European Commission

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Crop Monitoring in Europe

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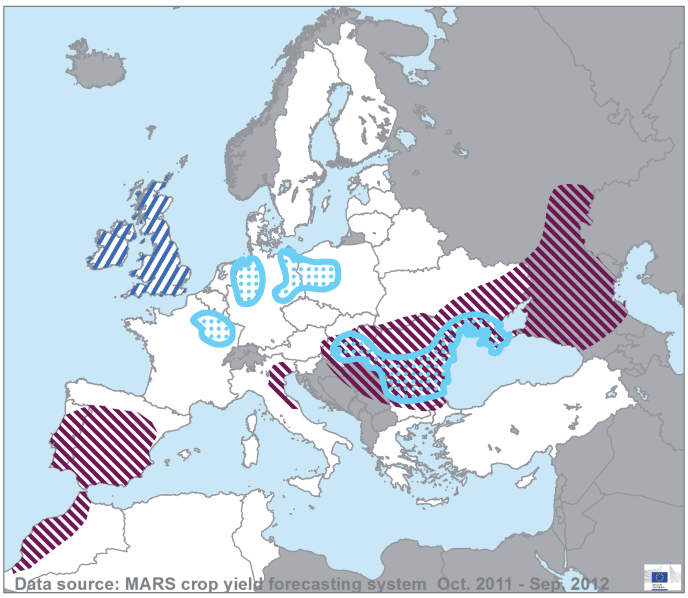
Cereals yield below average

NEGATIVELY IMPACTED AREAS SEASON 2011/12



Total cereals yield at EU-27 level is forecast to fall 5.7% below last year's figure and 2.7% below the five year average, mainly due to the drop in yields for grain maize.

Recurrent extreme heat waves and precipitation deficiencies caused serious grain maize yield losses in Romania, Hungary, Bulgaria and Italy. Average **grain maize** yields are forecast for France, Spain, Greece and Austria. A positive production season is expected in Germany, Poland, Portugal, Lithuania and the Netherlands. In several countries, maize partly replaced frost killed winter cereals, leading to increased acreage at European level. This season's **wheat** yields are forecast slightly below the average of the last five years. France, Germany and Italy have had quite a good year, but not sufficiently so to compensate the yield losses in Spain and the United Kingdom. Persistent dry conditions in the Mediterranean Basin were responsible for the modest **durum wheat** results. EU-27 **barley** yields are at average levels. Although the season was quite positive for most of Europe, especially for **spring barley**, persistent dry conditions in the Iberian Peninsula in the winter and spring resulted in substantial yield losses.

The forecast yields for **rye** at EU-27 level are exceptionally good: 12% above last year's campaign and around 8% above the five year average. Poland and Germany (the largest producers by far) had a positive year. **Triticale** yields at EU-27 level are slightly below average, mainly due to difficult meteorological conditions in the winter in eastern Europe having a moderate impact on yields. **Rice** yield at EU-27 level is confirmed as being close to the five-year average and to last year's yield, despite incidents of infection. The overall EU-27 **rapeseed** yield is forecast slightly above the average for the last five years. The positive production season in Italy, Denmark, Sweden, the Baltic States and France successfully compensated the yield losses in Poland, Romania, Hungary, the Czech Republic, Slovakia and Germany caused predominantly by the cold spell and frost kill at the end of January and in the first half of February.

Joint Research Centre

A – CAMPAIGN REVIEW 2011/12

1. SUMMARY OF THE 2011/12 SEASON

The campaign started off in the **autumn** with exceptionally mild temperatures in western and northern Europe. This was often coupled with scarce rainfall and November proved to be one of the driest months on record for western, central and eastern Europe. The prolonged water deficit in south east Europe postponed or hampered the emergence of winter cereals. On the other hand, the Balkan Peninsula and Turkey experienced a colder autumn.

In the **winter**, generally milder-than-seasonal conditions prevailed from the beginning of December until the last ten days of January in most of Europe, followed by an extremely cold period until mid-February, especially in central and eastern Europe. Due to insufficient snow cover and severe frosts, significant winter kill occurred mainly in France, Germany, Poland, the Czech Republic Romania, Bulgaria, Hungary and Ukraine, causing area shifts from winter cereals and rapeseed (which was severely hit) to spring/summer crops. This was one of the reasons for the large increase in maize area as compared with last year. A severe rain shortage was observed during the winter months for Spain, Portugal and Morocco. Below-average winter precipitation was also recorded in southern France, northern Italy and England.

In the **spring**, a very mild but predominantly dry March boosted the start of the season in north-west, central and eastern Europe, but was followed by a chilly April, which slowed crop growth. The end of April and beginning of May saw the first hot spells of the season around the Black Sea and accumulated temperatures during the spring were significantly above the long term average (LTA). There was plenty of rain in western and northern Europe in the spring, removing concerns after the previous dry period. At the end of the campaign the UK and Ireland recorded one of the wettest seasons of the last 40 years. Especially in Ireland, where a deficit on incoming solar radiation (associated with persistent overcast skies) was observed, crop photosynthetic activity was limited, resulting in below average yields. Similarly, in the UK, the over-wet conditions hampered ripening and delayed the harvest. Romania, Bulgaria and Greece experienced a wet spring too, which may have led to suboptimal root expansion, making crops vulnerable to the water stress that occurred in the summer and contributing to the negative yield outlook. A dry period was noted for southern Ukraine and also in parts of Germany, Poland, Slovakia and Hungary. Spain and Portugal saw some scattered rainfall, but the main agricultural areas remained rather dry. Here the persistent rain deficit throughout the growing season severely restricted leaf area expansion and grain formation stages and as a consequence yields dropped significantly.

The **summer** months were characterised by consistently high temperatures in southern and south-east Europe which, coupled with scarce rain, jeopardised the yield potential, especially for maize when not irrigated as well as sunflower and root crops. The main countries affected were Spain, Italy, Greece, Hungary, Romania and Bulgaria, resulting in very low yields. Central and northern Europe experienced a rainy period throughout the summer months, with unsettled weather and below-average temperatures allowing good to average yields. More specifically, key producers such as Germany and France had a rather positive campaign, and results were affected by no major obstacles during the harvest.

2. AGRO-METEOROLOGICAL CAMPAIGN OVERVIEW

AUTUMN 2011 (SEPTEMBER – NOVEMBER)

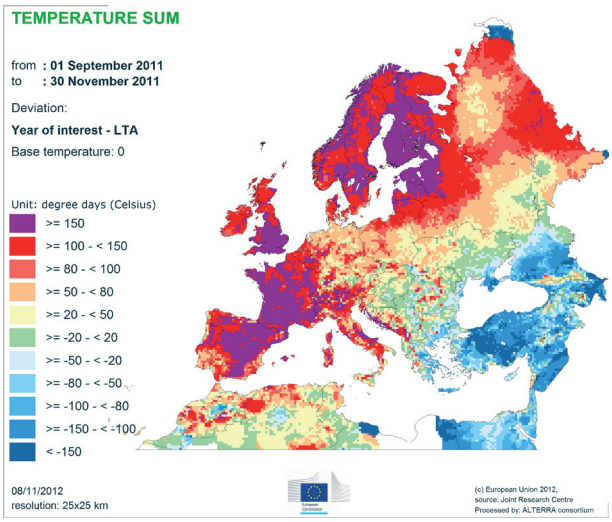
Mean temperatures were higher than the long-term average in the western and northern regions of Europe. By contrast, the Balkan Peninsula and Turkey experienced a colder autumn. Scarce precipitation was recorded in several places in central and eastern Europe. November was one of the driest months for several countries.

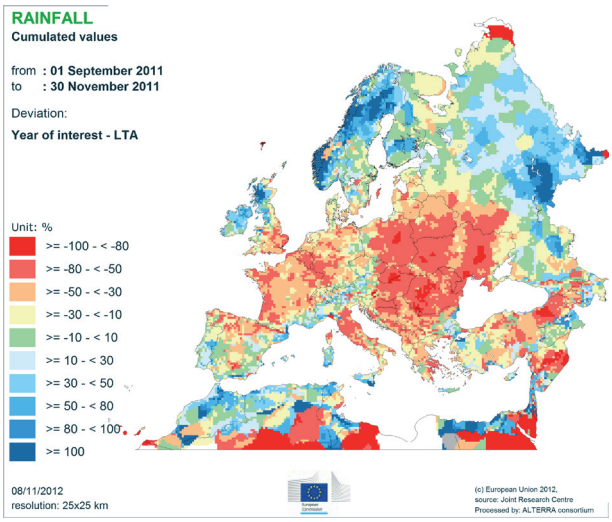
Temperature

During the autumn, the cumulated active temperatures (Tbase=0°C) significantly exceeded seasonal values in the Iberian Peninsula, France, the Benelux countries, some areas of northern and central Italy, the British Isles, Scandinavia, Finland and wide areas of Russia, reaching a +100 to +150 growing degree day (GDD) surplus and accelerating the development of winter crops. Consequently, air temperatures were significantly warmer than usual (+2 to +4°C) mainly in the Iberian Peninsula, France, the Alpine region, the British Isles, some areas of northern and central Italy, and Scandinavia. Colder than usual temperatures (-4 to -2°C) were recorded in the surrounding areas of the Black Sea, Turkey, the Caucasus, Romania, Ukraine and Bulgaria. In some regions of Turkey and the Caucasus, the accumulated active temperature deficit was more than 100 GDD. In **September**, the maximum air temperature values were generally below 30°C north of the Alps. Southern France, northern Italy, Hungary and southern Romania had six to ten hot days (Tmax > 30°C). A high number (ten to twenty) hot days was recorded in most of the Iberian Peninsula, the Apennine and Balkan Peninsula, and in western Turkey. Some extreme temperature peaks (Tmax>38°C) were measured in *Andalucía* (Spain), *Kentriki Makedonia* (Greece) and *Izmir* (Turkey) in September. From mid-September, cold days (Tmin<=0°C) were recorded in the Scandinavian Peninsula, Finland, northern and eastern Russia, and Turkey (*Erzurum*). The strongest frost events occurred in **October** but the temperature range was still moderate (Tmin>-6°C). In **November**, frost events were more frequent than usual in central Europe. Especially numerous cold days (Tmin<0 °C) occurred in a wide strip between Greece and Belarus, in Turkey, western Ukraine and in Russia (north of the Caucasus Mountains), exceeding the long-term average by ten days. The western part of the Mediterranean region and areas along the Atlantic coast remained frost free.

Precipitation

A severe rain shortage during the autumn affected the Carpathian region, Poland, Ukraine and Turkey, where rainfall was over 100% below the LTA. Below-average precipitation was also recorded also in northern France, northern and central Italy, some areas of England, Austria, and southern and eastern parts of European Russia. In **October**, scarce or absent precipitation was measured in Spain, the Po valley region of Italy, widely scattered areas of eastern Europe (Poland, Romania, Hungary, Ukraine and the Czech Republic) and in Turkey. The dry weather conditions continued through **November**, which proved to be the driest period in our climatological record in several countries in central and western Europe. Over the month, rainfall of less than 10 mm was recorded in the Black Sea countries, the Carpathian region and central Italy, which had suffered from a lack of rain since mid-August. Scarce or no rainfall was measured in particular in the Czech Republic, Hungary, Austria, some areas of Germany, southern Poland, Slovakia, some areas of Romania, and Moldova. Sowing was delayed or hindered in Poland, Slovakia, the Czech Republic, Hungary, Romania, Bulgaria, Moldova and Ukraine due to scarce or no rainfall. In several areas, the soil moisture content was not sufficient for the germination and development of winter cereals. During the autumn, the rain was mainly concentrated on the western and northern Atlantic coasts and in the central Mediterranean region. Conditions were wetter than normal in Ireland, the northern part of the British Isles, Scandinavia, southern France, northern Italy, the Adriatic Basin and *Sicily*, and large parts of Russia, where precipitation exceeded 200 mm during these months.



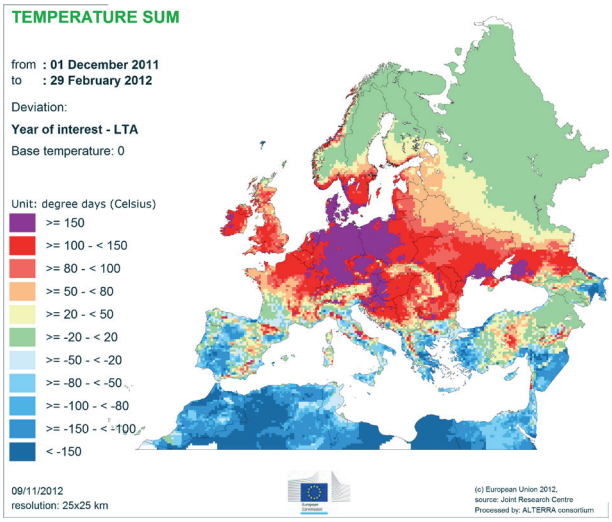


WINTER 2011/12 (DECEMBER – FEBRUARY)

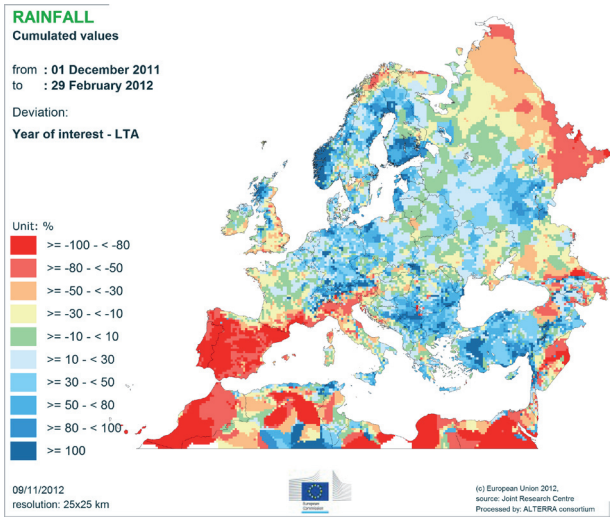
Generally milder-than-seasonal conditions prevailed from the beginning of December until the last ten days of January in most of Europe, followed by an extremely cold period until mid-February, especially in central and eastern Europe. This period was one of the coldest in our climatological record for several regions. Due to insufficient snow cover and severe frosts, significant winter kill occurred in some areas of central and eastern Europe. A severe rain shortage was observed from December onwards in Spain, Portugal and Morocco, with the driest period in our climatological record for southern Spain. Below-average winter precipitation was recorded also in southern France, northern Italy, some areas of England, Austria, Slovenia and Hungary, and southern and eastern parts of European Russia.

Temperature

In **December**, a significant warm anomaly affected most of the continent. The cumulated active temperatures indicated a +60 to +120 GDD surplus in a large triangle between the Pyrenees, southern Finland and the Caucasus. The mean temperature exceeded the long term average by 2-4°C in a wide strip from France to southern Russia. In the Baltic countries, Belarus and Ukraine, December was on average 4-6°C milder than usual. The most significant thermal anomalies (>+8°C) occurred in Finland and areas around the White Sea. The conditions were



near normal in the British Isles and the Mediterranean Basin. Only eastern Turkey and Georgia proved to be colder than average, by 2°C and 5°C respectively. In the New Year, the mild weather continued throughout Europe and lasted until 25 January, with positive anomalies from Ireland to the Ural Mountains. More seasonal conditions were observed in the Iberian and Apennine Peninsulas and the Maghreb countries, but the eastern region of the Mediterranean and the southern coastline of the Black Sea proved to be 1-3°C colder than usual. The higher-than-seasonal temperatures in the first half of the winter favoured the germination and tillering of winter cereals, but delayed or hindered the hardening process, exposing the new plants to a higher risk of frost damage. Due to strong Nordic cold air intrusion, the temperature dropped dramatically throughout Europe after 25 January and frost kill became a real risk. The first ten days of February were extremely cold, with temperatures more than 10°C (or even 15°C in some places) lower than average in large parts of Europe. The coldest temperatures reached -20°C in wide areas between Eastern Germany and Bulgaria, and along the eastern border of Poland, Slovakia and Romania temperatures even dropped below -25°C. What is more, daily maximum temperatures did not rise above 0°C between 28 January and 12 February in Germany and all countries eastwards towards Russia.



In several places, the period 21 January -20 February is the coldest in our archive (i.e. in the last 37 years) for both daily maximum and minimum temperatures. The number of cold days (Tmin<0°C) reached ten in almost all of Europe and exceeded 21 in most of Eastern Europe and wide areas of Southern Europe. Due to insufficient snow cover and severe frosts, significant winter kill occurred in eastern France, Germany, Poland, the Czech Republic, some areas of Romania, Bulgaria, Hungary and Ukraine, as simulated by our frost kill model and confirmed by remote sensing observations showing unfavourable biomass development. Warming started from 16 February as the prevailing anticyclone above Europe collapsed in the last ten days of February, with daily mean temperatures often exceeding the long-term average.

Precipitation

In **December**, precipitation was frequent and ample in Scandinavia, the British Isles, France, the Benelux countries, Germany and areas along the western coastline of the Adriatic and the Aegean Sea, where in several places more than 200 mm of precipitation was recorded. These regions typically experienced 50% to 100% more precipitation than usual. Scarce or no rainfall was measured in the Iberian Peninsula, northern Italy, southern France, Morocco and in areas east of the Black Sea. Romania and Moldova also had below-average precipitation.

The dry weather conditions continued through **January** in Spain, Portugal, northern Italy and southern France, accumulating a significant water deficit since the previous autumn. Abundant precipitation was recorded between 1 and 25 January in Scotland, the Baltic States, the Benelux countries, Germany, most of the Balkan Peninsula, eastern Turkey and some areas of Ukraine and Russia. Due to warm thermal conditions, hardly any snow covered western Europe before the beginning of the cold spell (25 January). The thin snow blanket in Poland, the Czech Republic and around the Black Sea was not enough to protect crops efficiently over the first few days of the frost wave. Some slight snowfall eased the situation in western Europe until the end of the month. Precipitation did not reach the long-term average in western Europe in **February**. Primarily the Iberian Peninsula, the British Isles, France, the Benelux countries and Morocco experienced scarce precipitation. Snowfall was plentiful in a wide strip between the Black Sea and Scandinavia. Abundant precipitation was observed in the eastern Mediterranean Basin, and along the western coastlines of Scotland and Norway. With rising temperatures in the last ten days of February, the snow cover started to melt in western and southern areas and the extent of the European snow cover decreased significantly. Gradual melting of the snow cover plays an important role in replenishing soil moisture in Romania, Ukraine and eastern Europe.

SPRING 2012 (MARCH – MAY)

A very mild but predominantly dry March boosted the start of the season in central and eastern Europe, followed by a chilly April, which slowed crop growth. There was plenty of rain in western and northern Europe and in Romania, Bulgaria and Greece. The dry spell continued in southern Ukraine and also in parts of Germany, Poland, Slovakia and Hungary.

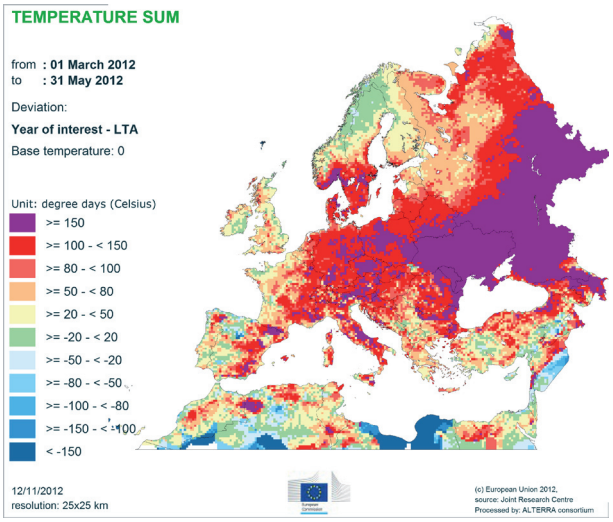
Temperature

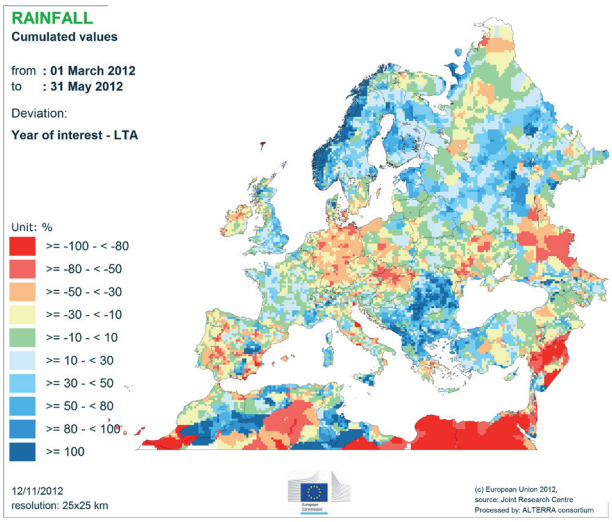
Spring started in **March** with higher than normal air temperatures and a temperature accumulation well above the average, with the exception of the Iberian Peninsula, western France, Greece and the Maghreb, which experienced seasonal temperatures and a normal temperature accumulation. It was significantly fresher than normal in Turkey.

Maximum air temperatures climbed above 20°C in parts of Germany, Poland and Austria, a positive deviation from the long-term average of just over 8°C. The same was true for northern Italy and most of France, with accelerated crop growth in those regions.

Cold days (below -8°C) were restricted to the Baltic States, eastern Poland and Ukraine. Also, the number of cold days below 0°C was considerably lower than the LTA for northern and central Europe, whereas central Spain saw an unusual drop in temperatures below 0°C in mid March. Towards the end of March, all main agricultural areas in Europe were snow-free. **April** was a rather chilly month in western Europe, with a temperature accumulation far below average in the United Kingdom, Ireland, the Benelux countries, large parts of France, Spain and Portugal. The low temperature accumulation in western Europe was mainly due to low maximum values, but minimum temperatures also dropped below 0°C around 17 April. In general, plant growth was slower than normal but did not accumulate a significant delay in western Europe.

In April, temperature accumulation in central and eastern Europe fluctuated around the average in Germany and higher than usual temperatures were accumulated in Poland, the Czech Republic, Slovakia and around the Black Sea generally. This was particularly the case in southern Ukraine, where temperatures peaked above 30°C towards the end of April, and the hot spell continued into **May** - also covering parts of Romania. As a consequence of the hot spell, temperate accumulation in Ukraine in May is at least 40% above the LTA. Romania and Bulgaria also recorded high temperature accumulation, compensating for their previously delayed crop growth. Temperature accumulation in May was close to the average for central Europe, France, Italy and the Baltic States. Like April, May brought lower than normal temperature accumulation for the UK and Ireland, while in France the accumulation was normal. In Spain and Portugal, on the other hand, the temperature accumulation was high, with daily maxima above 30°C for six to nine days in the southern and central parts of the Iberian Peninsula.





Precipitation

March was a dry month for most of Europe. There was a pronounced rainfall deficit in almost all Member States, with the exception of Estonia, *Sicily* (IT) and *East Anglia* (UK), where the rain was more than 100% LTA. There was rain too in *Murcia* (ES) and *Alentejo* (PT), slightly alleviating the drought situation. For most of central Europe, cumulated rainfall in March was less than 30 mm. Eastern Germany and the Czech Republic did not have a single day when there was over 5 mm of rain. During **April**, the United Kingdom, France and northern Italy all received more than their LTA rainfall, removing concerns raised by the earlier excessively dry period. The number of rainy days was also significantly higher than usual, making field work difficult. Rain also fell in Morocco, partially mitigating the effects of the previous dry period, and in Portugal and Spain. However, the rainfall in southern Spain came too late to help restore yield potential. Rainfall over 30% below the LTA was recorded in Germany, western Poland, Slovakia and Hungary. Precipitation in **May** was rather scarce in important agricultural regions in eastern Germany, Austria, Slovakia, Poland and Hungary. Western and southern Ukraine remained dry.

Romania, by contrast, received a lot of rain after the previous dry period, maintaining the country's yield potential, and this was also true of the main crop-producing regions in Bulgaria. Rainfall continued to be plentiful also in southern Spain, Portugal, the UK and northern Europe. Greece and Turkey also received beneficial rainfall, ensuring good growing conditions.

SUMMER 2012 (JUNE – AUGUST)

Persistent high temperatures in southern and south-east Europe, coupled with scarce rain, caused problems for crops. The main countries affected were Spain, Italy, Greece, Hungary, Romania, Bulgaria and Ukraine. Central and northern Europe experienced a rainy period with unsettled weather and below-average temperatures. The United Kingdom even had excessive amounts of rain.

Temperature

During the summer, northern and western Europe experienced near-average air temperatures, with a significant drop in maximum and minimum temperatures at the beginning of June, while southern and eastern Europe suffered from hot weather. The mean daily air temperature was 2°C to 4°C higher than the long-term average (LTA) in north-east, central and southern Italy, *Andalucía* (Spain), eastern Hungary, Romania, Bulgaria and Greece, and further east in Belarus, southern Ukraine, Turkey and the western and southern regions of Russia. In these areas from July to August, maximum temperatures mostly exceeded 30°C, reaching 36°C to 43°C. The number of hot days is a good indicator of the extraordinary thermal conditions experienced last summer in southern and eastern Europe. The total number of hot days (Tmax >30°C) since 1 June was 35 more than the LTA, and covered a wide belt stretching from Morocco and Spain through Italy and the Balkan region to the plains of the Caspian Sea.

The heat waves persisted around the Mediterranean Sea, Hungary, Romania and Bulgaria. In particular, the number of days above 35°C was considerably above the LTA in Romania, Bulgaria, Hungary, Greece, Italy and Ukraine. Also, the Czech Republic saw a couple of days above 35°C and consecutive days above 30°C. As a consequence, temperature accumulation in these countries was well above average. The heat waves mainly coincided with the ripening and maturation of winter cereals, negatively influencing yield

potential as the hot temperatures were accompanied by dry conditions. In the second ten days of August, the weather changed significantly in Europe with air temperatures above the LTA west of 10° east longitude except for Portugal and western Spain. At the same time, cold air relieved the hot spell in the east, where falling temperatures fluctuated around or slightly below the LTA.

Precipitation

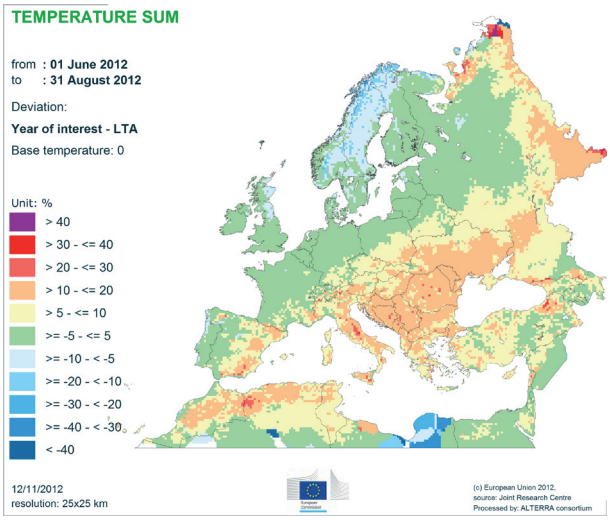
During the entire period under consideration, excessive rainfall was recorded in the British Isles, the Alpine region and Scandinavia. All countries bordering the North Sea also experienced a wet period.

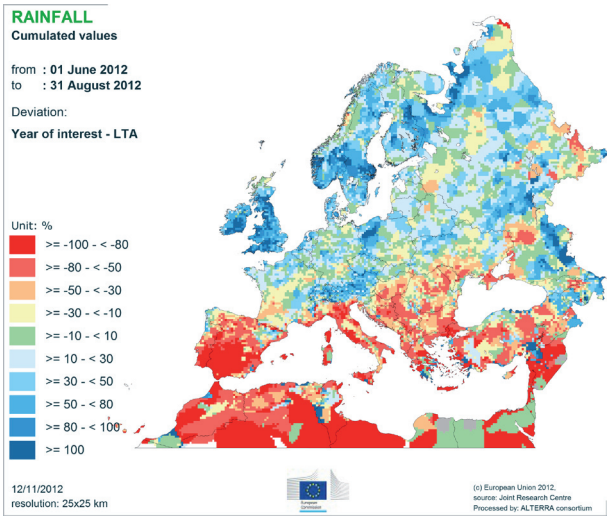
The situation was completely different in southern and eastern Europe. From June, a decisive rain deficit and very high evaporative demand was recorded mainly for the Iberian Peninsula, northern and central Italy, Hungary, Romania, Bulgaria, southern Ukraine and the Balkan Peninsula.

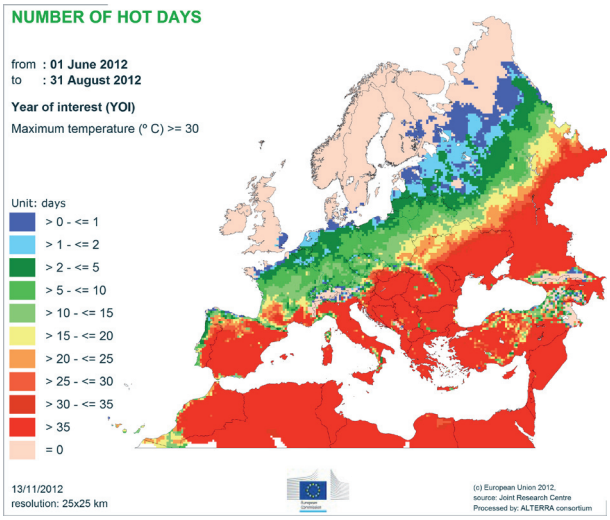
During **June**, there was more than long-term average rainfall in central, north and north-eastern Europe, except some areas of Germany (*Mecklenburg Vorpommern*, *Oberfranken*, *Oberpfalz*) and south west France, where a rainfall deficit of around 30% to 50% was recorded.

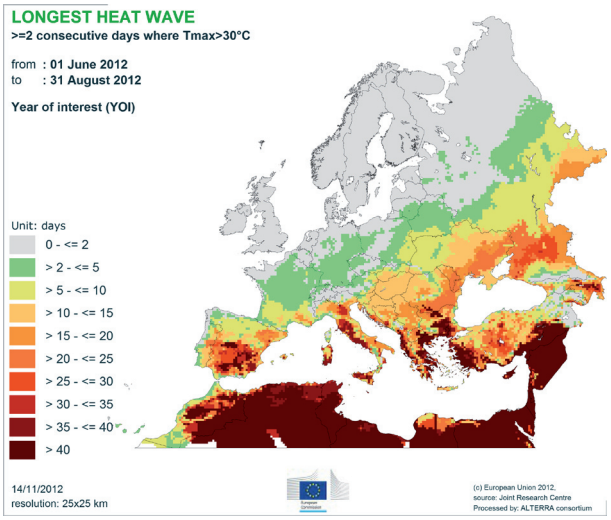
The period was also dry for the main producing regions of Spain: *Castilla y Leon* and *Castilla La Mancha*, as well as Mediterranean regions. Dry conditions persisted in Ukraine, Romania, Bulgaria and southern Russia. In **July**, strong rainfall deficits occurred in Spain, prolonging the dry conditions, and also in Italy, creating difficult conditions for summer crops. From July, soil moisture content was starting to deplete rapidly under summer crops in Romania, Hungary and Bulgaria, where the period was very dry with extremely high evaporation demand due to the high temperatures. A large precipitation surplus was recorded for Great Britain, continuing the overly wet season and, in conjunction with low sunshine rates, diminishing yield potentials. During the second ten days of July, abundant rainfall was recorded in Germany and in central and western France, beneficial for the grain filling of winter cereals. The wet conditions during this period in the countries bordering the North Sea caused some delay in crop development. From the last ten days of July, precipitation in France, Germany and Poland decreased, providing better conditions for the harvest. In **August**, abundant local rainfall was recorded in regions such as northern and southern Germany, Denmark, Ireland, the Netherlands, the south-west part of the Czech Republic, and Poland (along the Ukrainian border). Nevertheless, the overall number of days with significant (>5 mm) rainfall remained below the LTA across most of Europe. The soil moisture conditions remained favourable for summer crops in most of western and northern Europe, meeting the water requirements of summer crops. In Ireland, Scotland, southern Scandinavia and the Baltic States, the over-wet soil conditions may have caused some problems.

Some rainfall from the last ten days of July to the first ten days of August temporarily eased the water deficit in some areas of Italy, Slovenia, Hungary, Romania and Bulgaria. Nevertheless, very high values of evaporation demand were recorded during August in southern and eastern Europe, mainly in Romania and Bulgaria (the highest in our time series). After 12 August, considerable rainfall was recorded in Ukraine (especially on the western side), Belarus and western Russia. The dry weather conditions were very conducive to the quick and timely harvest of cereals and decreased harvest losses. At the same time, the water shortage compromised the yield potential of summer crops. Insufficient water supply to the maize crop during flowering and the first stage of grain-filling led to significantly lower yield expectations in Italy and the Balkan Peninsula.


TEMPERATURE SUM
from : 01 June 2012
to : 31 August 2012
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: %
> 40
> 30 - <= 40
> 20 - <= 30
> 10 - <= 20
> 5 - <= 10
>= -5 - <= 5
>= -10 - < -5
>= -20 - < -10
>= -30 - < -20
>= -40 - < -30
< -40
12/11/2012
resolution: 25x25 km
(c) European Union 2012,
source: Joint Research Centre
Processed by: ALTERRA consortium

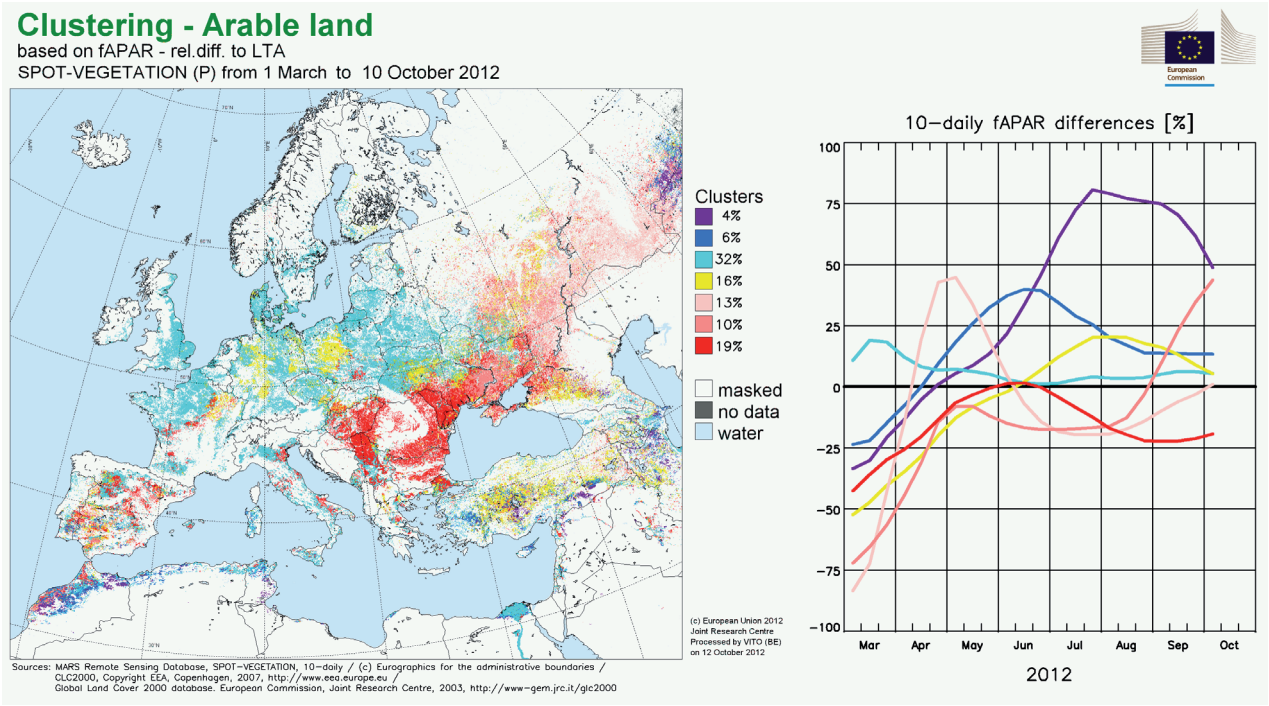

RAINFALL
Cumulated values
from : 01 June 2012
to : 31 August 2012
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
12/11/2012
resolution: 25x25 km
(c) European Union 2012,
source: Joint Research Centre
Processed by: ALTERRA consortium


NUMBER OF HOT DAYS
from : 01 June 2012
to : 31 August 2012
Year of interest (YOI)
Maximum temperature (° C) >= 30
Unit: days
> 0 - <= 1
> 1 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 30
> 30 - <= 35
> 35
= 0
13/11/2012
resolution: 25x25 km
(c) European Union 2012,
source: Joint Research Centre
Processed by: ALTERRA consortium


LONGEST HEAT WAVE
>=2 consecutive days where Tmax>30°C
from : 01 June 2012
to : 31 August 2012
Year of interest (YOI)
Unit: days
0 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 30
> 30 - <= 35
> 35 - <= 40
> 40
14/11/2012
resolution: 25x25 km
(c) European Union 2012,
source: Joint Research Centre
Processed by: ALTERRA consortium

3. REMOTE SENSING – OBSERVED CANOPY CONDITIONS

Map highlights – The late frost events of March did not impact the overall biomass development in western countries. Summer crop biomass development from eastern Italy across the Black Sea region was affected by drought. In Spain and Portugal, the persistent lack of rain made for an unfavourable season for cereals.



The cluster map shows the average time profiles of seven main fAPAR classes across Europe. The classification is based on the trend of differences for the current season against the long-term average (LTA 1998 2011). The **light blue** regions highlight cropland with an average trend of canopy development slightly better than usual at the start of the season. This behaviour is a consequence of the good germination of the winter cereals. The **yellow** regions are those where the frost kill events of late February and early March took place. This initial delay was made up for in the course of the season (partly due to re-sowing) and the overall biomass accumulation ranged around average values. The **pink** areas show the biomass evolution in large parts of the Russian regions. The cold temperatures in early spring significantly delayed the emergence of spring crops, while the subsequent high temperatures allowed for an impressive boost of canopy growth. The result was an increase in water demand, with consequences for the soil water reservoir. The lack of precipitation and the high temperatures of the summer months caused an early senescence and low biomass accumulation over the entire season. The **red** regions suffered partially from a lack of rain and predominantly high temperatures. While in the Iberian Peninsula the impact had already been felt in the spring and was due to rain scarcity, in eastern Europe summer crops were affected mostly by high temperatures creating huge evaporative demand. Even eastern Italy was affected. In the **light red** regions, crop conditions suffered from a suboptimal emergence that affected the whole season. The impact of the summer drought was less drastic in regions where average water supply allowed for better development as compared with the neighbouring regions. The **violet** and **blue** areas are marginal rural areas characterised more by natural vegetation than agricultural patterns.

4. CAMPAIGN ANALYSIS EU-27 AND NEIGHBOURHOOD COUNTRIES

The EU-27 cereals yield is forecast at 5.7% below last year's level and around 2.7% below the five-year average, mainly because of the drop in yields for grain maize.

Recurrent extreme heat waves and precipitation deficiencies caused serious **grain maize** yield losses in Romania, Hungary, Bulgaria and Italy. Average grain maize yields are forecast for France, Spain, Greece and Austria. A positive campaign is expected in Germany, Poland, Portugal, Lithuania and the Netherlands. In several countries, the maize partly substituted frost killed winter cereals, so the acreage increased at European level. The current season's **wheat** yield forecasts are slightly below the average of the last five years. France, Germany and Italy had quite a good year, but not sufficiently so to compensate the yield losses in Spain and the United Kingdom. Persistent dry conditions in the Mediterranean Basin were responsible for the modest durum wheat results. EU-27 **barley** yields are at average levels. Although the season was rather positive for most of Europe, especially for spring barley, persistent dry conditions in the Iberian Peninsula during winter and spring resulted in substantial yield losses. The forecast yields for **rye** at EU-27 level are exceptionally good: 12% above last year's and around 8% above the five-year average. Poland and Germany, the largest producers by far, saw a positive campaign. EU-27 **triticale** yields are slightly below average, mainly due to difficult meteorological conditions during the winter in Eastern Europe that were responsible for moderate yield losses. **Rice** yield at EU-27 level is confirmed as being close to the five-year average, and to last year's, despite incidents of infection.

The overall EU-27 **rapeseed** yield is forecast slightly above the average of the last five years. The campaign was positive for Italy, Denmark, Sweden, the Baltic States and France, successfully compensating yield losses in Poland, Romania, Hungary, the Czech Republic, Slovakia and Germany caused predominantly by the cold spell and frost kill at the end of January and in the first half of February.

Overall **potato** yield is slightly above average thanks to a favourable season in the two largest producer countries (Germany and Poland), counterbalancing the very difficult seasons in the other big producer countries (UK, Netherlands, Belgium, Romania, France). However, production prospects remain very low due a reduction in areas throughout EU-27. **Sugar beet** had a good start to the season, which was followed by generally adequate growing conditions without significant stresses. These conditions meant that yields were forecast around the five year average for the majority of the EU-27 countries, with the exception of the drought hit countries in south east Europe.

Crop	Yield t/ha				
	2011	MARS 2012 forecasts	Avg 5yrs	%12/11	%12/5yrs
TOTAL CEREALS	5,16	**4,86**	5,00	-5,7	-2,7
Total Wheat	5,38	**5,26**	5,31	-2,3	-1,0
soft wheat	5,60	**5,52**	5,57	-1,3	-0,9
durum wheat	3,37	**3,00**	3,17	-11,1	-5,3
Total Barley	4,32	**4,36**	4,36	+1,0	+0,0
spring barley	3,87	**3,90**	3,83	+0,7	+1,6
winter barley	5,02	**5,19**	5,15	+3,4	+0,7
Grain maize	7,65	**6,08**	6,95	-20,6	-12,5
Rye	3,06	**3,43**	3,18	+12,2	+7,8
Triticale	3,89	**3,85**	3,98	-1,2	-3,3
Other cereals	2,96	**2,84**	3,23	-4,1	-12,1
Rape and turnip rape	2,86	**3,03**	3,00	+5,9	+0,8
Potato	32,48	**30,90**	30,05	-4,8	+2,8
Sugar beet	70,99	**68,63**	67,74	-3,3	+1,3
Sunflower	2,04	**1,64**	1,80	-19,7	-8,8

CEREALS EU-27

Wheat – Yields slightly below the average

The current season's yields are slightly below the average of the last five years. It was a positive season in France, Germany and Italy, but not sufficient to compensate the yield losses in Spain and the United Kingdom. Persistent dry conditions in the Mediterranean Basin were responsible for the modest durum wheat results.

The overall wheat yield of the EU-27 countries is expected to be 5.26 t/ha, a decrease of 1% against the average of the last five years and 2% against the productive 2010-11 season. The campaign was rather positive for soft wheat for some of the main producers: France, Germany and Italy - with favourable spring weather conditions that included abundant rainfall and mild temperatures between April and May, yields improved as compared with the last five years. Similarly, higher yields than usual are forecast for Denmark and Benelux. In the UK, however, cumulated precipitation became excessive and incoming sun radiation insufficient for grain formation of soft wheat after the wettest spring in the last 40 years, followed by over-wet conditions delaying the harvest in the summer. As a result, yield is expected to decrease about 5% as compared with the last five years. By contrast, dry conditions have been the *leitmotiv* throughout the season in the Iberian Peninsula, producing substantial yield losses (about 20% in Spain and 50% in Portugal according to our analysis).

The results have been 3-5% below average in Poland, Romania and Hungary, affected by dry and hot conditions during the grain filling stage at the beginning of the summer. Similar conditions were observed in Austria, the Czech Republic and Slovakia. In Bulgaria, however, hot temperatures

affected only marginally soft wheat, for which results were better than the average of the last five years, but still below the 2011 level. Modest results are predicted for durum wheat due to the dry conditions experienced in most of the Mediterranean Basin, especially in the Iberian Peninsula, with yields dropping 50% in Spain and 12% in Greece as compared with the last five years. The satisfactory results in Italy (+5%) and France (average, according to our forecasts) were not sufficient to compensate for the adverse effects of the rainfall scarcity in southern Europe, so overall durum wheat yield is expected to be 3.17 t/ha, which is 11% below the previous season's level and 5% below the 2007-11 average.

Barley – Favourable season for spring barley

Average yields for EU 27, as compared with 2007-11. Although the season was positive for most of Europe, especially for spring barley, persistent dry conditions in the Iberian Peninsula during the winter and spring resulted in substantial yield losses.

Barley yield is forecast at 4.36 t/ha for EU-27, which is average for the last five seasons but slightly better than 2011. In 2012, the relative predominance of spring barley over winter barley increased in terms of acreage, as a result of the re-sowing with spring barley of winter barley fields affected by frost kill in some regions of central and eastern Europe. This shift in acreage from the winter to the less productive spring varieties explains why overall barley results are below average, given that both winter and spring barley yields exceed the levels of the last five years. Weather conditions between April and June were quite positive in most of Europe, with abundant rainfall and temperatures slightly above seasonal values, boosting the crop development of winter and, in particular, spring barley. In France and Germany, the expected yield of spring varieties was 6-8 % higher than in 2007-11, with a similar picture in Denmark, while winter barley was forecast slightly above average (2-4%). In north east Europe, spring barley also benefited from the favourable weather conditions, with satisfactory yields in Poland, the Baltic Sea countries and Sweden.

The UK and Ireland recorded one of the wettest seasons in the last 40 years. In Ireland, in particular, a deficit of incoming solar radiation combined with persistent overcast skies constrained crop photosynthetic activity, resulting in below average yields (1%) despite the abundant water supply. Similarly, in the UK, the over-wet conditions hampered ripening and delayed the harvesting of spring barley, but total barley yields nevertheless remained very close to the figures for the last five years. By contrast, the persistent dry conditions in Spain and Portugal throughout the season (cumulated rainfall in the growing season was almost half the long-term average) severely constrained the leaf area expansion and grain formation stages. This resulted in strong yield losses: around 20% in Spain for both winter and spring barley and 50% in Portugal. Similarly, in the Black Sea area, hot temperatures from June onwards negatively affected spring barley during the grain filling stage, especially in Romania and Hungary, whereas in Bulgaria this effect was not noticeable and above average yields were expected.

Rye – Positive yield and production outlook

The EU-27 rye yield is forecast clearly above the five year average and last year's campaign due to good results in Poland and Germany.

As the hardiest of all cereals, rye was less affected by the February cold spell in Germany and Poland and regenerated well in the spring. The remainder of the season for the two big producers was rather positive. The dry period in Germany in the spring did not negatively affect the rye and agro-meteorological conditions were helpful during flowering and grain filling. In the western part of Poland, rye benefited from favourable wet conditions in early summer, while thermal conditions were favourable in the main production areas in central Poland. Yield forecasts for both countries are above last year's level (particularly in Germany) and the five-year average. In Spain (the third largest producer), rye was constrained by the large water deficit, despite being more drought resistant than wheat.

Triticale – Unfavourable winter limited yields

Yield expectations for 2011/12 are slightly below the average of the last five campaigns. Difficult meteorological conditions during the winter in eastern Europe were responsible for moderate yield losses.

Yield forecasts are 3% below the average of the five last campaigns due to unfavourable winter weather conditions in eastern Europe. This affected Poland, in particular, where half of the EU-27's total triticale area is sown: the extremely low temperatures in February (with average daily temperatures dropping to -15°C) led to substantial losses both in harvested area and yield (forecast at 3.01 t/ha, 10% below the 2007-11 average). The impact of frost kill on triticale was limited in central and western Europe, where the winter was followed by a rather favourable spring, with mild temperatures and abundant rainfall benefiting crop growth and yield potentials. As a result,

yields in Germany and France improved slightly as compared with the last five seasons. Similarly, favourable temperatures and sufficient precipitation during most of the growing season in northern Europe allowed yields to increase in the Baltic countries and Denmark. A hot spell in Hungary, the Czech Republic and Slovakia in June affected yield expectations moderately, whereas in the Iberian Peninsula one of the driest seasons in the last 30 years had a severe impact.

Grain maize – Hot spells decreased maize yields

Recurrent extreme heat waves and precipitation deficiencies caused serious yield losses in Romania, Hungary, Bulgaria and Italy. The yield forecast for France, Spain, Greece and Austria is average. A positive season is expected in Germany, Poland, Portugal, Lithuania and the Netherlands. The European maize yield forecast is not just below last year's (exceptionally high) level, but also below the average of the last five years. In several countries, the maize partly substituted frost killed winter cereals, so that acreage increased at European level.

The continuous and excessive rain in April complicated the sowing of maize in northern Italy, France, northern Spain as well as in Belgium and also hampered germination and emergence. In April and May Bulgaria, Hungary and Romania experienced abundant rainfalls, which may have delayed the sowing of maize primarily in Romania. In these countries moist soils at the beginning of the crop cycle could have led to a sub-optimal root expansion making crops vulnerable to water stress. Maize was sown under good soil moisture conditions in the other areas of Europe like Poland, Germany, Portugal and most of Spain. Spain experienced dry and hot weather from last dekad of June until end of September, but the irrigation was sufficient to fulfil the water requirement of maize during its crop cycle.
The unfavourably high temperatures retained the yield potential on average level. In France biomass accumulation and canopy development was promising until end of July in spite of the over-wet spring. The high temperatures and scarce rainfalls from mid-July and especially in August required complementary irrigation to avoid significant yield losses. An average maize yield is expected.
Very high temperatures and rainfall deficiency characterized the summer in northern and central Italy just as in Slovenia inducing a serious water deficit and consequently decreasing significantly the yield outlook. In Hungary, Romania, Bulgaria as well as the remaining Balkan Peninsula scarce rainfalls and extreme high temperatures with an unusual frequent occurrence led to the formation of a severe drought situation during flowering and grain filling. As a consequence yields are at the level of the most severe years. Additionally the acreage of grain maize decreased, as many fields where harvested as green maize for silage. Eastern Austria and western Slovakia also suffered from a lack of rainfall and unusual hot weather affecting negatively the biomass accumulation and leaf area; consequently expected grain maize yields are low in these countries, too. A wide area from Benelux to Lithuania including Germany and Poland experienced slightly warmer than seasonal weather conditions with satisfactory precipitation and irradiation levels resulting in an adequate leaf area expansion and above average biomass and storage organ growth. Here maize yields are forecast above the five-year average.

Rice – Average season with satisfactory yields

Despite incidents of infection, satisfactory yields are forecast; EU-27 rice yield is confirmed as being similar to the five-year average and to last year's.

Forecast EU-27 rice yield is 2% above last year's values and 0.7% above the five-year average, though the sowing area is around 4 % down on last year's figure. Romania shows a major yield decline of around 13%, due to the enhanced risk of blast infection concentrated in the southern regions adversely affecting the photosynthetic capacity of the crop. The hot and dry weather throughout August affected potential yields in Spain and Bulgaria. Nevertheless, yield expectations remain close to the five-year average and slightly below the previous year's figures: 7.32 t/ha for Spain and 4.88 t/ha for Bulgaria. In Italy, the simulation model shows good canopy expansion and this is confirmed by remote sensing observations. However, the slight advance in canopy senescence due to the advance in development may have affected storage organ accumulation rate. Nevertheless, yield is forecast at 6.4 t/ha, 0.9% above the five-year average.
In Portugal and France, conditions seem normal and similar to the previous year's, leading to a close to average final yield expectation: 5.9 t/ha for Portugal and 5.46 t/ha for France. With favourable temperatures and abundant rainfall at the start of the crop season in Greece and Hungary, the scene was set for optimum crop growth and further development. The simulated values of potential leaf area index show positive canopy expansion, and potential yield storage values are also on a positive trend and above the long-term average values, at 7.72 t/ha for Greece and 4.13 t/ha for Hungary, suggesting a good yield year.

OIL SEED CROPS EU-27

Rapeseed – Yield decreases in eastern Europe

The overall EU-27 rapeseed yield for the season was slightly above the last five-year average. The campaign was positive for Italy, Denmark, Sweden, the Baltic States and France, which compensated for yield losses in Poland, Romania, Hungary, the Czech Republic, Slovakia and Germany caused predominantly by the cold spell and frost kill at the end of January and in the first half of February.

EU-27 rapeseed yield is forecast at 3.03 t/ha, about 1% higher than the last five-year average and 6% higher than the previous year. The season was successful, especially for countries that did not experience frost kill damage during the cold spell. The mild weather during the early spring, accompanied by higher than average temperature accumulation, positively influenced rapeseed development in northern Italy, Austria, Sweden, Denmark and the Baltic States. These countries experienced good conditions for rapeseed growth, with average thermal conditions and rainfall higher than average in late spring. Good weather, accompanied by optimal crop development, resulted in higher-than-average yields. The yield for the biggest rapeseed producer, France, is slightly above the five-year average. The yield forecast is lower than the five-year average for other major producers, such as Poland and Germany, and some of the important eastern European producers, such as Romania, Hungary, the Czech Republic and Slovakia. The severe cold spell at the end of January and in the first half of February caused serious winter kill problems in these countries. In particular, areas of France, Germany, Poland, Romania, Hungary and Bulgaria were badly hit and there was huge damage to rapeseed. Re-sowing with alternative crops in the spring led to a drop of planted rapeseed area. Rapeseed yield for the UK is forecast slightly below the last five-year average, due to the impact on pollination of insufficient solar radiation and abundant rainfall during the flowering stage.

Sunflower – Yields below five-year average

Overall, sunflower yields are lower than the 2007-11 average due to persistently dry conditions in the Iberian Peninsula, Italy and especially Hungary and Romania. However, the season was better or close to average for the Czech Republic, Denmark, Slovakia, Austria and France.

The beginning of the season was characterised by good weather conditions, with optimal rainfall and temperature accumulation for timely sowing, proper germination and good crop establishment for most large sunflower producers. Only Romania experienced heavy precipitation during the sowing. The yield outlook during the vegetative stage was positive for almost all of Europe due to mild temperatures and good rainfall amounts up to the end of spring and beginning of summer, except for Spain where sunflower was already affected by the lack of rain. Summer started with a shortage of rainfall and sharply rising temperatures in Italy, Hungary, Romania, Bulgaria and Spain. Soil moisture in these countries decreased fast and water stress seriously affected the sunflower crop. Crop indicators are showing substantially lower than average biomass accumulation. Heat waves in Hungary caused additional stress and, together with water stress in the most sensitive flowering phase, seriously constrained sunflower yields. Sunflower is considered a drought tolerant crop, usually grown without irrigation, but the prolonged drought combined with heat stress during the flowering and grain filling stage hit yields in the above mentioned countries. However, in other countries where rainfall was sufficient for normal crop water supply during the season (e.g. the Czech Republic, Denmark and Slovakia), yields were above the last five-year average. France (one of the larger producers) experienced an average season.

ROOTS AND TUBER CROPS EU-27

Potato – Sharp drop in production mostly due to acreage

Overall yield is slightly above average thanks to a favourable season in the two largest producing countries (Germany and Poland), counter-balancing a very difficult season in the other big producer countries (the UK, the Netherlands, Belgium, Romania, France). However, production prospects remain very low due to a reduction in areas throughout the EU-27.

Despite an overall aggregated EU-27 potato yield close to the five-year average (+2.8%), national averages varied considerably: from -16% to +6% as compared with the five year average and from -22% to +9% as compared with the previous season. Two regions stand out with strong yield drops as compared with previous years. In north-west Europe, several important producing areas (the UK, Belgium, the Netherlands and northern France) had a very difficult season: overly wet conditions in the spring delayed sowing (often an early indicator of lower yields), wet conditions limited growth during the summer and the harvest was complicated and delayed in the autumn. Grim yield prospects also applied

in south-east Europe (Romania, Bulgaria and Hungary), due mostly to the stress on crops from an excessively hot summer. A serious precipitation deficit as compared with the long-term average did not help. The season was in general rather favourable in Germany and Poland, the two largest producers, and in other minor producing countries elsewhere in Europe, thereby counter-balancing the low yield results in the above mentioned countries and keeping overall potato yield slightly above the five-year average. Nevertheless, potato is a sensitive crop and it is not easy to quantify the impact of unusual weather on the final yield. The extreme conditions this year in north-west and south east Europe may result in yields considerably worse than is possible to forecast reliably. In any case, it appears that it is the reduction in acreage in almost all countries, rather than the yield, that is responsible for the expected severe drop in EU-27 potato production (-9% as compared with 2007-2011).

Sugar beet – Average campaign for the main producers

Sugar beet had a good start to the season, followed by generally adequate growing conditions without significant stresses. These conditions meant that yield forecasts were around the five-year average for the majority of the EU-27 countries, with the exception of the drought hit countries in south-east Europe. As a consequence, the final EU-27 yield forecast for sugar beet is 68.63 t/ha, which is 1.3% more than the five year average and 3.3% below the (very positive) 2011 level.

Yields in the main producing countries (France, Germany and Poland) are forecast at around the previous year's level and the 5-five-year average (>-4% and <+4%). The good conditions and absence of major water constraints have led to yield forecasts above the five year average in Spain, the Netherlands, Poland, Denmark and Lithuania. On the other hand, after a good start to the season, the very dry summer conditions in Italy, Hungary, and Romania significantly reduced yield forecasts, which are now clearly below the five-year average. At the same time, significant acreage reductions further affected production forecasts in Italy and Hungary. Acreage reduction was also observed in Finland, Spain and Hungary, where, despite positive yield forecasts, production is expected to fall against the five-year average.

EU NEIGHBOURHOOD COUNTRIES

Turkey – Difficult start, but overall a positive season

Conditions for sowing in *Orta Anadolu*, the agriculturally important central region of Turkey, were characterised by low soil moisture. Average precipitation and slightly below-average temperature in the period before winter dormancy ensured normal crop development. The harsh winter had a negative impact on crops in the eastern regions of the country, but no significant losses were detected in the main central agricultural regions. Early spring was characterised by abundant rain, especially in the central Anatolian regions, allowing crops to start the season with good relative soil moisture. However, below average temperatures slowed down early development. This became apparent in the simulated biomass from the crop growth model and was confirmed by relatively low remotely-sensed NDVI values. From April onwards, favourable temperature, rainfall and global radiation characterised the season. Wheat and barley made up for the delay at the beginning of the season, while grain maize started promisingly. By the end of the season, modelled crop indicators were pointing to average or above-average yields and harvesting activities benefited from favourable weather conditions.

Ukraine – Difficult season due to winter frost kill followed by hot and dry conditions

Winter crops were sown in favourable conditions but then affected by a dry period throughout the country in the autumn. Conditions were close to average in the winter months, apart from February, when a rapid drop in temperature combined with insufficient snow cover caused significant frost kill losses, especially in the southern oblasts. Spring brought hot and dry weather, which was not conducive to crop recovery after the harsh winter. In the southern and eastern oblasts, the crop cycle was shortened, reducing potential yields and grain quality. Only June and July brought some promising rain, which allowed wheat and barley to recover slightly. Constantly high air temperatures hindered grain maize development. In general, the summer months were characterised by big variations in weather conditions at different times and in different places, with exceptional temperature peaks and troughs. Abundant rainfall delayed harvesting activities in the eastern regions, but no significant losses were expected. The season remained difficult for grain maize, especially in the north eastern oblasts. Our forecast was for below average yields for wheat and barley, while maize yields reached the five-year average but fell below last season's level.

Belarus – warm weather with seasonal precipitation resulted in near average yield outlook

There was no significant frost kill damage in Belarus in the previous winter, since thick snow cover protected the winter cereals against the harsh frosts in February. Sufficient precipitation replenished the soil moisture for springtime. The temperature was mostly above average from mid-April to the end of May. Below average thermal conditions characterised the first ten days of June, but the warm (on some days, unusually hot) weather returned and lasted until the first ten days of August, when more seasonal conditions prevailed until the end of September. Cumulated active temperatures (both Tavg>0°C and Tavg>10°C) indicated a continuous surplus over the crop cycle. Crop development was accelerated significantly this year, reaching 10-20 days' precocity. Rainfall was evenly distributed over time and near normal for the season in the northern and western territories, with slight (10-30%) deficiency, while there was a moderate surplus (15-35%) in the eastern and southern regions. Leaf area expansion was normal, but the senescence of wheat and barley leaves started prematurely. The shrinkage of canopy and the shortened crop cycle due to premature phenological development are the main reasons for the slightly below average yield expectations of these crops. Maize benefited from the warm and rainy weather building fair canopy and accumulating above average biomass for the end of the crop season, and yield expectations are positive. Our forecast indicates slightly below average yields for wheat and barley, while the maize yield forecast is slightly above the five year average (though below last year's level).

Russia – Severe drought hits winter wheat yields

Overall weather conditions were favourable for the sowing and wintering of winter wheat in Russia. The extreme cold spell in February caused just below average frost kill damages concentrated mainly in the southern regions where the snow cover was insufficient. From November until the end of March, there was frequent and normal or above normal precipitation over most of Russia, with the exception of areas between the Black and Caspian Seas as well as the eastern part of *Volga* Okrug (10-30% precipitation deficiency). The yield potential was quite high at the beginning of April, but the situation changed dramatically. Air temperatures rose quickly and remained high almost continuously until the last days of May over wide areas of southern Russia. Unfortunately, the hot weather was coupled with a long dry spell in a wide belt between the Black Sea and the border with Kazakhstan. A serious drought hit the southern, central and *Volga* districts. In mid-May, critically low soil moisture content values in the flowering and grain filling stage caused irreversible damage to winter wheat. The northern regions of European Russia were only moderately warmer than usual and received normal amounts of precipitation. From the last ten days of May, some rainfall started finally in the western (and later in the eastern) part of southern Russia, but the regions remained mostly drier than climatologically expected. This precipitation was too late for winter wheat, but mitigated possible spring barley losses. Thermal conditions were more seasonal from late spring onwards, but maximum temperatures still significantly exceeded the average. Crop development was accelerated by 10-30 days in the central, *Volga* and especially southern federal districts due to recurring and long lasting hot spells; meanwhile, crop development remained seasonal in northern areas. The leaf area index of winter and spring cereals did not reach average levels and senescence of crop canopy started earlier. The winter wheat yield outlook is poor. The barley yield will also be below average, but the losses more moderate. With warm weather and timely and sufficient rain in July and August, conditions were in general favourable for the maize crop and yield expectations are above average, though varying according to area.

Maghreb – Positive season in Tunisia and Algeria

Favourable spring weather conditions, with above average rainfall, were conducive to the satisfactory development of winter cereals in Algeria and Tunisia. In contrast, regions in western Morocco suffered prolonged dry conditions in most of the growing season, with yields down as compared with the previous campaigns. After a rather favourable start to the season in all three countries (Algeria, Morocco and Tunisia), with abundant precipitation from October to December, meteorological conditions varied between the Atlantic regions of Morocco and the Mediterranean Basin. In western Morocco, where most of the winter cereals are produced, rainfall scarcity from December to March limited crop growth for most of the campaign, thus constraining yield potentials. The precipitation in April was not sufficient to compensate the adverse effects of previous dry conditions and forecasts this season are consequently 15% below the average of the last five years for both wheat and barley. In the Mediterranean Basin, by contrast, weather was quite favourable for winter cereals, with enough rainfall during leaf area expansion and grain filling stages. As confirmed by satellite data, the presence of green biomass between February and June was above the seasonal values. The outlook for winter cereals is therefore slightly above average in Algeria, while in Tunisia the yield for wheat is forecast at 2 t/ha (26% higher than the 2007 11 average) and that for barley at 2.07 t/ha (very close to the 2003 record).

5. CROP YIELD FORECASTS

EU-27 and neighbouring countries

Country	TOTAL WHEAT (t/ha)					SOFT WHEAT (t/ha)					DURUM WHEAT (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
EU27	5,38	5,25	5,31	-2,5	-1,2	5,60	5,52	5,57	-1,5	-1,0	3,38	3,00	3,17	-11,1	-5,4
AT	5,85	5,09	5,25	-13,1	-3,1	5,90	5,13	5,30	-13,0	-3,3	5,09	4,33	4,42	-14,9	-2,0
BE	8,41	8,83	8,65	+5,0	+2,0	8,41	8,83	8,65	+5,0	+2,0	-	-	-	-	-
BG	3,92	3,63	3,39	-7,5	+7,0	3,91	3,62	3,38	-7,3	+7,1	4,30	3,81	3,81	-11,3	+0,2
CY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CZ	5,69	5,25	5,33	-7,7	-1,4	5,69	5,25	5,33	-7,7	-1,4	-	-	-	-	-
DE	7,01	7,59	7,42	+8,2	+2,3	7,02	7,60	7,43	+8,2	+2,3	4,74	5,38	5,37	+13,3	+0,1
DK	6,77	7,39	7,17	+9,1	+3,0	6,77	7,39	7,17	+9,1	+3,0	-	-	-	-	-
EE	2,65	3,01	3,01	+13,6	+0,2	2,65	3,01	3,01	+13,6	+0,2	-	-	-	-	-
ES	3,46	2,47	3,20	-28,7	-23,0	3,70	2,76	3,46	-25,2	-20,0	2,48	1,20	2,43	-51,7	-50,8
FI	3,85	3,78	3,77	-1,8	+0,4	3,85	3,78	3,77	-1,8	+0,4	-	-	-	-	-
FR	6,66	7,14	6,87	+7,2	+4,0	6,81	7,35	7,05	+7,9	+4,3	4,84	4,84	4,85	-0,1	-0,2
GR	3,13	2,42	2,70	-22,7	-10,4	3,32	2,83	2,93	-14,9	-3,4	3,06	2,31	2,62	-24,6	-12,0
HU	4,21	3,85	4,07	-8,7	-5,5	4,21	3,85	4,07	-8,7	-5,6	4,04	3,74	3,80	-7,5	-1,6
IE	9,87	8,62	8,82	-12,6	-2,2	9,87	8,62	8,82	-12,6	-2,2	-	-	-	-	-
IT	3,84	3,88	3,67	+1,2	+5,7	5,33	5,43	5,16	+1,9	+5,2	3,17	3,16	3,01	-0,6	+4,8
LT	3,39	4,08	3,82	+20,3	+6,9	3,39	4,08	3,82	+20,3	+6,9	-	-	-	-	-
LU	5,54	6,13	6,07	+10,7	+1,0	5,54	6,13	6,07	+10,7	+1,0	-	-	-	-	-
LV	3,06	3,76	3,48	+22,9	+8,0	3,06	3,76	3,48	+22,9	+8,0	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	7,85	8,81	8,40	+12,2	+4,9	7,85	8,81	8,40	+12,2	+4,9	-	-	-	-	-
PL	4,14	3,92	4,05	-5,1	-3,1	4,14	3,92	4,05	-5,1	-3,1	-	-	-	-	-
PT	1,36	0,86	1,72	-37,1	-50,2	1,36	0,86	1,72	-37,1	-50,2	-	-	-	-	-
RO	3,63	2,61	2,76	-28,1	-5,5	3,63	2,61	2,76	-28,1	-5,5	2,87	2,37	2,16	-17,5	+9,5
SE	5,36	5,89	5,84	+9,7	+0,7	5,36	5,89	5,84	+9,7	+0,7	-	-	-	-	-
SI	5,17	4,90	4,52	-5,2	+8,3	5,17	4,90	4,52	-5,2	+8,3	-	-	-	-	-
SK	4,52	3,68	4,15	-18,7	-11,5	4,53	3,68	4,15	-18,9	-11,4	4,20	3,68	4,29	-12,3	-14,2
UK	7,75	7,35	7,76	-5,2	-5,3	7,75	7,35	7,76	-5,2	-5,3	-	-	-	-	-

Country	TOTAL BARLEY (t/ha)					SPRING BARLEY (t/ha)					WINTER BARLEY (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
EU27	4,32	4,34	4,36	+0,5	-0,5	3,87	3,88	3,83	+0,4	+1,2	5,02	5,17	5,15	+3,1	+0,4
AT	5,61	4,98	4,83	-11,2	+3,1	4,98	4,15	4,10	-16,7	+1,2	6,21	5,76	5,68	-7,2	+1,4
BE	8,06	8,57	8,46	+6,4	+1,2	-	-	-	-	-	8,06	8,57	8,46	+6,4	+1,2
BG	4,00	3,67	3,41	-8,1	+7,6	-	-	-	-	-	4,00	3,67	3,41	-8,1	+7,6
CY	1,49	1,23	1,11	-17,2	+11,2	-	-	-	-	-	1,49	1,23	1,11	-17,2	+11,2
CZ	4,49	4,28	4,31	-4,7	-0,7	4,43	4,15	4,15	-6,3	+0,0	4,64	4,64	4,70	+0,0	-1,4
DE	5,46	6,04	5,96	+10,5	+1,3	4,90	5,22	4,81	+6,6	+8,4	5,67	6,48	6,34	+14,4	+2,3
DK	5,43	5,44	5,19	+0,2	+4,8	5,38	5,35	5,04	-0,6	+6,1	5,58	5,94	5,68	+6,5	+4,7
EE	2,44	2,62	2,55	+7,1	+2,5	2,44	2,62	2,55	+7,1	+2,5	-	-	-	-	-
ES	2,98	2,46	3,03	-17,5	-19,0	3,01	2,52	3,11	-16,2	-19,0	2,79	2,09	2,65	-25,1	-21,1
FI	3,41	3,44	3,43	+1,1	+0,3	3,41	3,44	3,43	+1,1	+0,3	-	-	-	-	-
FR	5,68	6,45	6,25	+13,4	+3,1	5,04	6,31	5,94	+25,3	+6,3	5,98	6,54	6,38	+9,3	+2,5
GR	3,23	2,48	2,59	-23,0	-4,1	-	-	-	-	-	3,23	2,48	2,59	-23,0	-4,1
HU	3,84	3,51	3,63	-8,6	-3,4	3,46	3,08	3,18	-11,0	-3,1	4,08	3,76	3,93	-7,8	-4,3
IE	7,80	6,87	6,95	-12,0	-1,2	7,50	6,55	6,72	-12,7	-2,5	9,00	8,21	8,46	-8,8	-3,0
IT	3,64	3,68	3,60	+1,0	+2,3	-	-	-	-	-	3,64	3,68	3,60	+1,0	+2,3
LT	2,90	2,88	2,83	-0,7	+1,8	2,90	2,88	2,83	-0,7	+1,8	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LV	2,40	2,62	2,46	+9,0	+6,2	2,40	2,62	2,46	+9,0	+6,2	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	5,93	6,02	5,99	+1,5	+0,5	5,93	6,02	5,99	+1,5	+0,5	-	-	-	-	-
PL	3,27	3,22	3,22	-1,5	-0,2	3,13	3,16	3,07	+1,2	+3,2	3,75	3,61	3,95	-3,8	-8,7
PT	1,26	0,89	1,77	-29,7	-50,0	-	-	-	-	-	1,26	0,89	1,77	-29,7	-50,0
RO	3,35	2,40	2,53	-28,5	-5,4	2,35	1,85	1,88	-21,2	-1,2	3,91	2,68	2,94	-31,5	-8,8
SE	4,43	4,46	4,31	+0,5	+3,3	4,43	4,46	4,31	+0,5	+3,3	-	-	-	-	-
SI	4,54	4,39	4,00	-3,4	+9,8	-	-	-	-	-	4,54	4,39	4,00	-3,4	+9,8
SK	3,93	3,46	3,48	-11,9	-0,6	3,94	3,46	3,46	-12,1	+0,2	3,86	3,45	3,70	-10,7	-6,8
UK	5,66	5,72	5,76	+1,0	-0,7	5,39	5,28	5,38	-2,1	-1,8	6,13	6,48	6,35	+5,8	+2,1

Country	GRAIN MAIZE (t/ha)					RYE (t/ha)					TRITICALE (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
EU27	7,65	**6,07**	6,95	-20,6	-12,6	3,06	**3,42**	3,18	+12,0	+7,7	3,89	**3,88**	3,98	-0,3	-2,4
AT	11,30	**10,50**	10,43	-7,0	+0,7	4,40	**4,02**	3,98	-8,7	+1,0	5,00	**5,08**	5,13	+1,5	-1,0
BE	11,94	**12,02**	11,98	+0,7	+0,3	-	**-**	-	-	-	-	**-**	-	-	-
BG	5,53	**3,48**	4,33	-37,1	-19,6	1,93	**1,75**	1,82	-9,3	-4,1	3,09	**3,22**	3,01	+4,4	+7,1
CY	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
CZ	8,79	**7,67**	7,62	-12,8	+0,7	4,73	**4,58**	4,59	-3,0	-0,2	4,52	**4,09**	4,22	-9,6	-3,0
DE	10,62	**9,95**	9,68	-6,3	+2,8	4,11	**5,03**	4,70	+22,4	+6,9	5,23	**5,79**	5,66	+10,8	+2,3
DK*	5,22	**-**	5,01	-	-	5,11	**5,35**	5,00	+4,7	+7,0	5,17	**5,24**	5,02	+1,3	+4,2
EE	-	**-**	-	-	-	2,32	**2,71**	2,71	+16,5	-0,2	-	**-**	-	-	-
ES	10,47	**10,15**	10,22	-3,0	-0,6	2,46	**1,90**	2,12	-22,8	-10,5	2,51	**1,30**	2,45	-48,2	-47,1
FI	-	**-**	-	-	-	2,90	**2,73**	2,69	-5,6	+1,7	-	**-**	-	-	-
FR	10,19	**9,27**	9,33	-9,1	-0,6	4,50	**4,84**	4,78	+7,3	+1,1	5,08	**5,37**	5,20	+5,7	+3,3
GR	11,91	**10,61**	10,69	-11,0	-0,8	2,09	**2,11**	2,06	+0,7	+2,2	-	**-**	-	-	-
HU	6,60	**3,86**	6,16	-41,5	-37,4	2,33	**2,14**	2,19	-8,1	-2,0	3,44	**3,08**	3,24	-10,4	-4,7
IE	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
IT	9,80	**7,82**	9,36	-20,2	-16,5	-	**-**	-	-	-	-	**-**	-	-	-
LT	7,49	**6,12**	5,13	-18,2	+19,4	2,02	**2,44**	2,34	+20,6	+4,5	2,51	**2,95**	2,80	+17,5	+5,3
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	2,35	**2,88**	2,91	+22,2	-1,2	2,28	**2,63**	2,55	+15,5	+3,1
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	11,52	**11,84**	11,53	+2,8	+2,7	-	**-**	-	-	-	-	**-**	-	-	-
PL	7,18	**6,51**	6,31	-9,3	+3,2	2,40	**2,54**	2,45	+6,0	+3,9	3,34	**3,01**	3,36	-9,8	-10,5
PT	7,91	**7,39**	6,74	-6,6	+9,7	0,85	**0,90**	0,94	+5,8	-4,7	0,93	**0,92**	1,42	-0,1	-34,8
RO	4,48	**2,34**	3,37	-47,8	-30,7	-	**-**	-	-	-	3,60	**3,02**	2,96	-16,1	+2,2
SE	-	**-**	-	-	-	5,31	**5,92**	5,57	+11,5	+6,2	4,46	**4,82**	4,88	+8,0	-1,1
SI	8,57	**7,60**	7,96	-11,3	-4,6	-	**-**	-	-	-	-	**-**	-	-	-
SK	7,15	**5,81**	6,38	-18,8	-8,9	3,10	**2,65**	2,77	-14,6	-4,5	3,15	**2,78**	3,00	-12,0	-7,5
UK	-	**-**	-	-	-	-	**-**	-	-	-	4,00	**4,06**	4,04	+1,5	+0,4

Country	RAPE AND TURNIP RAPE (t/ha)					POTATO (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
EU27	2,86	**3,03**	3,00	+6,0	+0,9	32,48	**30,87**	30,05	-4,9	+2,8
AT	3,35	**3,09**	3,13	-7,8	-1,1	35,71	**32,49**	32,29	-9,0	+0,6
BE	4,34	**4,07**	4,05	-6,3	+0,4	50,14	**42,77**	46,04	-14,7	-7,1
BG	2,25	**2,27**	2,27	+1,0	+0,0	14,34	**13,18**	15,74	-8,1	-16,3
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	2,80	**2,82**	2,96	+0,6	-4,8	30,45	**26,53**	26,56	-12,9	-0,1
DE	2,91	**3,55**	3,66	+21,8	-3,1	45,76	**44,86**	43,23	-1,9	+3,8
DK	3,38	**3,76**	3,55	+11,3	+5,9	38,94	**40,28**	39,43	+3,4	+2,2
EE	1,58	**1,70**	1,56	+7,5	+9,2	-	**-**	-	-	-
ES	1,98	**1,76**	1,81	-11,2	-3,0	30,00	**30,18**	29,31	+0,6	+3,0
FI	1,26	**1,22**	1,35	-3,6	-9,8	27,59	**28,27**	26,72	+2,4	+5,8
FR	3,45	**3,36**	3,35	-2,6	+0,5	42,29	**42,90**	43,29	+1,5	-0,9
GR	-	**-**	-	-	-	26,64	**26,67**	25,52	+0,1	+4,5
HU	2,26	**2,16**	2,30	-4,5	-6,1	26,99	**21,50**	24,64	-20,3	-12,8
IE	-	**-**	-	-	-	32,36	**31,97**	31,97	-1,2	+0,0
IT	2,34	**2,58**	2,23	+10,6	+15,9	24,95	**24,94**	24,98	+0,0	-0,1
LT	1,94	**1,97**	1,92	+2,0	+2,9	15,58	**14,40**	13,71	-7,5	+5,1
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	1,87	**2,20**	2,14	+17,8	+2,8	17,14	**17,00**	16,83	-0,8	+1,0
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	46,05	**44,84**	45,15	-2,6	-0,7
PL	2,26	**2,48**	2,69	+9,9	-7,7	23,04	**21,22**	20,13	-7,9	+5,4
PT	-	**-**	-	-	-	14,71	**16,10**	15,74	+9,5	+2,3
RO	1,94	**1,48**	1,59	-23,6	-6,8	16,55	**12,90**	14,77	-22,0	-12,6
SE	2,65	**2,82**	2,73	+6,6	+3,4	31,84	**31,90**	30,64	+0,2	+4,1
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	2,31	**2,15**	2,25	-7,0	-4,5	-	**-**	-	-	-
UK	3,94	**3,48**	3,50	-11,7	-0,7	42,30	**40,51**	42,60	-4,2	-4,9

*In the range of the 5-yrs average(2006-2011) only 2011 and 2010 figures available for computation

Country	SUGAR BEETS (t/ha)					SUNFLOWER (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
EU27	70,99	**68,65**	67,74	-3,3	+1,3	2,04	**1,64**	1,80	-19,8	-8,9
AT	74,20	**71,58**	69,79	-3,5	+2,6	2,83	**2,67**	2,68	-5,7	-0,5
BE	86,96	**76,98**	77,52	-11,5	-0,7	-	**-**	-	-	-
BG	-	**-**	-	-	-	1,93	**1,64**	1,74	-14,8	-5,6
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	66,84	**59,08**	57,90	-11,6	+2,0	2,48	**2,42**	2,32	-2,5	+4,5
DE	62,87	**66,02**	64,03	+5,0	+3,1	1,98	**2,27**	2,22	+14,3	+1,9
DK	67,50	**62,64**	58,98	-7,2	+6,2	-	**-**	-	-	-
EE	-	**-**	-	-	-	-	**-**	-	-	-
ES	88,14	**89,18**	80,29	+1,2	+11,1	1,26	**0,98**	1,19	-22,5	-17,9
FI	47,92	**41,39**	39,86	-13,6	+3,8	-	**-**	-	-	-
FR	91,24	**86,65**	87,65	-5,0	-1,1	2,54	**2,46**	2,46	-3,2	-0,1
GR	58,88	**66,10**	65,50	+12,3	+0,9	5,50	**1,28**	2,30	-76,6	-44,1
HU	53,54	**43,33**	53,22	-19,1	-18,6	2,38	**2,05**	2,29	-14,0	-10,5
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	57,01	**46,31**	55,98	-18,8	-17,3	2,32	**1,87**	2,24	-19,7	-16,5
LT	49,88	**49,71**	45,51	-0,3	+9,2	-	**-**	-	-	-
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	79,89	**78,75**	74,51	-1,4	+5,7	-	**-**	-	-	-
PL	55,64	**54,89**	51,36	-1,3	+6,9	-	**-**	-	-	-
PT	-	**-**	-	-	-	0,56	**0,61**	0,62	+8,9	-1,7
RO	34,31	**27,77**	34,49	-19,1	-19,5	1,89	**1,25**	1,40	-34,0	-10,7
SE	62,90	**54,06**	56,32	-14,1	-4,0	-	**-**	-	-	-
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	64,14	**57,89**	56,23	-9,7	+3,0	2,27	**2,24**	2,18	-1,3	+2,5
UK	65,00	**64,42**	62,27	-0,9	+3,4	-	**-**	-	-	-

Notes: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg.
Sources: 2007-2012 data come from DG AGRICULTURE short term Outlook (dated October 2012, received on 06/11/2012), EUROSTAT Eurobase (last update: 05/11/2012) and EES (last update: 19/11/2012).
2012 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/10/2012).

Country	WHEAT (t/ha)					BARLEY (t/ha)					GRAIN MAIZE (t/ha)				
	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs	2011	2012	Avg 5yrs	%12/11	%12/5yrs
BY	3,53	**3,40**	3,44	-3,8	-1,4	3,29	**3,14**	3,23	-4,4	-2,7	5,37	5,74	**4,89**	7,00	+17,6
DZ	1,47	**1,42**	1,39	-3,1	+2,5	1,23	**1,26**	1,26	+2,7	-0,1	-	-	**-**	-	-
MA	1,95	**1,31**	1,55	-32,8	-15,5	1,15	**0,90**	1,04	-21,5	-13,6	-	-	**-**	-	-
TN	1,57	**2,00**	1,58	+27,1	+26,1	1,94	**2,07**	1,33	+6,8	+56,4	-	-	**-**	-	-
TR	2,69	**2,38**	2,41	-11,7	-1,6	2,65	**2,56**	2,33	-3,2	+10,2	7,48	7,08	**7,19**	-5,40	-1,6
UA	3,22	**2,71**	3,00	-15,8	-9,6	2,34	**2,18**	2,23	-7,0	-2,5	4,85	4,64	**4,60**	-4,40	+0,9

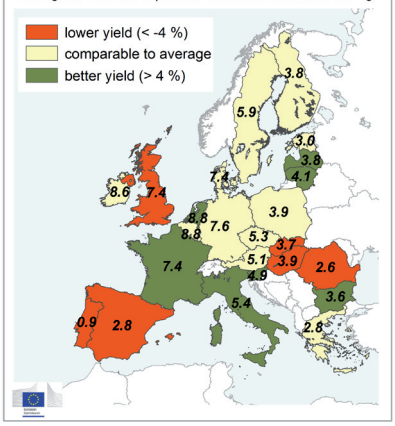
Notes: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: FAO database, INRA-Morocco

Yield forecast maps

Soft wheat - yield forecast 2012

Actual yield versus average yield 2007- 2011

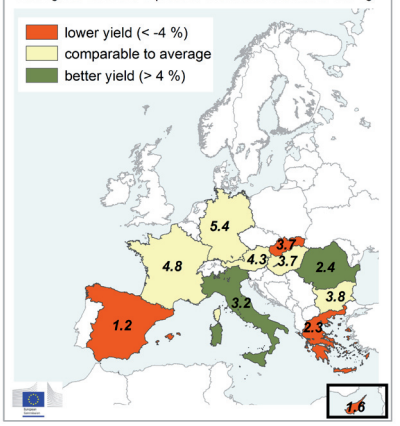
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Durum wheat - yield forecast 2012

Actual yield versus average yield 2007- 2011

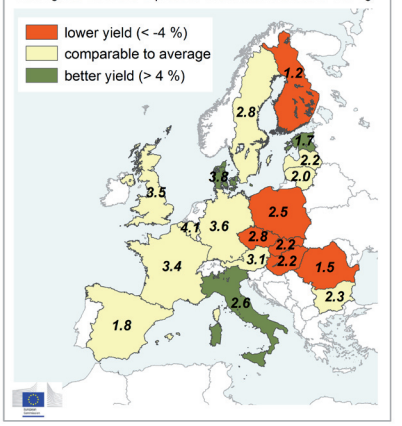
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Rape and turnip - yield forecast 2012

Actual yield versus average yield 2007- 2011

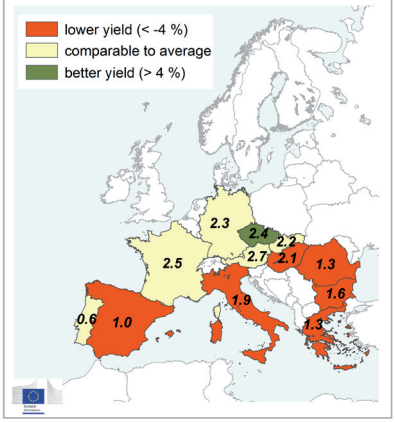
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Sunflower - yield forecast 2012

Actual yield versus average yield 2007- 2011

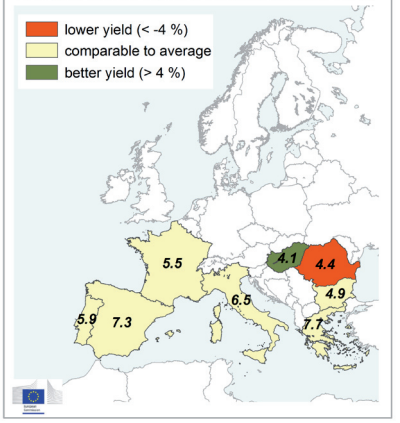
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Rice - yield forecast 2012

Actual yield versus average yield 2007- 2011

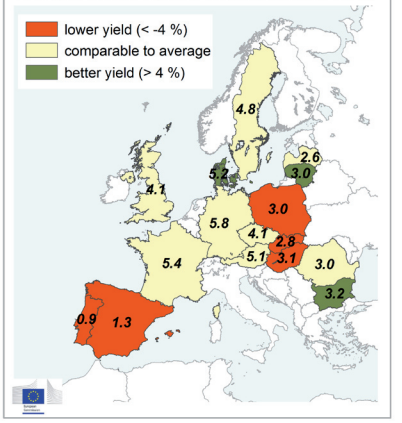
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Triticale - yield forecast 2012

Actual yield versus average yield 2007- 2011

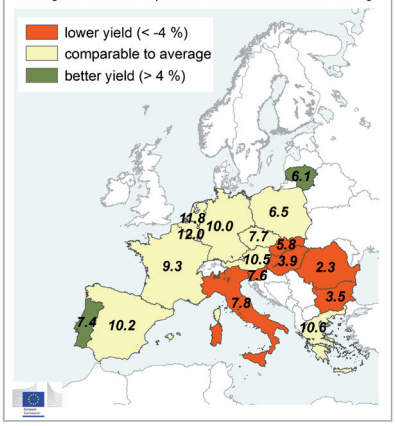
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Grain maize - yield forecast 2012

Actual yield versus average yield 2007 - 2011

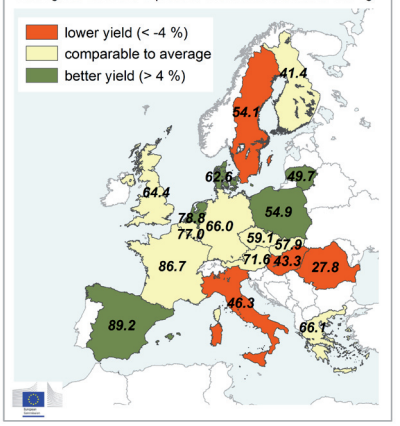
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Sugar beets - yield forecast 2012

Actual yield versus average yield 2007- 2011

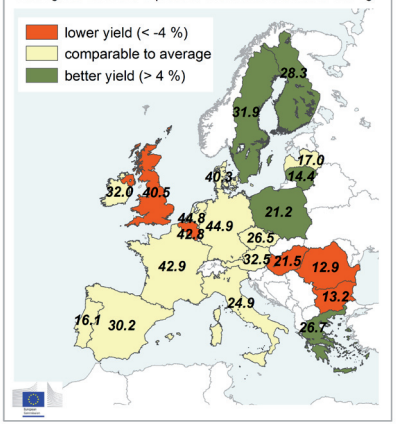
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



Potato - yield forecast 2012

Actual yield versus average yield 2007- 2011

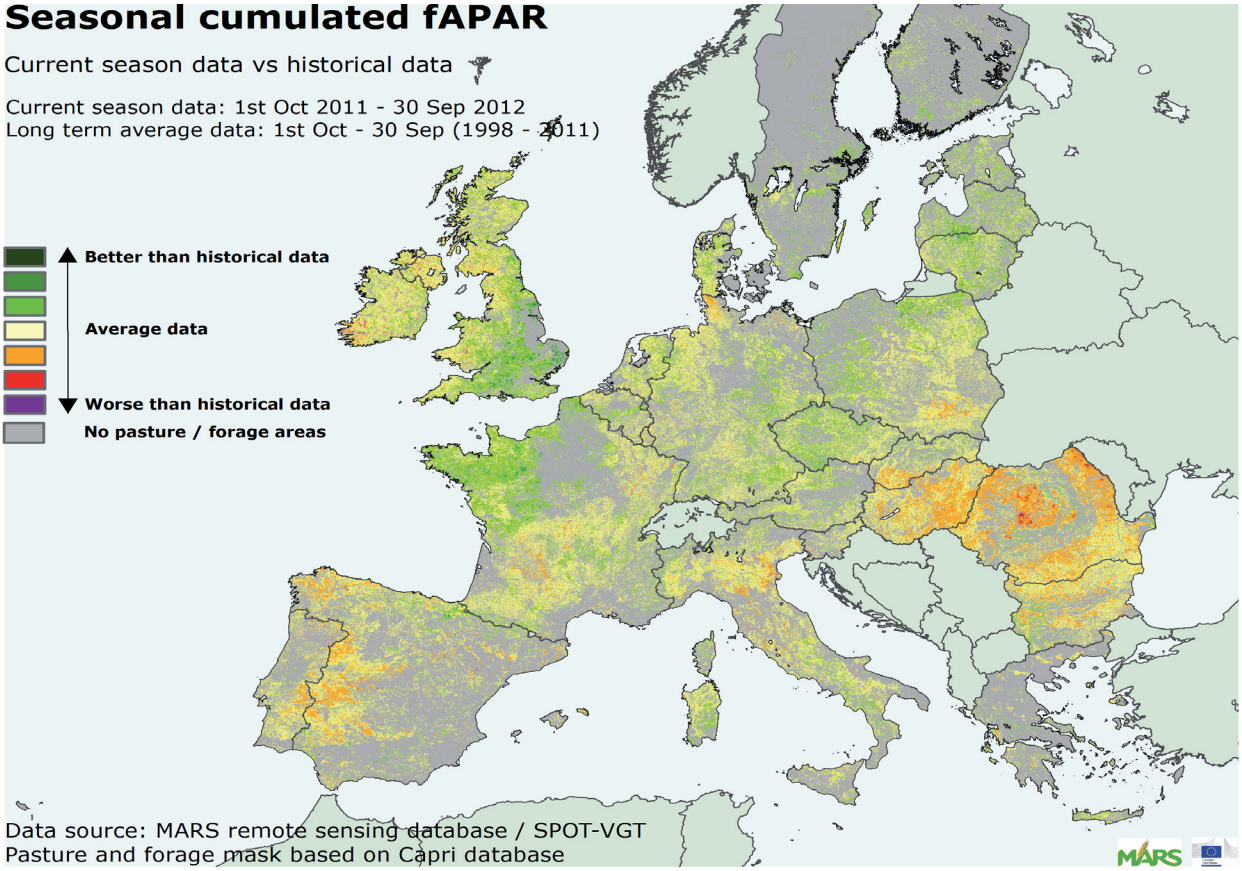
Yield figures 2012 are expressed in t/ha and rounded to 100 kg



6. PASTURES IN EUROPE – SEASONAL REVIEW

Low biomass production in the Mediterranean Basin and Black Sea area.

Two contrasting regions can be identified in Europe on the basis of an analysis of pasture indicators throughout the 2011-12 season: southern Europe, where substantial water constraints at critical moments of the season severely limited production levels; and northern and central Europe, where biomass production was quite satisfactory due to favourable weather conditions.



Dry conditions were a constant in the Iberian Peninsula during spring and summer, and the *Dehesa* area had one of its driest campaigns in the historical series. Hardly any precipitation was registered between December and April and production levels were therefore severely constrained. In northern Spain, rainfall accumulated during May and June allowed production to recover from June onwards. In the Black Sea area, the sharp temperature rises in July and August were the limiting factor behind this year's negative results. Although total rainfall accumulation was average, it was not sufficient to compensate for the increasing evaporative demand resulting from daily temperatures exceeding seasonal values in that period by up to 7 °C. As a consequence, a dramatic decrease in green biomass in the second half of the summer was observed in Romania, Hungary, Slovakia and south eastern Poland. Similar weather conditions and their consequences in northern Italy negatively affected the important fodder maize production areas of Emilia Romagna and Veneto. By contrast, in central and northern Europe the season can be considered quite positive. After a late start as a consequence of the cold wave during February, seasonal temperatures and sufficient water supply during the season benefited biomass production. Especially for the Baltic countries, the analysis of remote sensing images reveals one of the best results of the last ten years. Similarly, production levels were significantly higher than usual in Germany, Austria, Slovakia and western Poland. In France and the United Kingdom, abundant rainfall between April and July benefited pasture growth and in both countries the growing season is considered positive. Particularly high biomass production levels were observed in Wales, England and north west France (*Bretagne*, *Normandie* and *Pays de Loire*). In Ireland, the main limiting factor for pasture development was the deficit of incoming radiation, due to overcast skies most of the growing season. This restricted photosynthetic activity, resulting in slightly lower than average biomass production. In some regions in central France (mainly *Auvergne* and *Limousin*), scarce precipitation and high temperatures in August and the first half of September sharply reduced the presence of biomass at the end of the season, but overall the campaign can be considered close to average due to the high production levels in spring and summer.

B – NEW CAMPAIGN 2012/13

1. AGRO-METEOROLOGICAL OVERVIEW

Below average thermal conditions characterised the Atlantic region of Europe, while the eastern and south-eastern territories, especially the Black Sea countries and southern Russia, had a warmer period. October and November were rainy over most of Europe. Abundant rainfall was measured along the Atlantic coastline and in the western Mediterranean Basin, including Morocco. Precipitation was also plentiful in large areas of Russia, in contrast to the northern half of Germany, Poland and especially the North Caucasus region, which remained dry.

Observed temperature

During the period in question (11 October to 20 November), below seasonal temperatures were recorded in the western part of the Iberian Peninsula, the north-western part of France (e.g. *Bretagne*), the British Isles and Norway. In a wide strip from Gibraltar to Sweden, including most of France, Germany and Poland, near normal thermal conditions were observed. On the other hand, above average temperatures were recorded in the eastern half of Europe. The positive thermal anomaly exceeded +2°C in the southern regions of the Apennine and Balkan Peninsula, and in Turkey, areas around the Black Sea and further eastward. The thermal surplus exceeded by at least 80-100 GDD the agro climatologically expected totals in Greece, Bulgaria, Romania, Turkey, Ukraine and extensive areas of southern Russia, speeding up the development of rapeseed and winter cereals before the winter dormancy. The mild thermal conditions delayed the hardening of winter crops so that they were more vulnerable to any harsh frost. Until the last few days of October, frost events were scarce and moderate in the areas south of the Baltic Sea. A strong cold air intrusion after 26 October changed the weather across Europe and only some areas of Ireland and the UK, the Atlantic coastline south of Belgium, the Mediterranean Basin and the southern shore of the Black Sea remained frost free. During the most severe frosts, temperatures fell below -10°C in Scandinavia and northern Russia. At the same time, lowest minimum temperatures in the central and southern regions of Russia oscillated between -5°C and -10°C, while in Ukraine, Belarus and in the territories to the west - with the exception of limited agricultural areas in Poland, Germany and western France - there were only light frosts (Tmin>-5°C). The situation improved in November, since most of Europe again saw 4-5 fewer cold days (Tmin<0°C) than usual. Maximum temperatures in the south-eastern part of Europe were 2-4°C higher than the long-term average. Central areas experienced seasonal values, while daytime temperatures in the western regions were 1-2°C lower than expected.

Observed precipitation

Cumulated rainfall reached excessive levels (>150 mm) in the Iberian and Apennine Peninsula, along the west coast of England, and in France, Scandinavia and the Balkans. The intensive extreme rain events of 10 to 12 November caused flooding in northern Italy. Abundant precipitation was measured in the Maghreb countries, with 100-300 mm cumulated rain in northern Morocco and areas along the Mediterranean coastlines of Algeria and Tunisia. The positive precipitation anomaly for Spain, Portugal and the Maghreb countries replenished the soil moisture and water reservoirs. The precipitation was also plentiful in Belarus, Ukraine and Russia (except some southern regions). The lack of precipitation may cause problems in areas surrounding the Sea of Azov and further east towards the Caspian Sea, where the cumulated rainfall of only 20 mm or less may be insufficient for appropriate crop growth; future precipitation may stabilise the situation, however. A moderate precipitation deficiency can be observed in northern Germany and Poland, but there is no indication of significant problems. With the cold air intrusion in the last few days of October, snow fell in a belt between the Alps and the White Sea, but the thin snow cover melted quickly. With the exception of high latitudes and mountain tops, Europe remained snow free until 20 November.

TEMPERATURE SUM

from : **11 October 2012**
to : **20 November 2012**

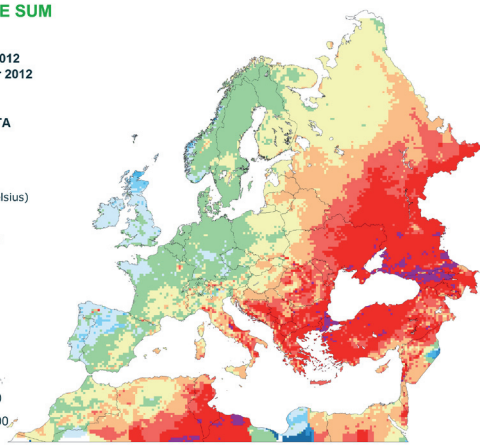
Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degree days (Celsius)

- >= 150
- >= 100 - < 150
- >= 80 - < 100
- >= 50 - < 80
- >= 20 - < 50
- >= -20 - < 20
- >= -50 - < -20
- >= -80 - < -50
- >= -100 - < -80
- >= -150 - < -100
- < -150



22/11/2012
resolution: 25x25 km

AVERAGE DAILY TEMPERATURE

Averaged values

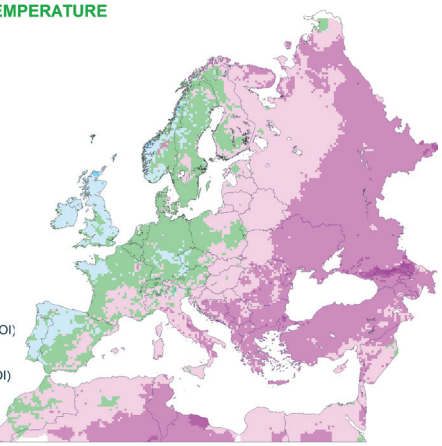
from : **11 October 2012**
to : **20 November 2012**

Deviation:

Year of interest - LTA

Unit: degrees Celsius

- -6 - -4 (cooler in YOI)
- -4 - -2 (cooler in YOI)
- -2 - < -0.5 (cooler in YOI)
- no difference
- >0.5 - 2 (warmer in YOI)
- 2 - 4 (warmer in YOI)
- 4 - 6 (warmer in YOI)
- 6 - 8 (warmer in YOI)



22/11/2012
resolution: 25x25 km

NUMBER OF COLD DAYS

from : **11 October 2012**
to : **20 November 2012**

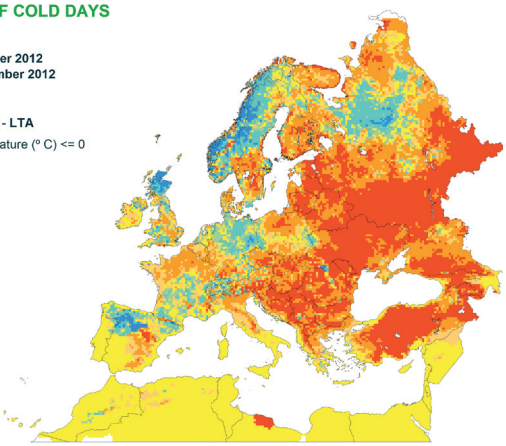
Deviation:

Year of interest - LTA

Minimum temperature (° C) <= 0

Unit: days

- <= -5
- -4 - -2
- -1 - -1
- 0 - 0
- 1 - 1
- 2 - 4
- >= 5



22/11/2012
resolution: 25x25 km

RAINFALL

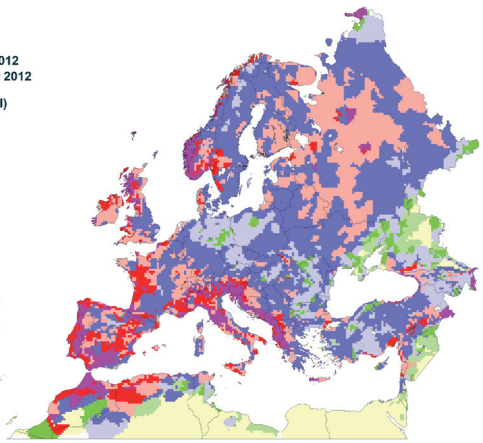
Cumulated values

from : **11 October 2012**
to : **20 November 2012**

Year of interest (YOI)

Unit: mm

- >= 200
- >= 150 - < 200
- >= 100 - < 150
- >= 50 - < 100
- >= 30 - < 50
- >= 20 - < 30
- >= 10 - < 20
- >= 0 - <= 10



22/11/2012
resolution: 25x25 km

RAINFALL

Cumulated values

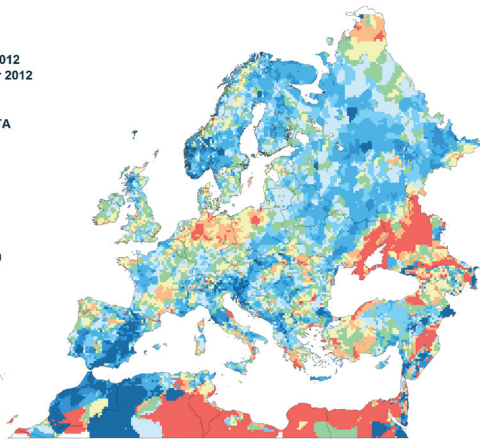
from : **11 October 2012**
to : **20 November 2012**

Deviation:

Year of interest - LTA

Unit: %

- >= -100 - < -50
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 100
- >= 100 - < 150
- >= 150



22/11/2012
resolution: 25x25 km

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from : **11 October 2012**
to : **20 November 2012**

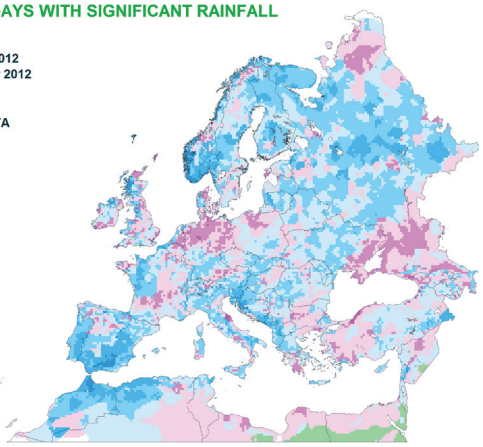
Deviation:

Year of interest - LTA

Rain (mm) > 5

Unit: days

- > 15
- 11 - 15
- 6 - 10
- 3 - 5
- 1 - 2
- no difference
- -2 - -1
- -5 - -3
- -10 - -3



22/11/2012
resolution: 25x25 km

2. SOWING CONDITIONS EU-27 AND NEIGHBOURHOOD

WINTER CROPS – EU-27

Winter wheat

Generally favourable sowing conditions for winter wheat in most of Europe, with the exception of delays in the UK and France.

Most winter growing areas in Europe had a combination of slightly above average temperatures and adequate precipitation in their respective sowing windows. This should have favoured proper sowing and germination in most areas. However, France and the UK stand out as having had considerable rainfall, delaying the summer crop harvest and thus the sowing of the new crop. Conditions are particularly unfavourable in the UK, since the ground is still saturated by the heavy rainfall that dominated most of 2012 and much of what is sown is under serious attacks by slugs.

Winter barley

Favourable weather conditions for the sowing of winter barley, with the exception of abundant rainfall in northern France and the UK.

The weather for winter barley sowing has been generally favourable all over Europe. Moderate rain during sowing was beneficial for timely field works and germination. However, northern areas of France experienced abundant rainfall and sowing delays. Sowing in France is almost complete but accumulated a delay of about two weeks. The UK is faced with abundant rainfall and over-wet soil hampering the late sowing of barley, and crop establishment is slow. Southern Romania, northern Bulgaria and Greece experienced lower amounts of rain during sowing, but rain arrived later and replenished soil water contents ensuring germination and crop establishment.

The majority of Europe experienced mild weather and temperatures beneficial for winter barley germination. However, areas with abundant rainfall experienced lower than average temperatures. The sowing of winter barley should have been completed for the remaining areas, mainly in Spain, by late December.

Winter rapeseed

Generally favourable weather conditions. Growth could be slightly delayed in the main rapeseed producer countries.

The four main producers of rapeseed are France (28% of the EU 5 year' average production), Germany (27%), Poland (11%), the United Kingdom (11%), followed by the Czech Republic (6%) and Romania (3%). They experienced favourable weather around sowing and emergence of rapeseed. In general, during the second half of August farmers benefited from seasonal weather conditions and a relatively dry period for rapeseed sowing. The only exception is *Bayern* in Germany (around 12% of rapeseed surface in Germany) where rainfalls above the 5 year' average were registered during the last week of August. Nevertheless this rain did not create any serious sowing delay as the following period (first two weeks of September) were again optimal for sowing. In the second half of September and the first of October, weather conditions were conducive to normal growth without any particular problem to report. Probably growth could be slightly delayed due to thermal accumulation (base temperature = 0°C) below average in France (with the exception of Lorraine), in the German regions of *Niedersachsen* and *Bayern*, and in the UK. On the contrary in Poland and the Czech Republic thermal accumulation was slightly higher than average and growth could be slightly advanced.

WINTER CROPS – NEIGHBOURHOOD COUNTRIES

Black Sea area

August and September were rather dry in the southern regions of Ukraine, while the eastern oblasts (e.g. *Dnipropetrovska*) and north-western oblasts (e.g. *Zhytomytska*) received abundant rain. This was intense and concentrated, so there were dry periods in between, allowing access to fields, but sowing may be delayed due to the rainy period. Insufficient soil moisture around sowing was observed in the main agricultural region of Turkey (*Orta Anadolu*) and central-southern oblasts of Ukraine. Weather conditions for early crop development were moderate, with average temperatures and low precipitation in September, followed by an exceptionally warm and wet October in the whole Black Sea area leading to advanced crop development for wheat in Ukraine. Here crops are not hardened and a gradual drop in temperature is needed to prepare them for the winter. Until mid-November, however, minimum temperatures remained high.

Belarus

Most of Belarus experienced favourable dry weather conditions during the sowing window for winter cereals. Although the first half of August was rainy, the moisture content of upper soil layers decreased rapidly towards the end of the month, allowing free access to the fields. Abundant precipitation meant problems only in a limited area between the *Brest* and *Gomel* regions. From mid-September, germination was possible due to sufficient rain. The cumulated active temperatures (Tavg>0°C) were significantly above average, supporting appropriate development and growth of seedlings after emergence.

Russia

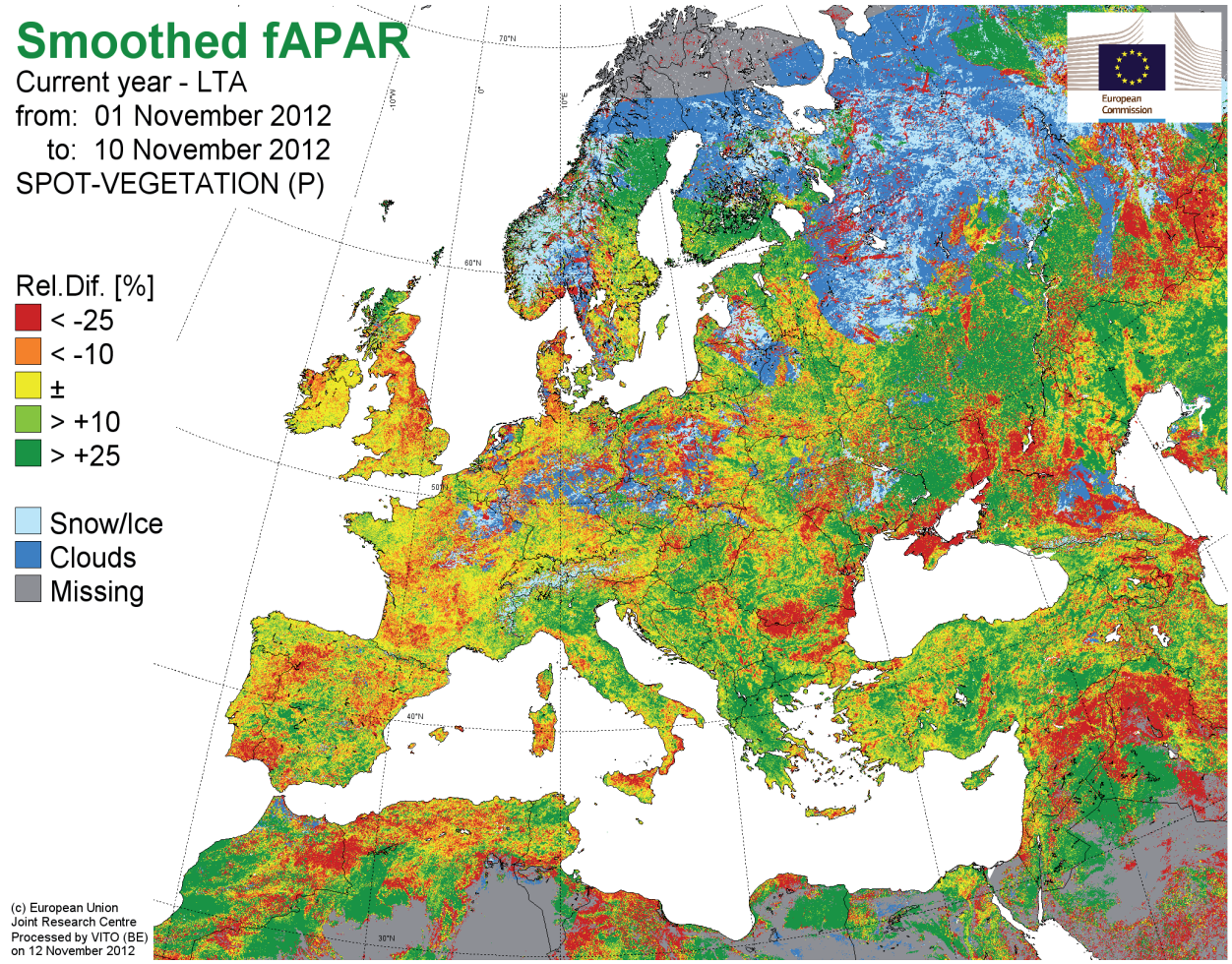
In Russia, the conditions were rather complex during sowing as abundant rains affected the black soil region and most of the northern wheat production areas. The cumulated precipitation in *Kurskaya*, *Lipetskaya*, *Orlovskaya*, *Tulskaya* and *Tambovskaya* oblasts exceeded the long-term average by 40-140 mm. This water excess could have caused delays in the sowing of winter cereals. At the same time, wide areas of southern Russia remained dry; the scarce rainfall allowed sowing but hampered germination, though subsequent precipitation towards the end of September and in October eased the situation. Only areas in the north-east Caucasus remained dry. Above average temperatures in most central, *Volga* and especially southern and northern Caucasian oblasts accelerated emergence and positively affected crop growth and development before dormancy, whilst also postponing the hardening process of winter wheat and increasing the risk of winter frost damage.

Maghreb

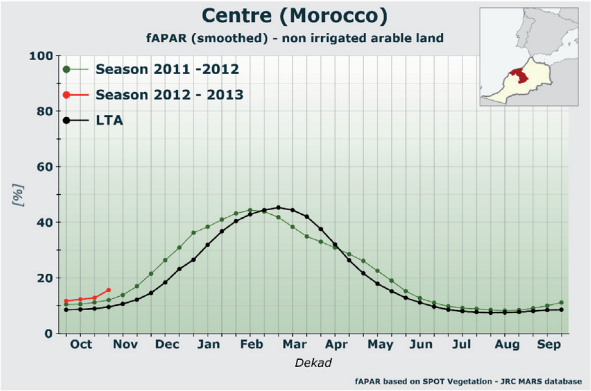
The sowing period for 2012/13 was unusually wet in central and western Morocco, where most of the winter cereals are produced. In the last week of October, heavy rainfall (over 100 mm) increased soil moisture content after a summer with almost no precipitation. This should benefit sowing (complicated by dry soil), which commonly takes place between the second half of October and the last week of November. Temperatures were close to seasonal values, thus favouring rapid emergence in early sown fields. Similar weather conditions were observed in western Algerian regions (*Oran*, *Aim Temouchent*). In eastern Algeria and Tunisia, winter cereals were sown under favourable weather conditions as early as the second half of October. Rainfall in these regions has ranged between 80 mm and 100 mm in the last month, slightly above the seasonal values. Daily average temperatures have been warm, especially during the first weeks of November (around 20°C), bringing forward the emergence of winter crops.

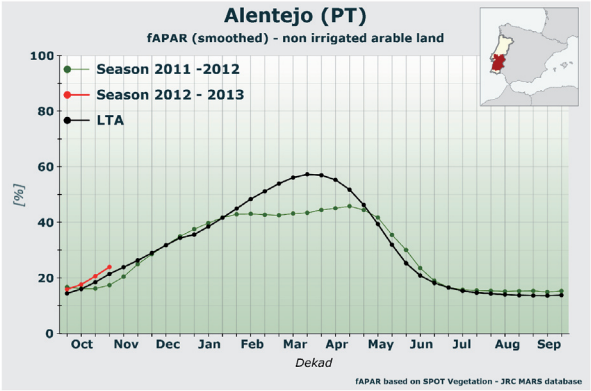
3. REMOTE SENSING – OBSERVED CANOPY CONDITIONS

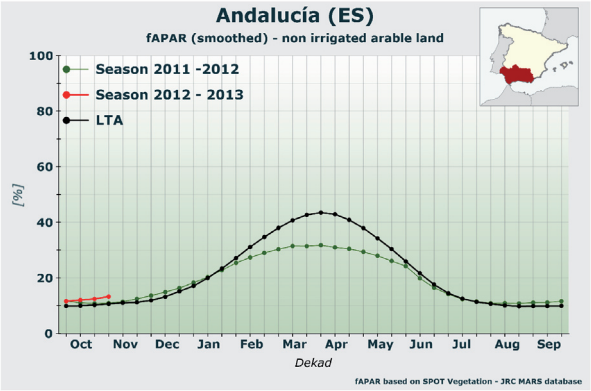
Crop emergence in Morocco, the Iberian Peninsula and Italy. Canopy boost observed in Black Sea regions favoured by mild temperatures.
Average conditions for the other countries.

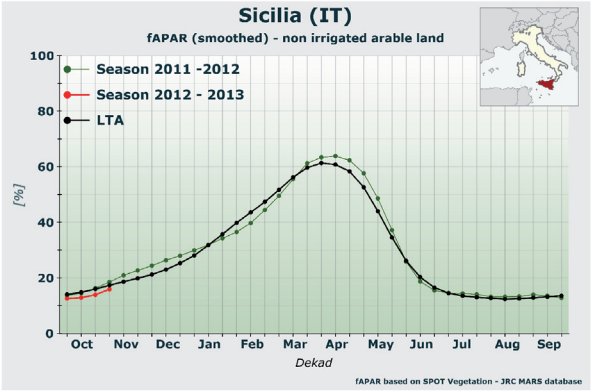


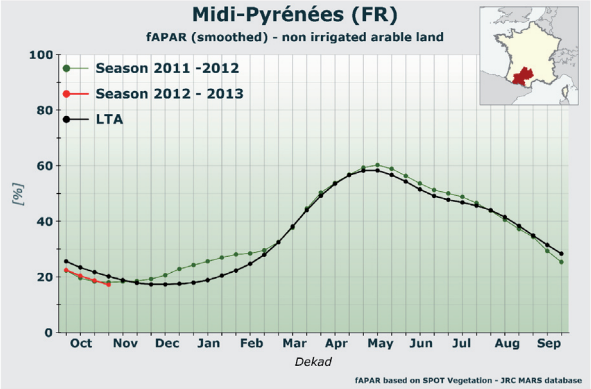
The map shows the differences in the period 1 to 10 November between 2012/13 fraction of Absorbed Photosynthetically Active Radiation (fAPAR) maximum composite values and the long-term average (LTA 1998-2011). Cloud coverage in this period was persistent over the entire continent and, even excluding the regions marked 'clouds', the actual fAPAR values could be unrealistically low. Pre winter growth just started for the main durum wheat regions across the Mediterranean Basin. In the Iberian Peninsula, the new crop season started in line with the LTA trend (see fAPAR profile for *Andalucía* and *Alentejo*). In Morocco (see *Centre* fAPAR profile), the initial emergence of new crops is early as compared with the LTA and even with last year, primarily because of the good rainfall rate. In **Italy**, the durum wheat regions (e.g. *Sicilia*) are experiencing average conditions for the crop's emergence stage. In southern **France** (e.g. *Midi-Pyrenees*), the sowing conditions for durum wheat were around average and the crops have not emerged yet. In the rest of France, the **United Kingdom** and **Germany** (e.g. *Sachsen-Anhalt*), the fAPAR graph for arable land shows average values. Also clearly visible is a drop in fAPAR values in the last ten days, due to cloud coverage. In eastern countries, the emergence of new crops has taken place in line with the average trend. The graph of *Eszak Alfold* (**Hungary**) is shown as an example. In **Romania**, sufficient precipitation and warm temperatures in October created good conditions for crop germination and early emergence is observed. Conditions in **Ukraine** are similar: early growth for the winter crops, with a well advanced phenological cycle. The current boost of vegetation is exposing the canopy to possible damage in the event of a sudden drop in temperature. The fAPAR graph for the *Dnipropetrovska* region shows the new season's above average values.

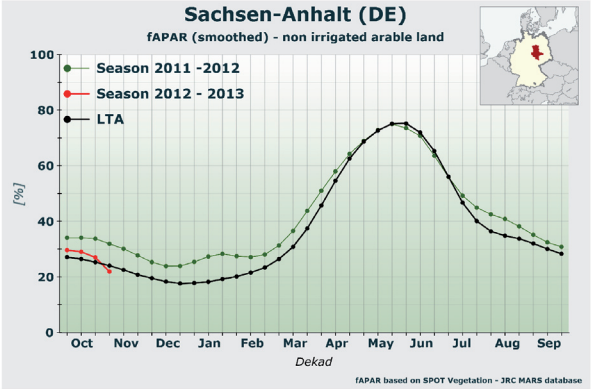

Centre (Morocco)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

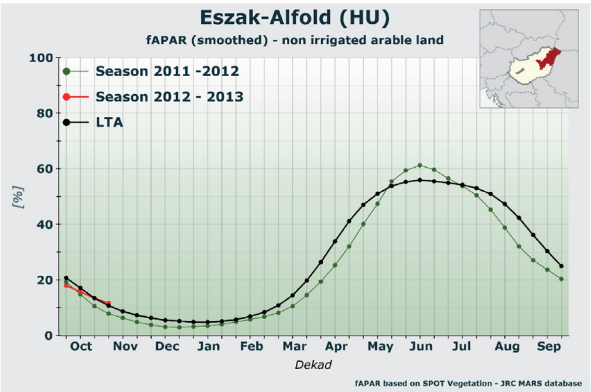

Alentejo (PT)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

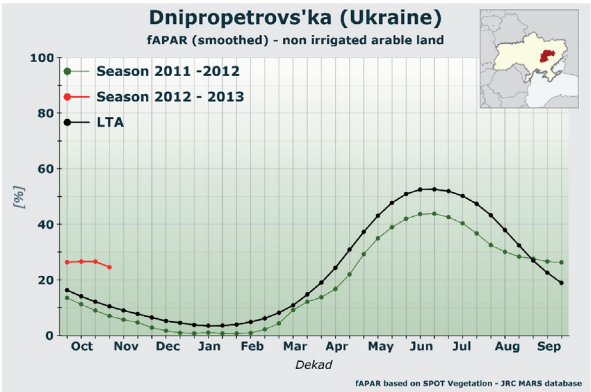

Andalucía (ES)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database


Sicilia (IT)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database


Midi-Pyrénées (FR)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

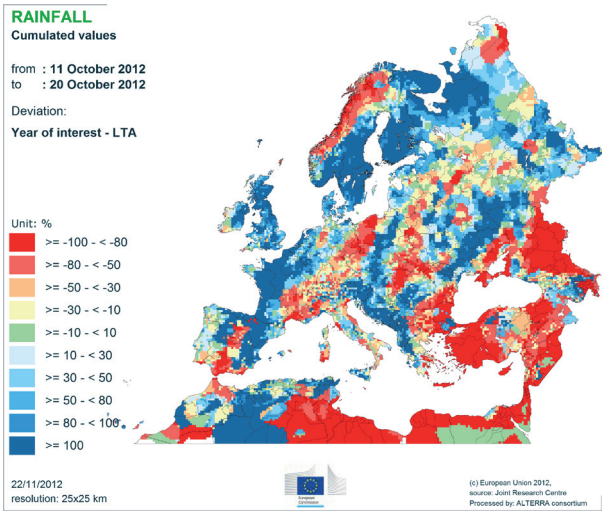

Sachsen-Anhalt (DE)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

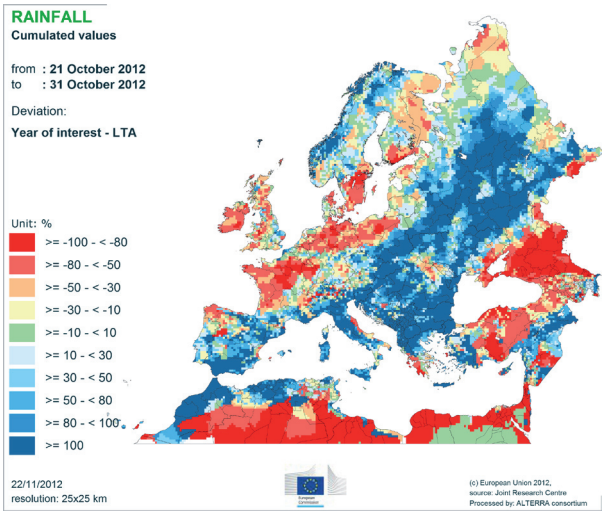

Eszak-Alfold (HU)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

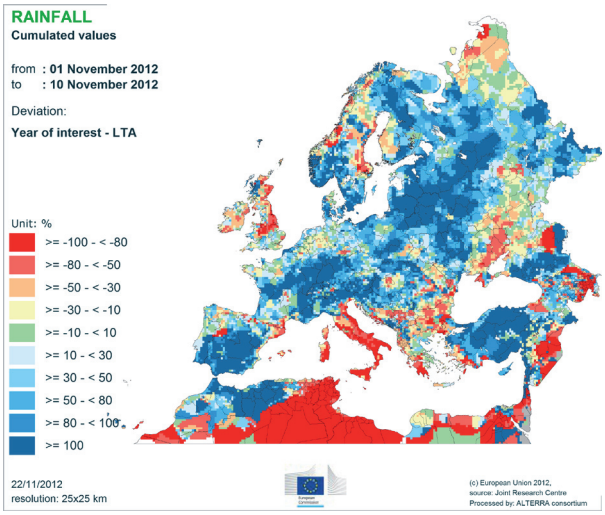

Dnipropetrovs'ka (Ukraine)
fAPAR (smoothed) - non irrigated arable land
Season 2011 -2012
Season 2012 - 2013
LTA
[%]
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Dekad
fAPAR based on SPOT Vegetation - JRC MARS database

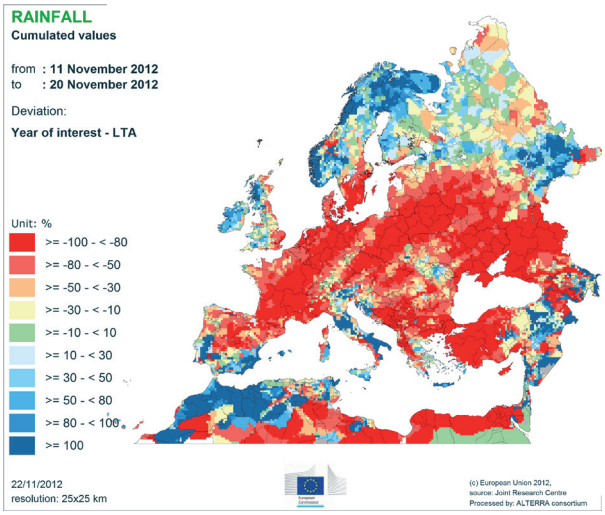
7. ATLAS MAPS

Precipitation

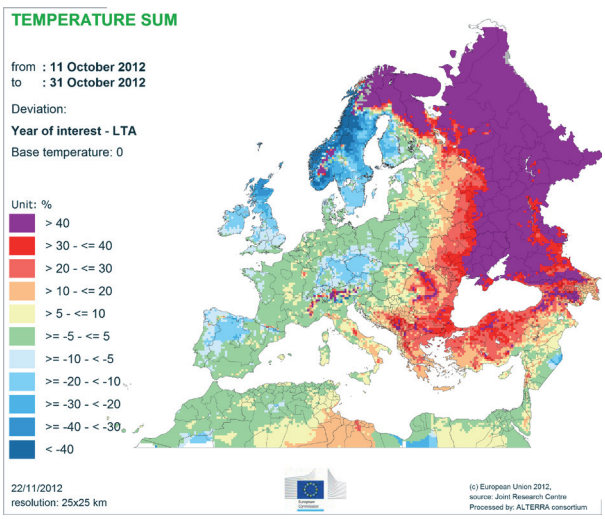


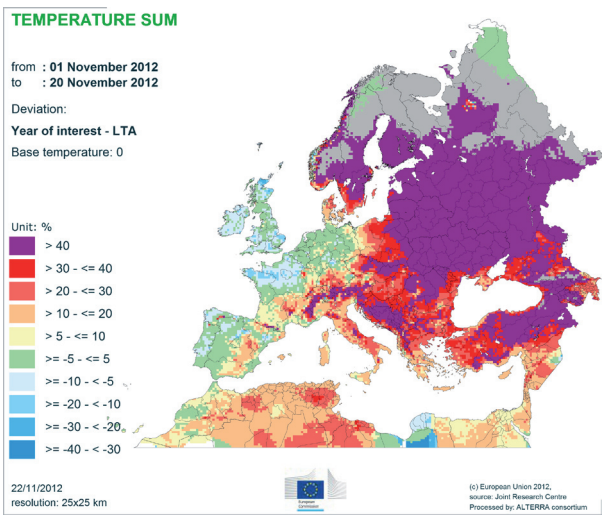






Temperature sum





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