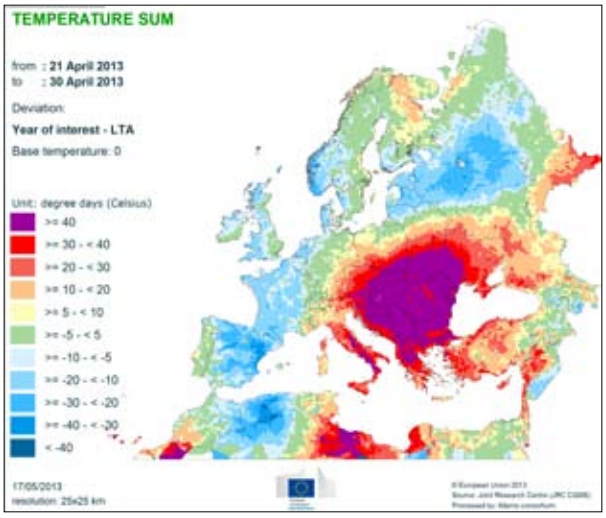


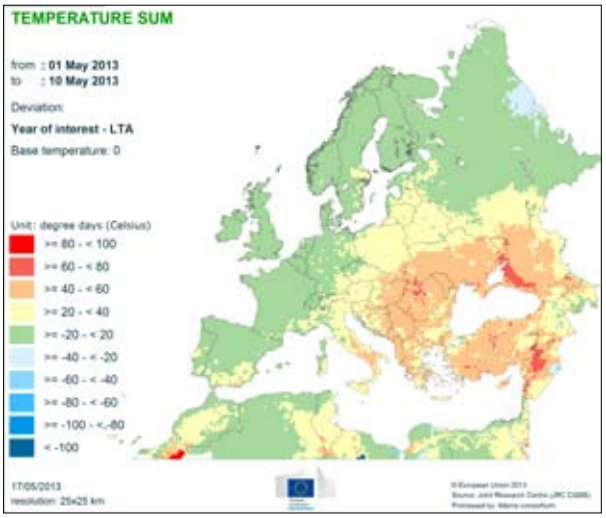


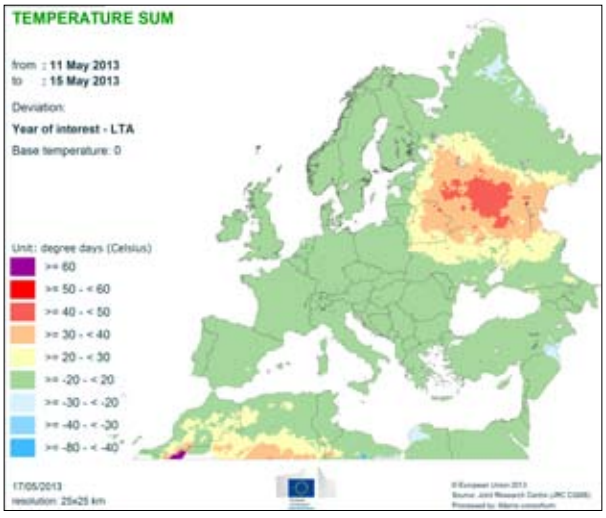


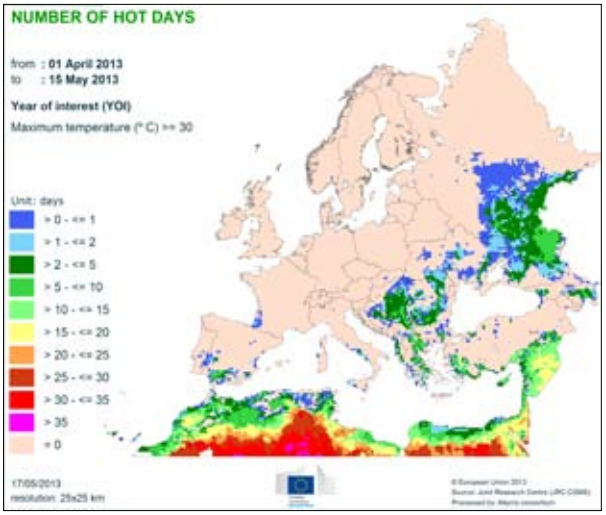
Temperature regime

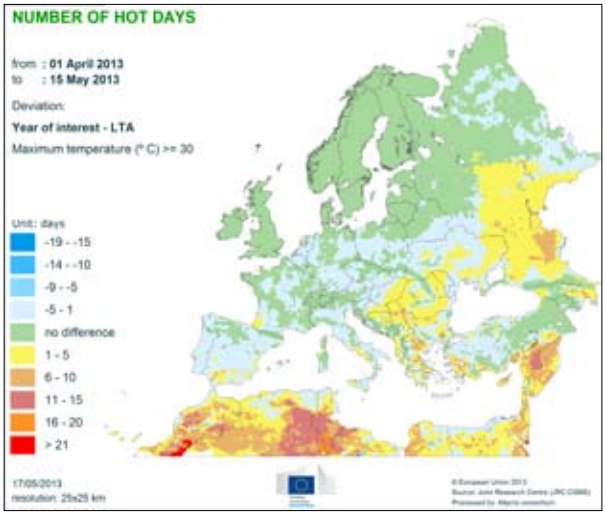




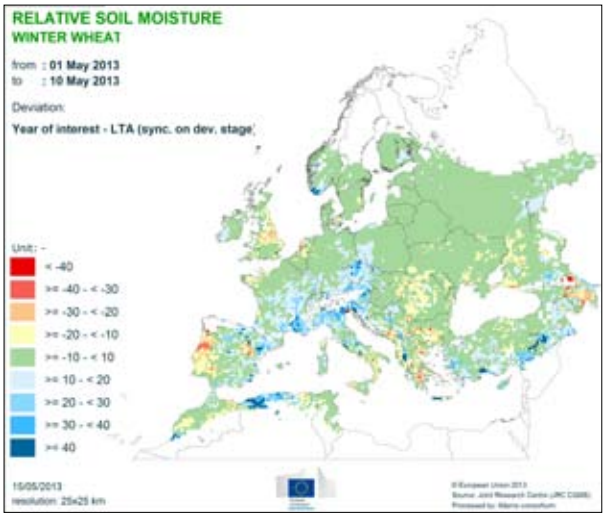


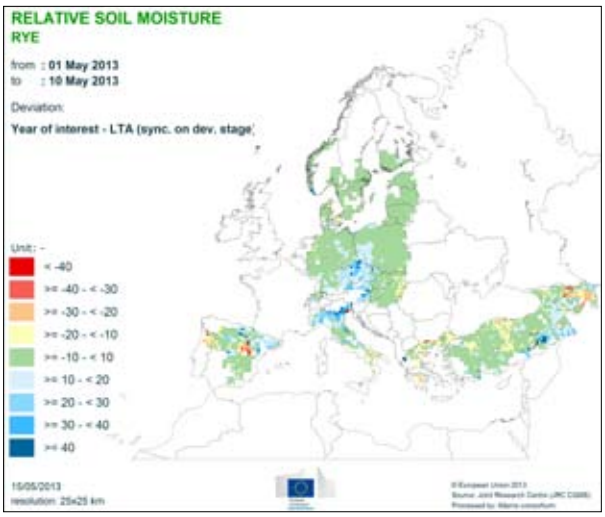


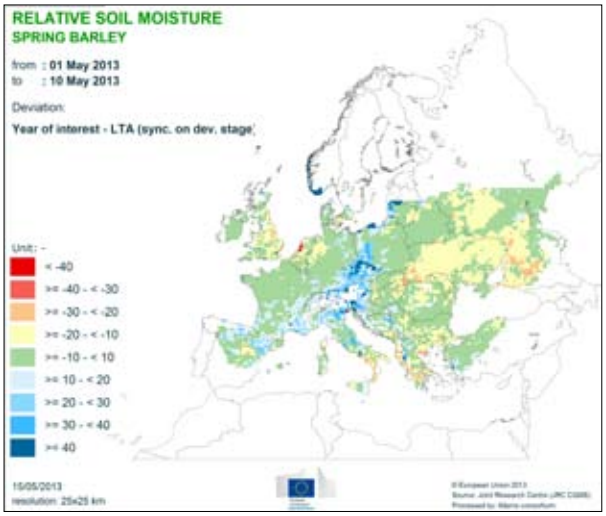


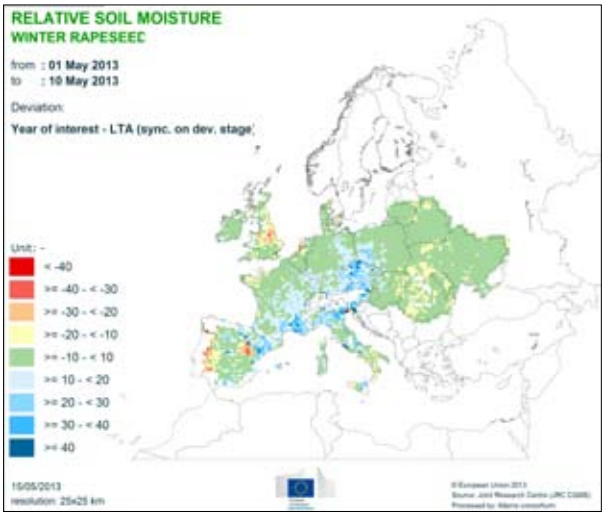


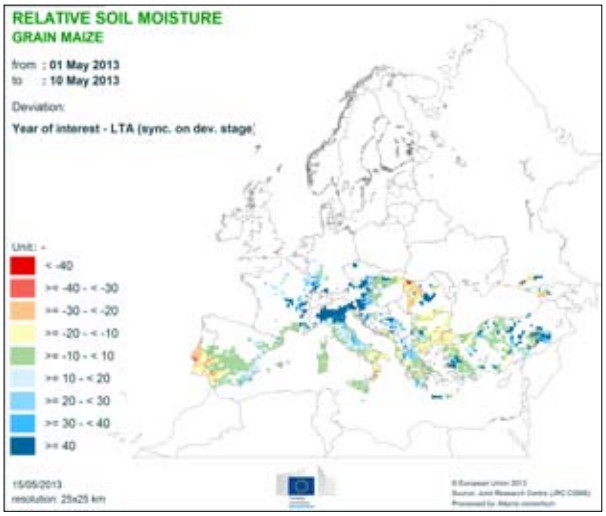
Relative soil moisture

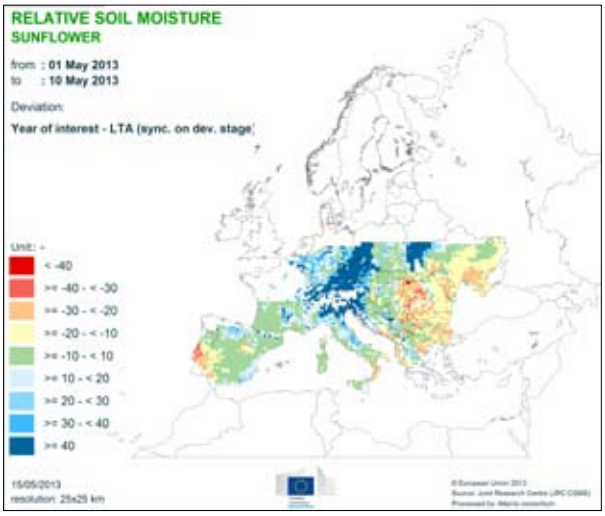




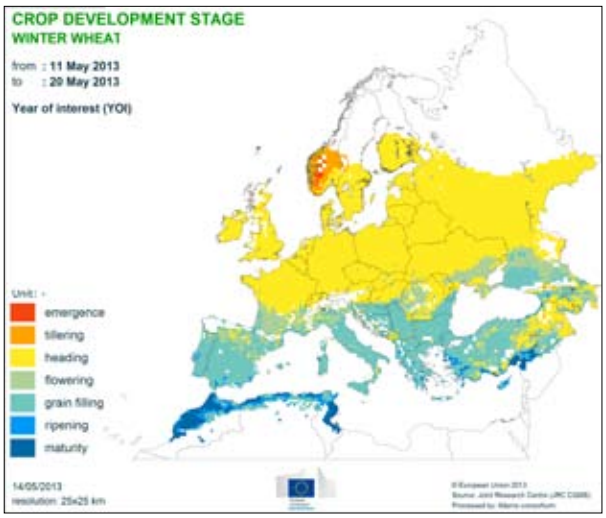


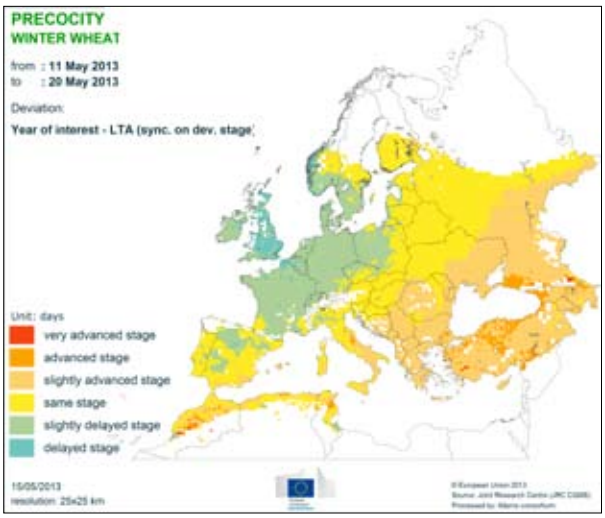


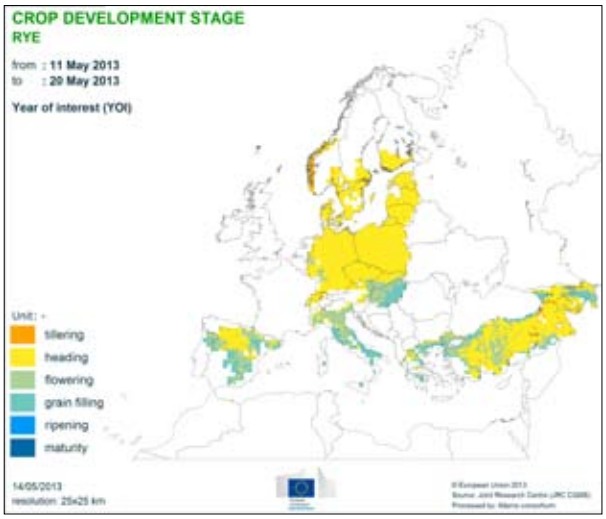


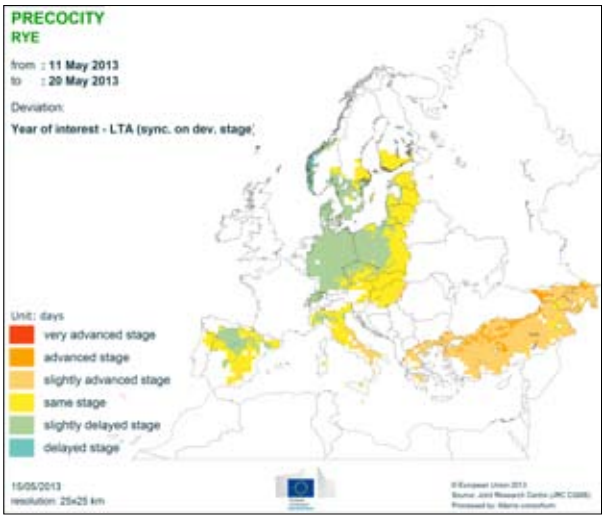


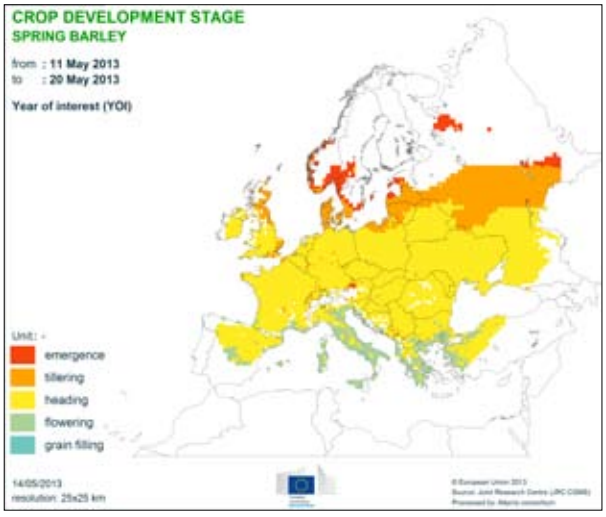
Development stages and precocity

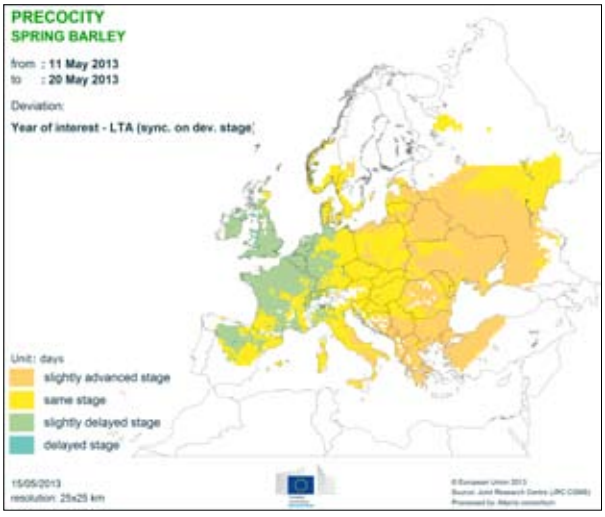




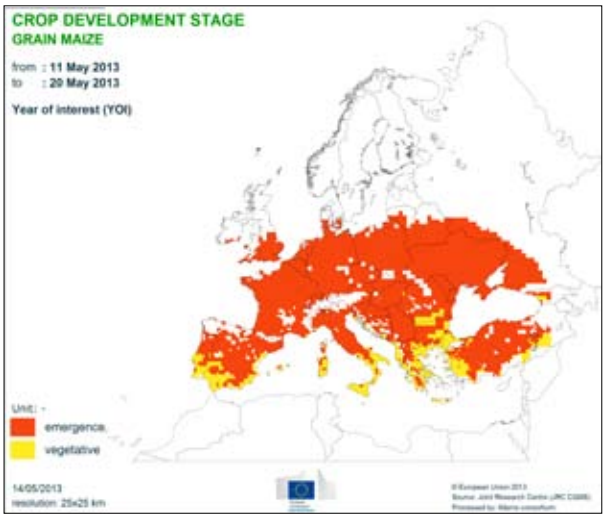


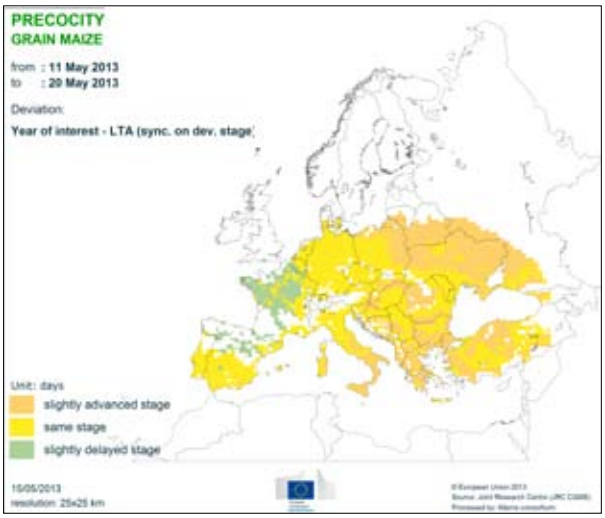


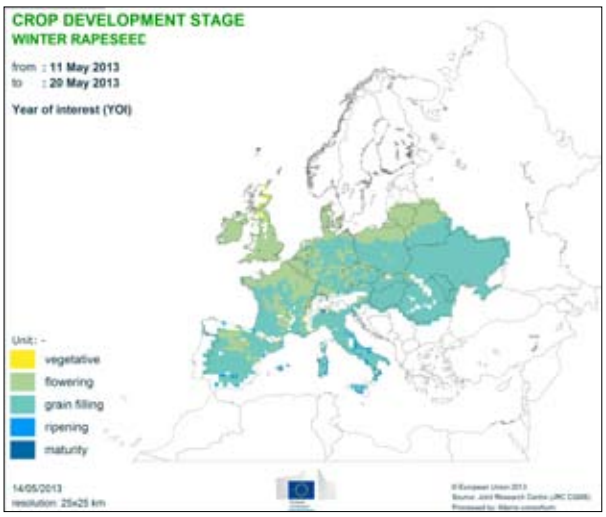


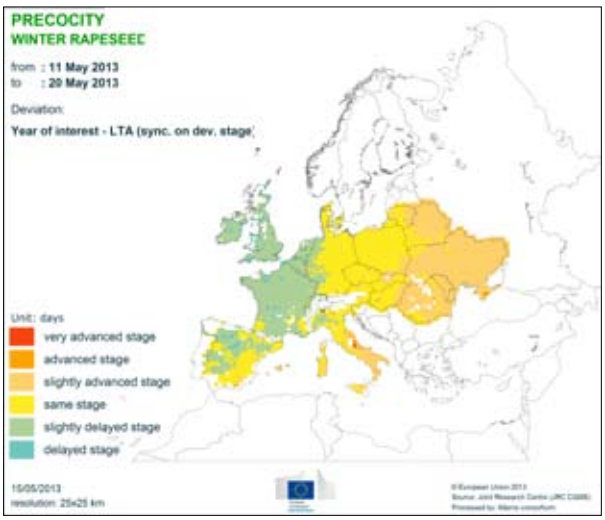


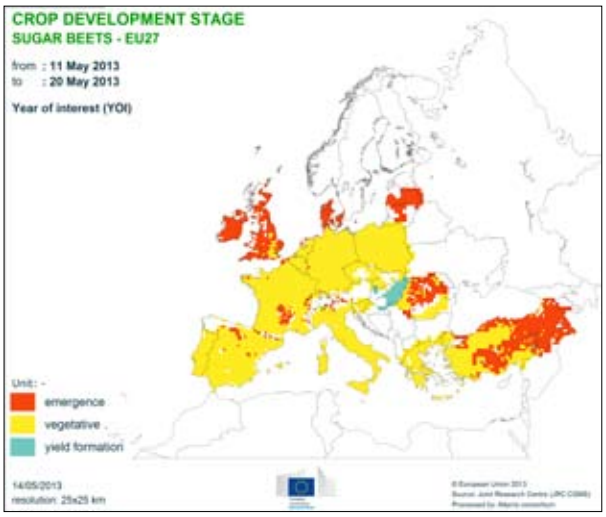
Development stages and precocity

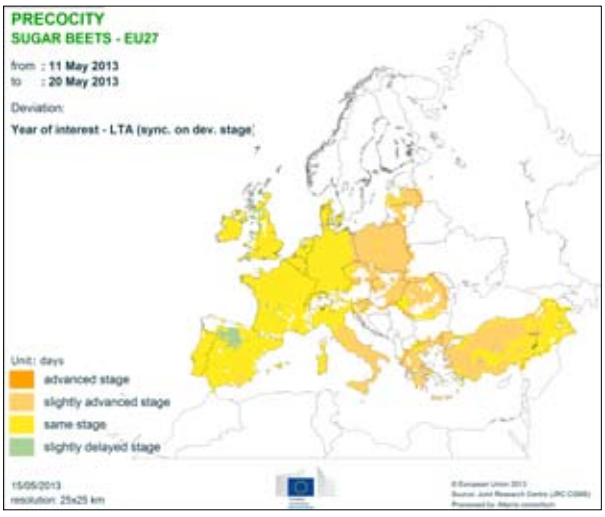












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Date	Publication	Reference
21 Jan	Agromet. analysis	Vol. 21 No. 1
25 Feb	Agromet. analysis	Vol. 21 No. 2
25 Mar	Agromet. analysis and yield forecast	Vol. 21 No. 3
22 Apr	Agromet. analysis, remote sensing analysis, and yield forecast	Vol. 21 No. 4
21 May	Agromet. analysis, remote sensing analysis, and yield forecast, pasture analysis	Vol. 21 No. 5
17 Jun	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update	Vol. 21 No. 6
22 Jul	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update, rice analysis	Vol. 21 No. 7
26 Aug	Agromet. analysis and yield forecast, pasture update	Vol. 21 No. 8
16 Sep	Agromet. analysis, remote sensing analysis and yield forecast, pasture update	Vol. 21 No. 9
21 Oct	Agromet. analysis, remote sensing analysis and yield forecast, pasture analysis, rice analysis	Vol. 21 No. 10
25 Nov	Agromet. analysis, campaign review and yield forecast	Vol. 21 No. 11
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