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MARS AGROMETEOROLOGICAL

Crop Monitoring in Europe

Review of the 2008-2009 season
Situation from 11th September to 20th October

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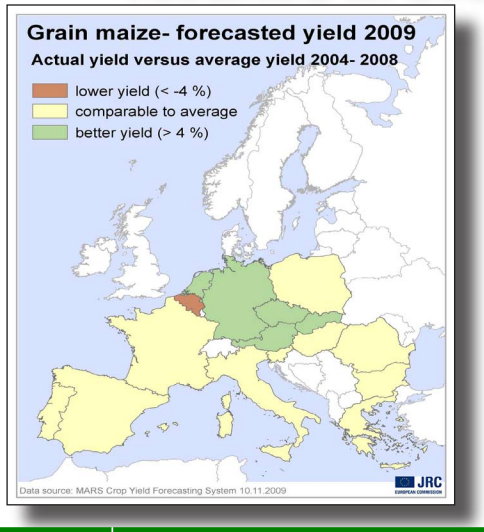
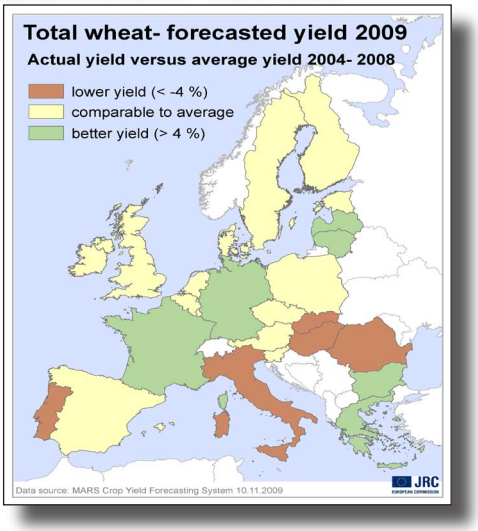
Issued: 10 November 2009

Variability in climate and yields across the EU resulted in average production levels





CROPS	EU27 yield forecast (t/ha) as of 10 November 2009				
	2008	2009	Avg 5 yrs	% 09/08	% 09/Avg
TOTAL CEREALS	5.2	**5.0**	4.9	-4.8	+1.1
Soft wheat	6.0	**5.7**	5.6	-5.4	+1.2
Durum wheat	3.2	**3.1**	3.0	-4.3	+4.5
Total wheat	5.7	**5.4**	5.3	-5.1	+2.1
Total barley	4.5	**4.3**	4.3	-4.6	+0.6
Grain maize	7.2	**6.9**	6.7	-4.2	+2.2
Other cereals (1)	3.3	**3.2**	3.2	-4.7	+1.3
Rape seed	3.1	**3.0**	3.1	-1.7	-1.8
Sunflower	1.9	**1.6**	1.7	-12.9	-3.5
Potato	29.3	**29.9**	27.9	+1.9	+7.0
Sugar beet	66.3	**65.0**	61.9	-2.0	+5.1

Yields are forecasted for crops with more than 10000 ha per country; figures are rounded to 100 kg
(1) Sorghum, rye, maslin, oats, triticale, mixed grain other than maslin, millet, buckwheat
Sources:
2004-2008 data come from EUROSTAT CRONOS (last update: 09/10/2009) and EES (last update: 23/10/2009)
2009 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2009)

Contents

A. Synthesis of the 2008/09 season

1. Highlights

The climate variability had a limited impact on the overall outcome of the agricultural season. Average wheat yield is estimated 5.4 t/ha, +2.1% on the 5 yrs avg but -6% on 2008. The worst conditions were reported in Portugal and Hungary whereas in Greece yield was above average. A similar trend was reported for winter barley. The average estimated yield of maize was 6.9 t/ha, stable on the average. Sunflower (1.6 t/ha), reported a reduction on 2008 but still stable on the 5 yrs avg. It was a good season for potato with +7% on average.

Weather at planting was milder than usual in the east but cooler in the west. In winter there were local extreme cold events but temperatures were mild almost everywhere. Water shortages in the south-west had little impact on the crop calendars except for an early exit from winter dormancy of winter cereals. Spring was marked by high temperatures in southern Europe balanced by favorable conditions in France and Germany. Similarly in summer there were some local extremes but overall conditions showed small variations from the norm. Rain was concentrated in the north and very limited in the Mediterranean; spring crops benefited from this in northern Europe and compensated the losses in the south.

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2. Crop yield forecasts

MARS crop yield forecasts at national level for EU27 as of 10 November 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	-5.1	+2.1	6.0	**5.7**	5.6	-5.4	+1.2	3.2	**3.1**	3.0	-4.3	+4.5
AT	5.7	**5.3**	5.3	-6.6	+1.0	5.7	**5.4**	5.3	-6.3	+1.1	5.1	**4.4**	4.5	-14.1	-2.2
BE	8.7	**8.5**	8.4	-2.2	+0.9	8.7	**8.5**	8.4	-2.2	+0.9	-	**-**	-	-	-
BG	4.2	**3.5**	3.3	-16.2	+4.8	4.2	**3.5**	3.3	-16.2	+4.8	-	**-**	-	-	-
CZ	5.8	**5.2**	5.2	-9.4	+0.5	5.8	**5.2**	5.2	-9.4	+0.5	-	**-**	-	-	-
DE	8.1	**8.0**	7.6	-1.1	+5.5	8.1	**8.0**	7.6	-1.1	+5.5	6.0	**5.5**	5.5	-6.8	+1.6
DK	7.9	**7.3**	7.2	-7.1	+2.4	7.9	**7.3**	7.2	-7.1	+2.4	-	**-**	-	-	-
EE	3.2	**2.9**	2.9	-7.3	+0.4	3.2	**2.9**	2.9	-7.3	+0.4	-	**-**	-	-	-
ES	3.2	**3.0**	2.9	-8.1	+1.6	3.6	**3.2**	3.2	-12.3	-2.0	2.2	**2.6**	2.3	+17.5	+9.0
FI	3.6	**3.7**	3.6	+3.8	+3.0	3.6	**3.7**	3.6	+3.8	+3.0	-	**-**	-	-	-
FR	7.1	**7.2**	6.9	+1.9	+4.4	7.3	**7.4**	7.1	+2.1	+4.4	4.9	**4.9**	4.8	-0.1	+2.7
GR	3.0	**2.8**	2.4	-5.0	+19.3	3.0	**2.9**	2.8	-2.5	+5.6	2.9	**2.8**	2.2	-5.7	+23.0
HU	5.0	**4.0**	4.5	-18.9	-9.1	5.0	**4.0**	4.5	-18.9	-9.1	4.3	**3.9**	4.2	-9.9	-7.2
IE	9.1	**9.1**	9.0	+0.3	+0.5	9.1	**9.1**	9.0	+0.3	+0.5	-	**-**	-	-	-
IT	3.9	**3.5**	3.7	-9.1	-4.1	5.3	**4.9**	5.3	-7.4	-6.8	3.2	**2.8**	3.0	-11.6	-4.9
LT	4.3	**3.9**	3.7	-7.9	+7.3	4.3	**3.9**	3.7	-7.9	+7.3	-	**-**	-	-	-
LU	6.7	**6.4**	6.2	-4.5	+2.4	6.7	**6.4**	6.2	-4.5	+2.4	-	**-**	-	-	-
LV	3.9	**3.5**	3.4	-8.9	+4.8	3.9	**3.5**	3.4	-8.9	+4.8	-	**-**	-	-	-
NL	8.7	**8.7**	8.4	-0.4	+3.6	8.7	**8.7**	8.4	-0.4	+3.6	-	**-**	-	-	-
PL	4.1	**4.0**	3.9	-1.4	+3.0	4.1	**4.0**	3.9	-1.4	+3.0	-	**-**	-	-	-
PT	2.3	**1.4**	1.8	-37.3	-18.7	2.3	**1.4**	1.8	-37.3	-18.7	-	**-**	-	-	-
RO	3.4	**2.6**	2.8	-22.9	-6.7	3.4	**2.6**	2.8	-22.9	-6.7	-	**-**	-	-	-
SE	6.1	**6.2**	6.0	+0.9	+2.2	6.1	**6.2**	6.0	+0.9	+2.2	-	**-**	-	-	-
SI	4.5	**4.3**	4.4	-4.9	-2.6	4.5	**4.3**	4.4	-4.9	-2.6	-	**-**	-	-	-
SK	4.9	**4.1**	4.3	-16.6	-6.0	4.9	**4.1**	4.3	-16.6	-6.0	-	**-**	-	-	-
UK	8.3	**7.9**	7.9	-4.4	+0.7	8.3	**7.9**	7.9	-4.4	+0.7	-	**-**	-	-	-

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
EU27	4.5	**4.3**	4.3	-4.6	+0.6	7.2	**6.9**	6.7	-4.2	+2.2	3.1	**3.0**	3.1	-1.7	-1.8
AT	5.2	**4.8**	4.7	-7.3	+1.9	11.1	**10.8**	10.0	-2.5	+8.3	3.1	**2.8**	3.1	-9.3	-10.1
BE	8.1	**8.4**	8.1	+4.8	+4.9	11.9	**10.4**	11.6	-13.0	-10.5	-	**-**	-	-	-
BG	3.9	**3.2**	3.0	-18.8	+5.4	4.2	**4.3**	4.2	+3.7	+2.7	2.6	**2.1**	2.0	-18.6	+6.0
CZ	4.6	**3.9**	4.2	-15.4	-7.2	7.5	**7.5**	6.9	-0.8	+8.7	2.9	**2.8**	3.1	-6.3	-11.0
DE	6.1	**6.3**	6.0	+3.9	+5.8	9.8	**9.7**	9.1	-0.8	+6.7	3.8	**3.9**	3.8	+4.4	+4.4
DK	4.7	**5.3**	5.0	+13.6	+6.7	-	**-**	-	-	-	3.7	**3.8**	3.5	+1.9	+8.4
EE	2.6	**2.4**	2.4	-7.4	-3.2	-	**-**	-	-	-	1.4	**1.6**	1.5	+9.5	+1.3
ES	3.3	**2.4**	2.8	-26.4	-16.0	9.9	**10.1**	9.9	+1.9	+1.7	1.8	**1.3**	1.6	-26.9	-15.6
FI	3.5	**3.5**	3.4	+2.1	+3.3	-	**-**	-	-	-	1.4	**1.3**	1.3	-7.1	+1.9
FR	6.8	**6.5**	6.4	-3.3	+2.9	9.1	**8.7**	8.9	-4.3	-1.9	3.3	**3.5**	3.3	+4.1	+5.4
GR	2.5	**2.5**	2.5	-2.1	+0.7	10.3	**9.5**	9.5	-8.1	-0.2	-	**-**	-	-	-
HU	4.5	**3.0**	3.9	-31.8	-21.4	7.5	**6.3**	6.5	-15.9	-3.6	2.6	**2.3**	2.5	-13.2	-6.7
IE	6.9	**6.4**	6.8	-7.1	-5.5	-	**-**	-	-	-	-	**-**	-	-	-
IT	3.7	**3.6**	3.8	-4.0	-4.3	9.8	**9.2**	9.3	-6.5	-1.9	2.2	**2.2**	1.9	-3.2	+13.6
LT	2.9	**2.6**	2.6	-11.2	-1.5	-	**-**	-	-	-	2.0	**1.9**	1.8	-6.8	+7.8
LV	2.2	**2.3**	2.3	+3.4	+2.8	-	**-**	-	-	-	2.4	**2.1**	2.0	-10.8	+8.0
NL	6.1	**6.4**	5.9	+5.2	+7.2	11.4	**11.8**	11.3	+3.6	+4.5	-	**-**	-	-	-
PL	3.0	**3.1**	3.1	+3.8	-0.1	5.8	**5.8**	5.6	-0.6	+3.3	2.7	**2.7**	2.7	-0.7	-1.1
PT	2.3	**1.5**	1.8	-34.5	-16.7	6.4	**5.7**	5.5	-11.0	+3.1	-	**-**	-	-	-
RO	3.1	**2.4**	2.5	-22.3	-3.6	3.2	**3.5**	3.4	+7.7	+3.3	1.8	**1.6**	1.6	-13.2	-1.2
SE	4.2	**4.6**	4.2	+9.4	+9.7	-	**-**	-	-	-	2.9	**2.8**	2.6	-4.4	+6.4
SI	4.0	**3.7**	3.8	-6.1	-2.1	7.3	**7.7**	7.6	+4.7	+1.2	-	**-**	-	-	-
SK	4.2	**3.7**	3.7	-12.8	-1.2	8.2	**6.6**	6.1	-19.1	+8.2	2.6	**2.4**	2.4	-8.6	+1.0
UK	6.0	**5.9**	5.8	-0.4	+1.6	-	**-**	-	-	-	3.3	**3.0**	3.2	-9.3	-6.1

Note: Yields are forecasted for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2004-2008 data come from EUROSTAT CRONOS (last update: 09/10/2009) and EES (last update: 23/10/2009)
2009 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2009)

MARS crop yield forecasts at national level for EU27 as of 10 November 2009

Country	SUNFLOWER (t/ha)					SUGAR BEET (t/ha)					POTATO (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	1.9	**1.6**	1.7	-12.9	-3.5	66.3	**65.0**	61.9	-2.0	+5.1	29.3	**29.9**	27.9	+1.9	+7.0
AT	3.0	**2.7**	2.6	-9.9	+2.7	71.8	**67.6**	66.7	-5.9	+1.3	33.2	**31.2**	31.7	-6.0	-1.6
BE	-	**-**	-	-	-	73.3	**69.2**	70.4	-5.6	-1.7	46.1	**44.7**	44.6	-3.2	+0.2
BG	1.8	**1.5**	1.5	-17.3	-2.3	-	**-**	-	-	-	16.3	**17.8**	15.9	+9.6	+11.9
CZ	2.5	**2.3**	2.3	-6.0	+3.4	57.2	**57.0**	53.1	-0.4	+7.2	25.8	**26.7**	25.3	+3.5	+5.5
DE	2.0	**2.2**	2.2	+11.7	-2.5	62.3	**62.9**	60.9	+1.0	+3.4	43.8	**44.6**	41.8	+2.0	+6.9
DK	-	**-**	-	-	-	55.4	**55.6**	57.0	+0.4	-2.5	35.0	**38.8**	37.8	+10.8	+2.7
ES	1.1	**0.8**	1.0	-26.3	-19.1	77.9	**73.3**	71.8	-5.9	+2.2	27.8	**28.1**	27.6	+1.2	+2.0
FI	-	**-**	-	-	-	34.4	**38.5**	37.7	+11.7	+1.9	25.8	**26.9**	23.7	+4.0	+13.3
FR	2.6	**2.3**	2.4	-10.7	-4.9	86.5	**82.8**	82.4	-4.2	+0.5	43.2	**44.6**	43.3	+3.2	+3.1
GR	-	**-**	-	-	-	65.4	**62.0**	63.8	-5.3	-2.9	25.3	**25.6**	24.4	+0.9	+4.7
HU	2.7	**2.5**	2.3	-7.3	+6.8	59.7	**55.0**	52.5	-7.8	+4.7	26.9	**24.7**	25.1	-8.3	-1.8
IE	-	**-**	-	-	-	-	**-**	-	-	-	31.1	**33.5**	34.9	+7.7	-4.1
IT	2.3	**2.1**	2.2	-6.1	-3.0	61.8	**56.1**	53.9	-9.2	+4.1	24.5	**25.5**	25.0	+4.0	+2.0
LT	-	**-**	-	-	-	39.0	**41.2**	40.4	+5.6	+1.9	14.8	**13.5**	11.7	-9.0	+14.8
LV	-	**-**	-	-	-	-	**-**	-	-	-	17.8	**16.1**	14.6	-9.5	+10.2
NL	-	**-**	-	-	-	72.2	**72.1**	67.0	-0.3	+7.6	46.0	**45.6**	43.8	-1.0	+4.1
PL	-	**-**	-	-	-	46.5	**48.8**	45.2	+4.9	+7.9	19.8	**19.2**	18.7	-2.6	+2.8
PT	0.7	**0.5**	0.6	-27.4	-15.1	-	**-**	-	-	-	14.6	**14.7**	15.0	+1.1	-1.4
RO	1.4	**1.3**	1.3	-9.9	-1.7	34.6	**36.3**	30.2	+5.1	+20.4	14.3	**15.4**	14.3	+7.5	+7.2
SE	-	**-**	-	-	-	53.7	**53.2**	50.4	-0.8	+5.5	31.7	**28.9**	29.8	-9.0	-3.2
SK	2.6	**2.3**	2.2	-8.8	+6.7	61.1	**57.6**	50.6	-5.7	+13.7	17.2	**16.7**	15.7	-2.7	+6.6
UK	-	**-**	2.0	-	-	62.5	**62.2**	58.7	-0.4	+6.1	42.7	**43.4**	41.6	+1.6	+4.2

Note: Yields are forecasted for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2004-2008 data come from EUROSTAT CRONOS (last update: 09/10/2009) and EES (last update: 23/10/2009)
2009 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2009)

MARS crop yield forecasts at national level for Black Sea and Maghreb as of 10 November 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	-	**-**	-	-	-
MA	-	**2.1**	1.4	-	+51.7	-	**1.4**	0.8	-	+74.3	-	**1.1**	0.9	-	+24.6
TN	-	**1.9**	1.6	-	+18.6	-	**1.1**	0.9	-	+18.4	-	**-**	-	-	-
TR	2.2	**2.3**	2.3	+2.6	+0.1	2.0	**2.5**	2.4	+23.5	+4.7	7.2	**6.8**	6.7	-5.9	+0.5
UA	-	**2.2**	2.7	-	-19.2	-	**1.7**	2.0	-	-17.8	-	**3.5**	3.8	-	-9.1

Country	RAPE SEED (t/ha)					SUNFLOWER (t/ha)				
	2008	2009	Avg 5yrs	%09/08	%09/5yrs	2008	2009	Avg 5yrs	%09/08	%09/5yrs
UA	-	**1.4**	1.4	-	+2.4	-	**0.9**	0.9	-	-8.7

Note: Yields are forecasted for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: TR: 2004-2008 data come from EUROSTAT CRONOS (last update: 02/10/2009) and EES (last update: 17/09/2009)
DZ, MA, TN, UA: FAO statistical database - 2008 data not yet available, therefore the 5-yrs average is computed on 2004-2007
2009 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 20/10/2009)

Abstract

The 6th 2009 printed MARS Bulletin (Vol. 17, No. 6) covers meteorological analysis and crop yield forecasts for the period 11 September to 20 October 2009.

Previous related analysis available:

— Climatic update, 1/09/2009 to 11/10/2009, (CU2009/9)
— Forecast update, 1/09/2009 to 30/09/2009, (FU2009/3)
— Pasture Bulletin, January-October 2009, (PB2009/2)

Next printed issue

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Contributions

The ***MARS technical report*** is an EC publication from JRC/IPSC Agriculture 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:

The geographic borders are purely a graphical representation and are only intended to be indicative. These boundaries do not necessarily reflect the official EC position.

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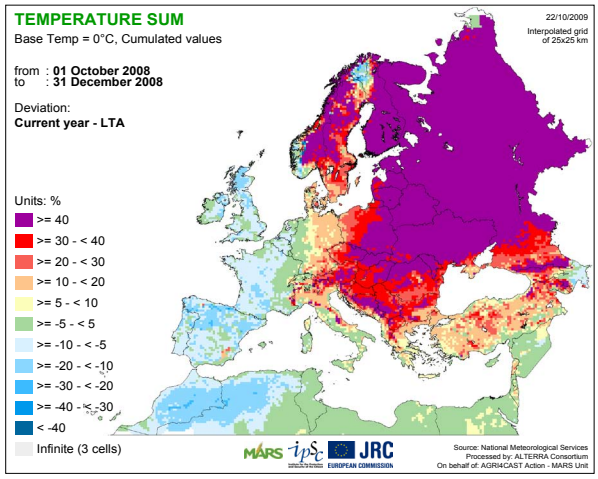
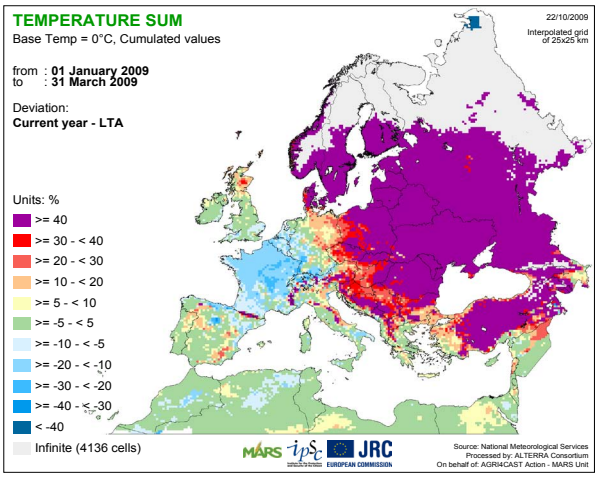
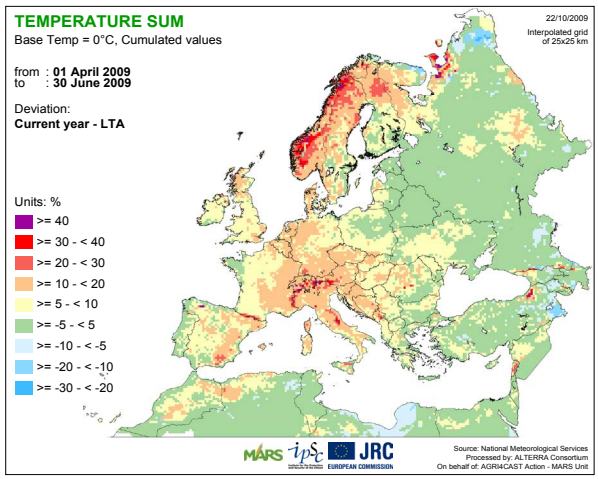
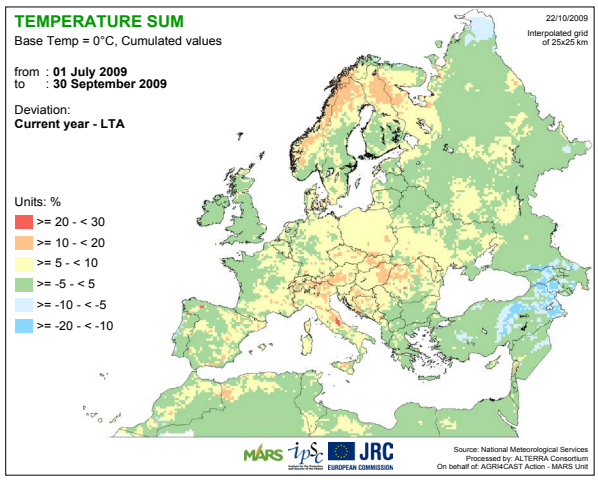








3. Meteorological overview for 2008/09

AUTUMN 2008 (October — December): Quite mild temperatures on the eastern side of the continent, whilst cooler in the west. Persistent water shortage in Portugal and the Black Sea basin, but abundant rain in the Mediterranean region

During the whole autumn, due to specific synoptic circulation, the eastern and western sides of the continent, separated along the 10th meridian, were exposed to two opposite kinds of thermal conditions: milder than average on the eastern side and cooler on the western side (in particular in November and December in the Iberian Peninsula). On both sides very large deviations from the average climatic conditions were recorded.

The largest positive differences (more than 40 % above the LTA) were reported in the eastern and northern parts of the continent, including Scandinavia, the Baltic countries, Russia, Belarus, Ukraine, all the eastern EU countries through to Germany and Greece. In these areas the thermal surplus was generally larger than 200 GDD and in some cases (Slovakia, Hungary, Romania, Bulgaria and Ukraine) even above 250 GDD. Those surpluses were mainly due to the above-seasonal minimum daily temperature recorded in October and the maximum in November and December. The higher thermal availability favoured rapid germination and tilling of the new winter cereals and, fortunately, throughout the period was sufficient to keep an adequate level of 'hardening' and, therefore, to keep exposure to possible frost damage quite low.

The negative differences were more moderate (the highest were around 20 %) and were reported in northern Spain, Algeria and Morocco. The deficits were driven by the relatively low temperatures recorded in both November and, particularly, December. In fact, in the Iberian Peninsula during these two months around 120 to 150 GDD were missing, compared with the seasonal values. Significant thermal deficits (50 to 60 GDD) were also recorded in December in France and in the British Isles. However, crop development was only marginally slowed down.

Overall, the rainfall showed an unusual spatial distribution: more abundant than normal in the central Mediterranean, Scandinavian and Maghreb regions (by 70 to 120 mm), but scarce in Portugal, western Spain, the central EU, Bulgaria, Tunisia, Ukraine and southern Russia (50 to 80 mm below normal). Nevertheless, during the period covered, with the exception of Portugal and the Black Sea area, where the water shortage was a constant feature throughout the whole period, the differences from the LTA distribution were not uniform. In general, the rain was sufficient to guarantee a good level of germination, sprouting and water consumption in winter crops. In October the rain was concentrated mainly in Spain, in the central and northern EU and in the Maghreb countries; it was particularly abundant in Finland, the Baltic countries and Scotland. By contrast, rain was scarce in Italy, Portugal, Greece and the eastern side of the Black Sea. Opposite conditions followed in the next two months, with abundant and persistent rain in the central Mediterranean area (Italy, former Yugoslavia, southern France and Morocco) but less in the central and northern EU, especially in December. As mentioned earlier, by the end of the period, despite the anomalous temporal distribution of the rainfall, the only areas of real concern were Portugal, eastern Spain and the Black Sea region, where the rain deficit was persistent and the soil water content, up to the beginning of December, was unlikely to be sufficient for appropriate germination of winter crops or forced farmers to delay sowing.

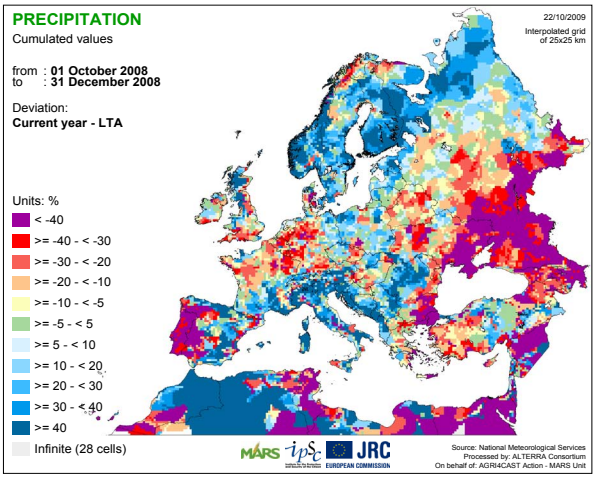
WINTER 2009 (January — March): Similar conditions to autumn: quite mild on the eastern side of Europe, rather cooler and dry in France and wetter in the Mediterranean, Balkan and Black Sea regions

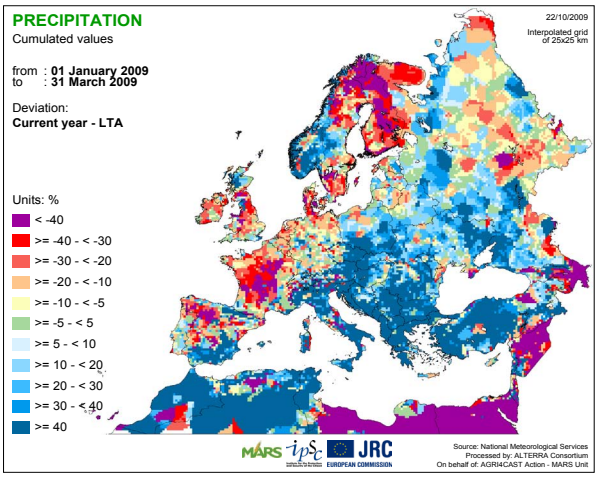
Taking the 'cumulated active temperatures' (elsewhere referred to as 'growing degree days' or GDD) as an indicator to assess thermal availability for crops, once again in the winter the whole eastern side of the continent, from Scandinavia to eastern Germany, the Balkans and down to Greece and Turkey, enjoyed milder than seasonal conditions. On average, in these areas the differences from the LTA were very significant (more than 40 % above). The highest surpluses were reported around the Black Sea basin, the Adriatic Sea and between Denmark and Sweden at above 100 GDD. However, similar surpluses were also recorded locally in Spain and Portugal. This was mainly due to the milder minimum temperatures recorded throughout the period and particularly in February and March: on average, 1.5 to 2.5°C above the LTA. Therefore, the number of 'frost days' this year was well below the seasonal average. Nevertheless, in the first part of January very sharp frosts were recorded, with temperatures of -24°C in Poland and -22°C in Germany. In February the synoptic circulation changed and the temperatures climbed rapidly above the seasonal average and even beyond the normal range of variation. A further deep drop in temperatures followed at the end of February, but in March more seasonal conditions returned. In these areas the frost damage to winter crops was generally well counter-balanced by appropriate 'hardening' levels and snow cover. Therefore, no significant impact was reported.

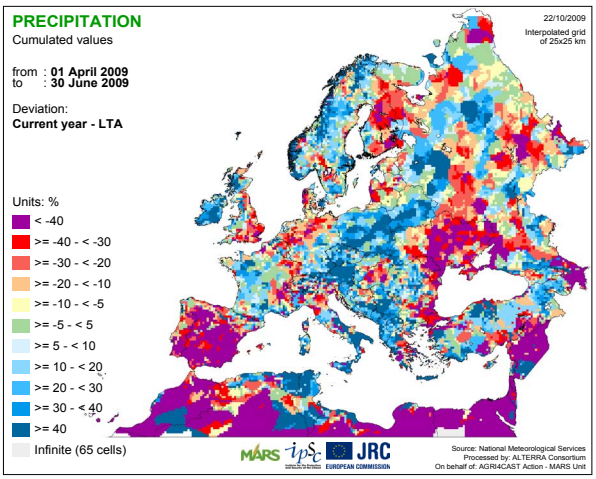
On the mid-western side of the continent (including France, the Benelux countries, southern UK and north-east Spain), in January conditions were similar to those in the rest of Europe, but in February and March the temperatures persisted generally below the seasonal average (but always within the normal ranges of variation). Therefore, by the end of March, the GDD accumulation was 50 to 80 GDD down. This was reflected in crop development and growth, which were clearly slowed down. Also, in the same areas in January brief, but very severe, frosts occurred, with temperatures of -15 to -12°C in central and northern France, 19°C in the Netherlands and 10°C in northern Spain. In this case too, the severe frosts occurred at a stage when the plants were sufficiently ready to resist such low temperatures and, therefore, the damage is very likely to have been negligible.

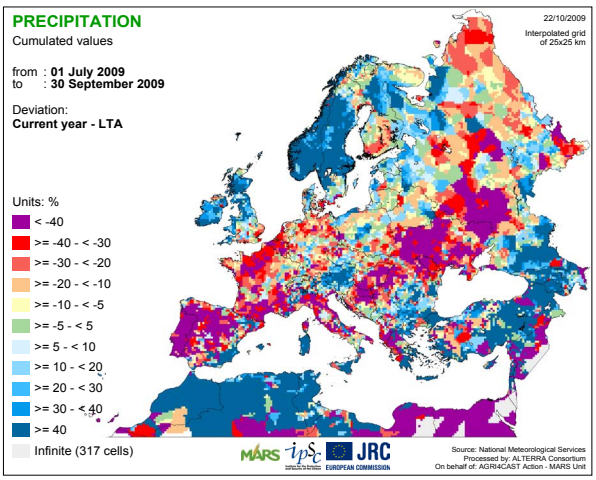
During the winter the precipitation was more abundant than normal in the Mediterranean basin, the Balkans and the Black Sea area. In particular, in Morocco, Tunisia, the whole of the Adriatic basin, western Greece and Turkey the rain surpluses were well above the LTA on 150 to 200 mm. In some cases (Serbia and Albania), the total rainfall even exceeded, on average, 350 to 400 mm with peaks of up to 800 mm. This amount of rain was generally concentrated between January and March, with a few extreme events in southern Italy, Slovenia and western Turkey also. On the whole, there were more than 20 rainy days (cumulated rain > 5 mm d-1), with extremes of 32 to 35 on the western side of the Adriatic Sea.

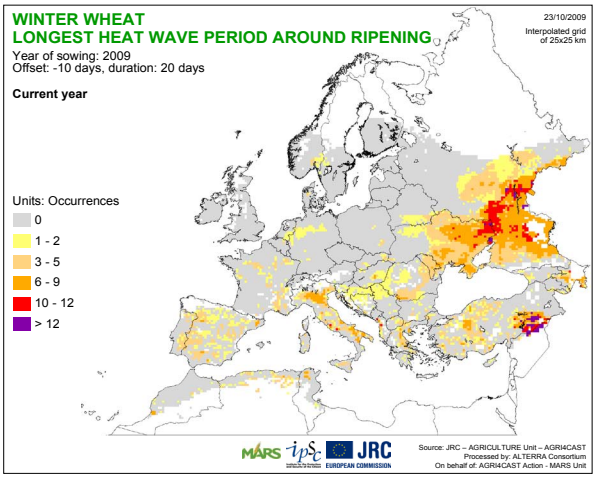
Quantitatively, the opposite situation was recorded in France, the Benelux countries, Denmark, southern Sweden, central Finland, central and northern England, Ireland, north-west Spain and Portugal. There, at the end of March, on average 70 to 90 millimetres of rain were missing. The water deficit was particularly large in central France (Limousin) and in Galicia, where it was estimated at more than 150 and 200 mm respectively (equivalent

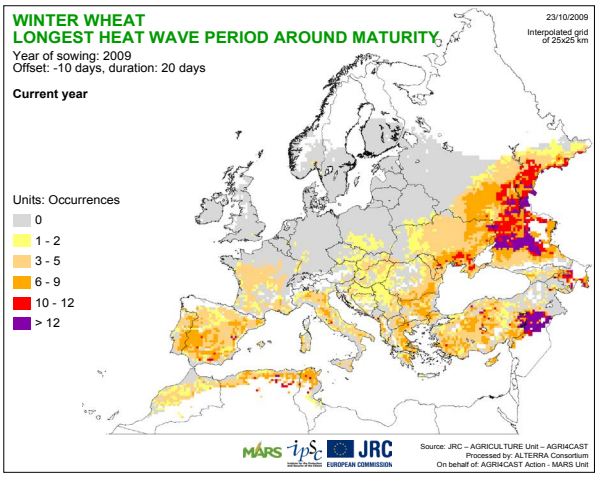


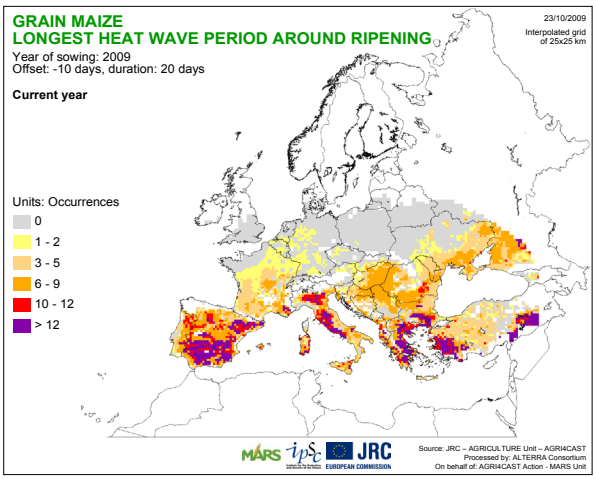


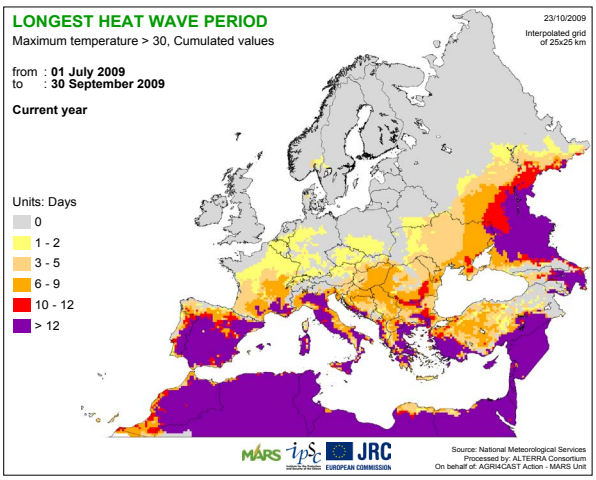












to around 50 % of the LTA). However, the rain was sufficient to satisfy the crops' very limited water requirements during this period. Portugal, Galicia, Extremadura and Aquitaine were the areas where the water shortage created real concern. In these areas by the end of March the simulated soil water content was comparable to that between mid-May and the end of May and the winter crops are likely to have been affected by the limited water availability.

SPRING 2009 (April — June): a moderate, mild March followed by a quite warm April and start to May. June colder in the Baltic area. Abundant rain in many Mediterranean countries in April and in central and eastern Europe in June (in Austria >300 mm)

In general, temperatures were slightly higher than the long-term average (LTA) across most of Europe. The cumulated rain distribution during the season was higher than the seasonal values mainly in the central longitudes and lower than normal in the Iberian Peninsula and north Black Sea area.

April brought seasonal temperatures in the Iberian Peninsula, central and western France, Ireland, western Russia, the western side of the Black Sea and Greece. A general surplus of cumulated temperature (of more than 120 GDD) was recorded in the Scandinavian countries, Germany, Austria, the Czech Republic, Slovakia, western Poland, the northern Netherlands and southern Switzerland. Temperatures were colder than normal in central and eastern Russia, eastern Ukraine and eastern Turkey. A severe frost (-8 to -10oC) was recorded between Russia and Ukraine in the last ten days of the month. Sub-seasonal temperatures were also recorded in Portugal, north Africa and on the eastern side of the Black Sea. Practically no rain fell in the large area between the Baltic and Black Seas (southern Sweden, north-eastern Germany, Poland, Lithuania, Latvia, Estonia, Belarus, south-western Russia, Ukraine and Moldova). Rain shortages also affected Finland, Denmark, the Czech Republic, Slovakia, Austria, Hungary, Romania and Ukraine. Precipitation was low (30 mm below the LTA) in the central and western Iberian Peninsula, eastern Scotland, England and Switzerland. Rain was more abundant in southern Italy, western France, Ireland, central Sweden, eastern Russia and northern Africa (more than 40 % above the LTA). Central France, Turkey and the Balkan Peninsula reported seasonal rain values.

In **May** the cumulated active temperatures were higher than normal (by more than 60 %) in the north (mainly the Scandinavian Peninsula). The Mediterranean and Adriatic areas (including the Alps and the Pyrenees) and central Russia were also warmer than usual (up by 80 to 100 GDD). The flow of hot air from Africa determined temperatures in Morocco and the Iberian Peninsula and influenced the whole Mediterranean basin, where the maximum daily temperatures in the second half of May rose to extreme values of 36 to 37°C. In Germany, Hungary, Romania and Greece too, anomalously high temperatures (34°C) were reported. A general surplus of cumulated active temperature was recorded in all the Mediterranean countries, in particular in Italy, eastern and southern Spain and Greece (between 100 and 150 GDD). In the northern latitudes, in the middle of May, a light temporary frost occurred in central and southern Poland and in southern Sweden. Little or no rain fell in the regions which recorded high temperatures, i.e. in the Iberian Peninsula, south-eastern France and Italy, with the exception of the central region (Tuscany and Umbria). A significant rainfall deficit occurred in southern and eastern Spain. There was little or no rain in northern and southern Italy and western Greece. Rain was also scarce in Hungary,

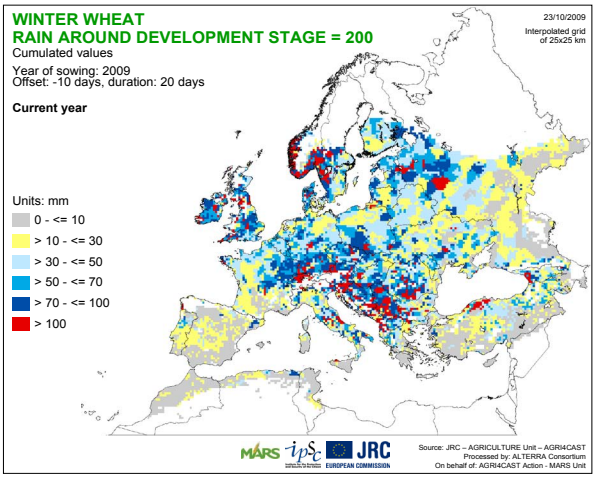
southern Bulgaria and between Moldova and southern Ukraine. Below-average rainfall (40 to 20 mm below) was recorded in the eastern areas of the Baltic countries (northern Lithuania, Latvia, Estonia, coastal areas of Finland and Russia). Opposite conditions prevailed in Sweden (except coastal areas on the Gulf of Bothnia), Norway, Poland, eastern Germany, the Czech Republic, Austria, Belarus, Ireland, central and northern United Kingdom and the north-east of the Black Sea area, where cumulated rainfall was significantly above the LTA (by more than 40 %).

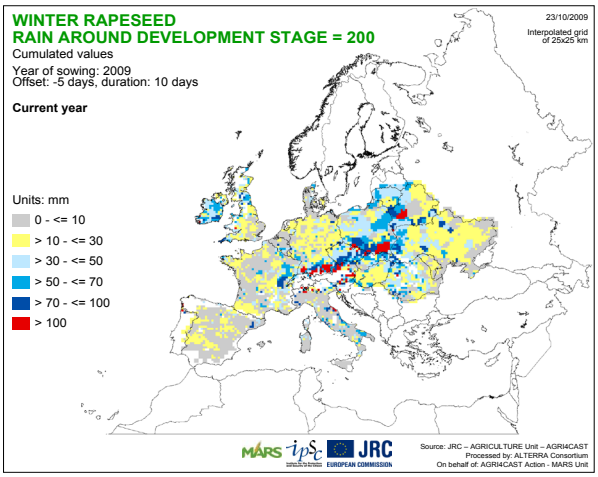
From early to mid-**June** the Azorean anticyclone strongly influenced the Iberian Peninsula and Morocco and a low-pressure system was centred on the North Atlantic. Until the middle of the month, warm conditions prevailed in Spain and Portugal. Cold air masses reached the Baltic areas: Sweden, Finland, Latvia, Estonia, central and eastern Germany and western Poland. At the end of the month warmer air blew into northern latitudes and on the northern and eastern sides of the Black Sea. By contrast, conditions were cloudy and cooler in the central Mediterranean basin. For several consecutive days in June, the maximum daily values were above 33° to 34°C and even reached over 41°C in Andalucía (Spain) and in Alentejo (Portugal). Temperatures were also very high in Scandinavia and the British Isles, e.g. 31.2°C in southern Sweden on 29 June (almost 14°C above the long-term average) and 30.4°C in Scotland (9° above the long-term average). In the second part of June persistent and abundant rains occurred along the eastern EU borders. Heavy downpours (over 150 mm) hit the eastern Baltic area and eastern and southern Poland (Małopolskie over 180 mm), moving southwards through Belarus, western Ukraine, the Czech Republic, Slovakia, Austria, the countries on the eastern side of the Adriatic Sea, southern Italy and central and western Romania. Large surpluses were recorded in the north of Portugal and Spain (Rioja and Pyrenees) compared with the long-term average. In Austria between 22 and 23 June very intense and abundant rain (180 to 200 mm in two days) created serious problems and possibly caused damage to crops. By contrast, persistent rain shortages were again recorded in the central and Mediterranean regions of Spain, the northern Black Sea area and southern France. Rain shortages were also reported in Piemonte and Emilia-Romagna in Italy, in eastern Ukraine and in southern Russia. In Spain, the Po valley, southern France and Ukraine, the limited water supplies observed since the beginning of May, combined with high evapotranspiration values, led to high climatic water balance deficits, estimated at more than 80 to 100 mm.

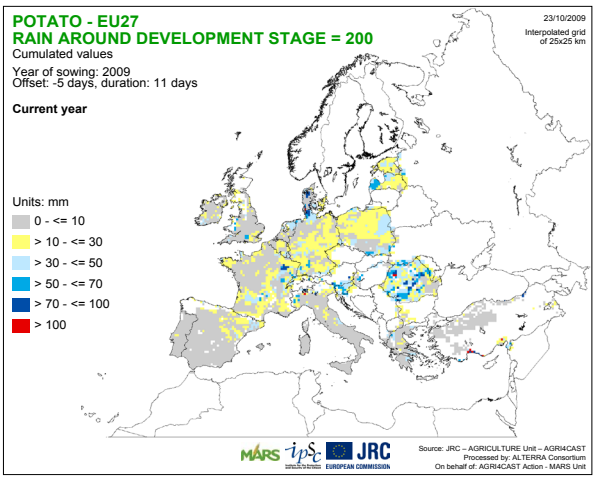
SUMMER 2009 (July — September): Generally favourable seasonal weather conditions: normal temperatures and rainfall. Exceptions in Ireland, the UK, Denmark, Sweden and Austria, with wet conditions, and in the Iberian Peninsula, Italy, southern and northern France with water supplies short

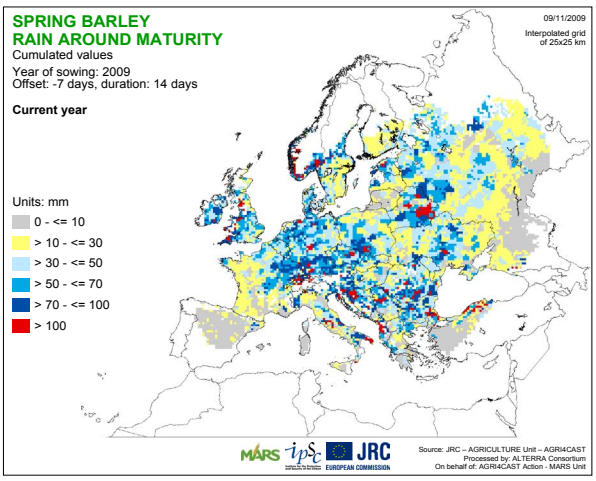
In general, thermal conditions during the summer season were close to normal. Above-average temperatures (by more than 10 %) were recorded in the continental part of Europe and in the Scandinavian Peninsula. Temperatures were slightly colder than usual in coastal areas along the Atlantic Ocean, southern Ireland, south-western England, Brittany in France and western Portugal.

In **July**, northern regions (northern parts of Russia and Finland and some areas near the Gulf of Bothnia) and Atlantic areas (north-western Portugal and Galicia) were colder than the LTA (by 10 %, equivalent to 60 to 80 GDD), whereas central regions were close to the average. Temperatures were above the seasonal









average (by 60 to 80 GDD) in the area between the southern side of the Baltic Sea (in Poland) and the northern side of the Black Sea (Ukraine and southern Russia). It was also warmer than usual in the coastal Mediterranean parts of Spain and northern Africa. Precipitation was abundant in northern latitudes, especially in Ireland, the United Kingdom and the Scandinavian Peninsula (except the northern part), where rainfall exceeded the seasonal value by more than 60 mm. In some northern areas and in Austria the monthly cumulated rainfall exceeded 200 mm. Denmark, Germany, Poland, Estonia, Belarus and the north-western part of the Iberian Peninsula (Galicia in Spain and from central to northern Portugal) also recorded heavy rain. By contrast, other areas of the Iberian Peninsula enjoyed a dry spell. Similar conditions occurred in southern France and Corsica, in some regions of Italy (Emilia-Romagna, Piedmont and Sardinia), in the western Pyrenees and in western Turkey.

In **August** temperatures were close to average in Ireland, the United Kingdom, the southern Scandinavian Peninsula, the western side of the Black Sea (eastern Romania and Bulgaria) and the Perinea Peninsula. Temperatures higher than normal (even by more than 20 %) were recorded in the north of the Scandinavian Peninsula. In the Alpine areas, western Europe (with the exception of Atlantic regions) and central Europe conditions were also warmer (10 % to 20 % above the long-term average). Around mid-August, temperatures rose above 38°C in Andalucía, Extremadura, Alentejo, south-western France and central Italy and above 35°C in northern Germany, central France, the Benelux countries and central and northern Italy. These high temperatures accelerated cereal desiccation, favouring harvesting in northern latitudes, but causing heat stress for the still active crops (e.g. maize in France and Italy), bottling up biomass accumulation and inducing higher water requirements. August was significantly drier than usual in almost every country, especially in Portugal, Italy, Ukraine and Turkey. Rain was also scarce in north-western France, Germany (except the southern part), western Poland and central Greece. Some parts of Russia also reported a shortage of rain. By contrast, in the northern latitudes above-average precipitation was observed (Ireland, northern United Kingdom, Scandinavian Peninsula, Denmark and some regions of Russia).

In **September** the western part of Europe (Ireland, the United Kingdom, the Iberian Peninsula, France, Germany and Denmark) and the Black Sea basin enjoyed seasonal temperatures. The month was warmer than normal in the eastern part of the continent, starting from longitude 15oE, including eastern Norway, Sweden, Finland and central to northern Russia. In Finland and Russia in particular, cumulated temperatures exceeded seasonal values by 40 % (more than 60 GDD). Above-seasonal temperatures were also recorded in Poland, Baltic countries, Belarus, Ukraine, the Czech Republic, Slovakia, Austria, Hungary, western Romania, Moldova, north-eastern Italy, Slovenia, Croatia, Bosnia and Herzegovina and northern Serbia. The Black Sea area (excluding the north-eastern part) was colder than usual. After a wet July and August, precipitation was lower than seasonal values in Ireland and central to southern United Kingdom. Rain was also scarce in Portugal, north-eastern Spain, France, the Benelux countries, Germany (excluding the central part where rainfall was even above the LTA), north-eastern Poland, south-eastern Belarus, central and eastern Russia, western Ukraine, Moldova, the Czech Republic, Slovakia, Hungary, central to north-eastern Romania and countries on the right side of the Adriatic Sea. The coastal areas beside the Mediterranean Sea (mainly south-eastern Spain, Sardinia, Sicily and northern Africa) received over 40 % more rain than normal. The same applied to the coastal areas along the Aegean Sea and the Black Sea and to the central and northern parts of the Scandinavian Peninsula.

4. Agrometeorological analysis of the EU-27 area

Cereals

Cereal production (excluding rice) is now expected to total 290 million tonnes, in line with the five-year average but 8 % down compared with 2008. This is mainly explained by an increase in average yield, which is forecast at 5.0 t/ha at EU-27 level. This is 4.8 % down on 2008 and only slightly above the five-year average.

In comparison with 2008 the cultivated area has decreased slightly (by 3 %) but is in line with the five-year average. Looking at the individual crops, all yield forecasts are between 2 % (winter barley) and 8 % (spring barley) lower than 2008. However, all cereals except spring barley are above the last five-year average, notably durum wheat which is 4.5 % up on it.

WHEAT

The yield for soft wheat is forecast at 5.7 t/ha at EU-27 level which is a decrease of 5.4 % compared with last year and only slightly (1.2 %) higher than the five-year average. Durum wheat is forecast at 3.1 t/ha which is 4.3 % less than in 2008 but 4.5 % higher than the five-year average.

The largest producer of soft wheat — France — forecasts yield of 7.4 t/ha (2.1 % up on 2008 and 4.4 % above the five-year average). The cultivated area decreased compared with 2008 but stayed in line with the long-term average. The 10- to 20-day delay in crop development for winter cereals observed in February was made up for in April thanks to above-seasonal temperatures. The rain supply was adequate during the spring. For the rest of the season agrometeorological conditions remained close to seasonal values.

Germany, the second largest producer, forecasts yield at 8.0 t/ha, which is 5.5 % up on the five-year average and slightly (1.1 %) below 2008 levels. The cultivated area remained constant in comparison with both 2008 and the long-term average. Despite a dry spell in April, the

soil moisture was replenished in May and June and favourable conditions produced a high yield.

In the United Kingdom, the yield forecast is 7.9 t/ha which is in line with the five-year average but 4.4 % down on the high yields obtained in 2008. Until June very high yields were forecast, but after persistent rainfall in July the expectations were revised downwards.

Most of the other countries are forecast to have yields considerably lower than the previous season. The only exceptions to this trend are Finland (up by 3.8 % to 3.7 t/ha), Sweden (up by 0.9 % to 6.2 t/ha), Ireland (up by 0.3 % to 9.1 t/ha), the Netherlands (down by 0.4 % to 8.7 t/ha), Poland (down by 1.4 % to 4.0 t/ha), Belgium (down by 2.2 % to 8.5 t/ha) and Greece (down by 2.5 % to 2.9 t/ha).

Several countries did worse in comparison with both 2008 and the five-year average: Hungary (4.0 t/ha, 9.1 % below the five-year average), Italy (4.9 t/ha, 7 % below), Portugal (1.4 t/ha, 18.7 % below), Romania (2.6 t/ha, 6.7 % below), Slovakia (4.1 t/ha, 6 % below), Slovenia (4.3 t/ha, 2.6 % below) and Spain (3.2 t/ha, 2 % below).

Finally, yields higher than the five-year average are forecast for Austria (1.1 % above), Bulgaria (4.8 %), the Czech Republic (0.5 %), Denmark (2.4 %), Estonia (0.4 %), Lithuania (7.3 %), Luxembourg (2.4 %) and Latvia (4.8 %).

Total production of durum wheat is forecast at 9 million tonnes, which is 10 % less than 2008 and 8 % below the five-year average. This is mainly due to the smaller area cultivated (12 % less than the five-year average) which is partly compensated by the high yield forecast for 2009. The yield forecast for EU-27 is now 3.1 t/ha which is 4.3 % less than 2008 but 4.5 % more than the five-year average.

Italy, the leading producer of durum wheat, forecasts 2.8 t/ha which is 11.6 % less than 2008 and 4.9 % less than the five-year average. France had an average season with yield at 4.9 t/ha. Greece had a very good season with predicted yield of 2.8 t/ha, which is 23 % more than the five-year average but 6 % less than 2008.

BARLEY

The forecast total EU-27 yield of barley (spring and winter) is 4.3 t/ha and thus 4.6 % less than 2008 but in line with the five-year average. The season was less conducive for spring barley which is forecast at 3.6 t/ha, 7.9 % less than 2008 and 2.8 % less than the five-year average. It was a rather good season for winter barley with a forecast of 5.3 t/ha, 2.3 % less than 2008 but 3.2 % more than the five-year average.

Total barley production is now set at 60 million tonnes, which is 8 % less than 2008 but in line with the five-year average. The decrease in comparison with 2008 is due partly to lower yield and partly to a decrease in the area used for cultivating spring barley.

For winter barley, the two leading producers — France and Germany — are both forecasting yield of 6.7 t/ha. In Germany, this is 2 % up on 2008 and 4 % above the five-year average, whereas in France it is 1.6 % down on 2008 but 2.4 % above the five-year average. A good season is predicted for some of the northern countries: Belgium (8.4 t/ha, 4.9 % above the five-year average), Lithuania (3.6 t/ha, 9.1 % above), Sweden (5.7 t/ha, 5.9 % above) and the United Kingdom (6.8 t/ha, 4.3 % above). In Portugal and some countries in eastern Europe the season has been poor, with yields of 1.5 t/ha (17 % below the five-year average) in Portugal, 3.3 t/ha (21 % below) in Hungary, 2.5 t/ha (9 % below) in Romania and 3.3 t/ha (12 % below) in Slovakia.

For spring barley, yields significantly below the five-year average are forecast in Spain (2.4 t/ha, 18.8 % below), Bulgaria (2.2 t/ha, 10.2 % below), the Czech Republic (3.7 t/ha, 10.7 % below) and Hungary (2.7 t/ha, 24.1 % below).

Most of the other countries are forecasting spring barley yields close to the five-year average. Exceptions to this trend are Denmark (5.2 t/ha, 8.6 % above), the Netherlands (6.4 t/ha, 7.2 % above) and Sweden (4.5 t/ha, 8.9 % above).

GRAIN MAIZE

Last year was much better. For grain maize close to normal yield is forecast. The predicted yield at EU-27 level (6.9 t/ha) is 4.8 % lower than last year, but 2.3 % higher than the five-year average.

Comparing the current values with the five-year average, the best maize yields are decidedly forecast in the Czech Republic (7.5 t/ha, 8.7 % above average), Austria (10.8 t/ha, 8.3 % above), Slovakia (6.6 t/ha, 8.2 % above) and Germany (9.7 t/ha, 6.7 % above). Among the main producers, only Romania (3.5 t/ha, 7.7 % up on 2008) is expected to avoid a reduction, whereas in comparison with the previous excellent year France (8.7 t/ha, down by 4.3 %), Italy (9.2 t/ha, down by 6.5 %) and Hungary (6.3 t/ha, down by 15.9 %) suffered from unfavourable conditions, mainly over the second part of the summer. Belgium (10.4 t/ha) is also forecasting yield significantly (10.5 %) below average.

The spring was marked by low soil moisture conditions in several countries across Europe (Austria, Slovakia, Hungary, Romania, Bulgaria and the Black Sea area), but these placed only marginal constraints on maize production. The precipitation in June and July arrived in time in central Europe replenishing the soil and providing an adequate water supply for the most sensitive stage of maize. In July and August, particularly in France, Italy and Spain but also in Hungary, Romania and the Black Sea area, the maximum daily temperatures frequently exceeded the normal level, causing heat stress for growing crops and lowering yield expectations. The heat spell, combined with dry conditions in southern France and northern Italy, worsened the situation. Problems with insufficient water availability emerged in Belgium, France, northern Italy and some areas of Hungary, Romania, the former Yugoslavia, Moldova and Ukraine.

Maize completed its cycle ten to twenty days in advance in southern, central and eastern Europe due to the frequent hot spells. Unfortunately, in most cases the advance was concentrated during the reproductive phase, hence shortening the grain-filling period and lowering yield expectations. In the end, the effects of the alternating good and bad weather conditions cancelled each other out and resulted in near-average crop yields in all EU-27 countries.

Oilseeds

RAPESEED

The final yield expectation for rapeseed (3.0 t/ha) is slightly less than both 2008 and the five-year average. France had a good year, forecasting 3.5 t/ha, 5.4 % better than average, as did Germany with 3.9 t/ha, 4.4 % above average.

Total rapeseed production in EU-27 is forecast at 20 million tonnes which is 16 % better than the five-year average. This large increase is explained by an 18 % increase in the area used for cultivating rapeseed.

Many countries will have much better yields than normal: Bulgaria (2.1 t/ha, 6 % above normal), Denmark (3.8 t/ha, 8.4 % above), Lithuania (1.9 t/ha, 7.8 % above), Latvia (2.1 t/ha, 8 % above) and Sweden (2.8 t/ha, 6 % above). As in the cases of wheat and barley, several eastern countries had a tough season. In Austria the yield is forecast to be 10 % below normal and in the Czech Republic 11 % below (both at 2.8 t/ha). In both countries, the season started with a delay in development, followed by a surge in growth combined with low water availability and a lack of soil moisture during the flowering period.

SUNFLOWER

Average conditions in eastern districts merely compensated for the depleted yields of many leading western producers (Spain, France and Italy). The expected yield for sunflower at EU-27 level is about 1.6 t/ha, not far from the five-year average (3.5 % below) but significantly down on the last, exceptional, year (by 12.9 %).

France, Hungary, Bulgaria, Romania and Spain still account for around 90 % of the total area growing sunflower in EU-27. Despite an increase in these areas (up by 5.4 % at EU-27 level compared with the last five-year average) in these five countries, particularly in Spain (16.9 % more than 2008 and 31.7 % above the five-year average) and with the sole exception of Romania (13.8 % below the five-year average), unfavourable agrometeorological conditions were observed, mainly on the central and western side of the EU, which significantly depleted the yield, leading to a forecast reduction of EU production by around 9.6 % compared with last year, but to a level closer to (1.7 % above) the five-year average.

In Hungary an average year is forecast, with 2.5 t/ha (7.3 % down on 2008 and 6.8 % above the five-year average). France and, particularly, Spain suffered unfavourable conditions reducing their yields to: France 2.3 t/ha, 4.9 % below average and 10.7 % down on 2008; Spain 0.8 t/ha, 19.1 % below average and 25.3 % down on 2008. After a very good result in 2008, Bulgaria and Romania returned to average conditions taking their yields to: Romania 1.3 t/ha (1.7 % below average and 9.9 % down on 2008); Bulgaria 1.5 t/ha (2.3 % below the five-year average and 17.3 % down on 2008).

In the case of this crop, two opposite situations were observed across the continent: quite average conditions for eastern producers but warmer and drier agrometeorological conditions than usual in western sunflower-growing areas. This season Spain was particularly hard hit. There the persistent drought started at the very beginning of the crop cycle and the higher temperatures accelerated crop development and had a severe impact on the final yield. In Spain the yield was so depleted that, despite an increase of almost 17 % in the area cultivated compared with 2008, the total national production is forecast at 13.8 % down on 2008. These losses were counter-balanced by the increase in the areas cultivated, by the relatively good performance in Hungary and by the average yields in Bulgaria and Romania.

Roots and tuber crops

SUGAR BEET

At EU-27 level, the 2009 sugar beet yield is forecast at 65.0 t/ha, 2.0 % down on the last season but 5.3 % above the five-year average.

A good season is expected among the main producers (France, Germany, Poland and the United Kingdom).

Despite a cold and wet June, favourable conditions prevailed during the sugar beet season in Germany, Poland, Finland and Lithuania. In these countries, and also in Romania, yield is expected to be higher both than 2008 and than the five-year average. For Germany yield is forecast at 62.9 t/ha (3.4 % above the five-year average) and for Poland 48.8 t/ha (7.9 % above). In both countries a wet June and July were followed by a drier August and September. The thermal and moisture conditions were favourable in Finland and Denmark, creating yield expectations higher than both last year and the five-year average. In Finland in particular a significant increase in yield compared with the last, cold and wet, year is forecast (38.5 t/ha, up by 11.7 %). Very good yield, higher than normal and the 2008 season, is forecast in Romania (36.3 t/ha, 20.4 % above the five-year average). In the Czech Republic and Slovakia, although the yield will be lower than last year, it is expected to be above 57 t/ha and will be significantly higher than the five-year average, by 7.2 % and 13.7 % respectively.

Although lower than in 2008, France is still expected to produce the highest yield in Europe (82.2 t/ha, 0.5 % above the five-year average), followed by Spain (73.3 t/ha, 2.2 % above) and the Netherlands (72.1 %, 7.6 % above). In Belgium and Greece the yield will be about 5 % lower than last season and below the five-year average (by 1.7 % in Belgium and 2.9 % in Greece), but will nevertheless exceed 62 t/ha. The most significant reductions in yield compared with the previous season are forecast in Italy (down by 9.2 %) and Hungary (7.8 %), because of the long dry and warm spell during the growing season. Nevertheless, the yield forecasts are 56.1 t/ha (4.1 % above the five-year average) for Italy and 55 t/ha (4.7 % above) for Hungary.

POTATO

The expected yield of potato at EU-27 level is 29.9 t/ha, higher than both 2008 (by 1.9 %) and the five-year average (by 7.0 %).

A good season is forecast in Germany (44.6 t/ha, 6.9 %

above the five-year average), France (44.6 t/ha, 3.1 % above) and in the United Kingdom (43.4 t/ha, 4.2 % above), where it will be higher than last year. For the other main producers — Poland and the Netherlands — yields will be higher than the five-year average but slightly lower than in 2008. Expectations are good, in line with the five-year average, for Belgium (44.7 t/ha). In Denmark, Spain, Italy, Greece and the Czech Republic the yields are also expected to be above both the five-year average (by 2.0 %) and last season, with forecasts of 38.8 t/ha, 28.1 t/ha, 25.5 t/ha, 25.6 t/ha and 26.7 t/ha respectively.

In Finland too a significant increase in yield is forecast (26.9 t/ha, up by 13.3 %), thanks to conditions warmer than both the long-term average and last year. In Romania and Bulgaria yields will also be significantly higher both than in 2008 and than the five-year average, because of the good seasonal distribution of the rainfall. The forecast for Romania is 15.4 t/ha (7.2 % above the five-year average) and the figure for Bulgaria is 17.8 t/ha (11.9 % above). In Latvia and Lithuania, although the yields are expected to be lower than last year, they should be significantly (more than 10 %) higher than the five-year average.

Compared with the previous season and the five-year average, a decrease in yield is expected in Hungary (where the persistent drought could have affected non-irrigated plantations), Sweden and Austria (where temporary heavy rainfall was recorded in the summer). However, this should have no significant impact on European Union potato production.

Rice

Rice yield at EU-27 level is forecast at 6.6 t/ha, slightly higher both than last year (by 0.4 %) and than the five-year average (by 0.8 %).

The increase in rice production at EU-27 level is due to a generally positive season supported by the increase in the area cultivated, especially in eastern countries where the improvement in yield expectations has been more significant. Rice yield forecasts for these countries are: 5.0 t/ha for Bulgaria (6.4 % up on 2008), 4.3 t/ha for Hungary (up by 16.8 %) and 4.7 t/ha for Romania (up by 21.8 %). Amongst the main producers, Italy (6.5 t/ha, up by 0.6 %), Greece (8.5 t/ha, up by 9.0 %) and France (5.8 t/ha, up by 2.6 %) have shown good potential during the current season, driven by high temperatures and a lower risk of blast infection. Only the advance in development might have led to premature canopy senescence and, consequently, shortened ripening. By contrast, the sub-optimum conditions observed in some regions of the Iberian Peninsula have lowered the gross yield potential in Spain and Portugal (7.0 t/ha, 0.7 % down on 2008 and 5.7 t/ha, 0.4 % down respectively). In eastern Spain the forecast blast infection risk has been 50 % higher than the long-term average, while in Portugal too abiotic limiting factors have a bearing on crop development.

5. Agrometeorological analysis of the Black Sea area

Turkey: Season marked by mainly average climatic conditions confirmed by average levels of yield for winter cereals. Dry summer had a negative impact on maize yield

A positive seasonal trend for winter cereals was observed, with sufficient rain and moderate temperatures, and the 2008-2009 agricultural season can be considered as average. Dry conditions prevailed for most of the summer, but with limited effects on irrigated summer crops. Wheat yield is estimated at 2.3 t/ha, close to average levels and slightly above 2008. Barley is estimated at 2.5 t/ha (compared with a long-term average of 2.4 t/ha and the 2008 yield of 2.0 t/ha). Grain maize is expected to yield 6.8 t/ha, 5 % below the five-year average and on the same level as in 2008.

In Turkey winter cereals are generally sowed between September and October. At the beginning of the current agricultural season this period was marked by precipitation below the seasonal average in the main producing regions of central Anatolia. Precipitation recovered from the second half of November on. At the end of November unseasonably warm weather followed. In specific areas such as the southern Konya Province the cumulated active temperatures (Tbase = 0°C) were 20 % higher than the norm. For cereals this meant rapid germination and early development and tillering. These conditions at the beginning of the winter could expose the new plants to a higher risk of frost damage. In fact, a significant frost actually affected most of central Anatolia in the first few days of January although the possible negative effects were mitigated by the snow cover. Snow was again reported during March in the west of the central highlands, only marginally affecting wheat in the heading phase. Due to a delay in development, barley avoided most of the potential damage. The cumulated active temperatures remained on average levels throughout the period, with a slight delay in the development cycle due solely to the snow cover. A short cold spell in late May further slowed down crop development, especially for barley, but wheat benefited from these agrometeorological conditions, further extending the growth season. Precipitation in the main cereal-growing regions of Ankara and Konya increased constantly from May onwards, allowing an almost complete recovery from the thermal and moisture stresses observed during the winter. Wheat reached flowering in early June and a relatively short dry period coinciding with this stage was favourable for pollination and, consequently, yield establishment. In early July there was a north-to-south reduction gradient in precipitation and the south-west of the country actually reported relatively dry weather, but not to such an extent as to influence the productivity of winter cereals in the final phenological phases.

Grain maize is cultivated essentially in the west of Turkey, in the Black Sea, Marmara and Aegean regions and in some

areas of the south. In general, it benefits from irrigation. This is reflected in the relative stability of yields across the time series, regardless of the climate trends. In May to June the crop was still at a very early stage of development and benefited from the rains. In late June, there were no particular stress events and development of grain maize was actually favoured by the combination of moderately dry weather and stable or slightly above-average maximum temperatures. Overall, conditions during the summer were, however, particularly dry with only some sparse precipitation in the north-west (Black Sea and Marmara areas) at the end of July. This trend significantly reduced the overall yield of maize.

Ukraine: Dry spell in June followed by wet conditions in early July reduced yields of winter cereals but improved yields of spring crops

Considering the seasonal trend in the main cereal-growing regions, the estimated yield for wheat is 2.2 t/ha, 19 % below the five-year average. This figure is, however, less negative considering the exceptional yield levels of the previous season. The forecast for barley is 1.6 t/ha (21 % below the five-year average), while rapeseed yield is expected to be 1.1 t/ha (17 % below the five-year average). For spring crops too, given the relatively low productivity, the percentage variations are not very significant. For grain maize the yield is estimated at 4.2 t/ha, 9 % above the five-year average. The yield estimate for sugar beet is 36.4 t/ha, once again a significant increase over the five-year average. The estimated yield for sunflower, taking into account the wider distribution of the crop, is 0.8 t/ha, more than 12 % below the five-year average.

The 2009 agricultural season followed an exceptional 2008 and started with high hopes. Mild temperatures and precipitation in September supported germination. Then, from October onwards, dry and moderately cold weather favoured hardening. Frost in December in the east of the country caused no significant winterkill and the winter cereals came out of dormancy quite early due to the combined effect of mild temperatures in late February and March and above-average precipitation. From mid-March onwards, however, relatively dry conditions followed, especially in the main cereal-growing regions (Mykolayivs'ka and Kherson'ka). These conditions persisted for over a month and ended during the second ten-day period in April. Rain set in again towards the end of April, combined with an increase in average temperatures, partly reducing the accumulated deficits and favouring winter cereals and rapeseed. Over the same period, temperatures fluctuated strongly and, while the maximums remained systematically above average, there were a couple of cold spells in mid-March and mid-April with, however, a limited impact on wheat, as it was still in the early heading phase. The cumulated active temperatures remained systematically above average despite these fluctuations.

Towards the last stages of their productive cycle, winter cereals suffered the effects of reduced soil moisture content and premature maturation and early harvest, which usually occurred between July and August. In the central and eastern regions, dry conditions were more persistent and significantly reduced the potential yield. The western and south-central regions of Ukraine recorded some precipitation during the second half of July, while dry conditions were already affecting the extreme east of the country. Temperature levels remained exceptionally high throughout most of the summer and during August the drought extended westwards and southwards. Leaf area indices and potential biomass levels linked to the vegetative conditions of the crop showed no particular decreases until late August when premature senescence started to be reported. The overall impact of the dry conditions in these areas was, however, limited as it started to affect crops at a more advanced stage of development, by which time yield levels were largely established. The sunflower yield estimates were affected even more by the dry, hot conditions in August, as, overall, the crop was at a more advanced stage of development and harvesting was already starting in the growing areas of southern and central Ukraine.

6. Agrometeorological analysis of the eastern countries

Belarus: diverging yield expectations: negative for winter crops but positive for summer crops

Sub-optimum conditions for winter crops led to forecast yields lower than the five-year average: wheat 2.9 t/ha (7.9 % below average), barley 2.9 t/ha (4.8 % below) and rapeseed 1.0 t/ha (12.2 % below). By contrast, good yields are expected for summer crops: the forecast for grain maize is 4.3 t/ha (11.8 % above average).

Generally, winter 2008/2009 was favourable for winter crop dormancy, except for some small areas in the north of the country, where the snow cover might not have been thick enough to provide protection against the frost.

A rainfall deficit prevailed in the spring. In some regions (Grodno and Minsk) the dry spell persisted until the beginning of the summer, reducing the climatic water balance significantly. This was followed by a longer wet period which pushed the cumulated rainfall values above the long-term average (by almost 20 to 25 %) leading to optimum water availability during the heading and flowering stages. Thermal conditions were favourable for crop development throughout the entire season, whereas the low irradiance levels (up to 15 % below the LTA in the south-east) had an adverse impact on biomass accumulation and grain-filling.

According to the CGMS simulation, winter crop yields have been lower than the long-term average as a consequence of the persistent wet and cloudy weather which delayed development and had an adverse effect on desiccation. By contrast, in the case of grain maize the simulation showed optimum development and good potential yields. The difference in development patterns between winter and summer crops is clearly shown by the NDVI profile, which

was well below the long-term average at the beginning of the summer but improved at the end when mainly maize was in the fields.

Russia: progressive worsening during the growing season, low yield expectations, especially in the southern and Volga regions

The winter was favourable for crop dormancy, even though in some areas in the Near Volga region the insufficient snow depth might have added to the frost risk. In spring the meteorological conditions worsened suddenly, with extremely low daily minimums during the last ten days of April which led to a long delay in sowing and to sub-optimum canopy development because of the lower accumulation of thermal time for winter crops.

In May below-average temperatures persisted in southern regions (Krasnoda, Stavropol and Rostov), preventing crops from catching up on the delay at the beginning of the season. In the Central and Central-Chernozermic regions, where the temperature conditions were close to normal, the situation was better, as confirmed by analysis of the NDVI profiles, which showed the deficit between the current values and the long-term average tailing off.

With the exception of some isolated heavy rains in western and southern regions, the precipitation was lower than the seasonal average; however, relative soil moisture values were normal for winter and spring crops.

By contrast, July and August 2009 were warmer than normal practically everywhere and the GDD surplus built up by the end of the summer kept crops ahead in terms of development. The shortening of the phenological cycle led to a sub-optimum grain-filling period, further worsening the already low yield expectation.

In most of the regions where grain maize is grown the dry spell continued in September, causing a significant drop in soil water content (more than 50 % lower than the long-term average), enhancing the previous water stress. The maize yield in the European part of Russia is therefore likely to be dramatically lower than normal.

7. Campaign analysis on the Maghreb

Morocco, Tunisia and Algeria: excellent season, combining abundant and well-distributed precipitation with mild temperatures, leading to significant increases in average yields of wheat and barley in all three countries

The yield estimates for Morocco point to a significant increase on the long-term average, albeit biased by the low levels in the 2006-2007 season. The estimated yields are 2.1 t/ha for wheat (52 % above the five year average), 1.4 t/ha for barley (74 % above) and 1.1 t/ha for maize (27 % above). In Algeria wheat yield is estimated at 1.6 t/ha (6 % above the five-year average) and barley at 1.7 t/ha (22 % above), while in Tunisia wheat is put at 1.9 t/ha (19 % above) and barley at 1.1 t/ha (19 % above).

The soil preparation and sowing conditions were highly favourable in both Morocco and Algeria. Cumulated rainfall in autumn was exceptionally high, reaching 350 to 400 mm in the north-west of the country. Access to the fields sometimes became difficult because of flooding, especially in the most productive region of Morocco, namely the Gharb.

The same trend was observed in Algeria, though with a less marked deviation from the norm. In Tunisia, by contrast, precipitation was below the LTA. At the end of January winter cereals in the more temperate parts of Morocco were at the tilling stage, whereas they had reached the shooting stage in the warmer regions of the south.

In Morocco, the climatic water balance levels between January and May 2009 can be put, on average, significantly above the average for the 35-year 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 which favoured stem elongation in cereals. A similar trend was reported in the winter cereal-growing areas of eastern Algeria and north-central Tunisia. The NDVI values in the cereal-growing areas of Maghreb countries show an increase from November 2008 to March 2009, with values exceeding both the five-year average and those of the previous season. The weather conditions allowed a favourable lengthening of the development season, with harvesting in June. This was conducive to exceptional yields in both Morocco and Algeria. In Morocco the outcome could have been better if weeds had been properly controlled, if nitrogen had been optimally applied and if sowing had taken place earlier.

8. Pasture analysis 2009

Dry conditions in southern Europe, especially Spain, delayed the start of the grazing season and caused early exhaustion of the resources; elsewhere, biomass availability was within the norm

The start of the 2009 season in southern Europe was delayed by cold weather and dry conditions. Precipitation returned in late spring, but the overall supply of green biomass was exhausted early. Elsewhere, in central and northern Europe, despite some fluctuations due to local climatic conditions, overall productivity was within average levels, producing a sufficient supply of forage for livestock. In the green maize-growing areas the precipitation was sufficient and harvesting lasted longer than usual.

Permanent grassland and pastures: In the EU, the highest concentration of grazing livestock is in Spain (including pigs), followed by Ireland and central France. The grazing season depends on the specific environment: in Spain the peak grazing season is in winter and early spring, whereas elsewhere grazing starts later and continues into the summer. In Spain, specifically in northern Extremadura and southern Castilla y León, the 2009 season started with accumulation of the biomass potential following the average long-term trend up to the end of March. From mid-April onwards, there was a marked decrease as a consequence of the almost complete lack of precipitation. The seasonal availability of biomass stabilised and then gradually declined in late May. The grazing season usually terminates in early June, but came to an early end because of exhaustion of the resources. In Ireland and the United Kingdom simulations show a high level of biomass accumulation starting from the beginning of February. In Wales in particular, production levels remained higher than average up to June when the dry weather brought the productivity potential back to normal levels. In Ireland, temperatures and rain kept biomass potential around average during the spring before biomass accumulation increased to above-average levels from June onwards.

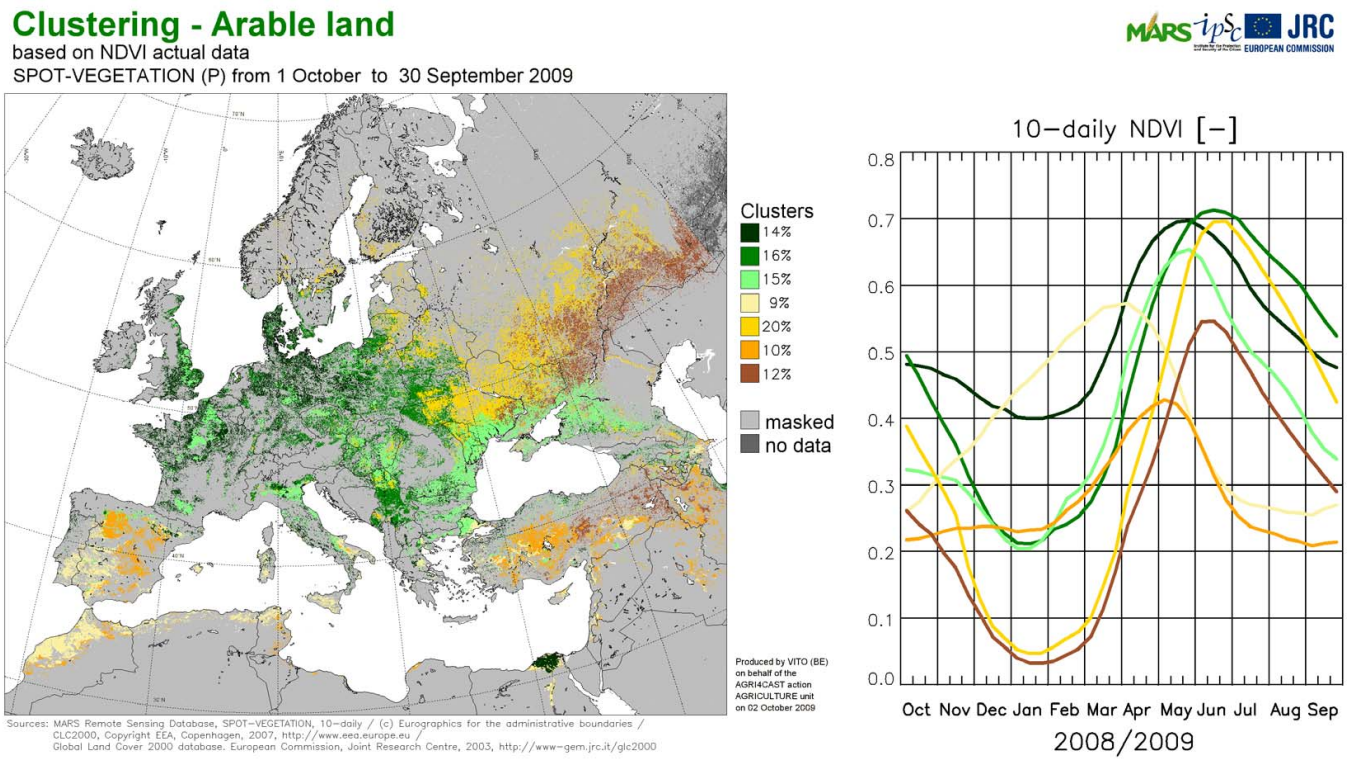
Rotation forage and hay: Production of hay for dry forage and silage is as common an agricultural practice as any other, even though it is largely connected with the presence of livestock. In France a dry spell lasting from early February to mid-April delayed the start of vegetative growth in the central regions of Auvergne, Limousin and Bourgogne. Significant precipitation from mid-April onwards favoured the start of biomass accumulation and the constant water supply from then on was sufficient to keep green biomass availability at average levels. The forage production regions of northern Germany, Denmark and the Netherlands recorded conditions warmer and drier than average. From the beginning of March onwards, temperatures progressively increased while precipitation remained constantly below average, delaying vegetative growth. Conditions improved in late spring and from July onwards precipitation was sufficient to maintain an acceptable level of biomass production. A dry spell prevailed between April and mid-May in the forage production regions of eastern and central Poland. At the end of May the rain increased, accompanied by higher temperatures, favouring the onset of vegetative development. The recovery in soil moisture compensated for the deficit and, from then on, biomass accumulation stabilised to average levels.

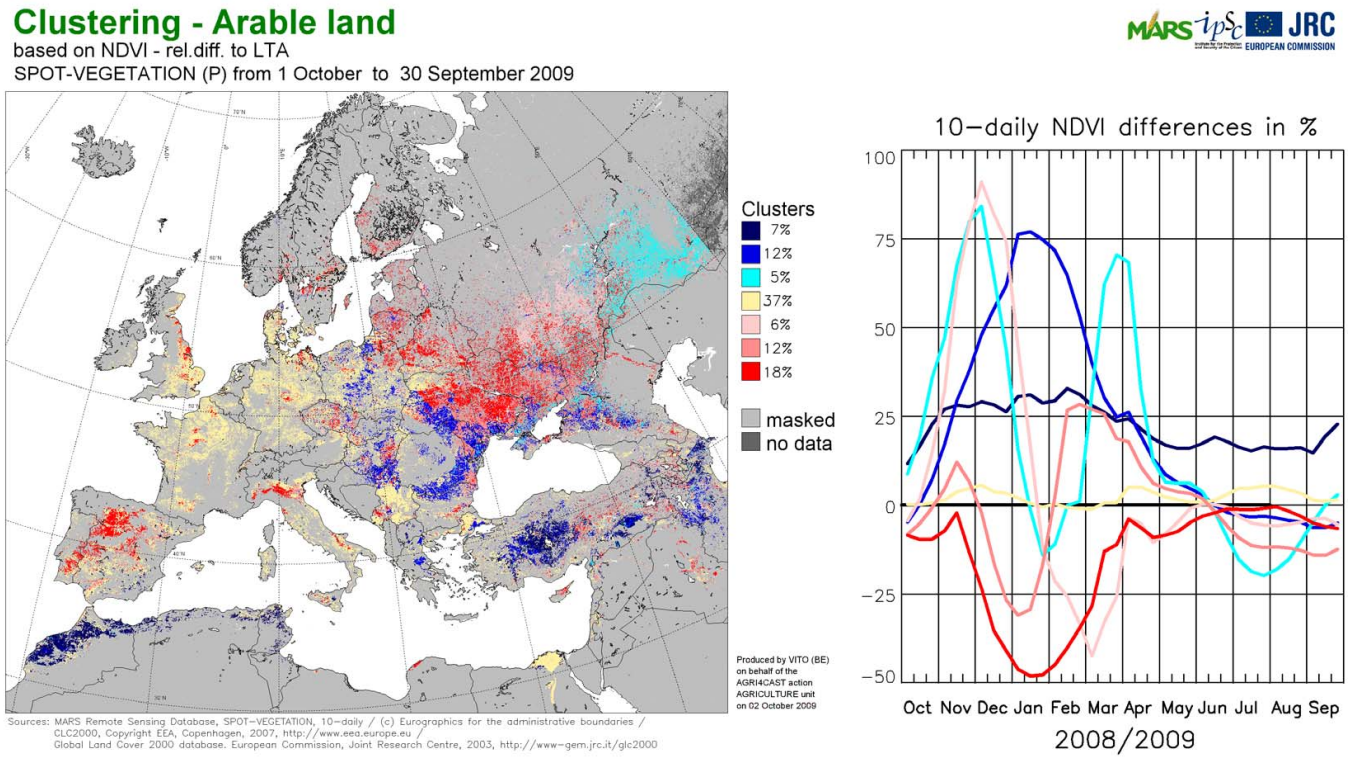
Green maize for silage: Cultivation of maize followed by harvesting at milky maturation is a common practice in the irrigated agricultural areas of southern-central Europe, especially in northern Italy, southern Germany and Austria. In this case too, the silage derived is intended mainly for dairy livestock. The winter season was dry and warm over most of the Po valley in Italy. A temporary recovery followed in May, but from then on there was only scarce, isolated but intense precipitation, especially in the downstream stretches of the river basin. Temperatures were abnormally high, increasing evapotranspiration and causing early maturation and an early harvest. There were no particular problems with availability of irrigation water.

9. Satellite analysis — SPOT vegetation

Map highlights — Conditions not so good in Western Europe, better in eastern Europe and the Mediterranean region and bad in Russia and Ukraine

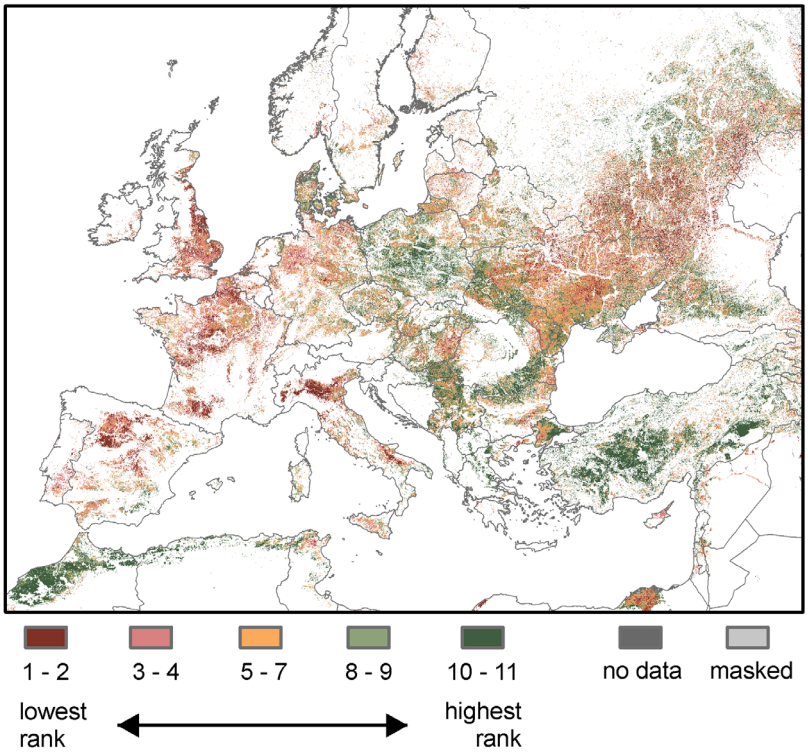
In large parts of western Europe the 2008/2009 season was marked by normal region-specific NDVI profiles with average values. This trend is maintained in the cluster analysis of percentage differences comparing the profiles for 2008/2009 with the average year for the period from October to September (see yellow curve). Bad conditions are visible across south-western Europe and the northern Black Sea coast: the water shortage affected the Iberian Peninsula, northern Italy and Ukraine (red areas).





In eastern European countries the growing season started earlier than in the average season, followed by above-average NDVI values.
Turkey and Maghreb recorded good NDVI values throughout the whole season.
The good conditions prevailing in eastern Europe clearly emerge from analysing the cumulated NDVI values from October 2008 until September 2009 and ranking them against the available time series (in this case against the NDVI data from SPOT vegetation since 1998). The cumulated NDVI values in Romania and Poland are among the highest in the whole time series, indicating a very good season, whereas in the Po valley (Italy) and Castilla y León (Spain) they were the lowest out of all the years available.

Comparison of Cumulated NDVI Values (October - September)



Cumulated NDVI of 2008/2009 ranked within all historic years (1998/1999 - 2007/2008) for arable land

Sources: MARS Remote Sensing Database, SPOT-VEGETATION, 10 daily / © EuroGeographics for the administrative boundaries / CLC2000, Copyright EEA, Copenhagen, 2007, http://www.eea.europa.eu / Global Land Cover 2000 database. European Commission, Joint Research Centre, 2003, http://www-gem.jrc.it/glc2000

B. New 2009/10 season — 1 September to 5 November 2009

1. Agrometeorological overview

Thermal conditions generally favourable for prompt germination. Excessively dry in Portugal, western and southern France, northern Germany, the UK, Ireland and Ukraine; wet in southern Italy, the Balkans, Greece and the Baltic countries

Temperature

Seasonal temperatures in most of the EU; warmer than normal in the Iberia Peninsula, Po valley, Hungary and between Ukraine and Russia.

Across most of the continent, the period was mainly marked by seasonal or slightly higher temperatures. In fact, the map of departures of the cumulated active temperatures from the LTA shows significant differences only in the Iberian Peninsula and on the extreme eastern side of the continent. This was due to the higher values recorded for both the minimum and the maximum in September on the eastern side and in October in both areas. November started with cooler temperatures in the east.
Analysing the period in more detail, it is clear that in the two milder periods both the minimum and maximum temperatures remained almost constantly above the seasonal average. In fact, in Spain in October the maximum daily values were 3 to 4°C above the seasonal average. Also some significant outliers were recorded in southern Spain: 31.5°C on 5 October, 29.4°C on 29 October and 31.8°C on 30 October (around 7°C above the normal range of variation). However, during the period covered, the temperatures progressively decreased and in around mid-October the first frosts occurred in many central and eastern parts

of the EU. The more intense frosts, of course, were recorded in the second half of October and beginning of November in the areas close to the EU's eastern borders and in the eastern countries: -4.6°C in eastern Poland and -7°C in Ukraine.
Therefore, in general, germination occurred under favourable thermal conditions and the progressive reduction of temperatures made it possible to avoid damage caused by the frosts.

Rain

Water supply generally good in the eastern EU and Mediterranean area; drier in western and central regions. Beneficial and abundant rain in Morocco and Algeria.

Similarly to the previous year, the rainfall showed an unusual spatial distribution, favouring the eastern (from Germany eastwards) and southern parts of the continent (central and eastern Mediterranean region) but remaining quite scarce in the central (France, southern UK and northern Italy) and western EU (Spain and Portugal) and in Russia.
During the period covered, September was generally the driest month. In fact, with the exception of the southernmost areas of the EU, Slovenia and the Maghreb countries, which received a significant amount of rain, in all other areas the water supply was very limited or non-existent. In October, the whole of eastern and northern Europe, the Adriatic basin and Galicia received quite abundant rain. In some cases temporary excesses were very likely. Intense rainfall also hit the southern Adriatic region, affecting southern Italy, Bosnia, Albania and western Greece. Again rainfall was scarce in northern Italy, France, southern UK, Spain and Portugal.
Fortunately, in November the synoptic circulation changed and more rain fell in all the central part of the EU from the UK to France, Germany, Italy, the Balkans, Greece and Turkey. The southern parts of Spain and Portugal still remained quite dry.

2. Winter crop sowing overview

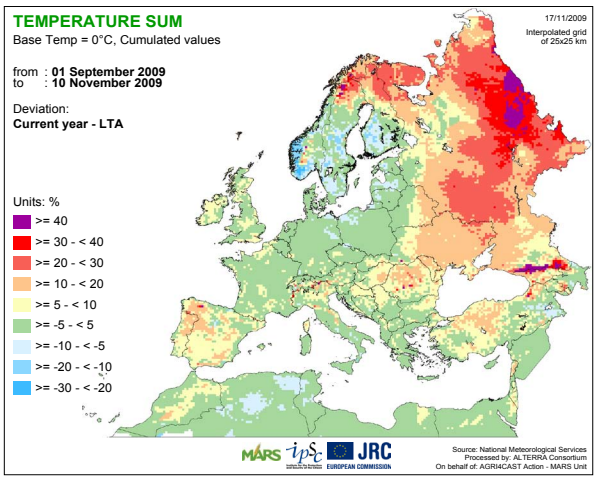
EU-27

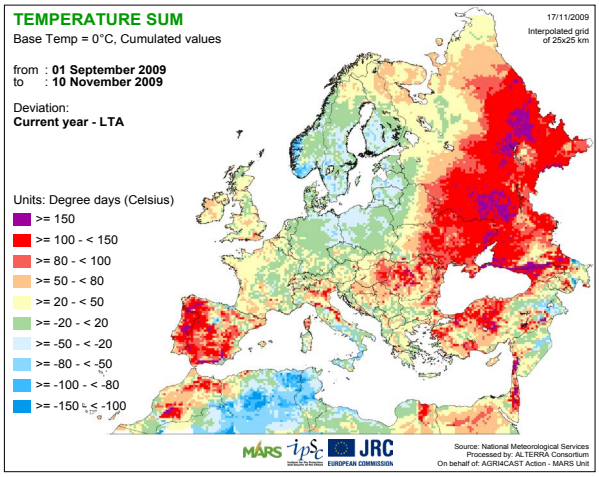
Winter wheat: wet conditions and lower daily minimum temperatures had an adverse impact on the sowing and emergence period in the Balkans and in south-eastern Europe

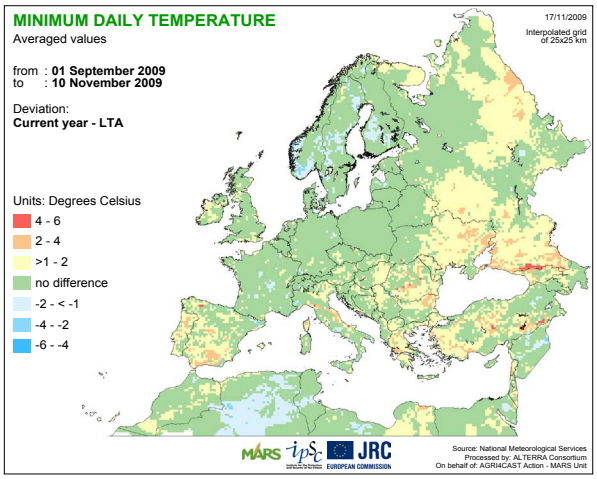
Precipitation around the sowing period affected mainly the Balkans and the western part of Romania and Ukraine, where the cumulated rainfall during this period exceeded the long-term average by 50 to 100 mm. The same regions and some areas in the southern part of the Scandinavian Peninsula recorded relatively cooler days during the emergence stage. By contrast, most of the other countries where sowing occurred in September reported very dry conditions, both at the time of sowing and on emergence. Dry conditions also prevailed during late sowing (in southern Spain and Portugal) in conjunction with above-average temperatures during the two previous ten-day periods, leading to very low soil moisture values.

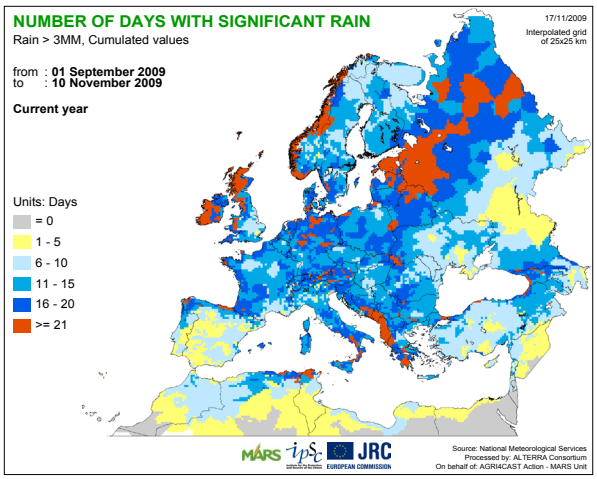
Winter barley: with the exception of the southern part of the Scandinavian Peninsula, favourable conditions for sowing

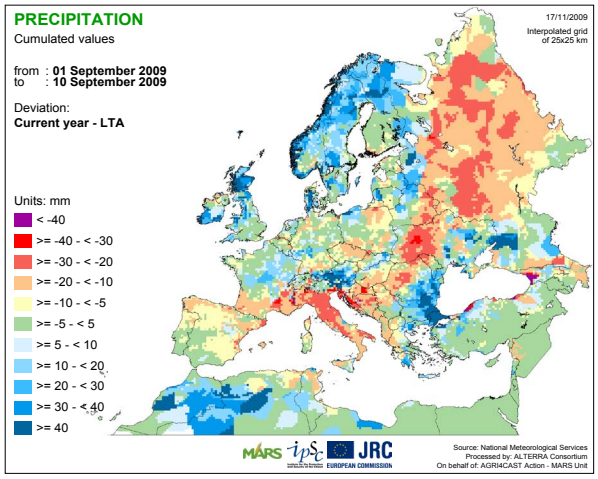
In most Member States the first part of the sowing season for winter barley (September and mid-October) was generally

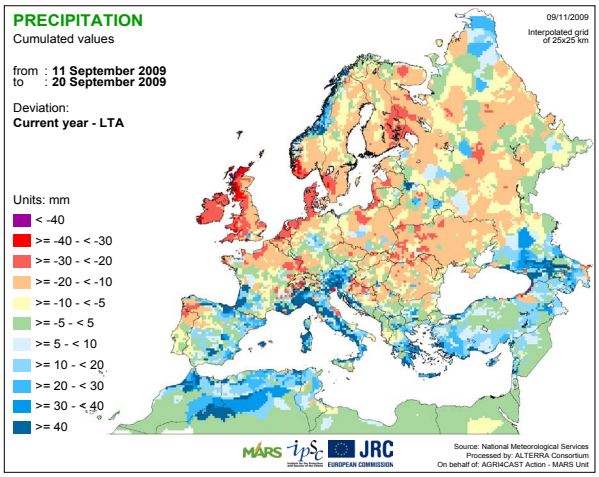


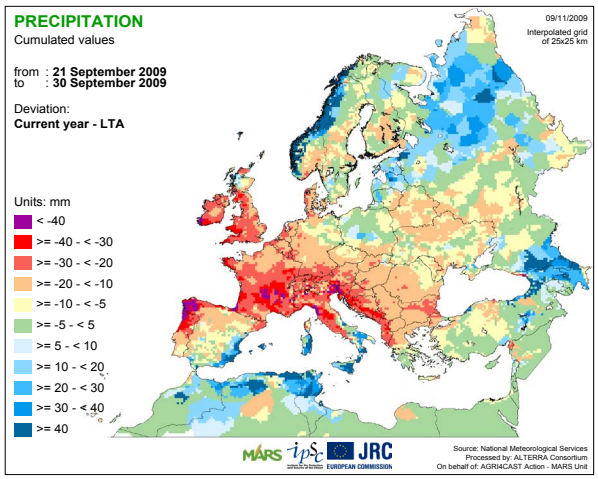


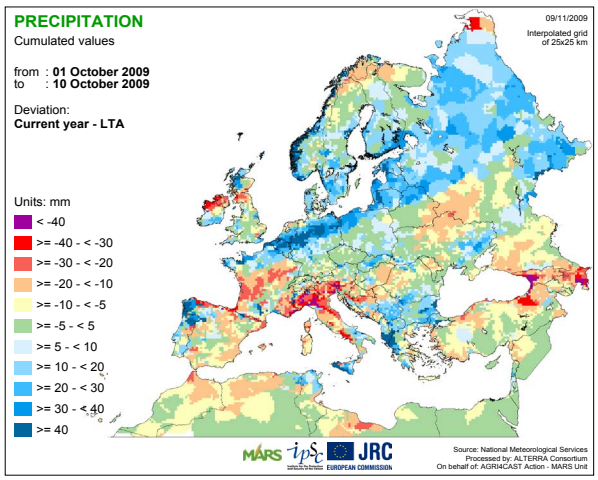












marked by warmer and drier conditions than the long-term average (up to 50 % less precipitation in southern Germany, Austria, the Czech Republic and Hungary), thus avoiding any significant problems with field accessibility or excessive soil moisture due to persistent rain. The only difficulties appear to be concentrated in the southern part of the Scandinavian Peninsula where intense precipitation persisted for over two weeks, leading to a possible delay. This unfavourable delay has also been aggravated by the sudden, persistent drop in temperatures in these regions, which could have strongly affected germination. The Baltic republics and the northern regions of Belarus also appeared to be marginally affected by excess rain. In southern countries sowing is being carried out under mild temperatures which should, potentially, favour the emergence phase.

Winter rapeseed: generally favourable conditions, but rain in August limited access to fields in the UK and Poland

In many countries, conditions were favourable during the sowing season for winter rapeseed (August and September). In August, in most countries the rainfall was in line with the long-term average and the opportunities for sowing depended largely on the distribution of the rainy spells. September was generally dry and the cumulated solar radiation was above average but without extreme temperatures, which should create good germination and emergence conditions.

In the UK, in August precipitation was in line with the long-term average, but limited access to fields, whereas September was rather dry, allowing sowing to proceed. France (Bassin Parisien) received more rain than average in both August and September but, as it was well distributed, this had no impact on sowing. In August, access to fields was limited by rain in Poland, but in the Czech Republic, Hungary and Romania the rainfall was distributed better. Also, in these countries September was dry and warm. No extreme temperatures were recorded, but the temperatures in the Czech Republic were towards the upper end of the range.

BLACK SEA AREA

Belarus — good in contrast to Ukraine and Moldova: sowing conditions dry

September was 1 to 3°C warmer than normal in every country in the Black Sea area. The amount of precipitation remained below average everywhere in that region. In northern Moldova and most of Ukraine practically no rain was recorded. The serious water deficit due to persistent drought slowed down work in the fields, hampering sowing, and delayed germination of rapeseed and winter wheat in most regions of Ukraine and Moldova. The autumn weather conditions in Belarus could be regarded as normal for crop development and agricultural work.

In October, the temperatures were lower in north-western Belarus, slightly higher in Moldova and in central Ukraine and significantly warmer along the south-eastern border of Ukraine. The abundant precipitation in the region eased the dryness. The wetter October counter-balanced the adverse effects of September, but rapeseed and winter cereals are stunted and the condition of the crops could be weak before the harsh winter across large areas of Ukraine and Moldova. The influence of the weather conditions could be even stronger because of savings on agricultural technologies in response to the economic crisis.

EASTERN COUNTRIES

Russia: sowing of winter crops delayed in some regions

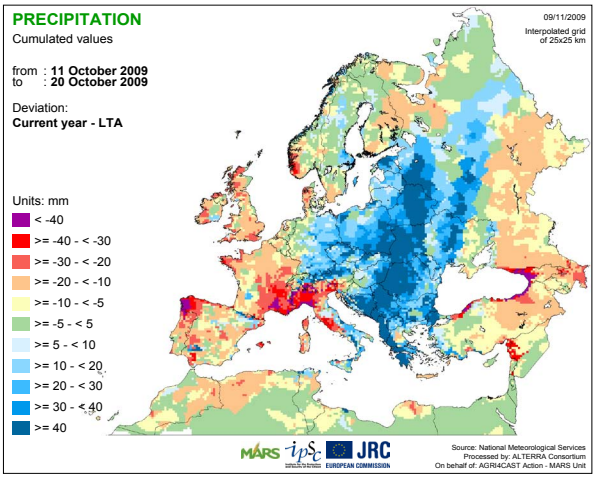
September 2009 was 2 to 4°C warmer than normal in most areas of European Russia, except in the southern region, where temperatures remained close to the long-term average. In October, temperatures slipped back to normal in the north-western and central regions but were high in the Near Volga and southern regions. September was drier than usual in the central and Volga region. The weather was wet north of the Caucasus mountains in the first month of autumn. The amount of precipitation in October was favourable in the western and northern areas, but the southern region remained practically rainless throughout this period.

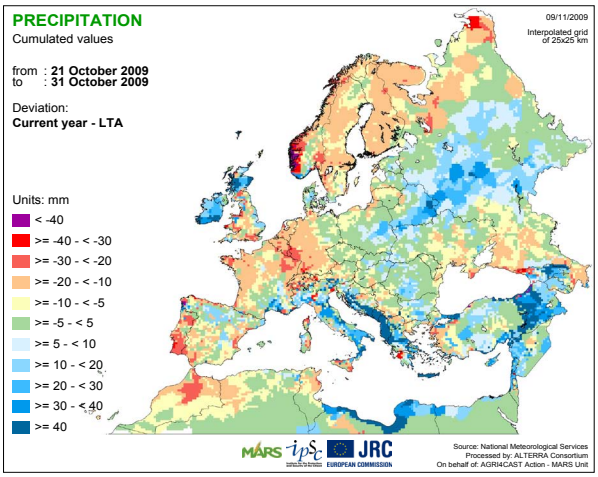
Sprouting conditions were less than ideal for winter crops in parts of the central and Volga regions due to consecutive weeks of below-normal precipitation in autumn. Sprouting of winter crops could be delayed due to late sowing and low soil moisture in some regions, resulting in inadequate crop development before the winter dormant period.

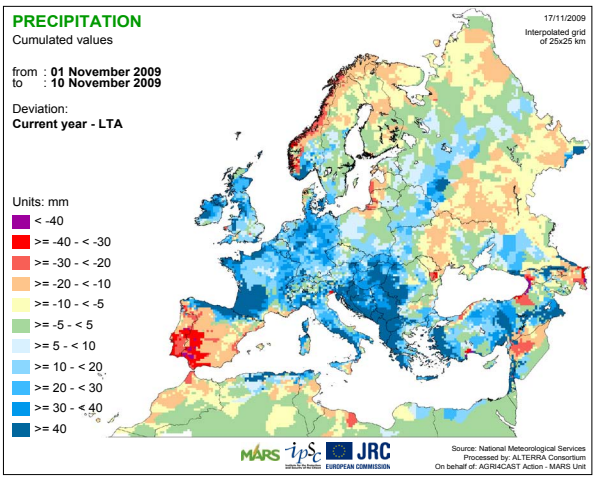
MAGHREB COUNTRIES

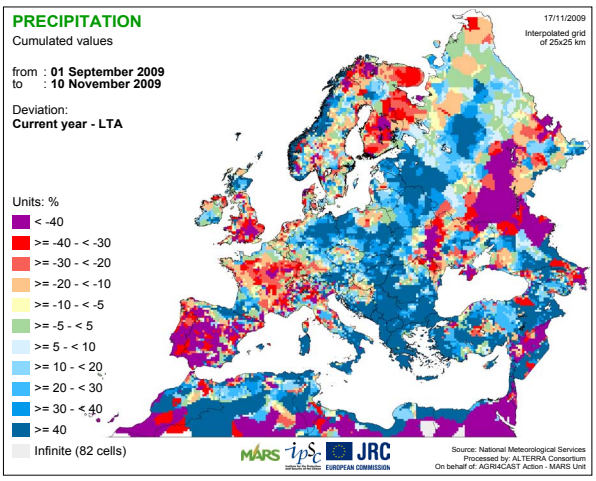
Wet season for Morocco and Algeria

In the leading winter cereal-growing areas of Morocco, the beginning of the 2009/2010 season was relatively wet, but at levels slightly below those of the previous season. After a dry summer, the first rains arrived in the second ten-day period of September in the three Maghreb countries and persisted through to the second ten-day period of October. Cumulated rainfall totalled over 100 mm in Tunisia and Algeria and 70 mm in Morocco, above the long-term average in all three cases. Temperatures were in line with the norm in all three countries. These can be considered generally good conditions for field preparation and for sowing winter cereals.





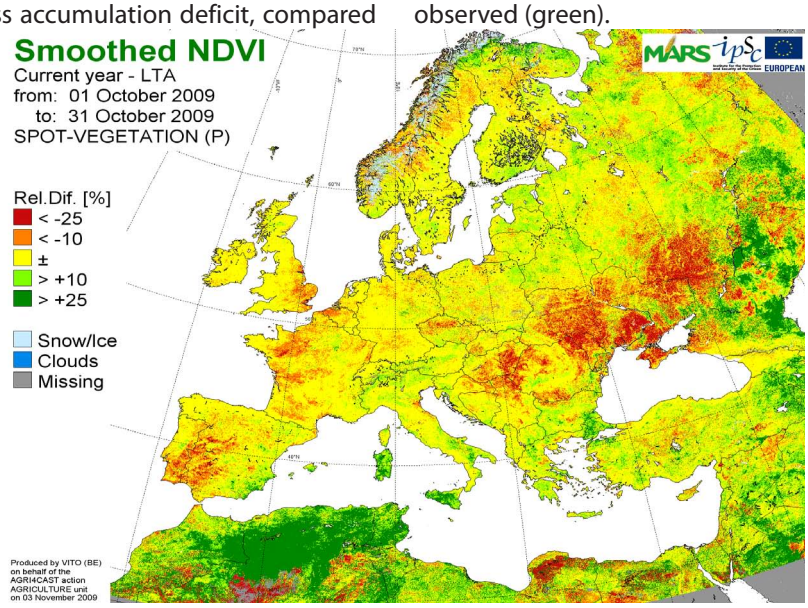




3. Satellite analysis — SPOT Vegetation

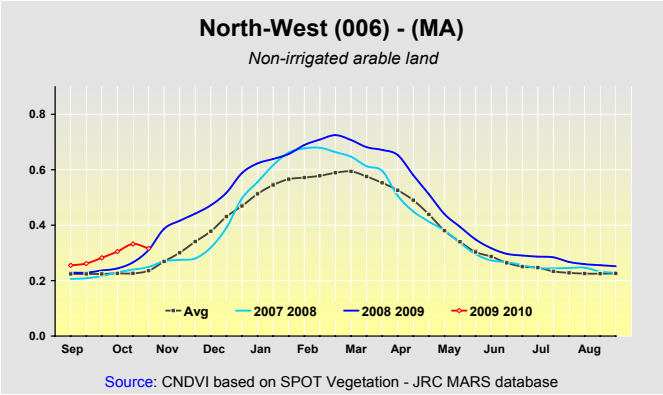
Map highlights — new season

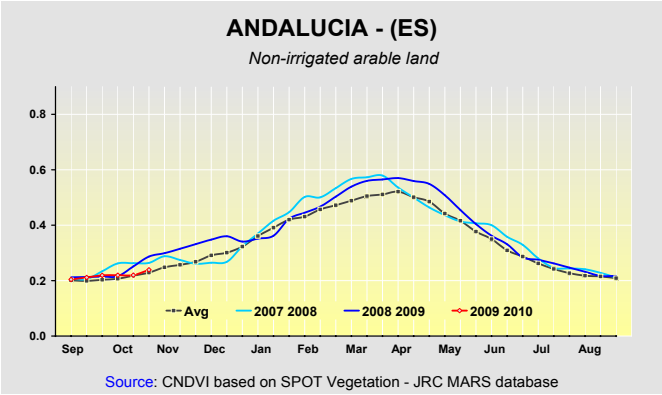
The map shows the relative differences between the maximum composite NDVI values for the current season (2009/2010) and the long-term average for October.
Normal autumn conditions are indicated (in yellow) for parts of Europe. A high biomass accumulation deficit, compared with the average, can be observed in areas like the southern Iberian Peninsula, eastern Hungary and Ukraine.
The opposite applies to parts of the Maghreb countries and Italian islands, where an early surge in vegetation is observed (green).

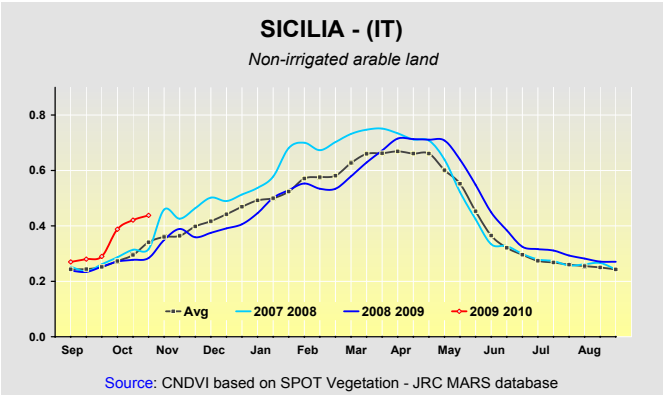


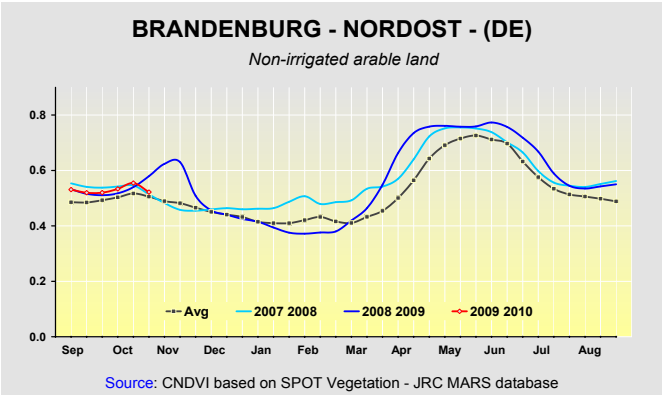
CNDVI — highlights

An expected vegetation surge in **Morocco** can be seen in the NDVI profiles for arable land in the north-western Maghreb area. The earlier-than-average increase in NDVI can be correlated to unusual rainfall in October. The profile observed for Banzart in **Tunisia** shows a similar NDVI trend.
For the same reason, the start of the season in Sicily and Sardinia is quite good. From the second half of September on, canopy development increased steeply, as shown by the NDVI graph for Sicily. In northern European countries biomass accumulation of winter crops before dormancy has begun. A fairly good start before dormancy is seen in the profile for **Brandenburg-Nordost** in Germany.









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