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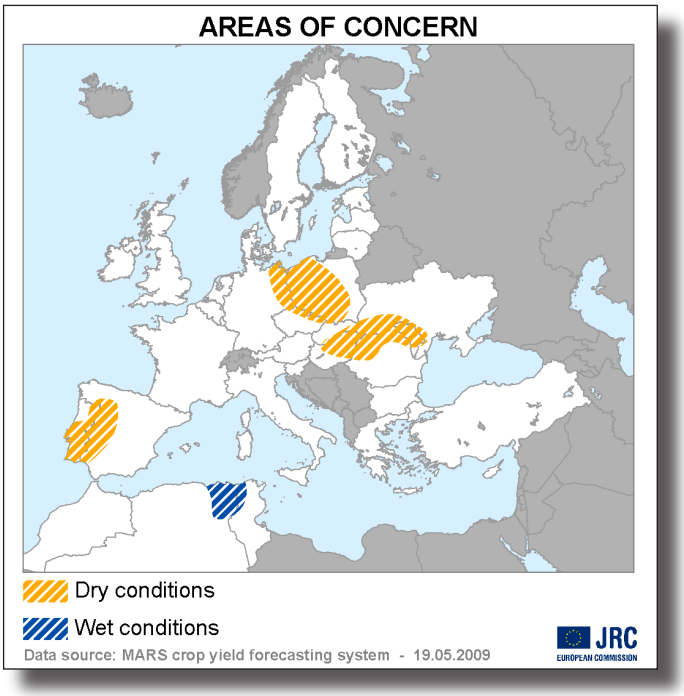
MARS AGROMETEOROLOGICAL

Crop Monitoring in Europe

1st March to 10th May 2009

Vol. 17, No. 2

Average potential for winter crops with some concern for the Eastern European Union and the Iberian Peninsula due to water shortage



During the second half of winter and the beginning of spring, the agrometeorological conditions have been generally positive with mild temperatures. In April and beginning of May, significantly higher than seasonal temperatures were recorded. In the northern areas, the high level of solar radiation was very positive.

However, in Iberia and Eastern Europe a matter of concern was the persistent water shortages which probably impacted negatively on the crops' potentiality and in particular on the spring crops in their very early stages.

Overall, the EU27 countries' yield potential was kept at a good level, although lower compared to the exceptional year in 2008. In fact, for all the crops - with the exception of spring barley, mainly cultivated in the areas affected by the dry conditions -, higher yields are forecasted compared with the last five-years' average.

19th May 2009 CROPS	EU27 yield forecast (t/ha) from AGRI4CAST				
	2008	2009	Average 5 years	% 2009/08	% 2009/ Average
TOTAL CEREALS	5.2	**5.0**	4.9	-4.2	+1.7
Soft wheat	6.0	**5.7**	5.6	-4.5	+2.1
Durum wheat	3.3	**3.1**	3.0	-4.1	+4.8
Total wheat	5.7	**5.4**	5.3	-4.6	+2.7
Spring barley	4.0	**3.6**	3.7	-8.1	-3.1
Winter barley	5.5	**5.3**	5.2	-2.5	+3.0
Total barley	4.5	**4.3**	4.3	-5.1	+0.0
Grain maize	7.1	**6.8**	6.7	-4.6	+1.1
Other cereals (1)	3.4	**3.2**	3.3	-4.8	+1.5
Rape seed	3.1	**2.9**	3.1	-5.3	-5.7

Yield figures are rounded to 100 kg
(1) Sorghum, rye, maslin, oats, triticale, mixed grain other than maslin, millet, buckwheat
Sources: 2008 yields come from EUROSTAT CRONOS
2009 yields come from MARS CROP YIELD FORECASTING SYSTEM

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ipsc Institute for the Protection and Security of the Citizen

1. Crop yield forecasts

AGRI4CAST crop yield forecasts at national level for EU-27: 19 May 2009

Country	TOTAL WHEAT (t/ha)					SOFT WHEAT (t/ha)					DURUM WHEAT (t/ha)				
	2008	2009	Avg 5yrs	%09/08	%09/5yrs	2008	2009	Avg 5yrs	%09/08	%09/5yrs	2008	2009	Avg 5yrs	%09/08	%09/5yrs
EU27	5.7	**5.4**	5.3	-4.6	+2.7	6.0	**5.7**	5.6	-4.5	+2.1	3.3	**3.1**	3.0	-4.1	+4.8
AT	5.7	**5.5**	5.3	-4.1	+3.8	5.7	**5.5**	5.3	-3.7	+3.9	5.1	**4.6**	4.5	-10.2	+2.2
BE	8.4	**8.5**	8.4	+1.3	+1.4	8.4	**8.5**	8.4	+1.3	+1.4	-	**-**	-	-	-
BG	4.2	**3.5**	3.3	-15.0	+6.1	4.2	**3.5**	3.3	-15.0	+6.1	-	**-**	-	-	-
CZ	5.8	**4.8**	5.2	-16.8	-7.7	5.8	**4.8**	5.2	-16.8	-7.7	-	**-**	-	-	-
DE	8.1	**7.6**	7.6	-5.8	0.5	8.1	**7.6**	7.6	-5.8	0.5	-	**-**	-	-	-
DK	7.9	**7.2**	7.2	-8.6	0.7	7.9	**7.2**	7.2	-8.6	0.7	-	**-**	-	-	-
EE	3.2	**2.9**	2.9	-9.3	-1.9	3.2	**2.9**	2.9	-9.3	-1.9	-	**-**	-	-	-
ES	3.3	**3.1**	2.9	-4.6	+5.5	3.6	**3.4**	3.2	-7.0	+4.0	2.2	**2.4**	2.3	+11.3	+3.2
FI	3.6	**3.6**	3.6	1.0	0.2	3.6	**3.6**	3.6	1.0	0.2	-	**-**	-	-	-
FR	7.1	**7.2**	6.9	+0.6	+3.2	7.3	**7.4**	7.1	+0.7	+3.1	4.9	**4.9**	4.8	+0.4	+3.4
GR	3.0	**2.8**	2.4	-7.0	+16.8	3.0	**2.9**	2.8	-4.4	+3.6	2.9	**2.7**	2.3	-7.7	+20.4
HU	5.0	**4.6**	4.5	-9.2	+2.3	5.0	**4.6**	4.5	-9.3	+2.3	4.3	**4.2**	4.2	-1.1	+0.9
IE	9.1	**9.4**	9.1	+3.8	+4.3	9.1	**9.4**	9.1	+3.8	+4.3	-	**-**	-	-	-
IT	3.9	**3.7**	3.7	-5.6	+0.0	5.4	**5.3**	5.3	-0.9	+0.5	3.2	**3.0**	3.0	-8.0	-1.1
LT	4.3	**3.8**	3.7	-11.9	2.8	4.3	**3.8**	3.7	-11.9	2.8	-	**-**	-	-	-
LU	6.7	**6.6**	6.2	-0.6	+6.5	6.7	**6.6**	6.2	-0.6	+6.5	-	**-**	-	-	-
LV	3.9	**3.5**	3.4	-10.4	3.1	3.9	**3.5**	3.4	-10.4	3.1	-	**-**	-	-	-
NL	8.7	**8.5**	8.4	-2.3	1.6	8.7	**8.5**	8.4	-2.3	1.6	-	**-**	-	-	-
PL	4.1	**3.9**	3.9	-4.4	-0.1	4.1	**3.9**	3.9	-4.4	-0.1	-	**-**	-	-	-
PT	2.2	**1.7**	1.8	-24.7	-5.9	2.2	**1.7**	1.8	-24.7	-5.9	-	**-**	-	-	-
RO	3.4	**3.0**	2.8	-11.6	+6.4	3.4	**3.0**	2.8	-11.6	+6.4	-	**-**	-	-	-
SE	6.1	**6.1**	6.0	0.0	+1.3	6.1	**6.1**	6.0	0.0	+1.3	-	**-**	-	-	-
SI	4.5	**4.4**	4.4	-2.4	+0.0	4.5	**4.4**	4.4	-2.4	+0.0	-	**-**	-	-	-
SK	4.9	**3.7**	4.3	-24.4	-14.7	4.9	**3.7**	4.3	-24.4	-14.7	-	**-**	-	-	-
UK	8.3	**8.0**	7.9	-3.9	+1.0	8.3	**8.0**	7.9	-3.9	+1.0	-	**-**	-	-	-

Note: Countries with areas below 10000 ha are not counted in

Country	TOTAL BARLEY (t/ha)					GRAIN MAIZE (t/ha)					RAPE SEED (t/ha)				
	2008	2009	Avg 5yrs	%09/08	%09/5yrs	2008	2009	Avg 5yrs	%09/08	%09/5yrs	2008	2009	Avg 5yrs	%09/08	%09/5yrs
EU-27	4.5	**4.3**	4.3	-5.1	+0.0	7.1	**6.8**	6.7	-4.6	+1.1	3.1	**2.9**	3.1	-5.3	-5.7
AT	5.2	**4.3**	4.7	-16.6	-8.4	11.1	**9.8**	10.0	-11.1	-1.3	3.1	**3.1**	3.1	-0.3	-1.1
BE	8.0	**8.4**	8.0	+4.6	+4.0	10.4	**11.6**	11.3	12.2	+2.9	-	**-**	-	-	-
BG	3.9	**3.4**	3.0	-14.2	+11.1	4.2	**4.0**	4.2	-3.7	-4.6	2.3	**2.1**	2.0	-6.0	+9.7
CZ	4.7	**3.7**	4.2	-20.2	-12.6	7.5	**7.1**	6.9	-5.8	+3.3	2.9	**2.8**	3.1	-5.6	-10.4
DE	6.1	**6.0**	6.0	-1.5	0.3	9.8	**9.5**	9.1	-3.2	+4.1	3.8	**3.6**	3.8	-5.3	-5.3
DK	4.7	**5.0**	5.0	+7.4	0.8	-	**-**	-	-	-	3.7	**3.3**	3.5	-11.9	-6.3
EE	2.6	**2.5**	2.4	-2.9	1.6	-	**-**	-	-	-	1.4	**1.7**	1.5	20.8	11.1
ES	3.3	**2.7**	2.9	-15.6	-3.7	9.9	**10.0**	9.9	+0.3	+0.4	2.0	**1.5**	1.6	-26.2	-9.9
FI	3.5	**3.4**	3.4	-2.2	-1.1	-	**-**	-	-	-	1.3	**1.2**	1.3	-6.5	-0.4
FR	6.8	**6.4**	6.4	-5.5	+0.9	9.1	**9.0**	8.9	-1.4	+1.1	3.3	**3.2**	3.3	-3.0	-1.8
GR	2.5	**2.6**	2.5	+3.8	+6.9	10.3	**9.3**	9.5	-9.9	-2.2	-	**-**	-	-	-
HU	4.5	**3.6**	3.9	-18.2	-5.7	7.5	**6.5**	6.5	-12.5	+0.4	2.6	**2.4**	2.5	-7.4	-1.3
IE	6.8	**6.8**	6.8	+0.0	+0.1	-	**-**	-	-	-	-	**-**	-	-	-
IT	3.8	**3.8**	3.8	-0.8	+0.1	9.6	**9.5**	9.3	-1.0	+1.7	2.3	**1.9**	1.9	-15.2	+1.5
LT	2.9	**2.8**	2.6	-4.3	6.1	-	**-**	-	-	-	2.0	**1.7**	1.8	-14.8	-1.4
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	2.2	**2.3**	2.3	1.7	1.0	-	**-**	-	-	-	2.4	**2.1**	2.0	-11.8	+6.8
NL	6.1	**6.1**	6.0	+0.1	2.0	11.4	**12.6**	11.3	10.4	+11.4	-	**-**	-	-	-
PL	3.0	**3.1**	3.1	4.8	+0.9	5.8	**5.7**	5.6	-1.2	+2.7	2.7	**2.6**	2.7	-4.8	-5.3
PT	2.5	**1.7**	1.9	-31.5	-9.2	5.8	**5.5**	5.4	-5.5	+2.1	-	**-**	-	-	-
RO	3.0	**2.6**	2.5	-15.9	+3.4	3.2	**3.2**	3.4	-0.2	-4.3	1.8	**1.8**	1.6	-1.7	10.5
SE	4.2	**4.6**	4.2	9.3	+9.4	-	**-**	-	-	-	2.9	**2.8**	2.6	-3.2	+7.8
SI	4.0	**3.9**	3.8	-1.7	+2.5	7.3	**7.6**	7.6	+3.1	-0.3	-	**-**	-	-	-
SK	4.4	**3.0**	3.7	-30.6	-18.9	7.5	**6.1**	6.0	-17.8	+2.8	2.6	**2.3**	2.4	-13.3	-4.2
UK	6.0	**6.1**	5.9	+2.1	+3.6	-	**-**	-	-	-	3.3	**3.2**	3.2	-4.7	-0.8

Note: Countries with areas below 10000 ha are not counted in

AGRI4CAST crop yield forecasts at national level for Black Sea and Maghreb: 19 May 2009

Country	WHEAT (t/ha)					BARLEY (t/ha)					GRAIN MAIZE (t/ha)				
	2008	2009	Avg 5yrs*	%09/08	%09/5yrs*	2008*	2009	Avg 5yrs*	%09/08*	%09/5yrs*	2008*	2009	Avg 5yrs*	%09/08*	%09/5yrs*
DZ	-	**1.6**	1.4	-	11.4	-	**1.7**	1.5	-	16.1	-	**-**	4.4	-	-
MA	-	**2.0**	1.4	-	46.8	-	**1.2**	0.8	-	45.2	-	**1.0**	0.9	-	9.1
TN	-	**1.8**	1.6	-	14.0	-	**1.1**	0.9	-	18.4	-	**-**	-	-	-
TR	-	**2.2**	2.3	-	-1.2	2.5	**2.3**	2.5	-7.9	-5.6	7.5	**6.7**	6.8	-11.2	-1.8
UA	-	**2.4**	2.7	-	-8.7	-	**1.7**	2.0	-	-17.8	-	**3.9**	3.8	-	2.8

Country	RAPE SEED (t/ha)				
	2008	2009	Avg 5yrs*	%09/08	%09/5yrs*
UA	-	**1.1**	1.4	-	-17.3

* Source TR: EUROSTAT New Cronos and EES: last update 2009-05-18

* Source DZ, MA, TN, UA: FAO statistical database - 2008 data not yet available, therefore the 5-yrs average is computed on 2004-2007

Abstract

The 2nd 2009 printed MARS Bulletin (Vol. 17, No. 2) covers meteorological analysis and crop yield forecasts for the period 1 March to 10 May 2009.

Previous related analysis available:

—Climatic update, 10/04/2009 to 01/05/2009, (CU2009/4)

—Forecast update, 01/03/2009 to 17/04/2009, (FU2009/1)

Next printed issue

Vol. 17, No. 3: 11 May - 10 June 2009 analysis and forecasts.

Contributions

The ***MARS technical report*** is an EC publication from JRC/IPSC MARS Unit-AGRI4CAST Action

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MARS stands for Monitoring Agricultural Resources.

Technical note:

The long-term average used within this bulletin as a reference is based on an archive of data covering 1975–2008.

The CNDVI is an unmixed normalised vegetation index on the base of Corine land cover 2000 for arable land or grassland.

Disclaimer:

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1. Agrometeorological overview

1.1. Temperature and evapotranspiration

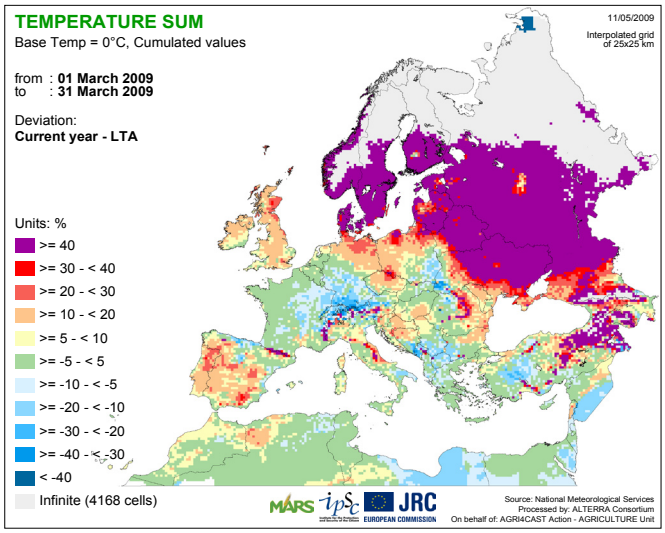
Practically all over Europe, a moderate mild March (mainly in extreme eastern and western Europe) was followed by a quite warm April and beginning of May; slightly cooler than seasonal in northern Africa. A few significant frost events occurred in March; late severe frost in April between Ukraine and Russia.

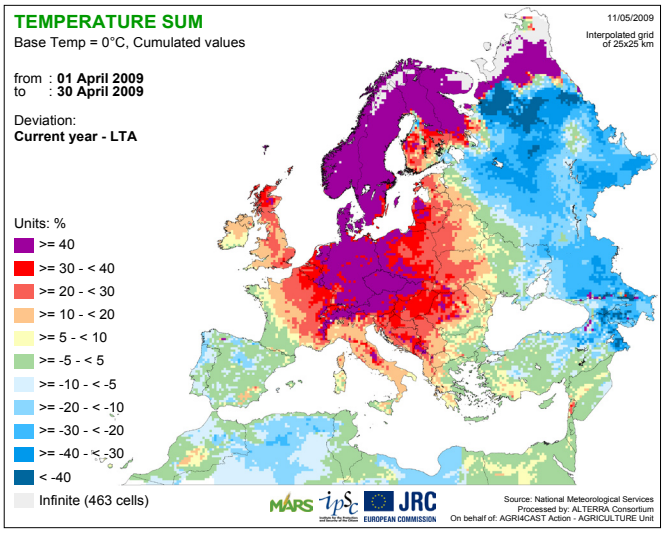
Especially in the areas located in higher latitudes, the last part of the winter also presented mild temperatures as compared with the seasonal values. In effect, in **March** a significant surplus (>+ 40 %) of cumulated active temperatures (Tbase = 0 °C) were recorded in the Baltic States, Finland, Sweden, Denmark, Russia, Ukraine and Belarus. But also in the UK, northern Germany, Poland, the Czech Republic, the Iberian Peninsula and central Italy large surpluses (+ 30 % v the long-term average — LTA) were estimated. It was slightly cooler in southern Germany and eastern France. However, in this month the last important frost events occurred, but the minimum temperatures remained in general within the normal range of variation. Exceptions were recorded in the UK, central France and in the area between Slovakia, Ukraine, Hungary and Romania, where on 26 March the minimum temperatures dropped several degrees below 0 °C (– 6/– 8 °C) and below the normal conditions. However, no significant impacts were estimated.

Since the beginning of **April**, in the majority of Europe, the temperatures progressively climbed and during the month remained constantly above the seasonal average. More normal conditions occurred in Spain and on the west side of the Black Sea. In Portugal, northern Africa and on the eastern side of the Black Sea cooler than seasonal temperatures were recorded. A very large surplus of growing degree days (GDD) appeared in the entire central and northern EU: namely Austria, Germany, Denmark, the Czech Republic, the Netherlands, Sweden, Norway and part of Poland. In these areas, mid-April, the maximums were even largely above the normal range of variation: in northern Poland and Germany, around 10 April, the maximum daily values were even 13–14 °C above the seasonal average. In the areas across the borders between Ukraine and Russia during the last dekad a sudden and severe frost (– 8/– 10 °C) occurred with very likely crops' damages on leaf and steams.

In **May** more seasonal temperatures returned but not in western EU (Iberia, southern and south-west France, northern Italy) and Morocco, where again surpluses of cumulated GDD were estimated.

The **evapotranspiration** was significantly influenced by the higher temperatures and, on 10 May, the cumulated values presented very large differences (>+ 30 %) as compared with the LTA: mainly in western Iberia, western Germany, Poland, the UK, Hungary, the Netherlands, the Black Sea shore in Romania and Bulgaria.





1.2. Rainfall and climatic water balance

Very abundant rain in many Mediterranean countries favoured the rain-fed winter crops; water shortage in the UK, France and Russia; persistently dry in Portugal and western Spain, where worrying soil moisture levels likely impacted negatively.

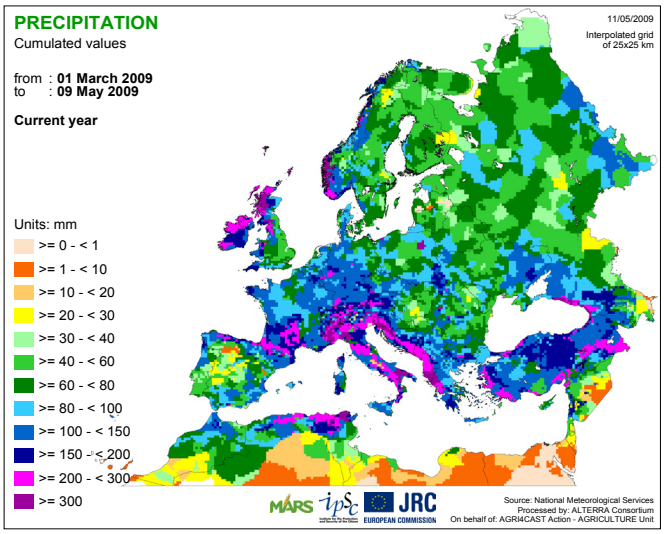
An anomalous rain distribution both in spatial and temporal terms characterised the period: quite abundant (in some cases also extremely abundant) rain in Italy, south-west France, the Adriatic and Algeria and Tunisia; and on the contrary quite dry (and in some cases extremely dry) in western EU, France, the UK, Hungary and Russia.

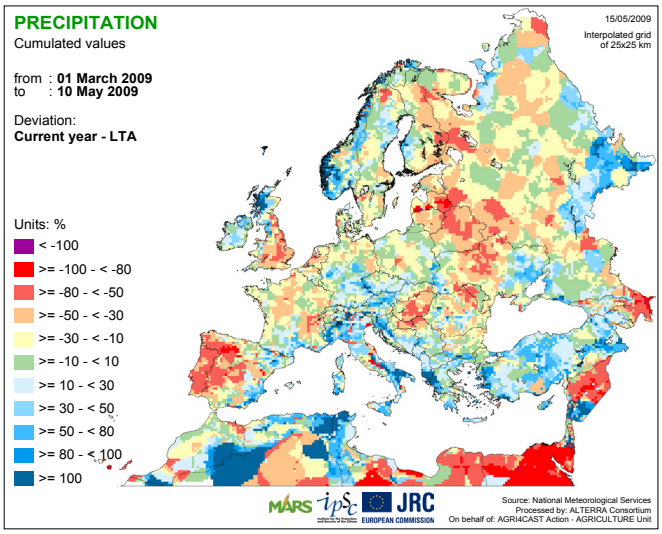
Of particular concern is the situation in **western Spain** and **Portugal**, where despite the abundant rain received in February, due to the persistent absence of rain since March (a deficit of more than 120–130 mm), the soil moisture reserves were almost completely used by the active crops. Likely, considering the particularly sensitive stages of developments reached by the winter crops (flowering, ripening) the future water supplies will be decisive for the final yield.

A reduced amount of rain (– 50/– 70 mm), as compared with the LTA, also occurred in the UK (both in March and April), in central and north-western France and in the upper Rhône Valley (mainly in March) and in April also in eastern Germany, Benelux, Hungary, the Baltic States and in eastern Europe (Belarus, central and western Ukraine, western Russia).

Opposite conditions occurred in south-east Spain, south-west France, Italy, Greece, Austria, Slovenia, Ireland and Scotland, where the surplus of rain was estimated larger than 100 mm (+ 50/+ 100 % as compared with the LTA). Also in Algeria, Tunisia and Turkey and eastern Ukraine the cumulated rain values were significantly above the LTA.

The climatic water balance due to the spatial rain distribution presented positive values mainly in the southern areas, whilst decidedly negative values were present all over the northern latitudes (due to also higher values of the cumulated evapotranspiration).





2. Campaign analysis at country level

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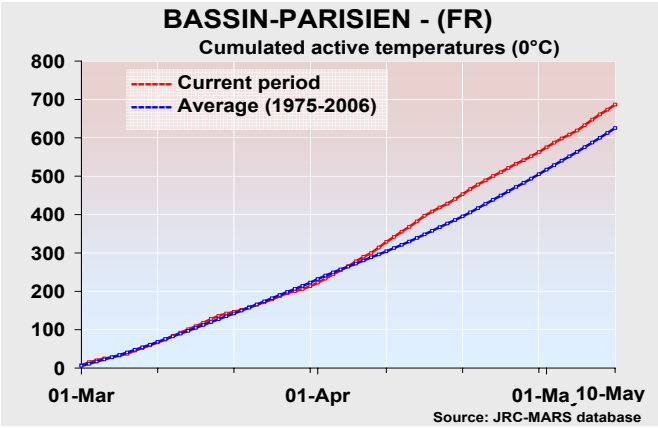
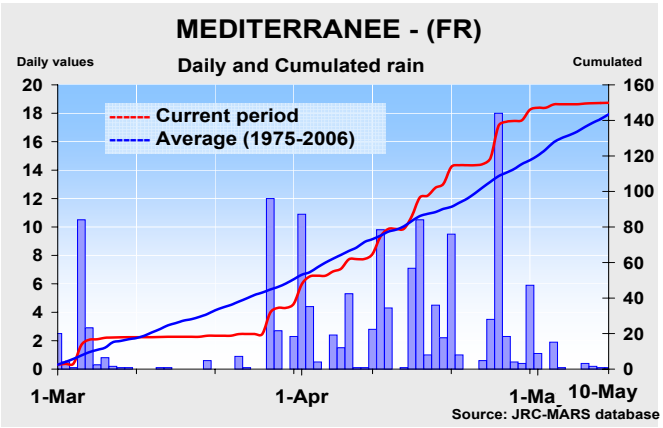
France: Normal winter course followed by a warmer spring; favourable rain in southern areas for durum wheat

The agroclimatic conditions were favourable for a normal crop development with a good yield potential. Soft wheat is forecast at 7.3 t/ha: higher than the five-year average (+ 3.1 %) and than last year (+ 0.7 %). The durum wheat yield is slightly progressing with 4.9 t/ha (+ 0.4 % on 2008, + 3.4 % on the five-year average). The winter barley yield is still foreseen with 6.6 t/ha (+ 0.8 % on 2008). The rapeseed yield keeps its potential with 3.2 t/ha close to the average (– 1.8 %) and lower than 2008 (– 3.0 %).

March, as the first part of winter, respected the seasonal course and both the thermal conditions and the rain presented values generally within the normal range of variation (nevertheless, two sudden peaks of high temperatures occurred during the second dekad and a few light frost events were recorded at the end of the month). Those conditions permitted a regular end of the winter dormancy and the winter crops did not face any stressing conditions.

However, this situation changed significantly since the beginning of **April** with higher than seasonal temperatures and particularly on the central and eastern side of the country (Bassin-parisien). More seasonal conditions were recorded in the other areas. These conditions remained until





the beginning of **May**, when more seasonal temperatures returned in the north but warmer than seasonal temperatures moved toward the southern side of the country. The warmer conditions accelerated crop development and the slight delay accumulated in the previous months was completely recovered.

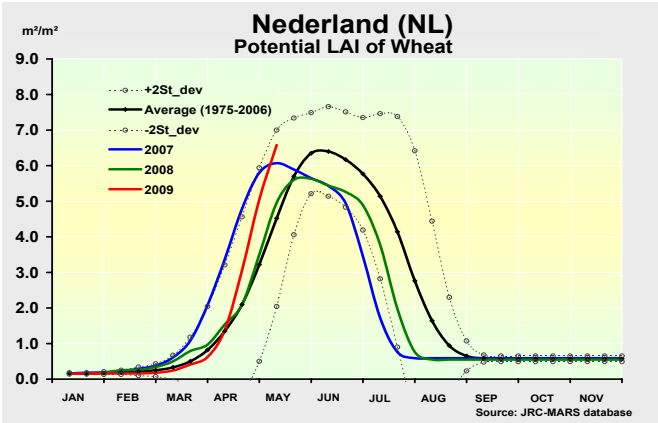
Crop growth and biomass accumulation were also favoured by an appropriate rain water supply: in effect, the rains were quantitatively adequate and also well distributed in time. In general, the crops' water requirements were completely satisfied and good soil water reservoirs remain for the future reproductive stages. However, in the Rhône Valley, despite the abundant rain which occurred (particularly in April), due to the high level of evapotranspiration, soil water deficits (as compared with the LTA and considering the stages of development reached) were simulated for winter wheat.

Belgium, The Netherlands, Luxembourg: Favourable climatic conditions stimulate good biomass accumulation

Warm temperatures allow good crop yield expectations. For soft wheat 8.5 t/ha, + 1.3 % compared with 2008 in Belgium, 8.5t/ha, – 2.3 % compared with 2008 in the Netherlands and 6.6 t/ha in Luxembourg. For winter barley in Belgium, a yield is forecast of 8.4 t/ha, + 4.6 % on 2008 and + 4 % on the average.
Spring barley in the Netherlands is forecast at 6.1 t/ha in line with last year. Grain maize is expected to be higher at 12.6 t/ha, 10.4 % more than 2008 and, in Belgium, 11.6 t/ha, 2.9 % more than the five-year average.

In the three countries, warmer temperatures compared with the LTA were recorded from April onward especially in the Netherlands, with a large surplus of GDD. The cumulated rain was below the seasonal values in particular during April and the beginning of May. The evapotranspiration was significantly influenced by the higher temperatures of May with cumulated values largely different (>+ 30 %) compared with the LTA (mainly in the Netherlands).
The sowing of grain maize and spring barley has been done starting from mid-March to mid-April with favourable climatic conditions as the rainfall events were distributed before and after the sowing period. The cumulated rainfall from March to the beginning of May has been recorded below the average and consequently the soil moisture is slightly below the average, more so in the Netherlands.

The potential leaf area index of winter crops is simulated greatly above the average, maybe due to the high solar radiation; normal to good yield expectations.



Germany: Unusual mild April boosted crop development; dry spells in the north-east

The forecasts are now: 7.6 t/ha for soft wheat (close to the average but 6 % below last year); 6.5 t/ha for winter barley (2 % below last year); and 4.6 t/ha for spring barley (3 % below last year and almost 3 % below the average). Grain maize is currently set to 9.5 t/ha.

Germany experienced two quite distinct months. March brought some rainfall that led to an overall balanced soil moisture. Surpluses in rainfall compared with the LTA of 30 mm to 80 mm have been recorded in many parts of the country (e.g. southern Germany, Nordrhein-Westfalen, Mecklenburg Vorpommern). Temperatures have been seasonal with one to two frost events towards the end of March in the range of – 2 C° to – 6 C°, that should not have harmed the crops at this development stage.

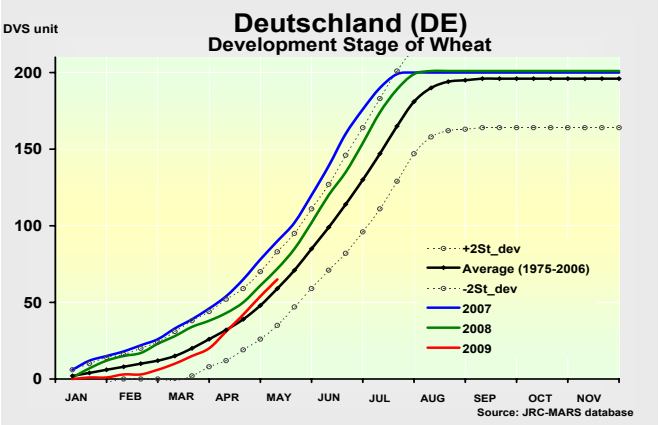
The weather regime changed completely within April, characterised by warm temperatures (3 °C to 5 °C over the average and up to 8 °C above the maximum) coupled with scarce rainfall but nevertheless boosting crop development. It presents the warmest April in our database, even warmer than 2007 (see ranked profile). Global radiation was generally above the LTA, from + 10–20 % for the south-west and up to more than 40 % plus compared with the LTA for the north-east of the country.

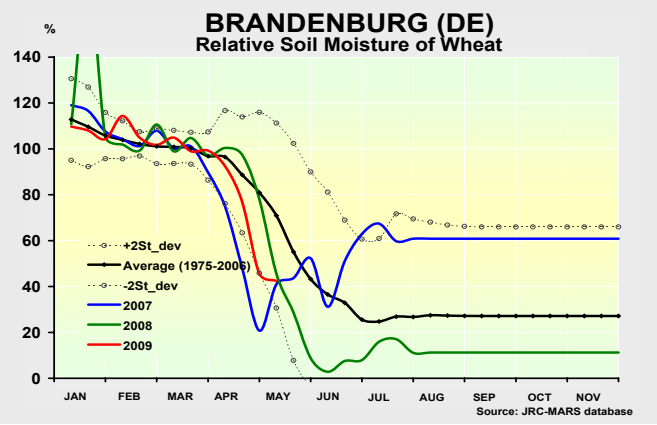
Rainfall was practically absent in north-eastern Germany (Mecklenburg-Vorpommern, Brandenburg) which, in conjunction with the sandy soils, decreased soil moisture content for the crops significantly, but not as seriously as in 2007. The dry spell was less pronounced for the remaining part of the country; however, also in the southern part the rainfall deficit was 50–60 % below the LTA.

This situation has been eased by precipitation starting from May onwards restricting the areas with low soil moisture content to a strip in the north-east, from Schleswig Holstein over Mecklenburg-Vorpommern to Brandenburg. Also the Rhine Valley is still lacking precipitations. Further precipitations will be necessary to ensure a normal grain filling and ripening. For the remaining part of the country the relative soil moisture for the winter crops is fluctuating around the LTA.

At the beginning of the dry spell in April, crop development had been delayed for most of the country compared with the LTA. Favourable conditions throughout the winter should have led to a well-developed root system, buffering the effect of the dry spell. The mild temperatures accelerated biomass accumulation, changing the picture from delayed development stages to advanced stages.

After the first dekad of May, one dekad in advance is simulated for winter wheat and rapeseed. Winter wheat is at heading stage with exceptional high simulated leaf area index entering the flowering stage. Simulated rapeseed is now at grain filling for Nordrhein-Westfalen und Niedersachsen and flowering for the remaining part of the country. Biomass accumulation is good. Sowing and emergence of summer crops took place under normal conditions, except for the north-eastern part of the country (dry conditions); however, the crop yield potential should not be reduced if the good conditions of May continue.



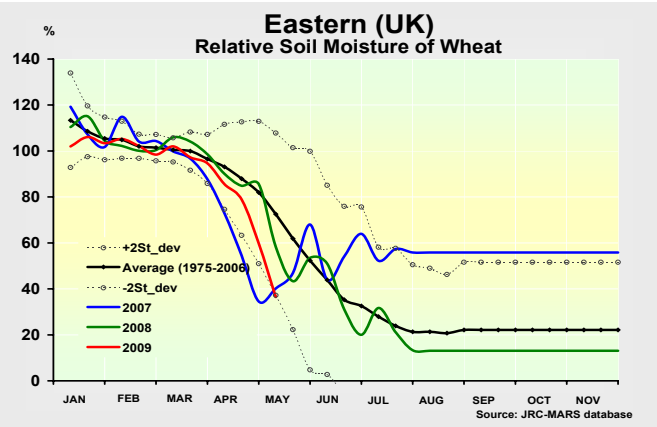


UK and Republic of Ireland: Mild and dry spring with high level of solar radiation favoured both winter and spring crops

In the UK the yields forecast confirmed the previous predictions: 8.0 t/ha for soft wheat (+ 1.0 % compared with the five-year average), 6.8 t/ha for winter barley (+ 4.1 %), 3.2 t/ha for rapeseed (– 0.8 %) and 5.6 t/ha for spring barley (+ 4.1 %).
Ireland: slight increase for soft wheat at 9.4 t/ha (+ 4.3 % compared with the five-year average), and for winter barley at 8.5 t/ha (+ 6.1 %), stable for spring barley at 6.6 t/ha (– 0.1 %).

The campaign started with favourable conditions and was followed by milder than average temperatures, especially in April and in May. Therefore, on 10 May, the cumulated active temperatures, since 1 March, presented a large surplus: in general around 80/100 GDD. The development of the active crops was obviously accelerated and the winter crops recovered the delay accumulated during the winter and in many areas even went over the seasonal levels of development. This is the case for winter rapeseed, which at the end of the considered period not only recovered the previous delay but reached flowering 8–10 days in advance compared with the average. Also the development of the spring crops (in particular spring barley) was accelerated.

Another peculiar phenomenon was the reduced amount of rain recorded both in April and in May: –40/– 50 % as compared with the LTA: on average 55/60 mm of rain. Only in 2003, 1996 and 1997 were drier conditions recorded. However, the abundant rain occurred in the previous months attenuated the water shortage impacts and no water stress conditions were simulated. Of course the future water supply will be crucial to maintain the crops' potentiality. Associated with the reduced amount of rain were also the higher level of solar radiation and the reduced risk of diseases: the active crops were also favoured by that larger energy input reflected in a higher biomass accumulation. In Ireland more seasonal amounts of rain were recorded.



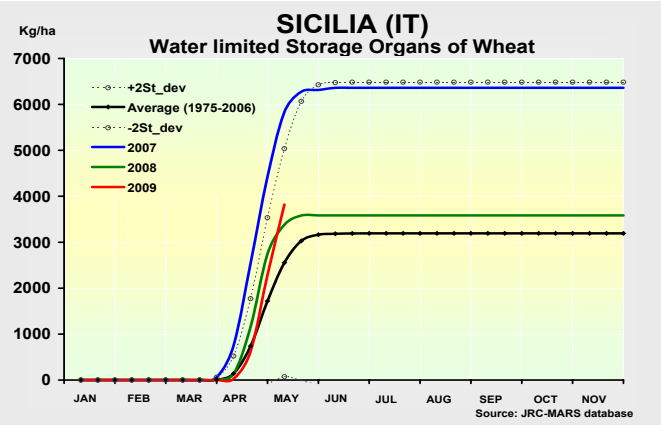
Italy: Moderately good yield expectations; abundant rainfall, which might have locally affected winter crops

Expectations for winter crop yields are close to the average. Durum wheat is estimated at 2.9 t/ha (– 8 % compared with 2008 and – 1.1 % on the five-year average). The yield for soft wheat is simulated at 5.3 t/ha (+ 0.5 % on the five-year average and – 0.9 % than last year). The estimate for barley is 3.8 t/ha, similar to the average and last year's value). Turnips (rape) have been estimated at 1.9 t/ha (+ 1.5 % on the five-year average).

The grain maize yield is expected to be the same as last year: 9.5 t/ha, + 1.7 % more than the five-year average.

The climatic evolution of the season was characterised by abundant rainfall all over Italy that could have locally compromised the flowering of winter crops and may have led to nitrogen losses due to leaching affecting the quality of production. The relative soil moisture is above the average

as the evapotranspiration remained normal all along the period. Maximum and minimum temperatures have mainly been on average; in central Italy it was warmer around mid-April. The cumulated solar radiation appears on average during all the period observed, almost all over the country. Good biomass potential is simulated especially for durum wheat in the southern and island regions, soft wheat on average. The development stage of rapeseed is advanced; its flowering may have been compromised by the intense precipitations; grain maize is on average. For winter barley values are close to average.



Spain: Lack of water decreases yield expectations in western Spain

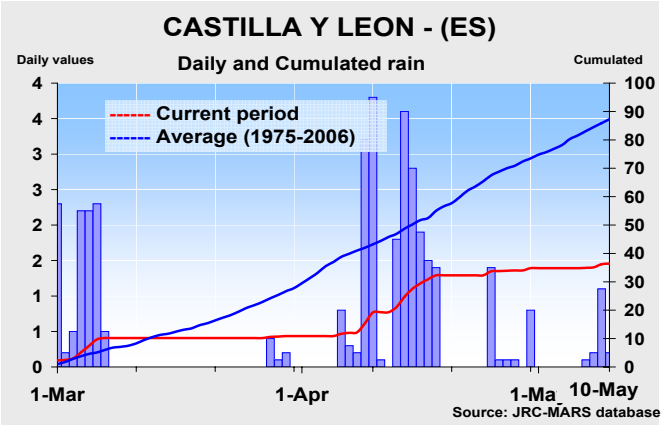
The average yield of durum wheat is estimated at 2.4 t/ha (+ 3.2 % on the five-year average). The estimate for soft wheat has decreased to 3.4 t/ha (+ 4 % on the five-year average but 7 % lower than last year). The estimate for winter barley is 2.7 t/ha, a bit lower than 2008 and + 1.2 % on the five-year average). Oil seed rape has also been lowered to 1.5 t/ha (– 26.2 % on 2008 and – 10 % on the five-year average). Spring barley has been forecast at 2.8 t/ha (– 18.2 % on 2008 and – 5.1 % on the five-year average). Grain maize, still in the early phases of development, has been forecast at 10.0 t/ha, in line with the two last seasons.

Castilla y León is suffering from a water deficit. The mid-April rains were not enough to compensate the dry period which started mid-February, although they were beneficial for the sowing of summer crops. In general all western Spain (Extremadura and western Andalucía) has had a dry spring. However, the situation at the moment is not serious in these regions, as there were good reserves from the winter. Instead, the problem is more critical in the north-western part of Castilla y León, which also had a dry winter.

There were also some late frost events in Castilla y León, even during the first half of April. Although in most places temperatures did not go below – 3 °C, some crops could have been locally affected.

As a result of the weather conditions, the situation until now is not bad for durum wheat, mainly cultivated in Andalucía and Aragón, although in Andalucía it can worsen if drought becomes more intense.

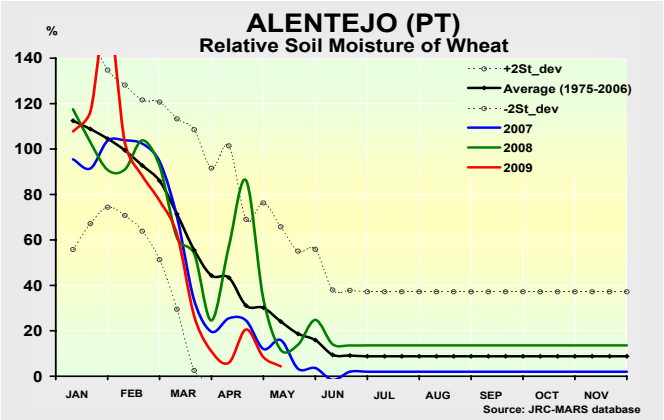
Soft wheat and barley expectations are strongly marked by the situation in Castilla y León, although partially compensated by the better expectations in the southern half of Spain.



Portugal: Dry spring decreases yield expectations

Yields of winter crops are quite low due to the water stresses suffered during spring. The yield for soft wheat is estimated at 1.7 t/ha (– 24.7 % than last year and – 5.9 % on the five-year average) and for winter barley at 1.7 t/ha (– 31.5 % than last year and – 9.2 % than the five-year average). Grain maize, at the early stages, is forecast on the trend at 5.5 t/ha.

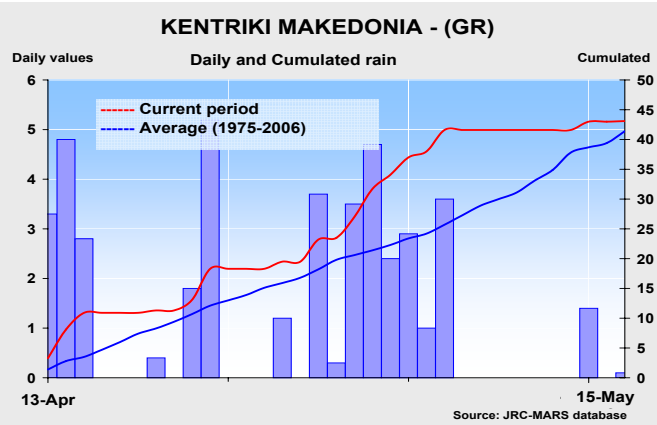
Low precipitations since mid-February until mid-April have led to a shortage of water for winter cereals. This situation took place together with high temperatures during March and with a high cumulated solar radiation, which led to a slight advance of the development stage. The low relative soil moisture was only partially compensated with mid-April precipitations. This rainfall was very beneficial for the sowing of spring crops.



Greece: So far an average season but the current evolution towards dryer and warmer weather may affect the crops

The yield expectation for soft wheat in Greece is for 2.9 t/ha, better than the five-year average (2.7 t/ha; + 7 %) but with a 4 % reduction on 2008 (3.0 t/ha). A different trend is reported for durum wheat for which the yield forecast is, at the present stage, of 2.7 t/ha, reduced from the 2008 levels (– 11 %) and also with respect to the five-year average. Barley, which shares the cultivation areas with soft wheat in north-western Greece, took advantage of a relatively delayed development and is forecast at 2.6 t/ha, increased with respect to both 2008 (+ 4 %) and the five-year average (+ 7 %). The forecast yield for grain maize is 9.3 t/ha. There is an expected reduction on the exceptional levels of 2008 (– 10 %) but also with respect to the five-year average (– 2 %).

The weather trend until the end of March was characterised by well-distributed and sufficient rains across the north-western regions and in central Greece. In late April the rain stopped especially in the central regions. Dry conditions persist in Thessalia but a certain recovery in precipitation appears to be taking place in Kentriki Makedonia. The interruption coincided with the grain-filling phase of wheat which at that stage is still susceptible to stress but out of the critical period of flowering and heading. The climatic evolution appears to affect more notably durum wheat in the vocational cultivation areas of central Greece, as the less-favourable conditions are combined with a certain delay in development. Currently the maximum temperatures appear to be peaking and, if this trend were to continue, especially in combination with the water shortages, there could be a negative impact on the level of the final yield. The forecast for grain maize, even in this early part of the season, appears to be affected by the mild temperatures reported in March which delayed germination and limited emergence.



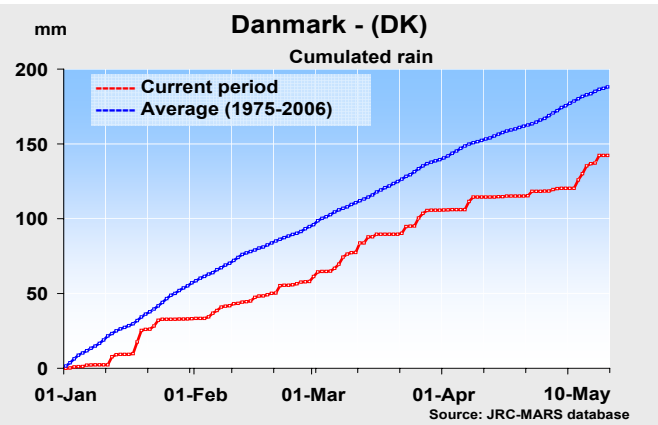
Denmark, Sweden and Finland: Mild and dry

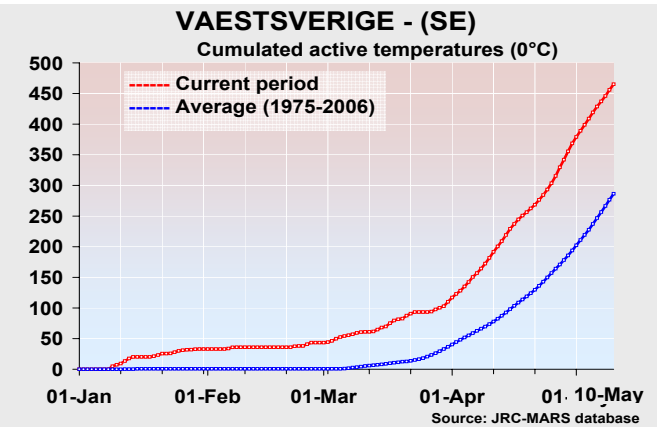
Denmark: yield forecasts are 7.2 t/ha for soft wheat (– 8.6 % compared with the previous year), 3.2 t/ha for rapeseed (– 11.9 %), 4.9 t/ha for spring barley (+ 9.1 %) and 5.7 t/ha for winter barley (– 1.6 %).
Sweden: 6.1 t/ha for soft wheat (at the same level of 2008), 2.8 t/ha for rapeseed (– 3.2 %), 4.5 t/ha for spring barley (8.8 %) and 5.7 t/ha for winter barley (– 0.3 %).
Finland: 3.6 t/ha for soft wheat (+ 1.0 % on 2008), 1.2 t/ha rapeseed (– 6.5 %) and 3.4 t/ha spring barley (– 2.2 %).

March was a relatively mild month compared with the LTA for all the three countries, but was interrupted by a frost event at the end of March with temperatures dropping below – 10 °C in Sweden. April continued to be milder than usual for Sweden and Denmark; here the average temperatures were above the exceptional temperatures of 2008 and also the cumulated temperature sum is above 2008 and the LTA. Finland experienced temperatures well above the average as well but below 2008. Therefore, at the end of the considered period (up to the first dekad of May) the monthly cumulated active temperatures presented a large surplus in Denmark and Sweden, around 50–70 GDD (+ 30/+ 40 %) and a moderate surplus in Finland, 20–30 GDD. The cumulated radiation is fluctuating around the LTA.

These thermal conditions were favourable for crop development and evapotranspiration and consequently the crop water consumption. For winter wheat the advancement in development stage is less pronounced (one week, Denmark and Sweden) compared with 2008, whereas winter barley is presently more advanced than in 2008 for Denmark.

All three countries present an overall rain deficit for the considered period compared with the LTA. Nevertheless the relative soil moisture is fluctuating around the LTA for Sweden and Finland whereas we see a clear drop for Denmark. The impacts of this possible water stress on yield will be evident in the next months.



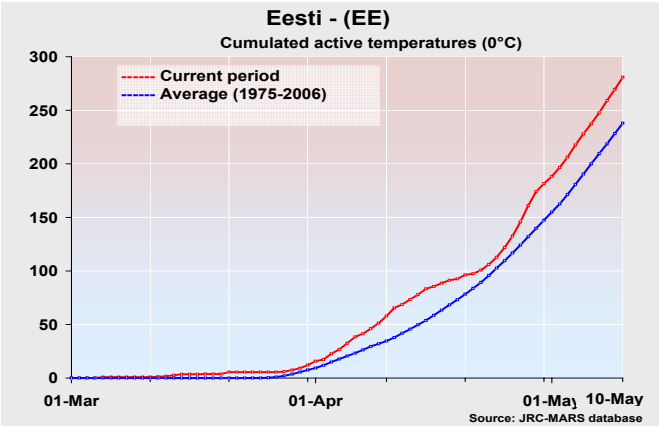


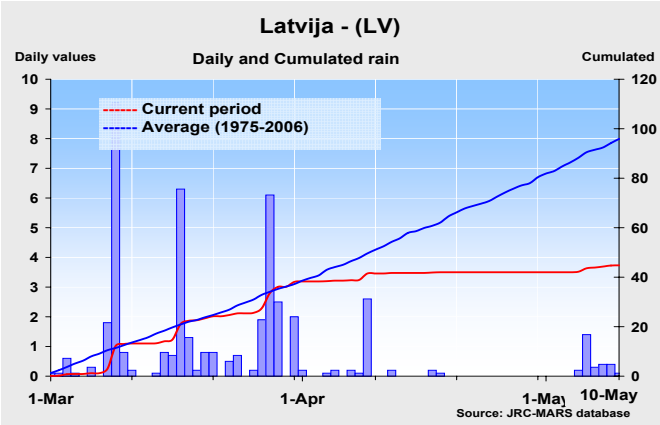
Estonia, Latvia and Lithuania: Very dry April

For Estonia, yield forecasts are: 2.9 t/ha for soft wheat (– 1.9 % compared with the five-year average and – 9.3 % on the previous year), 2.5 t/ha for spring barley (respectively + 1.6 % and – 2.9 %) and 1.7 t/ha for rapeseed (+ 11.1 and + 20.8 %).
For Latvia, yield forecasts are: 3.5 t/ha for soft wheat (+ 3.1 % compared with the five-year average and – 10.1 % on the previous year), 2.3 t/ha for spring barley (respectively + 1.0 % and + 1.7 %) and 2.1 t/ha for rapeseed (+ 6.8 % and – 11.8 %).
For Lithuania, yield forecasts are: 3.8 t/ha for soft wheat (+ 2.8 % compared with the five-year average and – 11.9 % on 2008), 3.6 t/ha for winter barley (respectively + 8.4 % and – 9.7), 2.7 t/ha for spring barley (+ 4.7 % and – 4.9 %) and 1.7 t/ha for rapeseed (– 11.8 % on 2008).

Average daily temperature and temperature sum for the considered period were continuously above the LTA and cumulated solar radiation was in line with the LTA. Cumulated precipitation was below the average with a deficit, increasing for the whole of April, when the rain was practically absent. The highest water deficit occurred in the eastern parts of Latvia and Lithuania (< – 50 % compared with the LTA).

Currently winter rapeseed is at the end of the vegetative stage (before flowering), winter wheat is finishing tillering and spring barley is at emergence. Wheat development until the end of April was below the average and much lower than the last two years in all the three countries. Development of rapeseed in the beginning of April was boosted by the more favourable temperatures and is now above the LTA (one dekad advance compared with the LTA). Relative soil moisture of the analysed crops is below the average and systematically decreasing in April, but not reaching worrying values.





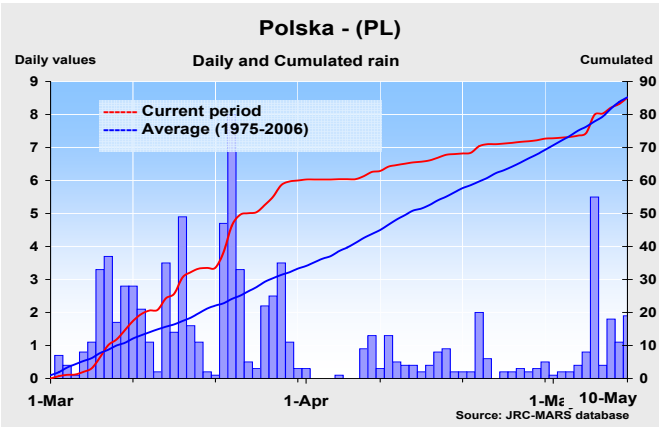
Poland: Scarcity of rainfall in April reducing soil water resources

Cereal yields are estimated in line with the five-year average: for soft wheat 3.9 t/ha (4.4 % less than in 2008), for winter barley 3.8 t/ha (– 6.0 %), for spring barley 3.0 t/ha (+ 7.4 %), for rapeseed 2.6 t/ha (– 5.3 % compared with the five-year average and – 4.8 % on 2008) and the forecast for grain maize is based on the trend with 5.7 t/ha (respectively + 2.7 % and – 1.2 %).

In Poland cumulated active temperatures (base = 0 °C) and solar radiation were higher than the LTA. After a development delay of winter crops, caused by low temperatures and a dry winter, in the first dekad of April consecutive days with both minimum and maximum daily temperatures above the average were recorded. It boosted crop growth and up until now the crop development is slightly anticipated.

Winter wheat is in at heading, spring barley started tilling and winter rapeseed started flowering almost in the whole country (a little delay in development stage is, as usual, observed in the north-eastern parts of the country). After a wet March, cumulated rainfall values in April were definitely below the LTA. Especially dry conditions occurred in Kujawsko-Pomorskie, Wielkopolskie, Łódzkie and Pomorskie, where the rain in April was practically absent. At the end of April cumulated rain was equal to the LTA with the exception of the aforementioned regions. Cumulated climatic water balance in the country dropped below the long-term average (< – 40 % compared with the LTA).

The simulated total biomass of winter crops is slightly lower than last year. Soil moisture is consequently decreasing. The spring sowing activities could be conducted without problems.

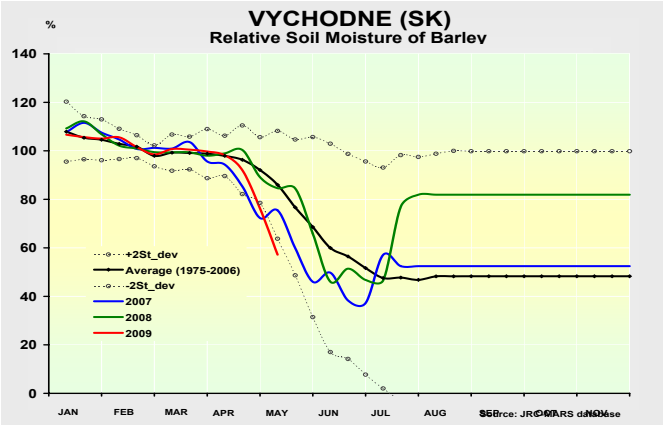


Czech Republic and Slovakia: Dry conditions and shortening of vegetative phase depicts lower yield expectations

With respect to the last year, a reduction in yield is depicted for Slovakia. Forecasts for winter crops are: 3.7 t/ha (– 24.4 %) for soft wheat, 3.4 t/ha for winter barley (– 17.6 %) and 2.3 t/ha for rapeseed (– 13.3 %) . Summer crops as well show lower yield expectations: 6.1 t/ha for grain maize (– 17.8 %) and 3.0 t/ha (– 31.8 %). Forecast yields for the Czech Republic are: 4.8 t/ha for soft wheat (– 7.7 % with respect to the five-year average), 2.8 t/ha for rapeseed (– 10.4 %) and 4.3 t/ha for winter barley (– 5.1 %). Yields for grain maize and spring barley are depicted lower than last year: forecasts are respectively 7.1 t/ha (– 5.8 %) and 3.5 t/ha (– 24.4 %).

In the period of analysis, rain presented a heterogeneous spatial distribution: in the northern regions of the Czech Republic (Severozápad and Severovýchod) and in the southern and eastern parts of Slovakia, consistently lower values of cumulated precipitation are depicted (reduction with respect to the LTA up to 30 %) and consequently the cumulated values of climatic water balance are strongly reduced (a drop between 30 and 70 % is observed). In the other areas, values are above the average. Temperatures, both in the Czech Republic and Slovakia, have been consistently above the average especially because of the daily maximums which have been, during the first part of April, more than two standard deviations higher than the LTA.

These particularly warm thermal conditions have therefore boosted both spring and winter crop development: rapeseed recovered the delay registered until dekad 10 and entered the grain-filling phase with an advance of more than one dekad if compared with the average. Spring barley is also completing the first part of the vegetative phase with a one-dekad advance, while winter wheat is still ending the vegetative stage. The global radiation has been significantly higher than the LTA only in Východné (Slovakia) and Jihovýchod (Czech Republic). In the rest of the country, cumulated values of potential evapotranspiration fluctuated around the LTA ensuring an optimal leaf area expansion in almost all regions. Grain maize only emerged in southern Slovakia.

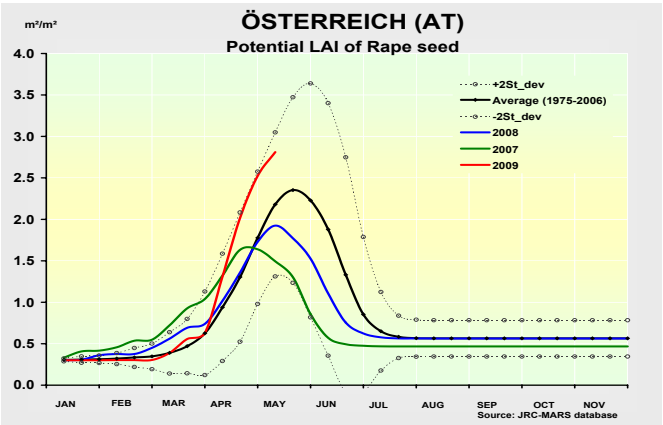


Austria: Exceptional canopy development for winter crops

Except for spring barley, which may suffer from the shortening of the vegetative phase and the high soil moisture at emergence (3.3 t/ha, – 30.7 % compared with 2008), good potential is shown for winter crops: 3.1 t/ha for rapeseed (– 1.1 % compared with the five-year average), 4.6 t/ha for durum wheat (+ 2.2 %) and 5.6 t/ha for winter barley (+ 0.6 %). The maize yield is still forecast in the average: 9.8 t/ha (– 11.1 % on 2008).

The warm conditions characterising the current season have become even stronger during the last three dekads pushing the monthly cumulated active temperature to values significantly above the LTA (418 GDD, about 50 % more than the LTA in Oberösterreich). Precipitation has been low during April but the water coming from the thaw contributed to keeping the cumulated values of the climatic water balance positive. These favourable conditions have sped up the development of all crops which recovered the past delay and present now an advance of one dekad compared with the average: in almost all regions winter wheat is ending the vegetative stage, rapeseed is completing flowering and spring barley just entered the stem elongation phase.

Despite a decrease in soil moisture registered in the past dekads and which could lead to a suboptimal grain filling, good conditions exist also for rapeseed. Both simulated total biomass and leaf area index values are depicting a situation characterised by an exceptional canopy development. Grain maize entered the emergence phase — according to the average — under optimal conditions.



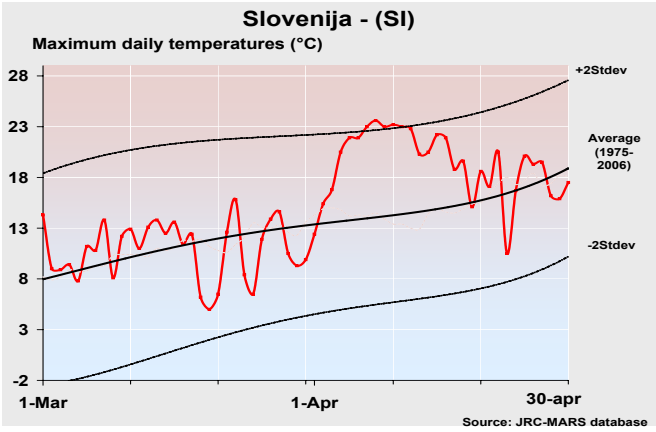
Slovenia: Good potential simulated for all crops

Forecasts are 7.6 t/ha for grain maize (+ 3.1 % compared with 2008), 4.4 t/ha for soft wheat (0.0 % with respect to the five-year average) and 3.9 t/ha for barley (+ 2.5 %).

The relatively humid conditions which characterised the last part of the winter were replaced by a longer period where precipitation has been unequally distributed over time. However, the abundant rainfall event that occurred on 29 March (46.3 mm) contributed to replenishing the soil moisture, bringing them back to average values. The first two dekads of April were also characterised by

temperatures which have been noticeably higher than the LTA especially because of prolonged high daily maximums. Despite average irradiance levels registered in the period of analysis, potential evapotranspiration values have been above the average probably because of the wind.

As a consequence of this warm period winter crops show an advance in development of one dekad. Winter wheat has already entered the reproductive phase while winter rapeseed completed flowering and started, in eastern parts of the country, the grain-filling phase. Despite this sudden acceleration in development, models are simulating optimal conditions for light interception and biomass accumulation. Where the high values of soil moisture have not penalised spring barley sowings, average conditions are simulated for this crop, which has entered the second part of the stem-elongation phase.



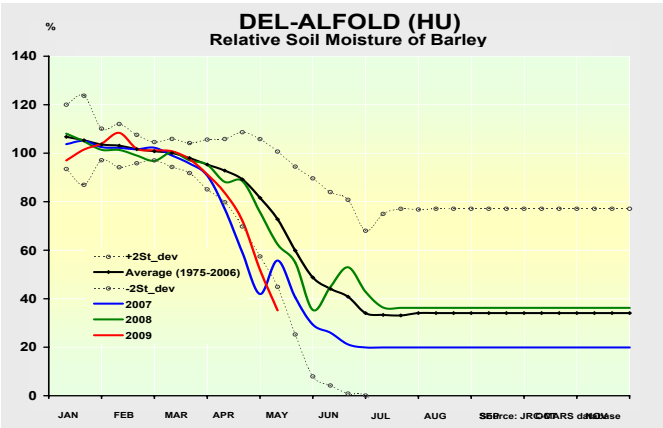
Hungary: Very low climatic water balance but yield expectations are still sufficient

Water stress could have affected crop growth and the lack of significant rain forecast for the next dekad could worsen the situation: soft and durum wheat are forecast to yield respectively 4. 6 t/ha (– 9.3 % compared with last year) and 4.2 t/ha (– 1.1 %). Rapeseed and winter barley may have suffered less, therefore yield expectations are respectively 2.4 t/ha (– 1.3 % compared with the five-year average) and 4.3 t/ha (+ 3.4 %). For summer crops the expected yields are 6.5 t/ha (+ 0.4 %) for grain maize and 2.7 t/ha (– 24 %) for spring barley.

Both daily minimums and maximums have been exceptionally high during the whole period analysed. Higher-than-average temperatures have pushed the accumulation of thermal time for winter crops in the last month to GDD values which have almost doubled the LTA.

High irradiance levels in conjunction with wind-speed values higher than the average for many days have boosted the potential evapotranspiration to above-average values (in Del-Alfold the cumulated ETp shows an increase of 60 % with respect to the LTA) and consequently the consumption of water by the crops. Despite the frequent precipitations which occurred in the last two months, cumulated rainfall never rose to noticeably high values. On the contrary, the water balance shows a pronounced deficit especially in southern regions. This consistent reduction of soil moisture coupled with higher-than-seasonal water consumption may have determined water stress conditions.

Despite the shortening of the vegetative phase (more than one-dekad advance for winter wheat and rapeseed), owing to the warm April and the depletion in soil moisture, canopy development does not seem to have suffered yet. The simulated leaf area index and biomass are still within the average and in northern and western regions the difference of NDVI profiles between the current year and the LTA even shows an increase of about 10 %. Spring barley reached the first part of the stem elongation phase with only a slight advance with respect to the LTA.



Romania: Positive expectations for winter cereals while the current dry conditions may negatively affect spring crops

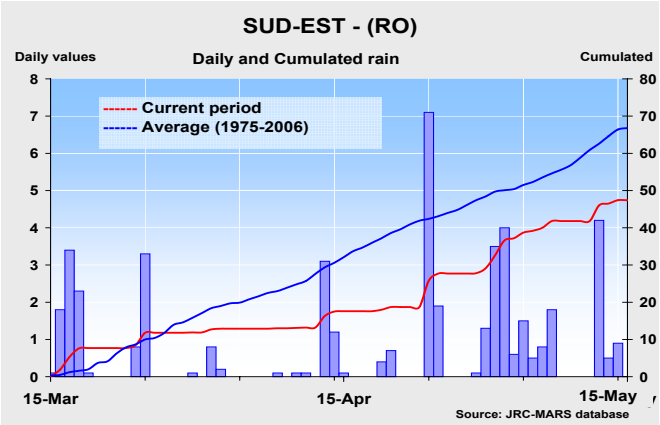
Up to the present, Romania reports a positive season for winter cereals even though there is still some uncertainty regarding the outcome of spring crops. The yield forecast for soft wheat is 3.0 t/ha, improving by 6 % on the five-year average but below the levels achieved in 2008 (3.9 t/ha; -12 %). Winter barley has a similar trend and is expected to yield 2.9 t/ha (– 13 % on 2008 but + 6 % on the five-year average). Turnip with 1.8 t/ha performs better than the five-year average (+ 11 %) and is also not significantly worse than in 2008 (– 2 %). Spring barley is forecast at 2.1 t/ha, which is much lower than in 2008 (3.4 t/ha; – 18 %) and at the same levels as the five-year average. Expectations for maize are still provisional and the forecast is 1.8 t/ha.

The cumulated precipitation levels are at present below those of the LTA but rain was well distributed all along the period from March to the present and consequently not a cause for stress. Climatic conditions appear to be improving in the main agricultural areas of the south-east, favouring the positive completion of the productive cycle of winter cereals. The concurrent worsening of the climatic water balance in the north should not affect significantly the

overall yield expectations for winter cereals, which are a less relevant crop in those regions. For spring crops such as maize and spring barley, which have a wider diffusion in the northern regions, this evolution may have an impact even if potential damage is still not evident in the forecasts.

Temperatures continued to fluctuate across the whole period but levels dropped to an unseasonal minimum during the second dekad of April. At that time wheat and winter barley had not yet reached the most vulnerable stage of flowering and consequently should not have been significantly affected by the event except for a possible delay in the following development stages.

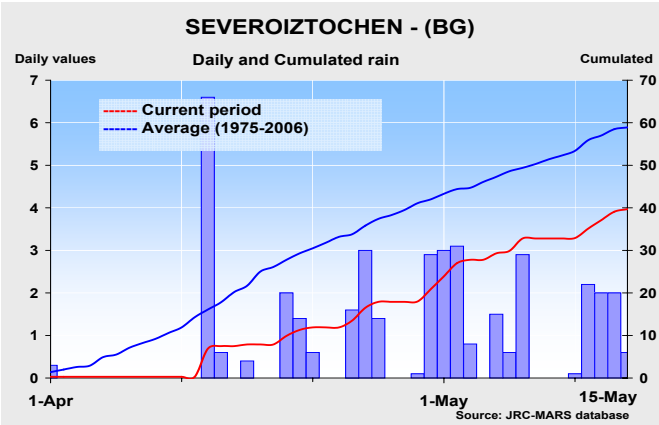
If the current conditions do not change significantly during the final stages of grain filling, the season can be considered positive or in any case within average levels. More uncertain is the impact on germination and the development of spring crops for the parallel decrease in moisture availability and occurrence of cold spells.



Bulgaria: Favourable conditions for main crops, but worsening of climatic water balance may negatively affect the final yield

The yield forecast for soft wheat in Bulgaria is at 3.5 t/ha with a significant reduction (– 15 %) on the exceptional level of 2008 (4.2 t/ha) but with an improvement over the five-year average (+ 7 %). A similar trend is forecast for winter barley, with 3.4 t/ha (– 15 % on 2008 and + 11 % on the average). Winter rape with 2.1 t/ha also performs better than the five-year average (+ 10 %) and below the 2008 levels (– 6 %). The current favourable climatic conditions in the south-east of the country encourage a positive forecast also for spring barley, expected to yield 2.6 t/ha (2 % on 2008 and + 6 % on the average). Grain maize has a wider distribution in the north-west where the overall climatic trend was not as favourable. The forecast yield is 4.1 t/ha, slightly reduced with respect to both 2008 (– 2 %) and the average (– 3 %).

The levels of cumulated precipitation in the period March to early May were slightly different between the northern (Severentsentralen) and south-eastern (Yugoiztochen) agricultural districts of Bulgaria. Precipitation levels were overall below the LTA but rather homogeneously distributed throughout the period. Rain was, however, slightly more abundant in the south of the country. Temperatures fluctuated within average levels of both maximums and minimums. Up to the present it appears to be an overall positive season, better than average but without the particular combination of events that made 2008 an exceptional year. Winter cereals are in the flowering and grain-filling phases and the limited precipitation is a positive circumstance. However, the climatic water balance appears to be decreasing and this could negatively affect the further evolution of the season. Spring crops report a normal evolution of the phenological cycle but appear to be more affected by the relatively dry period.



Spring sowing conditions

Generally good conditions have been observed during the sowing time of spring crops.

In the sowing period of spring barley the crop has not been affected by an excess of rain. Significantly higher values of cumulated precipitation (+ 80 % up to + 100 %), with respect to the LTA, have been observed on the costal area in northern Spain (Principado de Asturias, Cantabria and País Vasco), in northern Italy and in southern regions of France, all regions where spring barley is not very common. Soil moisture as well has been close to average values which should have guaranteed the access to the fields without any problem.

On the contrary young grain maize seedlings may have suffered from the dry conditions experienced immediately after sowing. The high temperatures registered especially in Hungary and Romania in conjunction with relatively low precipitation values could have led to the dryness of sowing beds. Extremely dry conditions have been observed in France in central and eastern regions.

A large number of rainy days around grain maize sowing have been experienced only in the Alpine area of western Italy (Piemonte and the hilly provinces of Lombardia), both regions where grain maize is not a key crop.

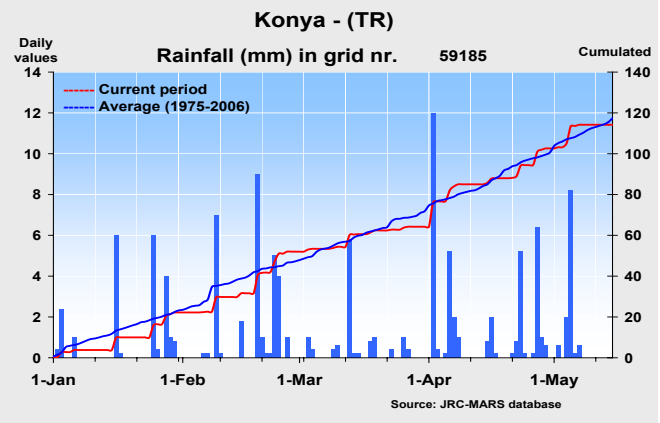
(Maps in section 4.2)

BLACK SEA AREA

Turkey: A recovery in rainfall during April supports positive expectations

The wheat yield is forecast at 2.2 t/ha with a significant reduction (– 12 %) on the exceptional yield of 2008 and in line with the five-year average. Barley, sharing the cultivation areas with wheat, appears to perform generally better as it experienced a certain delay in development avoiding climatic stresses during March. The forecast yield is 2.3 t/ha, at the same levels of 2008. The forecast for grain maize is at the present state of development of 6.7 t/ha, reduced with respect to the exceptional level of 2008 (– 11 %) and at the same level of the five-year average.

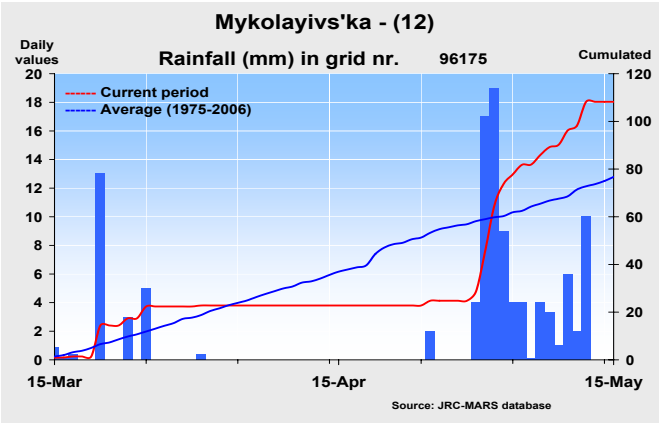
The 2009 agricultural season in the main producing regions of central Anatolia (Ankara, Konia, Kirikkale and Kayseri) continued along the same trend reported since the start of the season and is balanced on the climatic paramenters of the LTA. A reduction in rainfall was reported during March in the west of the central highlands but it coincided with diffuse snow fall. Rain precipitation, however, recovered from the beginning of April onward. The cumulated active temperatures remained at average levels all through the period and the slight delay in the development cycle was due only to the snow cover. At present wheat has reached almost everywhere the heading phase and is therefore quite susceptible to the current climatic conditions and, even if there is no clear sign of possible stresses, it is still early for a definitive statement of the potential yield. Differently from wheat, barley took advantage of its slightly delayed development and avoided problems connected to the March snow. The crop is performing at good to average levels both concerning the development cycle (late shooting) and the potential yield biomass. Maize, which is cultivated in the irrigated areas of western Turkey and on the coastal regions, is in its early stage of development and, at present, is not affected by any particular stress.



Ukraine: An overall normal season with positive prospects for spring crops

The yield forecast for wheat in Ukraine is, at present, 2.4 t/ha, rather reduced with respect to the five-year average (2.6 t/ha; – 9 %). This is, however, an overall normal performance as the comparison is biased by the exceptionally productive seasons of 2008 and 2007. Barley production refers for the greater part to the spring cycle and the yield forecast is 1.7 t/ha; like wheat, it also reports a biased decrease of 18 % on the five-year average. Rapeseed (turnips) reflect the same overall trend and the forecast yield is 1.1 t/ha (– 17 % on the five-year average). Maize cultivation is in its initial development stages but the season is starting under positive auspices and the forecast yield is 3.9 t/ha increased by 3 % over the five-year average (3.4 t/ha).

The main winter crops came out of the dormancy period quite early in the course of the 2009 spring due to the combined effect of mild temperatures in late February and March and above-average precipitation. Since mid-March rather dry conditions incepted, especially in the main cereal production regions of Mykolayivs'ka and Kherson'ka. This condition lasted for over a month and ended during the second dekad of April. Temperatures reported strong variations between the maximum and minimum levels and, while the maximums remained systematically above average, there were a couple of cold spells in mid-March and mid-April. The overall impact on crop production should not be significant because wheat was still in the early heading phase. The cumulated active temperatures remained systematically above average meaning that, regardless of the temperature fluctuations, the regularity of the further development of cereals should not be hampered. Rain started picking up again towards the end of April in combination with an increase in average temperatures. This is a positive premise for flowering and grain filling, which is starting during the second half of May. The same climatic trend sets a positive basis for germination and emergence of grain maize.



EASTERN COUNTRIES

Belarus: Scarcity of rainfall in April

The estimated yield appears to be worse than the five-year average. Wheat is forecast at 2.9 t/ha, barley at 2.7 t/ha, rapeseed at 1.0 t/ha and the early forecast for grain maize is on the trend at 3.8 t/ha.

In Belarus rainfall in March was close to the LTA, but in April the country suffered rain deficits. Cumulative active temperatures were higher than the LTA and solar radiation was close to the LTA. The climatic water balance dropped significantly down in April.

The total biomass of winter crops is in line with the LTA, but much lower than the last two years. Crop development after a delay in March and at the beginning of April is now slightly anticipated compared with the LTA .

The sowing of spring barley was performed under normal conditions, but available soil moisture to plants is decreasing.

Russia: Cold caused a delay in sowing and spring frost affected winter crops in southern regions

Spring time has been characterised by cold conditions especially because of the extremely low daily minimums during the last dekads of April; deep snow cover persisted until the end of March. As a result the sowing campaign has been delayed and the reduced accumulation of thermal time for winter crops has led to a suboptimal canopy development. This is clearly shown by the negative difference between the NDVI profiles and leaf area index values for the current year with respect to the LTA. Additionally, spring frost has affected crops in southern Russia; in the Krasnodar, Stavropol and Rostov regions from 9 to 11 April and especially from 20 to 24 April values twice below the standard deviation were observed. Consequently in these regions big reductions in wheat yield are expected.

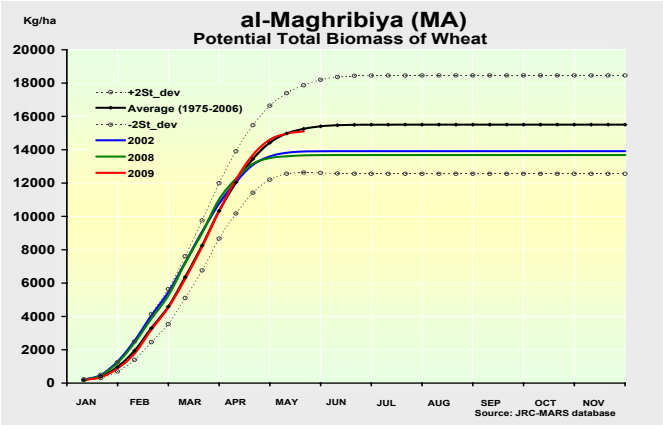
Despite the fact that the amount of precipitation between March and April 2009 was lower than normal, practically everywhere soil moisture is still maintaining values close to normal, which should avoid the risk of water stress.

MAGHREB

Maghreb: Overall a very positive season

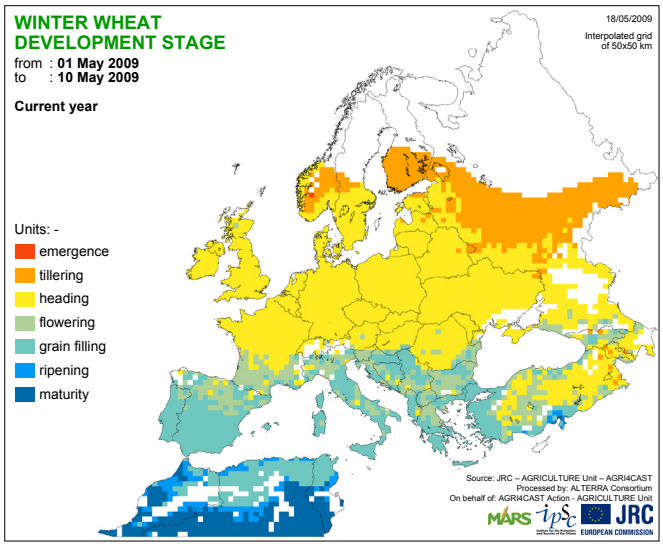
The 2009 season can be considered particularly positive for most of the Maghreb region and especially for Morocco. In this country the forecast yield for wheat is over 2 t/ha, meaning a 45 % increase on the five-year average (1.4 t/ha). This is, however, a largely biased figure affected by the disastrous 2007 season where yield hardly reached 0.6 t/ha. Barley is forecast to yield 1.2 t/ha in Morocco, also reporting a + 45 % increase on the five-year average and over + 200 % on 2007. Maize cultivation is in its initial phases and largely irrigated; yield is expected to achieve 1.0 t/ha with a 9 % increase on the five-year average mainly due the good moisture supply in the soil. Overall wheat yield is positive also for Algeria (1.6 t/ha; + 26 %) and Tunisia (1.8 t/ha; + 14 %). Barley forecast results are even more positive: 1.7 t/ha in Algeria (+ 22 %) and 1.0 t/ha in Tunisia (+ 15 %).

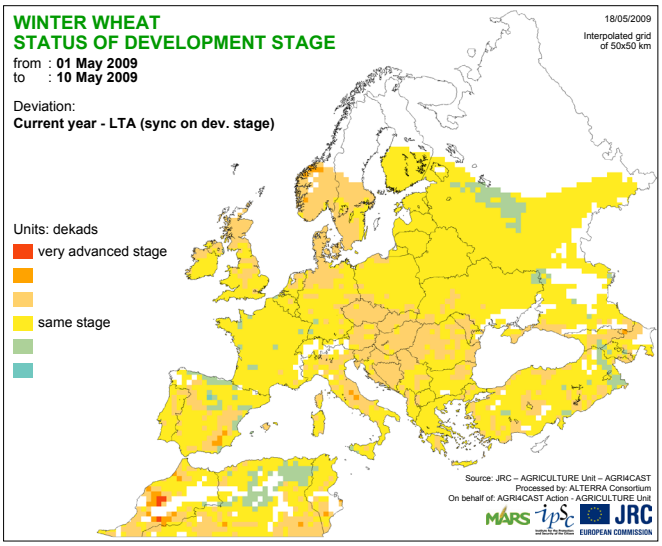
Most provinces in Morocco had exceeded the average levels of seasonal rainfall by the end of January and significant areas were even flooded, especially in the Gharb province. On average, the levels of the climatic water balance during the period from January 2008 to May 2009 can be placed significantly above the average of the 35 years' time series. At the same time, temperature levels remained almost constantly below average for all regions of Morocco, except for a short period at the end of January 2009. This climatic set-up allowed a lengthening of the development cycle and therefore a more efficient use of the available soil moisture. All across the season there were substantially no limiting climatic factors and this allowed cereals to express their full physiological productivity potential for the region. The only element that somewhat limited the reaching of an absolute maximum was probably the excess of precipitation itself, causing nitrogen leaching and the insurgence of weeds. A similar trend can be reported for the winter cereal production areas of eastern Algeria and north-central Tunisia. Also in these areas precipitation has been abundant for the whole season, combined with mild temperatures.

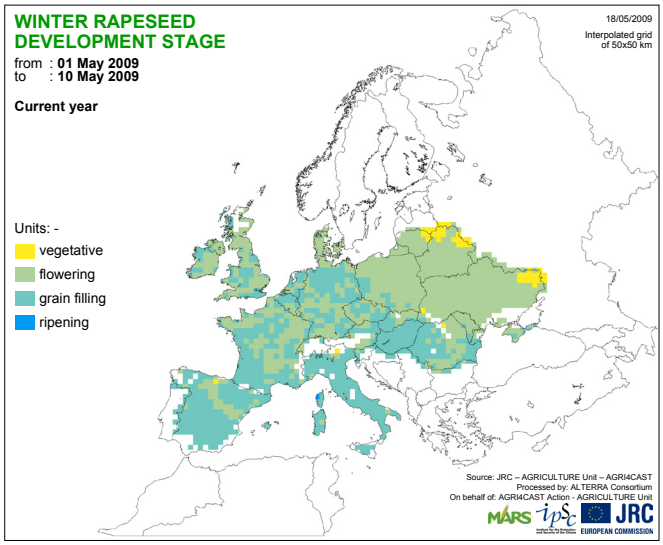


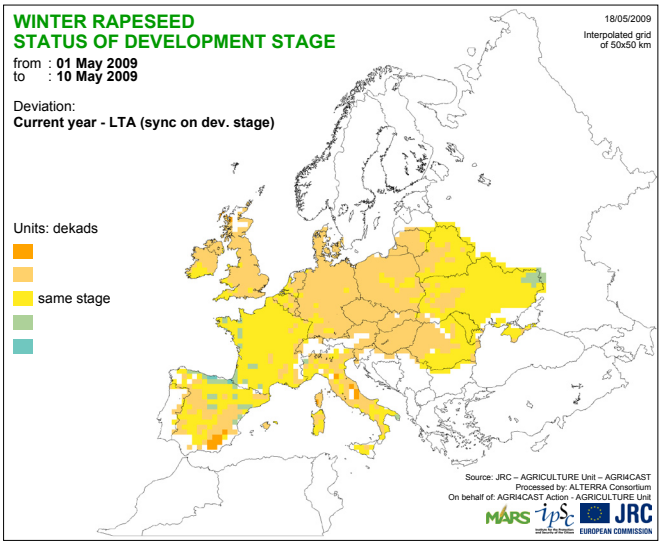
4. Map analysis

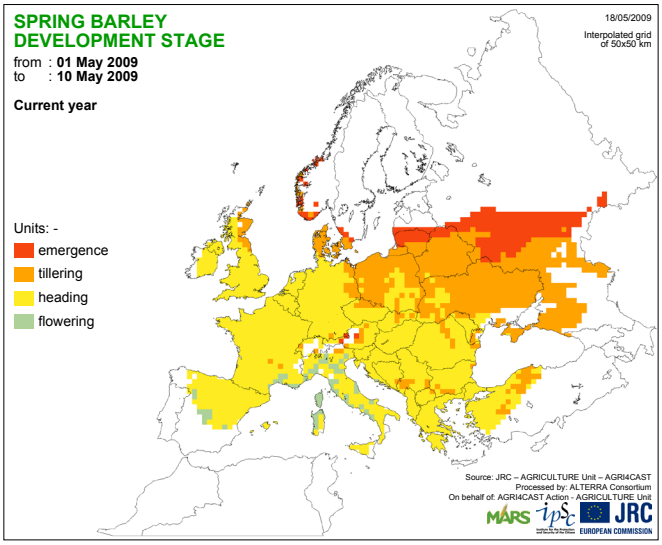
4.1. Crop development stage

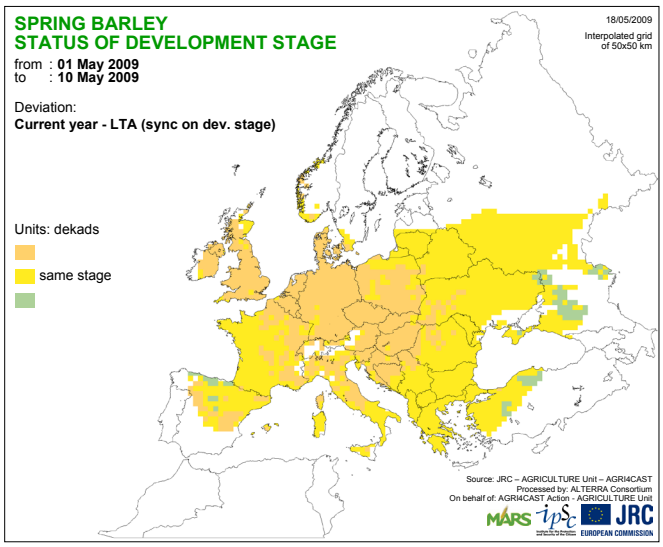




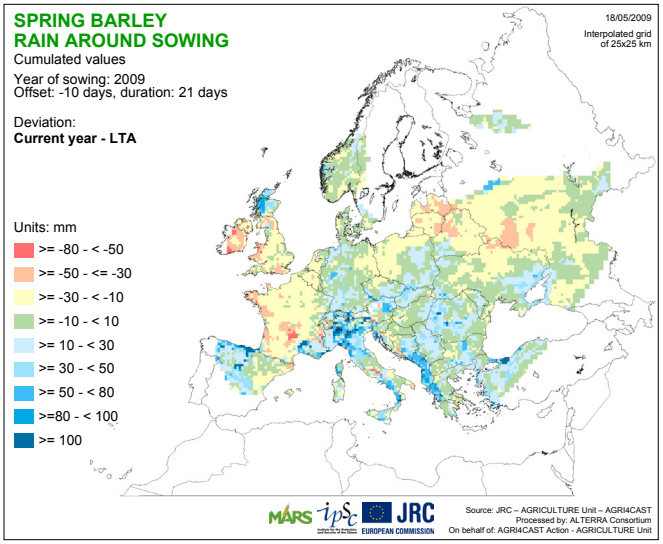


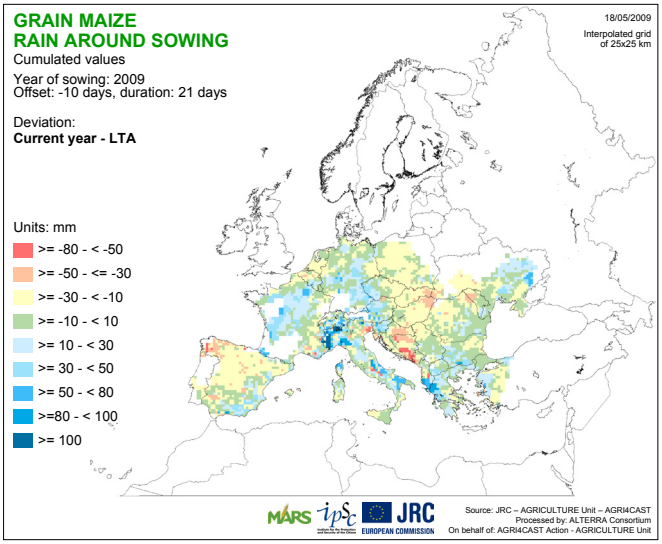


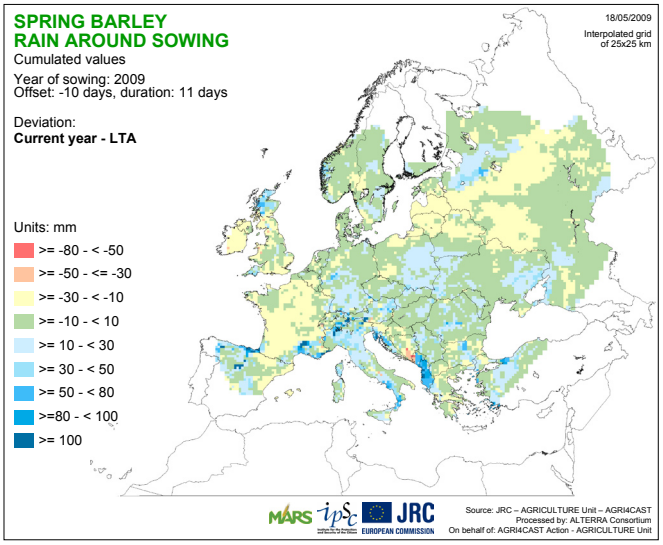


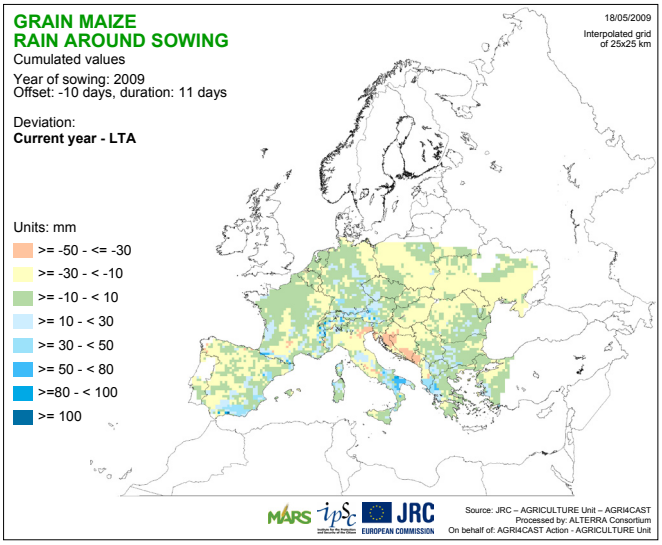


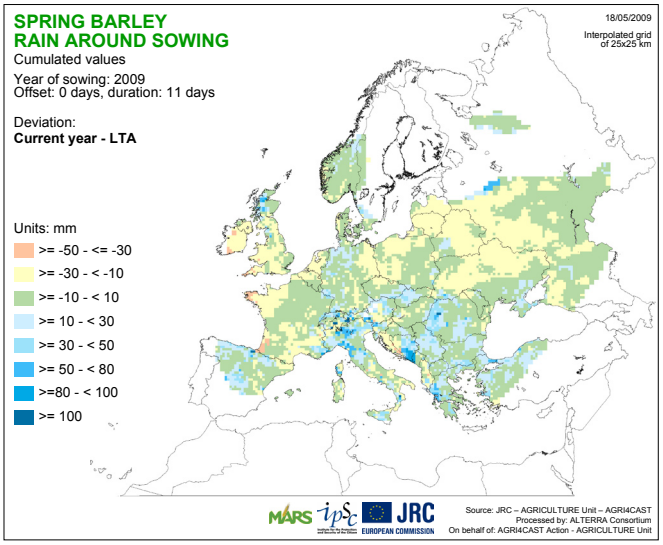
4.2. Weather conditions at spring sowing

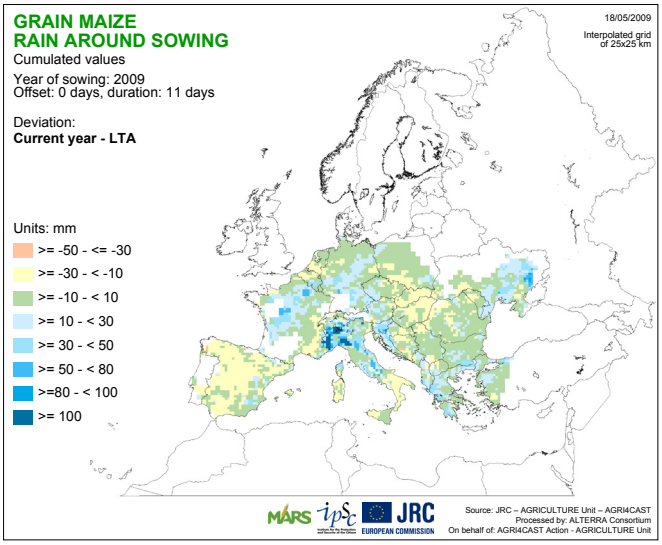




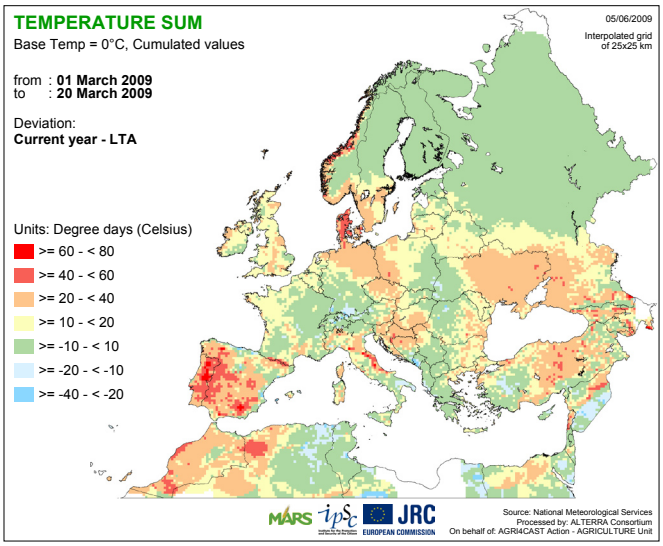


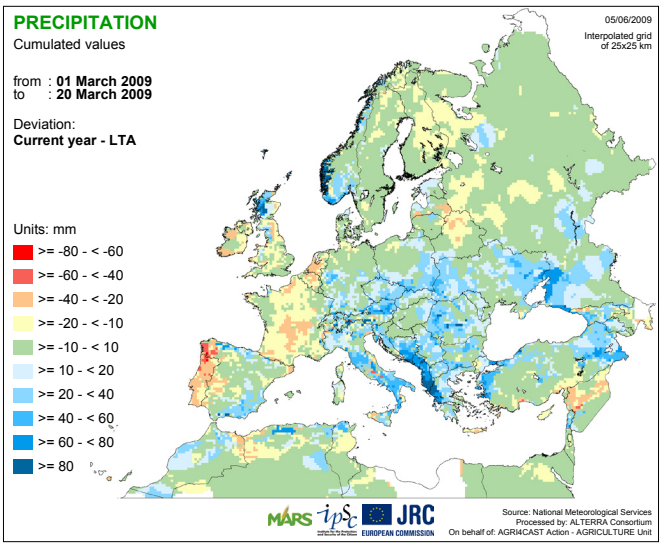


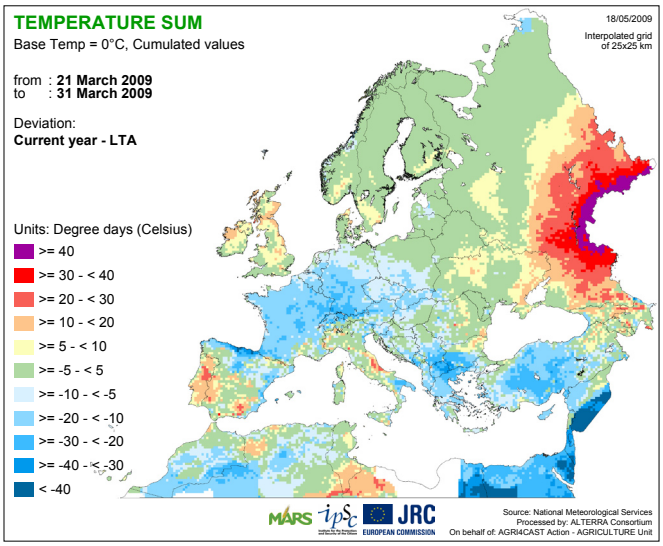


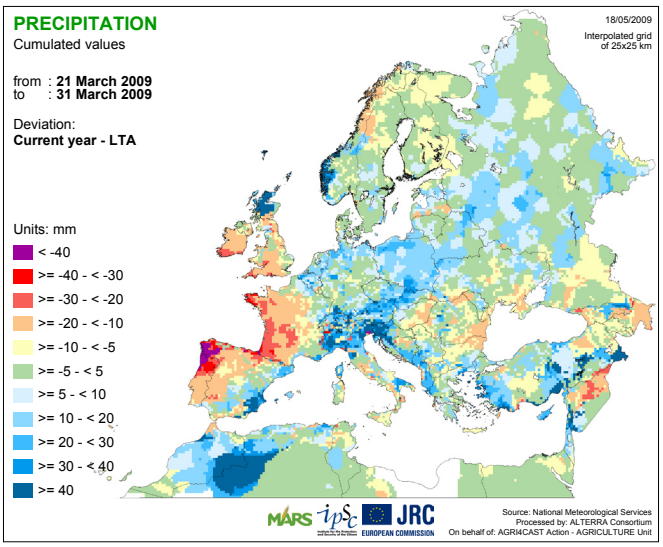


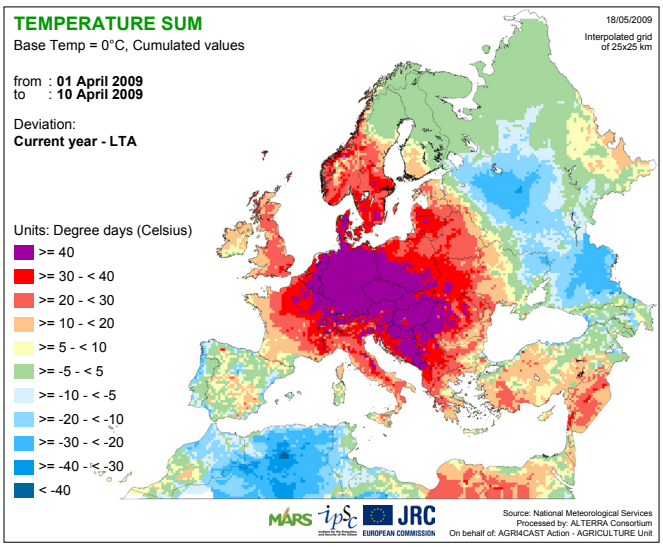
4.3. Temperature and precipitation – 01 March-10 April - 2009 compared with Long Term Average -

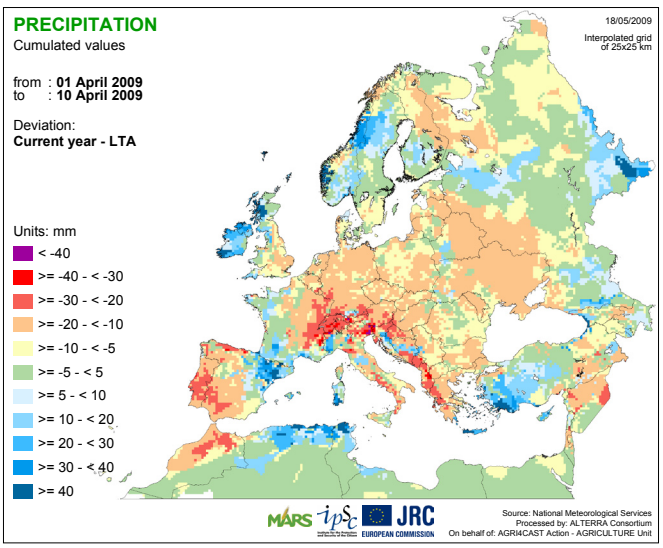




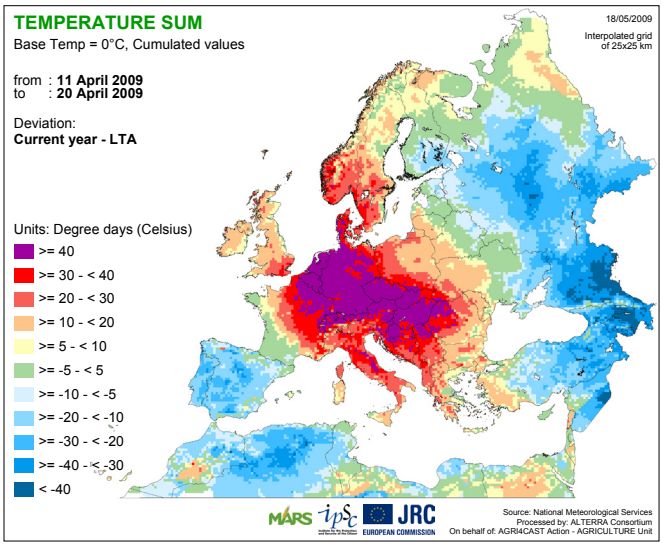


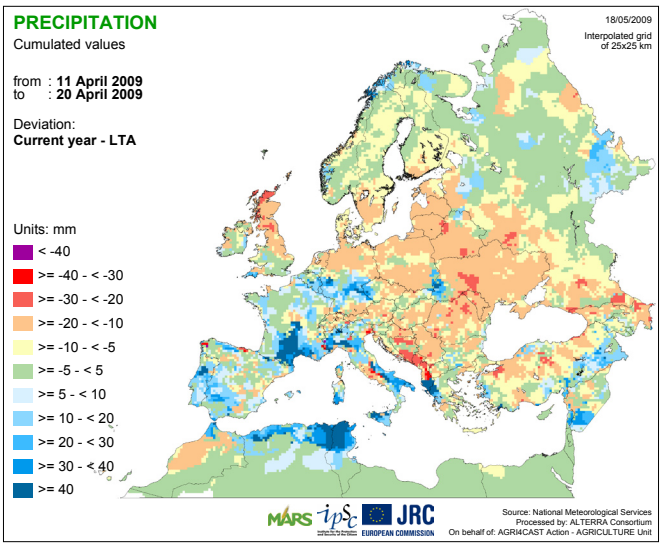


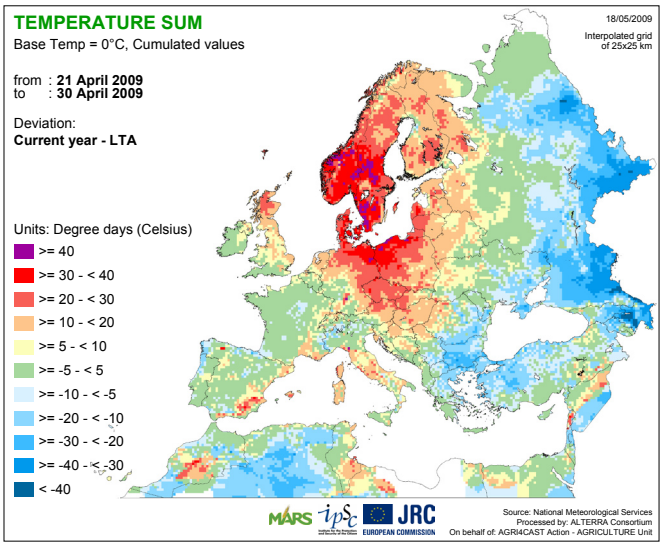


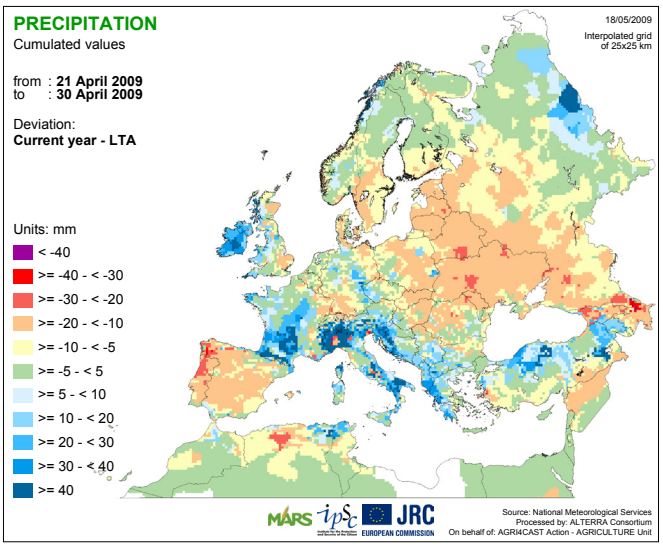


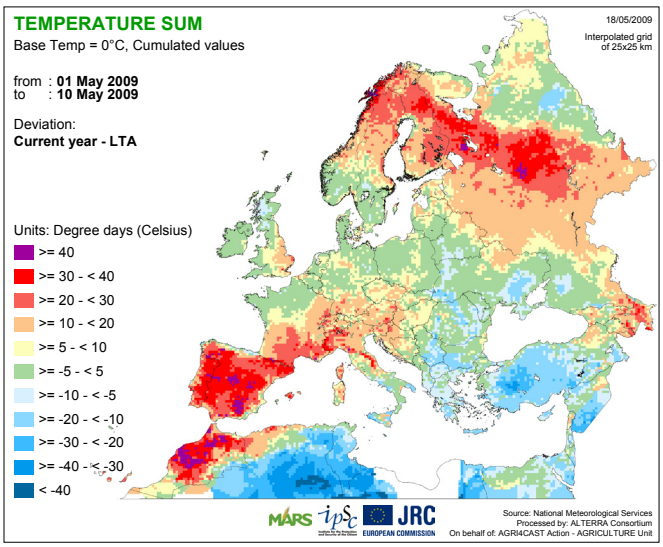
4.3. Temperature and precipitation – 11 April-10 May - 2009 compared with Long Term Average -

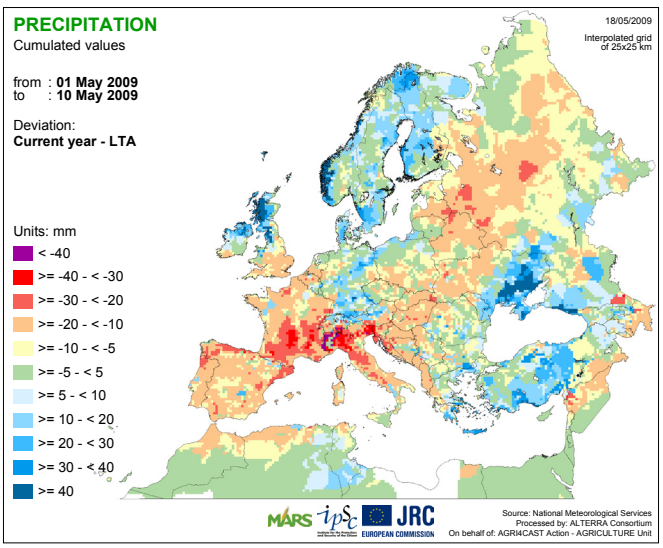






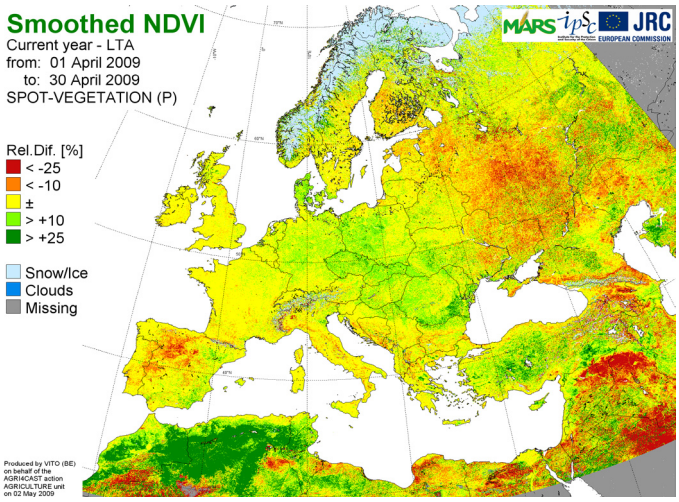




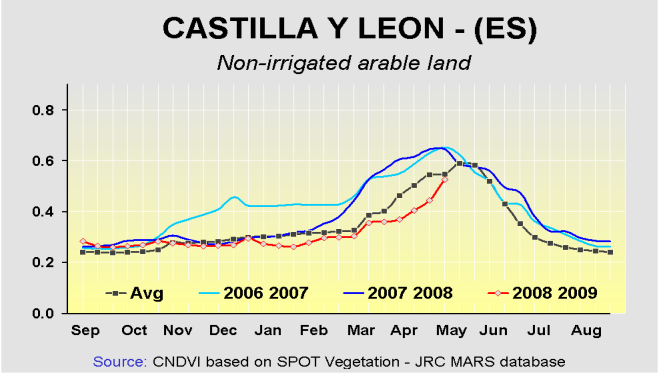


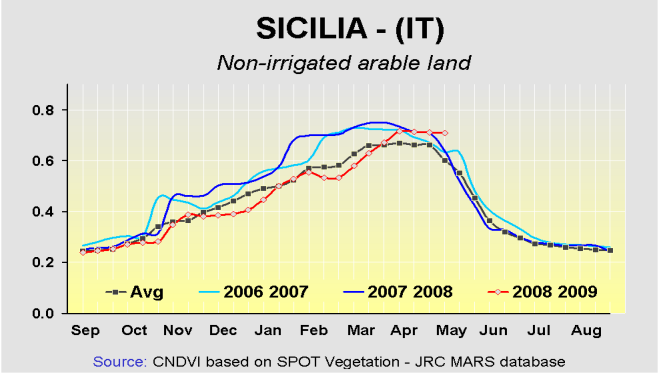
5. Satellite analysis: SPOT Vegetation

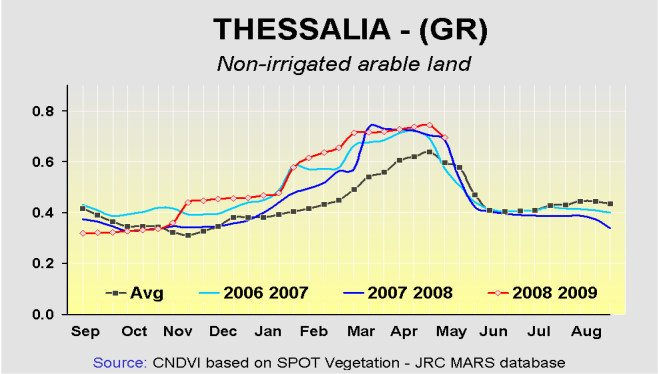
Low NDVI values for Iberian Peninsula and European Russia, good development in south-eastern Europe and Maghreb region.

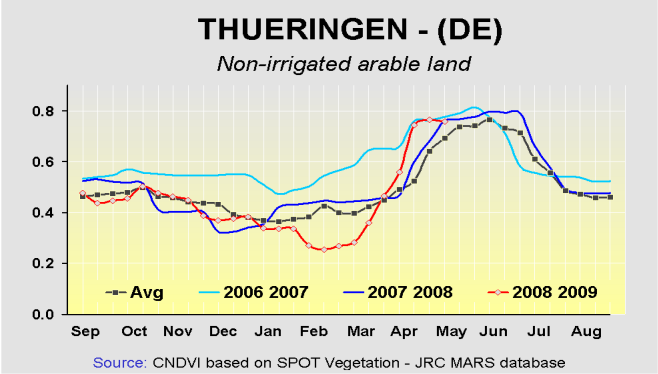


The **NDVI map** shows relative differences between current NDVI and the LTA (1998 – 2008) for April 2009. NDVI values of the Iberian Peninsula have two different behaviours: the western part has values significantly below average, due to a prolonged drought period. This is confirmed by the NDVI profile for the non-irrigated arable land of Castilla y Leon (**Spain**). Opposite, the eastern part had favourable climatic conditions and NDVI values are slightly higher than average with a fairly good trend. **Italy** has a normal to good situation along the entire peninsula. The example given by the Sicilia profile displays a fairly good situation in the last period, with NDVI values definitely above average. Better conditions are present in **Greece** (e.g. Thessalia) where the graph shows high NDVI values, similar to the previous year. France and the United Kingdom are near the average. Above-average NDVI values are shown in east European countries and in **Germany**. In German profiles (see Thüringen graph) a steep vegetation boost is highlighted, changing the crop development from delayed stages into advanced stages. The temperatures in April, higher than average, determined a strong biomass accumulation,;afterward the NDVI values range around the saturation threshold. Western Black Sea countries exhibit NDVI values higher than average in extensive parts of arable land. The agricultural season is almost finished in the Maghreb regions; good conditions are visible throughout all the countries, especially in Morocco where NDVI values are even higher than the previous year. Lower than the LTA values are observed for European Russia, where the sowing has been delayed and winter kill has affected the crops.









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