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MARS AGROMETEOROLOGICAL

Crop Monitoring in Europe

Review of the 2009-2010 season
Situation from 11th September to 20th October

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Difficult season and decrease of planted areas lead to average production levels

Contents

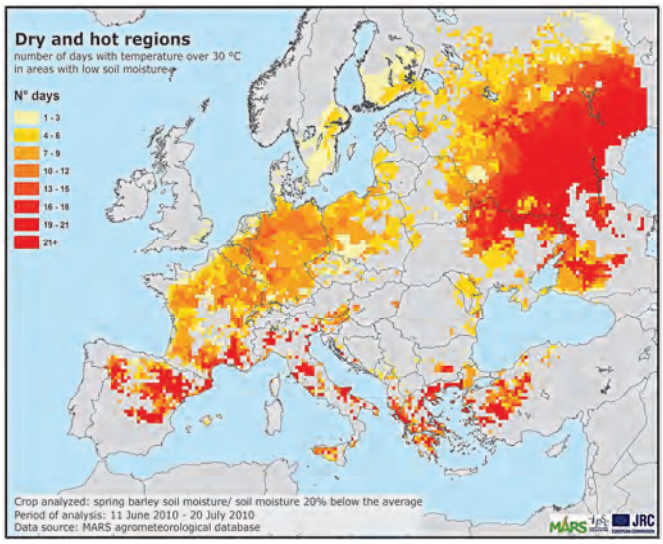
A. Synthesis of the 2009/10 season

1. Highlights

The yield forecast for total cereals is 5.0 t/ha and therefore 1 % below last year's yield and more than 2% above the 5 years average.

After a favourable start of the season, with a mild autumn, Europe saw a harsh winter, with waves of exceptionally low temperatures from December onward; Romania faced excessive rain, Russia harsh frosts and Spain snowfall in March. These conditions led to a delayed start of the spring growing season. Spain and Italy had abundant rain in spring, whereas during spring and early summer the United Kingdom, eastern Poland, and Greece had rain shortages; in this period anomalous high temperatures were recorded in France, Benelux, Germany and the Maghreb, while flooding occurred in Poland, Hungary, the Czech Republic and Slovakia. The unseasonal hot and dry conditions continued through the end summer in Russia, south France and the north Iberian peninsula. In northern Europe very high autumn rainfall hampered harvesting activities.

Largely negative weather conditions in Europe during the 2009/2010 season reduced cereal yield 2010 forecasts compared to 2009, except for grain maize yield, forecast at 7.2 t/ha, +4.0 % higher than 2009 and +6.7% higher than the 5-year average. For non-cereal crops, sunflower yields were slightly higher compared to both 2009 and the five-years average. Sugar beet yield is forecast to be -8.6 % compared to 2009, but is still above the five-years average (+1.7 %). For rapeseed (2.9 t/ha)and potato (27.5 t/ha) yields are forecast at levels below both 2009 and last five year average.



EU 27 (09 November 2010)					
CROPS	Yield t/ha				
	2009	2010	Avg 5yrs	%10/09	%10/5yrs
TOTAL CEREALS	5.1	**5.0**	4.9	-1.0	+2.6
Total Wheat	5.5	**5.3**	5.2	-3.2	+0.7
soft wheat	5.8	**5.6**	5.5	-3.2	+0.4
durum wheat	3.1	**3.1**	3.0	-1.5	+1.4
Total Barley	4.4	**4.3**	4.2	-2.2	+2.4
spring barley	3.8	**3.7**	3.7	-2.5	+1.4
winter barley	5.3	**5.2**	5.1	-2.1	+2.3
Grain maize	6.9	**7.2**	6.7	+4.0	+6.7
Other cereals	3.6	**3.5**	3.5	-1.8	+2.4
Sunflower	1.8	**1.9**	1.7	+7.6	+12.1
Rapeseed	3.3	**2.9**	3.1	-10.9	-4.2
Potato	29.8	**27.5**	28.2	-7.7	-2.3
Sugar beets	71.5	**65.4**	64.3	-8.6	+1.7

Yields are forecast 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:
2005-2009 data come from EUROSTAT EUROBASE and EES (last update: 25/10/2010)
2010 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2010)

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ipsc Institute for the Protection and Security of the Citizen

2. Crop yield forecasts

AGRI4CAST crop yield forecasts at national level for EU-27 (09 November 2010)

Country	TOTAL WHEAT					SOFT WHEAT					DURUM WHEAT				
	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs
EU27	5.5	**5.3**	5.2	-3.2	+0.7	5.8	**5.6**	5.5	-3.2	+0.4	3.1	**3.1**	3	-1.5	+1.4
AT	4.9	**4.9**	5.1	-0.3	-2.9	5.0	**5.0**	5.1	-0.2	-2.6	4.0	**4.0**	4.3	+0.9	-6.8
BE	9.4	**8.4**	8.5	-10.6	-1.7	9.4	**8.4**	8.5	-10.6	-1.7	-	**-**	-	-	-
BG	4.2	**3.7**	3.4	-12.0	+7.3	4.2	**3.7**	3.4	-12.0	+7.3	-	**-**	-	-	-
CY	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
CZ	5.2	**5.2**	5.1	-1.7	+1.0	5.2	**5.2**	5.1	-1.7	+1.0	-	**-**	-	-	-
DE	7.8	**7.2**	7.5	-8.4	-4.6	7.8	**7.2**	7.5	-8.3	-4.5	5.8	**5.2**	5.4	-9.7	-3.1
DK	8.0	**7.4**	7.4	-7.7	+0.8	8.0	**7.4**	7.4	-7.7	+0.8	-	**-**	-	-	-
EE	3.0	**3.1**	3.0	+4.5	+3.6	3.0	**3.1**	3.0	+4.5	+3.6	-	**-**	-	-	-
ES	2.7	**3.0**	2.8	+12.4	+6.4	2.8	**3.4**	3.1	+23.0	+9.8	2.5	**1.9**	2.3	-24.5	-16.3
FI	4.1	**3.7**	3.8	-8.3	-1.2	4.1	**3.7**	3.8	-8.3	-1.2	-	**-**	-	-	-
FR	7.5	**6.8**	6.9	-8.3	-1.1	7.7	**7.0**	7.1	-8.2	-1.0	5.1	**4.9**	4.8	-3.1	+3.0
GR	2.6	**2.5**	2.5	-6.3	-2.8	2.9	**2.7**	2.8	-5.1	-0.6	2.5	**2.4**	2.4	-6.8	-3.4
HU	3.9	**3.9**	4.2	+1.7	-6.6	3.9	**3.9**	4.2	+1.6	-6.6	3.6	**4.0**	4.0	+8.6	-1.4
IE	8.6	**8.7**	8.7	+1.5	-0.2	8.6	**8.7**	8.7	+1.5	-0.2	-	**-**	-	-	-
IT	3.5	**3.7**	3.6	+3.6	+0.6	5.0	**5.3**	5.2	+5.0	+1.1	2.9	**3.0**	2.9	+2.9	+1.0
LT	4.2	**3.9**	3.7	-7.1	+5.5	4.2	**3.9**	3.7	-7.1	+5.5	-	**-**	-	-	-
LU	6.6	**6.3**	6.2	-3.5	+2.8	6.6	**6.3**	6.2	-3.5	+2.8	-	**-**	-	-	-
LV	3.6	**3.5**	3.5	-3.2	+0.6	3.6	**3.5**	3.5	-3.2	+0.6	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	9.3	**8.7**	8.5	-6.1	+3.0	9.3	**8.7**	8.5	-6.1	+3.0	-	**-**	-	-	-
PL	4.2	**3.9**	3.9	-6.6	+0.5	4.2	**3.9**	3.9	-6.6	+0.5	-	**-**	-	-	-
PT	1.8	**1.3**	1.8	-27.9	-26.5	1.8	**1.3**	1.8	-27.9	-26.5	-	**-**	-	-	-
RO	2.4	**2.9**	2.6	+21.9	+12.7	2.4	**2.9**	2.6	+21.9	+12.7	-	**-**	-	-	-
SE	6.1	**5.7**	6.1	-6.0	-5.4	6.1	**5.7**	6.1	-6.0	-5.4	-	**-**	-	-	-
SI	4.0	**4.5**	4.3	+12.7	+3.6	4.0	**4.5**	4.3	+12.7	+3.6	-	**-**	-	-	-
SK	4.0	**3.8**	4.2	-5.2	-8.0	4.0	**3.8**	4.2	-4.9	-7.9	4.7	**3.8**	4.5	-18.6	-13.8
UK	7.9	**8.1**	7.9	+3.4	+3.3	7.9	**8.1**	7.9	+3.4	+3.3	-	**-**	-	-	-

Country	TOTAL BARLEY					GRAIN MAIZE					RAPE SEED				
	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs
EU27	4.4	**4.3**	4.2	-2.2	+2.4	6.9	**7.0**	6.7	+1.8	+4.2	3.3	**2.9**	3.1	-10.9	-4.2
AT	4.6	**4.5**	4.6	-2.1	-2.1	10.6	**10.3**	10.2	-2.9	+0.6	3.0	**3.0**	3.1	-1.6	-3.3
BE	8.7	**8.0**	8.1	-7.3	-1.0	12.1	**10.9**	11.6	-10.2	-6.0	-	**-**	-	-	-
BG	2.0	**3.3**	2.8	+61.2	+19.6	4.2	**5.5**	3.9	+33.3	+41.2	2.6	**2.5**	2.2	-5.0	+16.4
CY	1.8	**1.5**	1.1	-15.2	+33.6	-	**-**	-	-	-	-	**-**	-	-	-
CZ	4.4	**4.3**	4.1	-1.9	+4.2	8.4	**7.8**	7.3	-7.8	+6.7	3.2	**3.1**	3	-2.1	+3.3
DE	6.5	**6.0**	6.0	-7.9	+0.7	9.8	**8.7**	9.2	-11.3	-6.5	4.3	**3.8**	3.8	-11.2	+0.3
DK	5.7	**5.2**	5.1	-10.0	+1.9	-	**-**	-	-	-	3.8	**3.6**	3.5	-5.3	+2.9
EE	2.7	**2.6**	2.5	-4.3	+2.1	-	**-**	-	-	-	1.7	**1.6**	1.6	-2.3	+1.0
ES	2.4	**3.1**	2.7	+26.6	+15.0	10.1	**10.0**	9.9	-0.4	+1.2	1.5	**1.6**	1.6	+8.4	+3.7
FI	3.6	**3.5**	3.5	-3.3	-1.5	-	**-**	-	-	-	1.7	**1.5**	1.4	-15.7	+2.5
FR	6.8	**6.3**	6.4	-7.2	-0.4	9.1	**8.8**	8.9	-3.1	-0.9	3.8	**3.3**	3.3	-12.2	-0.4
GR	2.3	**2.3**	2.3	+0.2	+1.0	9.8	**9.3**	9.7	-5.3	-4.2	-	**-**	-	-	-
HU	3.3	**3.5**	3.7	+5.9	-4.3	6.4	**6.7**	6.4	+4.1	+4.2	2.2	**2.2**	2.4	+1.0	-4.7
IE	6.1	**6.4**	6.6	+4.4	-2.2	-	**-**	-	-	-	-	**-**	-	-	-
IT	3.4	**3.6**	3.7	+6.3	-1.1	8.6	**9.4**	9.2	+8.8	+2.1	2	**1.9**	2	-8.4	-3.7
LT	3.1	**2.8**	2.7	-8.8	+6.3	-	**-**	-	-	-	2.2	**2.0**	1.8	-9.7	+9.3
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	2.5	**2.5**	2.3	-1.9	+6.0	-	**-**	-	-	-	2.2	**2.2**	2	-0.2	+6.7
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	6.8	**5.9**	6.1	-14.2	-4.0	13.0	**11.8**	11.5	-9.4	+2.1	-	**-**	-	-	-
PL	3.4	**3.1**	3.1	-10.0	+0.0	6.2	**5.8**	5.7	-6.2	+2.5	3.1	**2.9**	2.8	-7.0	+4.0
PT	1.8	**1.6**	1.9	-10.8	-13.4	6.8	**6.0**	5.7	-11.8	+4.6	-	**-**	-	-	-
RO	2.3	**2.5**	2.3	+10.1	+10.9	3.4	**3.9**	3.2	+15.0	+22.3	1.4	**1.5**	1.5	+7.5	-2.0
SE	4.6	**4.1**	4.2	-11.0	-2.5	-	**-**	-	-	-	3.0	**2.6**	2.7	-13.0	-1.9
SI	3.5	**3.9**	3.8	+11.1	+4.3	7.8	**8.0**	7.6	+2.2	+5.6	-	**-**	-	-	-
SK	3.4	**3.0**	3.6	-13.2	-16.4	6.8	**6.4**	6.3	-7.0	+1.1	2.3	**2.2**	2.3	-4.8	-2.5
UK	5.8	**5.9**	5.8	+2.0	+1.8	-	**-**	-	-	-	3.4	**3.1**	3.3	-6.3	-4.4

Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2005-2009 data come from EUROSTAT EUROBASE and EES (last update: 25/10/2010)
2010 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2010)

AGRI4CAST crop yield forecasts at national level for EU-27 (09 November 2010)

Country	SUNFLOWER					SUGAR BEETS					POTATO				
	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs
EU27	1.8	**1.9**	1.7	+7.6	+12.1	71.5	**65.4**	64.3	-8.6	+1.7	29.8	**27.5**	28.2	-7.7	-2.3
AT	2.7	**2.7**	2.6	+0.2	+5.0	70.3	**68.0**	67.8	-3.3	+0.2	32.5	**31.6**	31.9	-2.7	-0.9
BE	-	**-**	-	-	-	82.7	**73.7**	72.7	-10.9	+1.3	44.7	**41.8**	43.8	-6.6	-4.7
BG	1.8	**2.1**	1.5	+13.9	+35.0	-	**-**	-	-	-	16.3	**15.6**	15.5	-4.0	+1.0
CY	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
CZ	2.4	**2.2**	2.3	-7.7	-4.9	57.9	**56.9**	54.6	-1.7	+4.2	26.2	**24.1**	25.8	-7.9	-6.5
DE	2.4	**2.1**	2.3	-14.8	-10.2	67.6	**60.6**	62	-10.2	-2.2	44.3	**37.7**	41.8	-14.9	-9.8
DK	-	**-**	-	-	-	54.1	**53.9**	57.2	-0.5	-5.8	35.4	**38.8**	38.3	+9.3	+1.3
EE	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
ES	1.0	**1.2**	1.0	+16.1	+16.1	83.6	**76.5**	74.9	-8.4	+2.1	29.1	**28.9**	27.6	-0.5	+4.7
FI	-	**-**	-	-	-	37.8	**36.8**	38.4	-2.6	-4.1	28.6	**25.9**	25.2	-9.4	+2.8
FR	2.4	**2.4**	2.4	+0.4	-1.6	93.7	**84.8**	85.2	-9.5	-0.4	43.8	**41.3**	43	-5.7	-4.0
GR	1.2	**1.2**	1.2	-0.8	+0.5	66.1	**63.1**	64.3	-4.5	-1.8	25.3	**25.4**	24.7	+0.1	+2.7
HU	2.4	**2.2**	2.3	-8.0	-5.8	53.6	**59.2**	52.8	+10.4	+12.2	25.1	**21.5**	25.1	-14.3	-14.1
IE	-	**-**	-	-	-	-	**-**	-	-	-	28.1	**34.5**	32.3	+22.6	+6.8
IT	2.3	**2.3**	2.2	-0.2	+1.7	54.6	**57.4**	55.7	+5.1	+3.0	24.8	**25.1**	24.9	+1.2	+0.8
LT	-	**-**	-	-	-	45.2	**43.4**	41.7	-4.0	+4.1	14.2	**12.6**	12.0	-11.8	+4.7
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	-	**-**	-	-	-	17.5	**15.9**	15.6	-9.2	+2.3
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	78.9	**69.3**	69.8	-12.1	-0.8	46.3	**43.8**	43.9	-5.4	-0.4
PL	-	**-**	-	-	-	54.3	**48.5**	47.5	-10.6	+2.2	19.2	**18.4**	18.6	-4.2	-1.2
PT	0.5	**0.5**	0.6	-1.7	-10.4	-	**-**	-	-	-	15.0	**14.7**	14.7	-2.1	-0.2
RO	1.4	**1.8**	1.3	+22.4	+35.9	38.3	**36.2**	31.4	-5.6	+15.3	15.7	**14.1**	14.3	-10.0	-1.1
SE	-	**-**	-	-	-	60.5	**54.7**	52.9	-9.5	+3.3	31.8	**28.0**	30.0	-11.9	-6.6
SI	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
SK	2.2	**2.1**	2.2	-7.1	-6.2	56.4	**53.7**	52.8	-4.7	+1.6	18.4	**15.1**	16.2	-18.2	-7.1
UK	-	**-**	-	-	-	70.0	**67.0**	61.8	-4.2	+8.4	40.9	**41.4**	41.5	+1.3	-0.3

Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: 2005-2009 data come from EUROSTAT EUROBASE and EES (last update: 25/10/2010)
2010 yields come from MARS CROP YIELD FORECASTING SYSTEM (up to 20/10/2010)

AGRI4CAST crop yield forecasts for Maghreb, Black Sea and Eastern Europe countries (09 November 2010)

Country	WHEAT (t/ha)					BARLEY (t/ha)					GRAIN MAIZE (t/ha)				
	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs	2009	2010	Avg 5yrs	%10/09	%10/5yrs
BY	3.5	**3.2**	3.4	-8.9	-5.4	3.5	**3.3**	3.1	-4.8	+6.0	4.7	**5.2**	4.4	+10.5	+17.6
DZ	-	**1.4**	1.4	-	-2.8	-	**1.2**	1.4	-	-15.7	-	**-**	5.0	-	-
MA	2.1	**1.8**	1.4	-15.0	+27.3	1.7	**1.3**	0.9	-24.9	+46.0	-	**-**	0.8	-	-
TN	2.2	**1.7**	1.7	-20.3	+4.1	1.8	**1.2**	1.3	-36.3	-12.2	-	**-**	-	-	-
TR	-	**2.2**	2.3	-	-0.7	-	**2.5**	2.3	-	+8.3	-	**7.0**	7.0	-	+0.2
UA	3.1	**2.5**	2.9	-17.8	-12.1	2.4	**2.0**	2.2	-18.2	-11.8	5.0	**4.5**	4.3	-9.1	+5.0

Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 100 kg
Sources: DZ (FAO, last 5 years: 2003-2007), MA (Min. of Agriculture & partner INRA-Maroc, last 5 years: 2005-2009), TN (Min. of Agriculture and CNCT, last 5 years: 2005-2009), TR (FAO, last 5 years: 2005-2009), UA (data from Leonid Pogorilyy Ukrainian Scientific Research Institute).

Abstract

The 6th printed MARS Bulletin 2010 (Vol. 18, No. 6) covers meteorological analysis and crop yield forecasts for the period 1 September to 20 October 2010 and an overview of the 2009/10 season.

Previous related analysis available:

—Climatic update, 11/09/2010 to 11/10/2010, (CU2010/9)

—Complete Bulletin, 11 July to 10 September, (Vol. 18, No. 5)

Next printed issue

Vol. 19, No. devoted to analysis and forecasts for the new 2010/11 season.

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.

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Technical note The long-term average used within this bulletin as a reference is based on an archive of data covering 1975–2009. The CNDVI is an unmixed normalised vegetation index on the base of Corine land cover 2000 for arable land or grassland.

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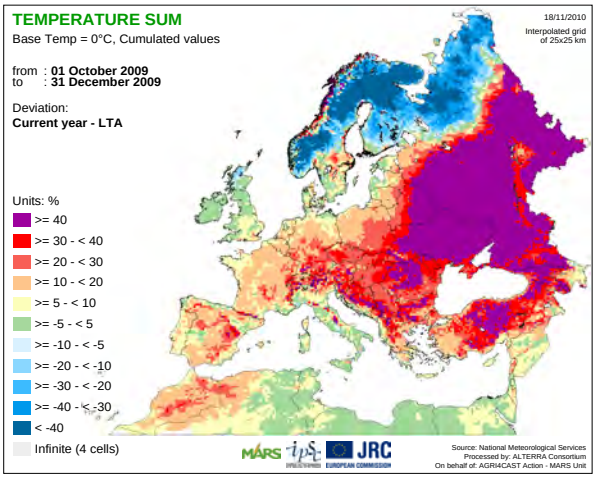
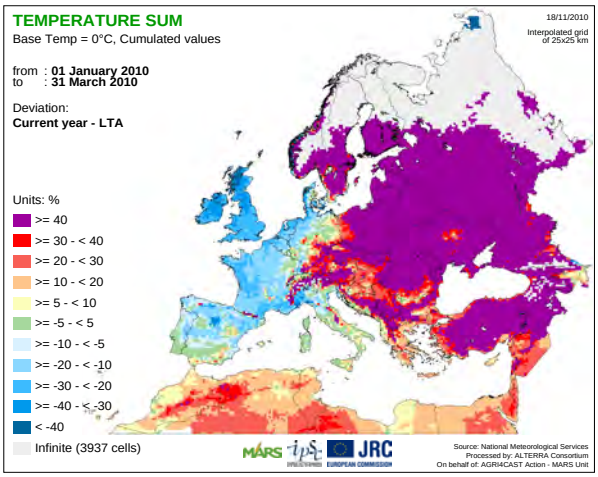
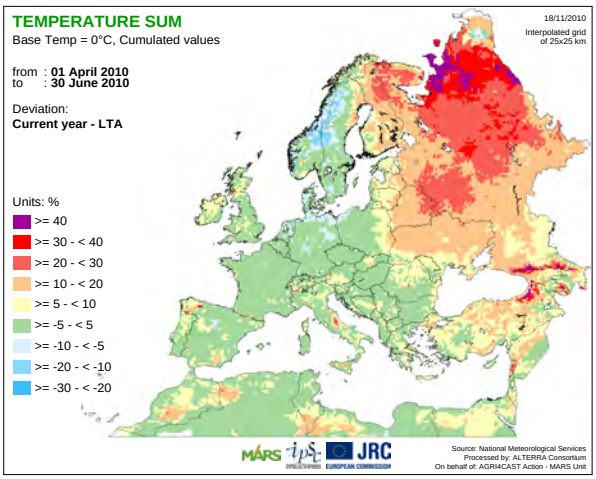
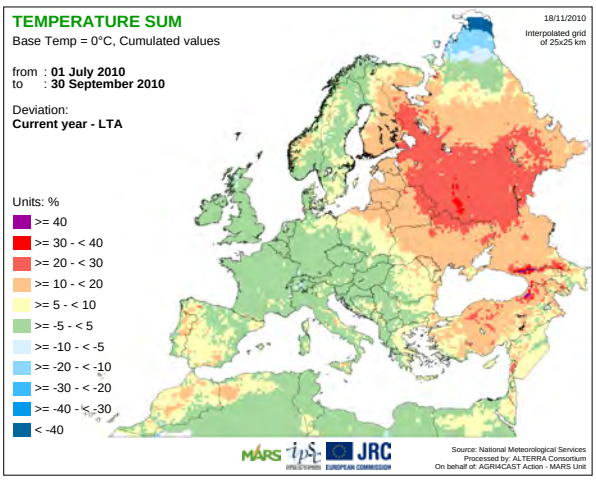








3. Meteorological overview

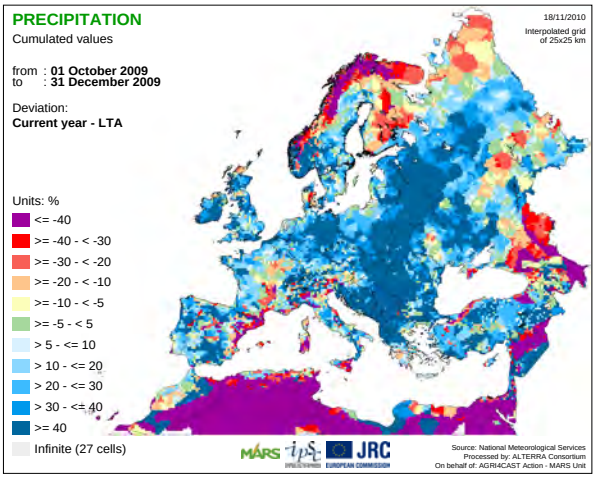
AUTUMN 2009 (October–December): Quite mild temperatures (with prompt germination), despite some sharp frosts in December. Water supplies generally positive, albeit excessive in Romania

At a glance, it is readily apparent that all over Europe (with the exception of Norway and Finland) this season was milder than normal. Across the whole continent the cumulated growing degree day (GDD) figures were well above the seasonal values. In particular, surpluses of 100 to 150 GDD (over 30 %) were recorded all around the Black Sea basin, the Balkan peninsula, eastern parts of the EU and Germany (on average, over the whole season both daily minimum and daily maximum temperatures were 2 to 3 °C above the long-term average (LTA)). The season was also milder, even if less so than in the above-mentioned regions, in France, the Iberian peninsula, the Benelux countries, Poland and the Maghreb countries. Normal conditions prevailed in Italy, the British Isles, southern Sweden and Denmark. By contrast, in Norway and Finland temperatures were cooler than normal, with maximum daily values on average 1 to 1.5 °C below the LTA. In most of Europe, milder temperatures were favourable for rapid germination and tillering of newly planted winter cereals. At the same time, the warmer temperatures exposed the crops to a higher risk of frost impact, due to plants de-hardening. Fortunately, the most severe and potentially dangerous frosts were limited to December — following a gradual fall in temperatures after completion of the hardening process — and were generally coupled with good protective snow cover. The most worrying frosty spell occurred between 15 and 21 December when temperatures below -15 °C were recorded across most of Europe, in particular -18 °C in Germany, -17 °C in central Spain, -21 °C in the Czech Republic, -23 °C in Hungary, -22 °C in Poland, -25 °C in Finland, -26 °C in Ukraine and -12 °C in the Po valley.

Cumulated rainfall during the period was above normal seasonal values: around 200 mm were recorded in Romania (85 % above the LTA), Bulgaria (53 % above), Slovakia (60 % above) and Poland (40 % above), 250 mm in Germany (40 % above the LTA), the Baltic countries (30 % above), Spain (15 % above), Italy and France (10 % above), 350 mm in the UK (30 % above the LTA), 460 mm in Ireland (40 % above), 120 mm in the Czech Republic (20 % above) and 400 mm in Portugal (20 % above). Shortfalls were recorded only in Finland (10 % below the LTA) and in the Maghreb countries (from 10 to 65 % below). The spatial distribution of cumulative precipitation anomalies over Europe also differed over the three months. In October, the rain was concentrated mainly on the eastern side of the continent (Romania, eastern Poland, western Ukraine, the Baltic countries and north-¬western Russia), in the Balkan peninsula and southern Italy, whereas the Maghreb countries, Spain, France and the eastern side of the Black Sea basin remained almost dry. In these areas, the scarce precipitation allowed good access for field preparation, while the abundant rain in southern Italy replenished the soil water reserves.

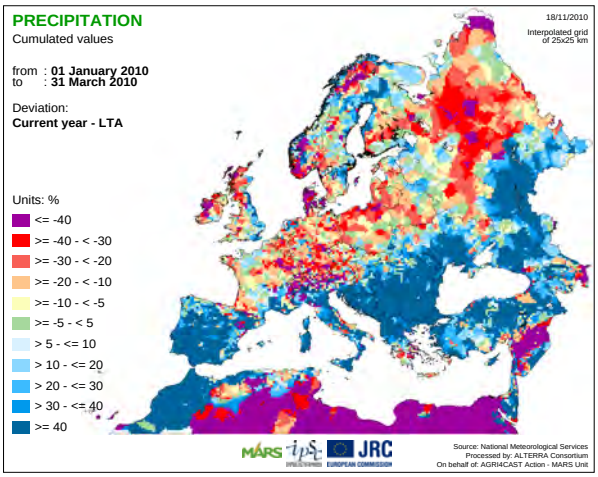
In November, the rains moved westward, bringing more precipitation to Ireland, the UK, France, the Benelux countries, Germany, southern Sweden, central Italy, the Adriatic basin and northern Portugal. In the UK, western Italy and Greece, the rain was particularly persistent and intense spells (over 80 to 100 mm per day) were recorded. In the same month, the eastern EU, the Black Sea area, Spain and the Maghreb countries

received negligible amounts of rain. Luckily, in December the rain spread to these previously dry areas, where quite abundant falls (over 250 mm) were recorded. Rain was also observed in the Mediterranean region, but only a few millimetres were recorded at higher latitudes. One point which must be highlighted is the excess rain in western and southern Romania, which received precipitation above the LTA for the third consecutive month (150 % above in December).

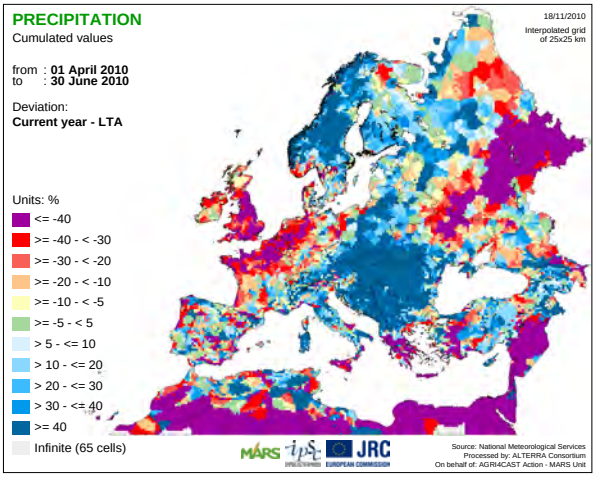


WINTER 2010 (January–March): Mild winter in the southern and eastern Mediterranean and the Black Sea regions, cooler in the western parts of the EU. Several sharp frosts, but any negative impact on crops limited to Russia. Abundant rain beneficial in the Mediterranean region and Morocco.

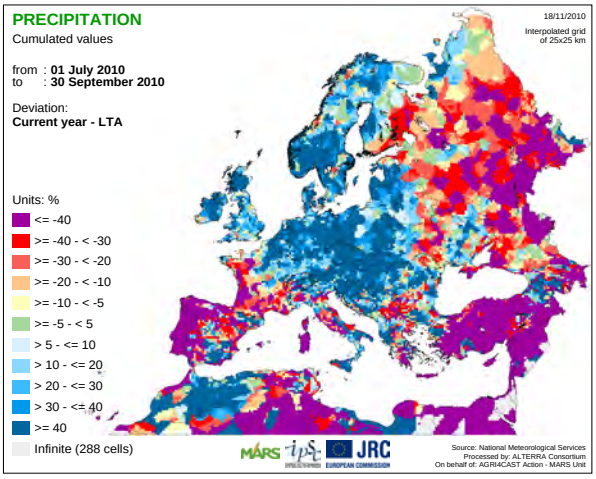
This season the western and eastern sides of the continent experienced different conditions: while a deficit of GDDs accumulated on the western side, a surplus was built up in the south-eastern part. However, large temperature fluctuations occurred on both sides and very severe frosts were recorded as several inflows of Arctic air masses pushed deep into the continent, although predominantly along the western side in the form of a succession of cold waves lasting 15 to 20 days each. In January, two spells of frost occurred, the first at the beginning of the month (affecting mainly the northern side), the second at the end (affecting mainly the eastern side). However, -15 to -18 °C were recorded in Spain and France, -22 °C in Germany, -25 °C in Poland and -27 °C in Romania. Again in February, two more frosty spells occurred, the first between 8 and 12 and the second between 17 and 22 February, with temperatures of around -10 °C in France, -21 °C in Poland, -18 °C in Romania, -23 °C in Russia and Ukraine and below -9 °C in central Spain. In March too, two main spells occurred, between 6 and 10 and between 17 and 20 March, but affecting mainly the northern and eastern sides (Germany, Denmark, Sweden and eastern Europe). Fortunately, almost all these frosts followed a gradual fall in temperatures (allowing complete hardening of plants) and were accompanied by adequate snow cover, giving crops sufficient protection. Belarus and southern Russia were the only regions where the frosts could have had a severe impact on winter crops, deeply affecting foliage systems and killing many plants.



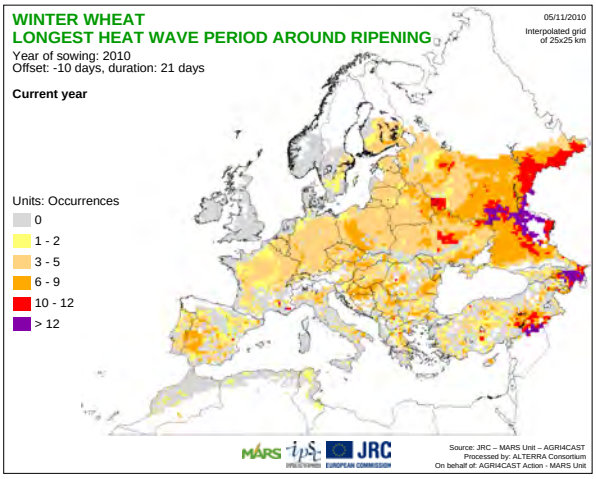
On the southern and eastern sides of the Mediterranean (Greece, Turkey, Cyprus and the Maghreb countries), completely different conditions prevailed, with surplus GDD accumulation. In many of these areas this winter was the mildest since 1975: on average, over the period the daily mean temperatures were 4 to 5 °C above the normal seasonal values.

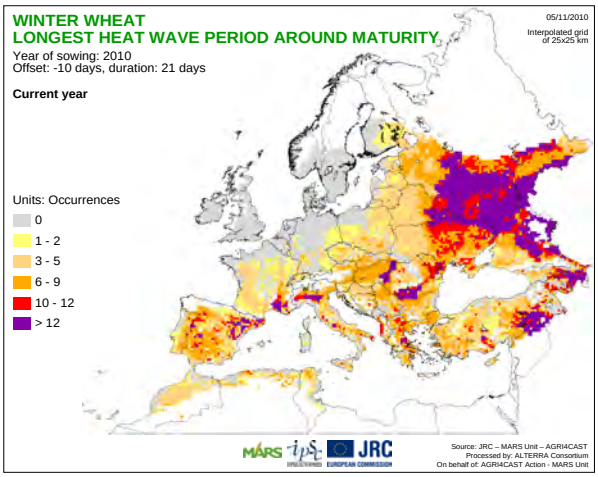


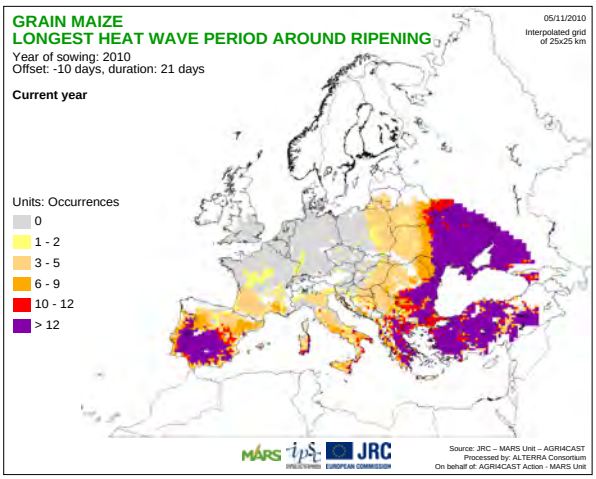
On the whole, during the winter the rain was abundant and persistent in the Mediterranean countries. It was particularly heavy in Portugal (350-400 mm, 130 % above the LTA), Andalucía and Galicia (450-550 mm, 150-200 % above), southern France (150-200 mm, 70 % above), central and southern Italy (200-300 mm, 70-100 % above), the Adriatic basin (800-900 mm above) and Morocco (700 mm or 300 % above the LTA: indeed, 2010 was the wettest winter since 1975; the second wettest was 1987 with 400 mm). In southern Russia too, the rainfall was well above the LTA.

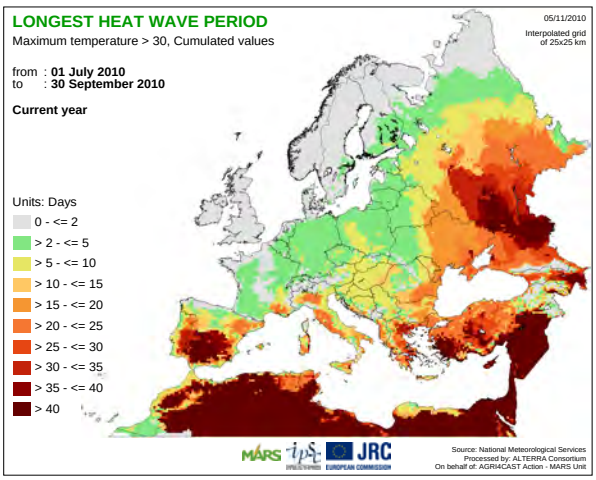


By contrast, the whole of the northern part of the EU, in particular eastern France, the Benelux countries, central and southern Germany, Ireland, Scotland, Denmark and northern Poland, received significantly less rain than usual (30 % below the LTA). The rain shortage occurred mainly in January and March. The









largest shortfalls were estimated at between 90 and 140 mm. However, because of winter crop dormancy, the impact of these deficits is likely to be negligible over the entire crop growth cycle.

SPRING 2010 (April–June): Seasonal GDD accumulation in the EU. Milder than seasonal in Russia, with high temperature anomalies in May and June. Rain deficits continued in the English Channel area and Russia, whilst very wet conditions developed in the eastern EU and the Balkans.

Overall, spring 2010 followed a seasonal course in most EU countries, where general seasonal GDD accumulation (Tbase = 0 °C) was normal; only in Finland was a slight surplus estimated.

However, this season started with milder than average thermal conditions in April, when estimates pointed to significant GDD surpluses in western regions of the EU, mainly the Iberian peninsula, France and Italy. The largest surpluses occurred in Castilla y León and Andalucía (80 to 100 GDD) and in southern France. Significant surpluses were also recorded in the Maghreb countries, Finland, Russia and Belarus. In the last three of these countries relatively light frosts occurred (-4 to -5 °C), but the daily average temperatures generally remained below the threshold for the crop de-hardening process, thereby giving crops appropriate levels of protection from the cold.

At the beginning of May, conditions changed in the western regions of the EU, with falling temperatures and light frosts in central Spain, northern Germany, Denmark, Scotland, Sweden, Finland and the Baltic countries (-2 to -3 °C). In these areas the cumulated GDD began to show small deficits, curbing crop development and growth. An isolated, brief rapid increase in temperatures in mid-May was immediately followed by a new dip. In June, normal seasonal GDD accumulations were recorded in the whole of the EU. In Russia, however, (mainly along the Volga river) the Siberian anticyclone became blocked in the south, leading to very high temperature anomalies from the LTA.

In this season, the rains were concentrated and persistent in the Alpine region, the eastern EU countries and the Balkans. In particular, in north-western Italy, southern Poland, Austria, Slovenia, Hungary and western Romania around 500 mm of rain were measured. Similar amounts were recorded in western Ukraine and Serbia. The abundant precipitation (120 to 150 % above the LTA) brought temporary flooding and soil water saturation, along with nitrogen leaching and wash-out and likely plant lodging. Higher than normal seasonal rains — albeit less pronounced than in the above-mentioned regions — were also recorded in Italy, southern France, the Baltic countries and Finland.

By contrast, precipitation was scarce in the regions bordering both sides of the English Channel, with estimated deficits of around 100 mm (50 to 55 % below the LTA).

In central and southern Russia, even more severe shortfalls in precipitation occurred: only 30 to 35 % of the LTA levels were measured, with the deficit more pronounced in June, coinciding with the higher than normal crop water requirements associated with the exceptionally high temperatures mentioned earlier.

SUMMER 2010 (July–September): Prolonged anomalously hot and dry conditions in Russia. Normal seasonal temperatures in the EU. Persistent wet conditions in eastern parts of the EU and water shortage in the north of the Iberian peninsula, France and Italy.

The most significant agrometeorological phenomena this season were the persistent hot and dry conditions in the leading growing areas of Russia (e.g. the Volga basin), the high temperatures in the western Mediterranean and Black Sea areas and the abundant rain recorded in central and eastern parts of the EU.

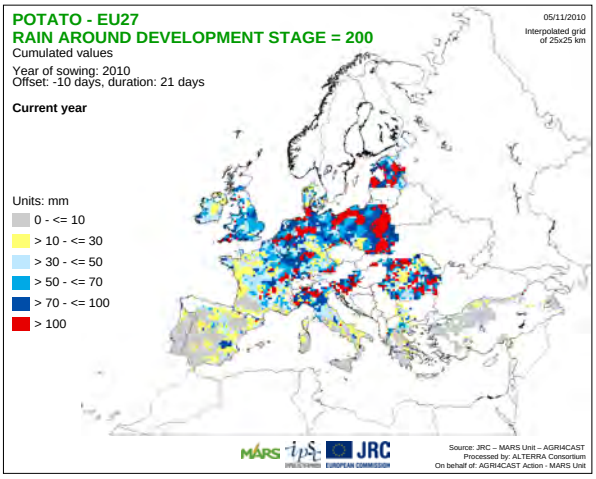
These conditions were mainly determined by the Siberian anticyclone blocked over Russia, which drew in hot air from the south of Russia and the Black Sea region, combined with a similar blockage of the Azorean anticyclone, which pushed the Atlantic rain fronts towards central and eastern EU countries.

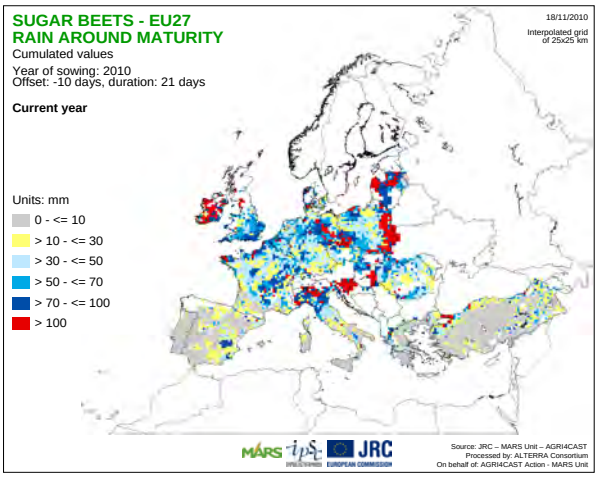
On average, during this season, across the whole of Russia and its eastern EU neighbours, as in the Maghreb countries and the western parts of the Iberian peninsula, the daily maximum temperatures were 4 to 5 °C above the normal seasonal values. This phenomenon was particularly marked in July and August, but was also observed in September. In July, virtually the whole continent (except Bulgaria, Greece and Ireland) experienced temperatures significantly above the seasonal average. Extremely high temperatures were recorded in Germany (38 °C in Brandenburg), Spain and Portugal (41.5 °C in Extremadura and Alentejo), France (40 °C in Aquitaine), Turkey (46 °C in Sanliurfa) and Russia (44 °C along the River Volga). In Russia, this was the hottest spell recorded since 1975. The central parts of the EU felt a more positive influence of the synoptic circulation driven by the two anticyclone systems in August, when temperatures fell because of an inflow of air from the north. In these areas the temperatures dropped by 15 °C and were below the seasonal average. Hot conditions persisted, however, in Russia, the Black Sea region and the Iberian peninsula. In September, more seasonal temperatures returned to the western Mediterranean region, yet anomalously high temperatures persisted over Russia and the Black sea basin. In Russia, these unseasonal agrometeorological conditions had an adverse impact on crop cycles, affecting final yields very negatively.

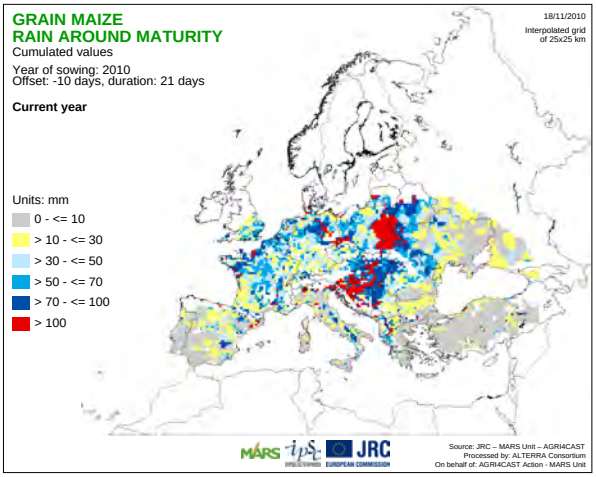
Because of the unusual synoptic circulation observed, the rain was concentrated in northern, central and eastern EU countries, while the western and eastern Mediterranean countries, the River Volga region and the Black Sea basin remained dry.

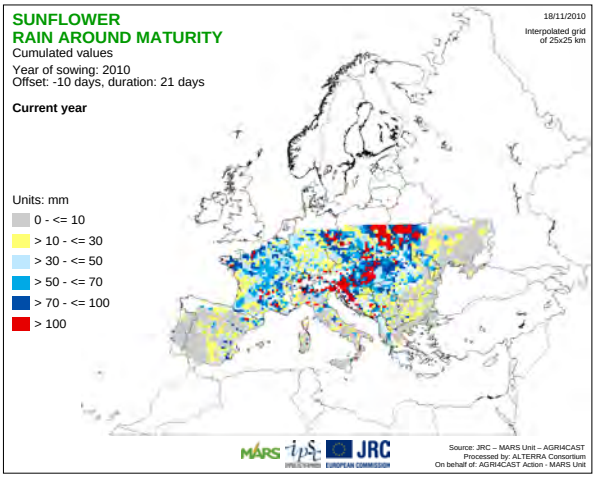
Out of the first group of countries, Austria, Slovenia, southern and eastern Germany (albeit only locally), Slovakia, southern Poland, the Czech Republic, the north-western parts of the UK, Denmark and southern Sweden received more than 500 mm of rain (100 to 120 % above the LTA). The rain was particularly persistent and abundant in August and September, affecting both late harvesting and field preparation for the new crops. Extreme rainfall (over 100 mm a day) occurred locally in Denmark, north-western Germany, southern Poland and Slovenia, where floods lasting several consecutive days were reported.

By contrast, Portugal, southern Italy (Sardinia), Greece, the Maghreb countries, Turkey and, once again, the River Volga region remained almost dry throughout the entire period. In these areas, less than 10 mm of rain were recorded, with a negative impact on rain-fed crop production. This could also have had a negative impact on irrigated crops in these regions, because of likely restrictions on water supplies.









4. Agrometeorological analysis of the EU-27 area for 2009/10

Cereals

This agricultural year has been marked by unusual scattered weather events, ranging from a severe shortage of rain to floods. However, the impact of poor weather on crops in some areas of the EU has been offset in other areas. The yield forecast for total cereals is 5.0 t/ha, 1 % below last year's yield but more than 2 % above the five-year average.

In general, Europe suffered a harsh winter, with waves of exceptionally low temperatures in December, January, February and March (e.g. snowfall in Spain), delaying the start of the season. Spring and early summer brought a severe shortage of rain in the United Kingdom, western France, the Benelux countries, northern Germany, eastern Poland and Greece.

Flooding occurred in Poland, Hungary, the Czech Republic and Slovakia. On the other hand, Spain and Italy received favourable and abundant rain in spring. Northern and central France, the Benelux countries and Germany had very high temperatures in June and July, coupled with low rainfall. Autumn brought very high rainfall levels back, hampering harvesting in northern Europe.

According to the JRC's yield forecasts and the area estimates supplied by the European Commission Directorate-General for Agriculture, total cereal production (excluding rice) is now expected to reach almost 285 million tonnes (Mt). This is more than 4 % down on last year (296 million tonnes) and roughly 3 million tonnes below the five-year average (287 million tonnes). The largest fall in yield compared with last year was observed for soft wheat (down by 3.2 %), followed by spring barley (2.5 %). Grain maize is the only crop heading for higher yields than last year, with forecasts also pointing clearly above the five-year average.

WHEAT

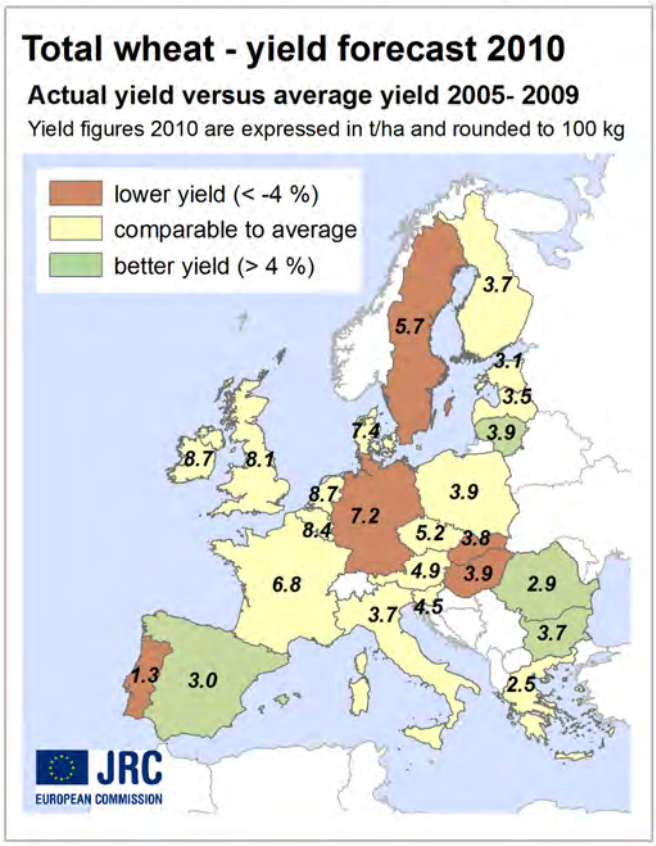
At EU-27 level, total wheat production is estimated at 136.8 Mt, a decrease of 1.8 % over the previous season, despite a 1.5 % increase in the acreage. Yield is forecast at 5.3 t/ha, which is 3.2 % below the 2009 level, yet 0.7 % higher than the five-year average. The same trend is observed for soft wheat, with a yield forecast of 5.6 t/ha (3.2 % down on 2009), leading to production of 127.9 Mt, which is 2.1 % below the level in 2009, despite a 1.2 % increase in acreage. By contrast, durum wheat production is forecast at 8.8 Mt (1.8 % up on 2009) with yield forecast at 3.1 t/ha, 1.5 % lower than in 2009.

The two main producers of **soft wheat** in Europe — France and Germany — are expected to report decreases in their production compared with 2009 of 4.2 % and 5.7 % respectively. In both cases, production is expected to be slightly higher than the five-year average. The decrease in production is due to lower yields, as in fact acreage increased by 4.4 % in France and by 2.2 % in Germany. In both these countries yields were lower than in 2009 and than the five-year average: more specifically, the final yield forecast for France is 7.0 t/ha (-8.2 % compared to 2009 and -1.0 % to the last five-year average), while in Germany the final yield forecast is 7.2 t/ha (-8.3 % and -4.5 %).

In particular, the negative performance in Germany was largely due to unfavourable weather conditions during the summer, which started very dry and hot. This was followed by high rainfall in terms of both cumulative totals and number of rainy days, which delayed harvest operations. A hot, dry summer led to poor yields in France. The high temperatures at the end of June and start of July accelerated crop development and caused heat shock, depressing potential yields. In addition, many regions of France experienced a dry summer, leading to below-average soil water levels and, thus, crop water stress.

In the United Kingdom, the yield forecast is 8.1 t/ha (3.4 % higher than in 2009 and 3.3 % above the five-year average). Good crop development was recorded from March to July, with low precipitation and good solar radiation, followed by a favourable rainy period. Furthermore, harvesting was completed before the start of the wet period at the end of August. These positive yield signals, combined with a 5.6 % increase in acreage compared with 2009, are likely to result in a significant increase in UK soft wheat production (up by 9.2 % compared with last year).

Among the other producers, the season was particularly positive in Romania and Spain, where production is expected to be 6.6 % and 15.5 % higher than the five-year average respectively. Yield is forecast at 2.9 t/ha in Romania (21.9 % up on 2009) and at 3.4 t/ha in Spain (up by 23.0 %). Italy (5.3 t/ha, up by 5.0 % on 2009), Estonia (3.1 t/ha, up by 4.5 %) and Slovenia (4.5 t/ha, +12.7 %) are all likely to report an increase in soft wheat production compared with last year.



By contrast, production in Hungary (3.9 t/ha, +1.6 %) and Ireland (8.7 t/ha, +1.5 %) will fall, despite these positive yield performances, due to big decreases in acreage (+12.1 % and +16.9 % respectively).

Some countries are forecasting lower yield than last year, yet still higher than the five-year average, namely: Poland (3.9 t/ha, down by 6.6 %), Denmark (7.4 t/ha, -7.7 %), the Czech Republic (5.2 t/ha, -1.7 %), Bulgaria (3.7 t/ha, -12.0 %), Lithuania (3.9 t/ha, -7.1 %), the Netherlands (8.7 t/ha, -6.1 %), Latvia (3.5 t/ha, -3.2 %) and Luxembourg (6.3 t/ha, -3.5 %).

Finally, the yield forecasts for Sweden (5.7 t/ha, 5.4 % below the five-year average), Belgium (8.4 t/ha, -1.7 %), Austria (5.0 t/ha, -2.6 %), Slovakia (3.8 t/ha, -7.9 %), Finland (3.7 t/ha, - 1.2%), Greece (2.7 t/ha, -0.6 %) and Portugal (1.3 t/ha, -26.5 %) are lower than both last year and the last five-year average.

Total production of **durum wheat** is forecast at 8.87 million tonnes, which is 1.8 % higher than in 2009, but 2.6 % lower than the five-year average. This increase is due to the 3.3 % increase in the area planted compared with 2009. The durum wheat yield forecast at EU-27 level is 1.5 % down on 2009. Yield in Italy, the main producer of durum wheat in Europe, is forecast at 3.0 t/ha, which is 2.9 % up on 2009 and 1.0 % above the five-year average. The area planted increased by 4.3 %, but is still 8.0 % lower than the five-year average. Due to unfavourable weather conditions (mainly drought), yields are expected to be lower than in 2009 in France (4.9 t/ha, -3.1%) and Greece (2.4 t/ha, -6.8 %). Yet production in France is likely to increase by 16.8 % compared with 2009, due to a substantial (+20.5 %) increase in area. By contrast, the 7.8 % decline in production in Greece is the result of both lower yields and smaller area.

In Spain, the cumulated winter rainfall was historically high, particularly in Andalucía. Yield is estimated at 1.9 t/ha, a reduction of -24.5 % compared with last year and 16.3 % below the five-year average. At the same time, the area planted was also reduced (-12.2 % compared to 2009 and -21.4 % compared to the five-year average), leading to a significant reduction in estimated production (by roughly 30 % compared with both 2009 and the five-year average).

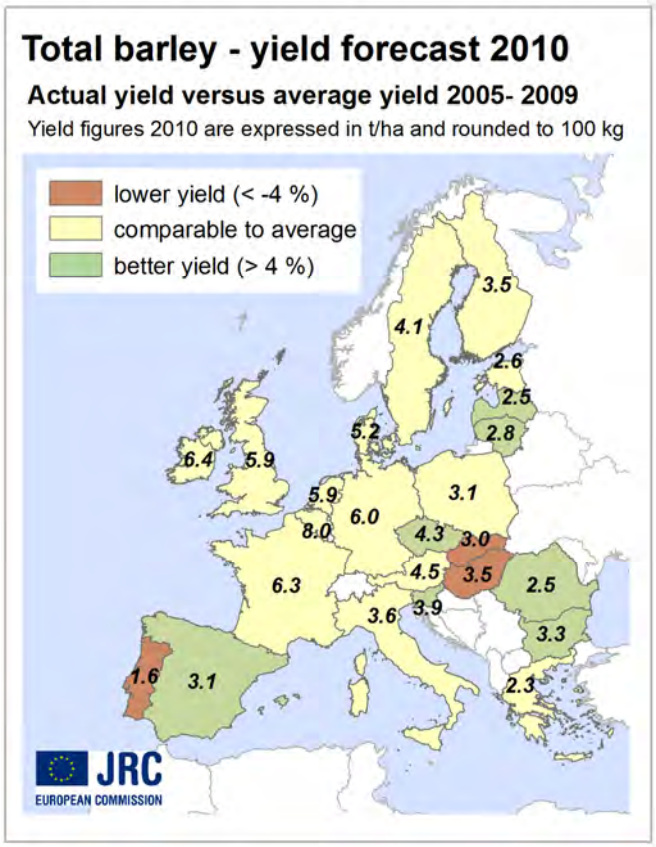
For smaller producers, durum wheat production is expected to rise very significantly above the five-year average in Germany (+118.2 %) and Slovakia (+228.3 %), due to large increases in area (125.2 % in Germany and 280.7 % in Slovakia). In both countries, the yield forecast was lower than average (5.2 t/ha or -3.1 % for Germany and 3.8 t/ha or -13.8 % in Slovakia).

BARLEY

The total EU-27 yield forecast for barley (spring and winter) is 4.3 t/ha (-2.2 % compared to 2009 and +2.4 % higher than the five-year average). The season was rather good for both spring and winter barley compared with the five-year average, but less so compared with the 2009 yield. More specifically, winter barley is forecast at 5.2 t/ha (-2.1 % less than 2009, but +2.3 % more than the five-year average) with spring barley at 3.7 t/ha (-2.5 % and + 1.4 % more than the five-year average).

Total barley production in EU-27 is now set for 53 million tonnes, which is 13.4 % less than in 2009 and 9.4 % lower than the five-year average. This overall decrease is largely due to a significant decrease in the area planted (11.5 % below the five-year average). This big decrease in production was partly counter-balanced by the good yields forecast in Spain for both spring and winter barley.

For **winter barley**, the two main producers — France and Germany — scaled down their yield forecast compared with 2009, which was a very good year (6.6 t/ha and 6.4 t/ha, down by 4.2 % and 7.6 % respectively). However, the forecast values are close to the five-year average. A good season is expected for some countries in north-western and eastern Europe, namely the United Kingdom (6.7 t/ha, 3.7 % above the five-year average), Ireland (8.0 t/ha, +3.3 %), Romania (2.9 t/ha, +12.0 %), Bulgaria (3.3 t/ha, +19.6 %) and Slovenia (3.9 t/ha, +4.3 %).



In Spain, the season was particularly favourable and the yield forecast (2.9 t/ha) is very high compared with both 2009 (38 % higher, as 2009 was a very bad year for barley in Spain) and with the five-year average (+16.8 %). Hungary and Italy are forecast at 3.8 t/ha and 3.6 t/ha respectively, which shows an increase in yield compared with 2009 (+5.0 % and +6.3 %, respectively), but a slight decrease compared with the five-year average (-3.9 % and -1.1 % respectively). The forecasts for some countries show a significant decrease in yield compared with both 2009 and the five-year average, namely Austria (5.3 t/ha; 1.2 % and 3.7 % below), Portugal (1.6 t/ha; -10.8 % and -13.4 %), Sweden (5.1 t/ha; -7.8 % and -5.1 %) and Slovakia (3.3 t/ha; -12.5 % and -9.5 %).

For **spring barley**, most countries show a significant decrease in yield in comparison with 2009. Only Spain, the biggest producer, shows a large increase compared with 2009 (3.1 t/ha, up by 24.7 %) and the five-year average (14.0 % above). The forecasts for a few other countries show yields

higher than the five-year average, i.e. the Czech Republic (4.2 t/ha; 3.9 % above), Lithuania (2.8 t/ha; 5.8 % above) and Latvia (2.4 t/ha; 4.7 % above).

All the other countries show yields close to, or slightly lower than, the five-year average: the United Kingdom (5.4 t/ha; 0.2 % above), Poland (2.9 t/ha; 1.4 % below), France (5.8 t/ha; 4.4 % below), Germany (4.6 t/ha; 1.2 % below), Denmark (5.0 t/ha; 2.9 % above) and Sweden (4.1 t/ha, 3.3 % below).

GRAIN MAIZE

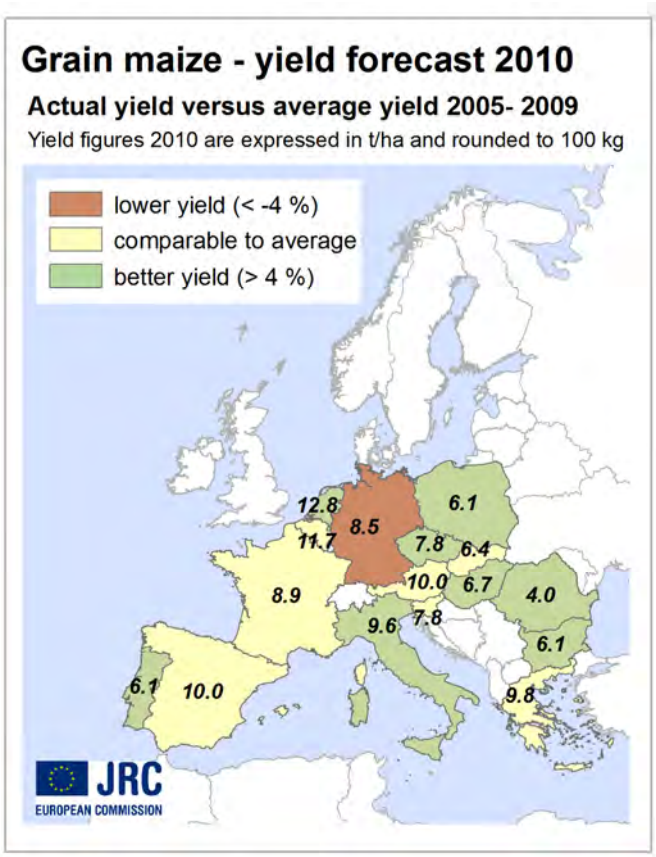
The expected yield for maize is about 7.2 t/ha at EU-27 level, which is 4.0 % better than last year and 6.7 % higher than the five-year average.

The highest recorded positive changes in yield were due to the surplus precipitation over the north-eastern part of the Balkan peninsula, which produced near-record yields. The forecast for Bulgaria is 6.1 t/ha (56.5 % over the five-year average) and for Romania 4.0 t/ha (+24.2 %). Good weather conditions also resulted in good yields in the Netherlands (12.8 t/ha, 11.0 % above the five-year average), the Czech Republic (7.8 t/ha, +6.7 %), Poland (6.1 t/ha, +6.8 %), Portugal (6.1 t/ha, +7.4 %), Hungary (6.7 t/ha, +5.0 %) and Italy (9.6 t/ha, +4.4 %).

Near-average yield is expected for Austria, Belgium, Spain, Slovakia and Slovenia. France, the leading European maize producer, could reach yield of 8.8 t/ha, slightly over the LTA, yet 2.1 % less than in 2009. The other two large EU maize producers — Germany and Greece — are expected to be below average. The forecast for Germany is 8.5 t/ha (-8.0 %), with Greece on 9.8 t/ha (-0.4%). In Romania, Bulgaria, France, Spain and Italy, favourable weather provided good conditions for sowing and corn seed germination.

This spring, very wet conditions delayed field preparation and sowing in Hungary, Slovakia, southern Poland and the Balkans. In France, Belgium, Germany, the Czech Republic and Poland, soil moisture content decreased significantly until mid-July, producing below-average values for flowering, thus jeopardising final crop yield. This dry spell was followed by a period of persistent and abundant rains, until September, leading to nutrient leaching, reducing root activity and having a negative effect on the final grain-filling phase, thus reducing yield expectations, especially in Germany.

The growing season was unusually wet in Romania and Bulgaria. The plentiful precipitation in July led to favourable soil moisture levels during flowering, resulting in very high production. Grain maize matured a week or two earlier than average in most of the Mediterranean region and areas along the eastern border of the EU, slightly lowering yield expectations because fewer days were left for grain-filling. Crop phenological development was normal in France, the Benelux countries, Germany and the Czech Republic, as in western Poland and Hungary. Abundant September precipitation increased the water content of maize seeds, postponing harvest operations significantly in Hungary, Slovakia and eastern Poland.



Oilseeds

RAPESEED

The final yield forecast for rapeseed at EU-27 level is set at 2.9 t/ha, 10.9 % down on 2009 and 4.2 % below the five-year average.

Total oil rapeseed production in EU-27 is forecast at 20.3 million tonnes, which is 4.9 % less than last year, yet 13 % higher than the five-year average, due to an 18 % increase in the area planted, compared with the five-year average.

Rapeseed yield is, however, expected to be lower than last year, due to exceptional weather conditions during the growing season. In Spain, crop yield is expected to be higher both than last year (1.6 t/ha, up by 8.4 %) and than the five-year average (3.7 % above). A good year compared with 2009 is also forecast for Romania (1.5 t/ha, up by 7.5 %) and Hungary (2.2 t/ha, up by 1.0 %), because of the better water supply, although yield values are still lower than the five-year average.

Significantly lower yields, at least 10 % lower than in 2009, are expected from the main producers, Germany (3.8 t/ha, down by 11.2 %) and France (3.3 t/ha, down by 12.2 %), and also from Finland (1.5 t/ha, down by 15.7 %) and Sweden (2.6 t/ha, down by 13.5 %). In France, Austria, Italy, Slovakia, Sweden and the United Kingdom, yield is forecast to be lower both than last year and than the five-year average. For instance, the UK yield forecast (3.1 t/ha) is 4.4 % below the five-year average. Yields higher than the five-year average but lower than in 2009 — which was a bumper year, overall — are forecast for several eastern European countries: Bulgaria (2.5 t/ha, 19.4 % above the five-year average), the

Czech Republic (3.1 t/ha, 3.3 % above), Latvia (2.2 t/ha, 6.7 % above), Lithuania (2.0 t/ha, 9.3 % above) and Poland (2.9 t/ha, 4.0 % above) and also for Denmark (3.6 t/ha, 2.9 % above) and Estonia (1.6 t/ha, 1.0 % above).

In western regions of Europe, lower than normal temperatures persisted until mid-June, delaying rapeseed development and lowering yield potential. Heavy rains during flowering likewise contributed to lower than average yield potential in central Europe. The northern part of the continent was warmer and drier than usual, leading to faster crop development throughout the entire season, shortening subsequent grain-filling and, thus, limiting potential yields. In southern and south-eastern Europe, access to fields during harvesting was reduced because of high soil moisture and intense rainfall, which could have a negative impact on final yield and, perhaps, grain quality.

SUNFLOWER

The expected yield for sunflower is 1.9 t/ha at EU-27 level, 12.1 % above the five-year average and 7.6 % higher than in 2009.

More than 90 % of the area under sunflower in EU-27 is accounted for by five countries. Bulgaria (2.1 t/ha, 35.0 % over the LTA) and Romania (1.8 t/ha, 35.9 % over) both had excellent yields. Yields were also very good in Spain (1.2 t/ha, 16.1 % higher than both the LTA and 2009). In France, an ordinary year is forecast (2.4 t/ha, 0.4 % over 2009 but 1.6 % below the five-year average). After excess precipitation combined with unfavourable meteorological conditions, Hungary is expecting a below-average harvest (2.2 t/ha, 5.8 % less than the LTA).

In the major producing areas of Spain and France, sunflower was sown under good soil moisture conditions. In Slovakia and most of Romania, over-wet conditions delayed field preparation, sowing and even the early development of sunflower.

Bulgaria and Romania benefited from wet and rainy conditions throughout the crop growth period. Sunflower benefited from a relatively humid and warm summer with wet soil conditions and good water supply, which led to very good yield. In Spain, fair weather conditions during the entire crop cycle, combined with ample local showers in August — especially in Andalucía — supported high yields. In France, the irradiation levels and temperatures were below average, leading to moderate crop water demand in summer and thus reducing stress. However, the dry spell from July to August in the southern provinces reduced the national yield expectations from above normal to average.

In Hungary, heavy and continuous rainfall caused excess soil water and flooding at several places. The colder conditions were also unfavourable for crop phenological development. These negative weather conditions depressed potential yields, hampered harvest operations and considerably decreased seed quality.

Roots and tuber crops

POTATO

Dry soil conditions in mid-summer were followed by excessive precipitation in major producing countries, depressing potential yields. The forecast for potato at EU-27 level (27.5 t/ha) is significantly (7.7 %) lower than in 2009 and 2.3 % below the five-year average.

Weak potato yields were expected for most European countries, due to unfavourable weather conditions. A below-average season is forecast for Germany (37.7 t/ha, 9.8 % below the five-year average), the Netherlands (43.8 t/ha, 0.4 % below), Belgium (41.8 t/ha, 4.7 % below), France (41.3 t/ha, 4.0 % below), Poland (18.4 t/ha, 1.2 % below), Sweden (28.0 t/ha, 6.6 % below) and the Czech Republic (24.1 t/ha, 6.5 % below).

In all these countries, below-average soil moisture conditions in mid-July caused water stress for this shallow-rooted crop. Intensive and persistent precipitation followed from the last week of July until the end of September. The excess water was coupled with low solar irradiation, which had a negative effect on crop growth. The continuous summer rains led to excessive soil water and reduced the potato yield in Romania (14.1 t/ha, 1.1 % below the long-term average), Hungary (21.5 t/ha, 14.1 % below), Austria (31.6 t/ha, 0.9 % below) and Slovakia (15.1 t/ha, 7.1 % below).

Meteorological conditions in the British Isles, the Baltic countries and the Mediterranean region were more positive, which led to forecast yields close to or higher than the five-year average: the United Kingdom (41.5 t/ha, 0.3 % below the LTA), Ireland (34.5 t/ha, 6.8 % above), Lithuania (12.6 t/ha, 4.7 % above), Latvia (15.9 t/ha, 2.3 % above), Denmark (38.8 t/ha, 1.3 % above), Finland (25.9 t/ha, 2.8 % above), Spain (28.9 t/ha, 4.7 % above), Portugal (14.7 t/ha, 0.2 % above), Italy (25.1 t/ha, 0.8 % above) and Greece (25.4 t/ha, 2.7 % above).

In general, the wet weather caused widespread late blight (*Phytophthora*) infections, while the high soil moisture hampered harvest operations and induced rotting of potato tubers in several countries (e.g. Poland, Hungary, Romania and Slovakia). Furthermore, the high water content is expected to lower the quality of tubers for winter storage.

SUGAR BEET

At EU-27 level, the 2010 sugar beet yield is forecast at 65.4 t/ha, which is a 8.6 % decrease compared with the last exceptional season, but still 1.7 % above the five-year average.

The 2010 season was marked by average performances by all the main producers (on average, around 2 % above or below the five-year average), with the positive exceptions of the UK (8.4 % above), Italy and the Czech Republic (3 to 4 % above). As the previous year had been exceptional, the differences compared with 2009 are largely negative in all these countries: down by 9.5 % in France, by 10 to 11 % in Germany, Poland, the Netherlands and Belgium, by 4.2 % in the UK and by 8.4 % in Spain. In addition, 2010 saw the first downturn in yield after seven consecutive years of continuous increases.

Absolute yields are nonetheless quite high: in many cases they are still the second or third highest since 1988. This is the case in France (84.8 t/ha, third highest), Germany (84.8

t/ha, third), Poland (48.5 t/ha, second), the UK (67.0 t/ha, second), the Netherlands (69.3 t/ha, third), Belgium (73.7 t/ha, second), Italy (57.4 t/ha, second), the Czech Republic (56.9 t/ha, third) and Spain (76.5 t/ha, third).

Less positive results are expected for yields in Germany and Denmark, mainly due to the high precipitation and associated excessive soil moisture from the beginning of August onwards.

Rice

Rice yield at EU-27 level is forecast at 6.7 t/ha, 1.7 % above the five-year average but slightly (0.4 %) below last year's values.

Rice production at EU-27 level will be close to last year's values (up by 1.3 %), with an increase in the area cultivated (1.7 % more than last year and 10.7 % above the five-year average).

At EU-27 level, yields are forecast to be close to the five-year average (1.7 % above), but slightly lower than last year (down by 0.4 %).

Good meteorological conditions guaranteed average yield potential in western countries. Among the main producers, some regions of the eastern part of Spain and of the Po Delta in Italy suffered from losses of yield due to fungal disease, whereas in the others conditions were sufficiently dry to stave off any high disease risk.

Rice yield forecasts are 7.3 t/ha (3.2 % above the five-year average) for Spain, 5.9 t/ha (3.9 % above) for France, 7.9 t/ha (2.4 % above) for Greece and 5.8 t/ha (1.8 % above) for Portugal.

Due to the colder than usual weather in Italy, the rice yield forecast was revised downwards slightly, to 6.5 t/ha, still 1.0 % above the five-year average.

In eastern European countries, the increase in temperatures made it possible to catch up on the earlier delay in development, but strongly increased the risk of blast infection, especially in Bulgaria (4.7 t/ha, 0.2 % below the five-year average). Slightly better results are forecast for Hungary (3.7 t/ha, 1.5 % above) and Romania (4.2 t/ha, 4.2 % above).

5. Agrometeorological analysis of the Black Sea area

TURKEY

Winter-crop yields average, normal outcome for maize. Winter wheat is forecast at 2.2 t/ha, an average level despite the good start to the season. Barley is forecast at 2.5 t/ha, above the five-year average. The forecast yield for maize is 7.0 t/ha, pointing to a normal outcome.

The beginning of the 2010 season in the major cereal-producing areas of Turkey, namely Orta Anadolu, Bati Anadolu and Guney Dogu Anadolu provinces, was marked by wet weather and moderate temperatures. Precipitation was considerable and well distributed from October to December 2009 and the cumulative rainfall remained steadily above the norm. These were favourable conditions for sowing and emergence of winter cereals. The positive trend continued in March and April. As reported by various sources (FAO, PECAD, etc.), these favourable meteorological conditions, which would have allowed a bumper crop, also favoured rapid development of yellow rust infection, therefore lowering yield expectations in central Anatolia.

In general, the country and especially the main wheat-producing regions in central Anatolia received sufficient rain (indeed a surplus, compared with the LTA). June in particular was marked by two distinct rainy periods. The last similar wet June was recorded in 1997.

By contrast, July, August and September were rather dry. The beginning of August brought some extremely hot days, with temperatures close to 40 °C. In general, over the period from August to September, the temperature sum was 20 % above the LTA. The main areas for winter and spring cereals are located in the central highlands (Antalya and Ankara), where harvesting takes place during July. In these regions, the dry weather coincided with the final maturation phases of wheat and barley. Crops in these regions are expected to show a decrease in final yield. Wheat, however, is harvested during June in the western and Mediterranean regions, coinciding with the heavy rainfalls, possibly with a negative effect on grain quality. October brought back significant rainfall, leading to a large soil water surplus in central Anatolia.

UKRAINE

Overall, a positive, warm, wet season with near-average yields. The yield estimate for wheat is 2.5 t/ha (18 % down on 2009 and 12 % below the five-year average). Barley is forecast to yield 2.0 t/ha (down by 18 % and 12 % below average). Maize is forecast at 4.5 t/ha (down by 9 % but 5 % above average) and rapeseed at 1.6 t/ha (down by 20 % compared with 2008, but similar to the five-year average).

The meteorological conditions were favourable for crop development. In general, it was a warm and wet, mild season. The main exceptions were sudden sharp drops of temperature in December and January and heavy rainfall in summer. The influence of those extreme events on overall yields was, however, limited because of sufficient snow cover in most of the country during the frosts and because of the small geographical area receiving the heavy precipitation.

The season started mildly, with temperatures slightly higher than average and normal rainfall. December and January brought two distinct drops in temperature to between 10 and 15 °C below the long-term average. Spring was favourable for crop development. Only northern-central oblasts were considered at risk because of very low rainfall in March and April.

However, intensive rainfall in May prevented drought. This was followed by one of the hottest summers in recent decades. Luckily, sufficient precipitation prevented the onset of serious droughts. However, heavy rainfall during the harvesting period could cause some losses.

All the main crops — wheat, barley, maize and rapeseed — started the season with promising, above-average development conditions. However, very high summer temperatures shortened the growing period of wheat and barley. As a result, final yields of these two crops were below average. Maize and rapeseed benefited from the warm conditions and developed better than on average.

6. Agrometeorological analysis of the eastern countries

BELARUS

Extremely hot summer and sufficient rainfall resulted in average yields.

The beginning of the season was promising for all crops. Expectations of above-normal yield were then dampened slightly by frosts during the mild spring. However, a very hot summer hastened crop development and depressed potential yields. As a result, earlier expectations were scaled down to a forecast of average yields. Wheat is now forecast at 3.2 t/ha (15 % less than the previous forecast and 9 % down on 2009) and barley at 3.3 t/ha (5 % down on 2009). Grain maize yield is expected to reach 5.1 t/ha (9 % up on 2009). Rapeseed is estimated at 1.5 t/ha (15 % less than in 2009).

The season started with mild conditions after sowing. The beginning of the winter was mild, but then followed by very cold periods in December, January and February. The thin snow cover was not sufficient to protect seedlings, which suffered significant frost damage, as visible in frost impact maps. Spring brought higher than average temperatures, which remained above normal for almost five months. August 2010 was the hottest month in the last 35 years, with temperatures remaining well over 40 °C in the eastern oblasts. Although there were some short dry periods, cumulated rainfall was sufficient to prevent the onset of significant drought in most of the country.

RUSSIA

Significant drought hit yields.

The season started with a warm autumn and favourable conditions after sowing. Two sharp drops in temperature affected crop development in December and January in all of European Russia except southern oblasts. Low snow cover and snow depth during the first temperature drops recorded resulted in significant frost damage. By contrast, the spring was very favourable, with temperatures slightly higher than normal and sufficient rainfall. As a result, all crops developed well.

Nevertheless, June brought significant warming, first in the south, then — in July — the whole European part of the country experienced very high temperatures, up to 40 °C. There was not enough precipitation during this very hot period, especially in the agriculturally important Volga district. From Volgogradskaya to Bashkortostan, a very severe drought had a negative impact on crop growth and development.

Rainfall at the end of August and in September brought some recovery. Nonetheless, damage had already been done to crops in most areas. Severely reduced yields are expected.

7. Campaign analysis on the Maghreb

The season is considered better than average in Morocco and more in line with the average in Algeria and Tunisia.

In Morocco, the wheat yield is estimated at 1.8 t/ha, which is 15.0 % lower than the exceptional result in 2009, but still 27.3 % higher than the five-year average. For barley, yield is forecast at 1.3 t/ha, a decrease of 24.9 % on 2009, but still 46.0 % above the five-year average. In Algeria, where the 2009 season was also a record for cereals, wheat is forecast at 1.4 t/ha (2.8 % down on the last five years) and barley at 1.2 t/ha (15.7 % below). In Tunisia, wheat is forecast at 1.7 t/ha (20.3 % down on 2009, but 4.1 % higher than the five-year average) and barley at 1.2 t/ha (36.3 % down on 2009 and 12.2 % below the last five-year average).

In Morocco, the leading cereal producer in the Maghreb region, in the end the season can be described as good, with crop yields higher than the average for the last five years. Despite very good cumulated rainfall values, flooding occurred in some regions and temperatures were higher than normal, especially in March and April. These two factors affected the crop cycle by delaying sowing and, more importantly, shortening the grain-filling period.

In Algeria, the season has been average, particularly for wheat. The lower performance than in the previous season is largely due to irregular rain at the beginning of the season followed by excess rain in June which, in the end, had a negative effect on crop development and hampered harvesting operations.

In Tunisia, the figures for the season are slightly lower than average, largely due to continuous lack of rain during the growing season.

8. Pasture analysis 2010

Unfavourable climatic conditions in the winter and summer held down annual production levels in north-western countries. Southern and eastern countries show production levels close to or above average

In general, the seasonal production balances show lower than average biomass production across north-western Europe, particularly in north-western areas of France. By contrast, in Mediterranean and eastern countries, production levels were above normal.

Significant production shortfalls (exceeding 20 %) were observed in north-western regions of France. These unfavourable conditions also affected green maize and are partly due to the low cumulated precipitation in north-western areas during the spring and summer. By contrast, the production levels observed in eastern regions of France (Bourgogne, Rhône-¬Alpes and Provence, Alpes, Côte d'Azur) are at or above average. Dry conditions in spring also had a negative effect on biomass production levels in Ireland and the United Kingdom. However, subsequent favourable conditions during the summer took annual production levels close to average values. A deficit was also observed in production levels in the Netherlands, Denmark and northern Germany. In these regions, in addition to a slight delay in development observed at the beginning of the cycle, two consecutive dry spells in April and early summer (from 20 June to 10 August), combined with a very warm period, adversely affected total biomass production. By contrast, in southern Germany favourable conditions led to good production levels for grassland and green maize. In many of the negatively affected areas, some of the land previously used for crop production (e.g. grain maize or barley) was turned over to grassland and fodder production in order to bridge the expected shortfall in feed supply.

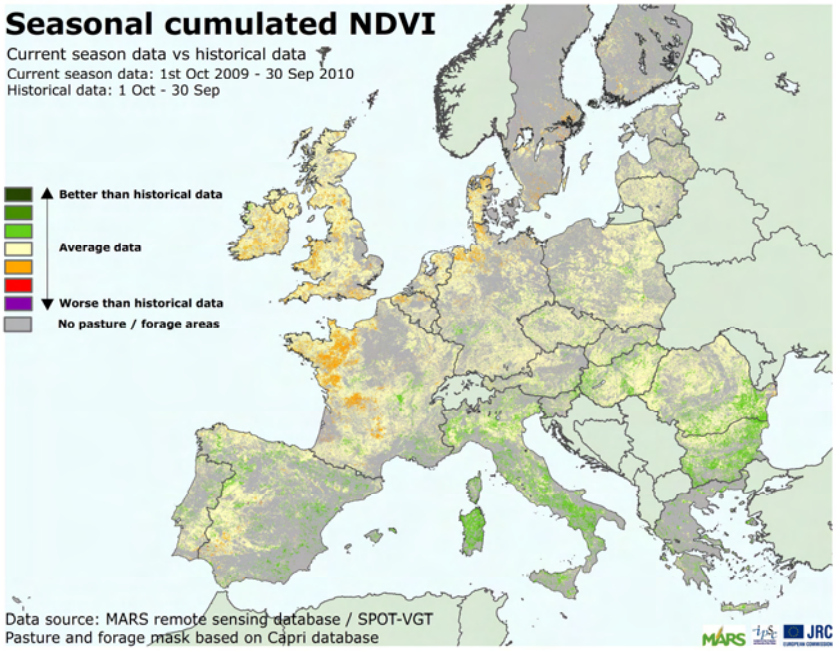
In Mediterranean and eastern countries, the season was quite good. In Spain and Portugal, high production levels were observed for the whole season. In these countries, the large amount of rain accumulated during the winter kept the soil water content high, while favourable climatic conditions during the summer further supported good potential biomass levels. Only in parts of the Dehesa region was a deficit in biomass production observed. Italy also shows very good biomass production levels, particularly in southern regions and the islands. Temperatures slightly above average, combined with significant levels of rainfall, resulted in exceptional grassland growth in these areas. Consequently, higher than normal growth (up to 40 % above average) was recorded in all areas with grassland and forage (using the CAPRI database). Likewise, high production levels are expected for green maize in northern areas of Italy.

In Austria, the Czech Republic, Slovakia and Romania, good production levels were reached, particularly due to the favourable summer climatic conditions. The total biomass production in Austria, the Czech Republic and Slovakia is near or above the historical average. The exceptional amounts of rain accumulated during the spring and summer in all regions kept the soil water content relatively high during the entire growth cycle. This situation allowed high levels of biomass production even during the hottest periods. In Romania, average production levels were observed, with only parts of the Sud-Est region rising above average. Production of green maize was also helped by the favourable weather conditions, with the result that production levels are near or above the average in every region.

Finally, heavy rainfall during the second half of May unleashed local floods in southern Poland and around the River Danube, but did not affect biomass production.

In the Baltic countries and Poland, favourable weather conditions during the summer ensured average biomass production, with a few localised areas in central and south-western Poland and the east of the Baltic countries reporting values above average. The cumulated rainfall was very high in every region after May and the warm temperatures supported biomass. In Finland and Sweden, although grassland production was slightly affected by dry and hot conditions in early summer, subsequent over-wet conditions allowed pastures to recover towards average potential biomass production levels.

More detailed information about seasonal production of grassland, forage and green maize in Europe can be found at:



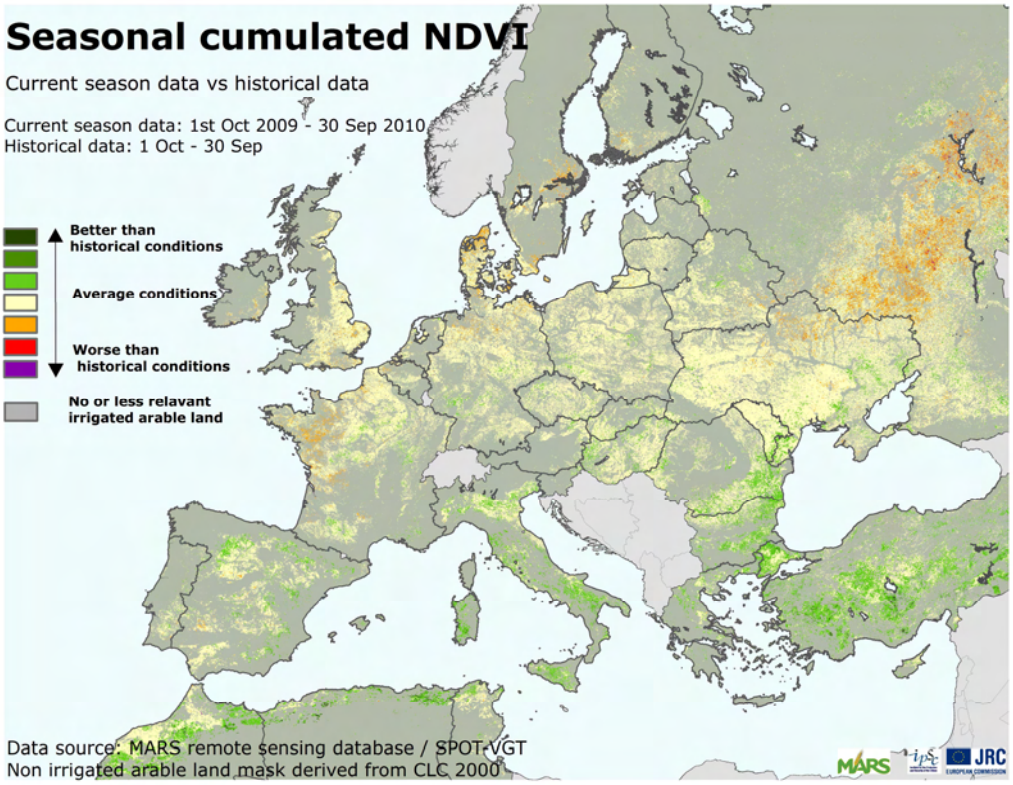
http://mars.jrc.ec.europa.eu/mars/Bulletins-Publications/MARS-Bulletin-Europe-Pasture-bulletin-19-10-2010-No.-2

9. Satellite analysis — SPOT vegetation

Map highlights — Drastic drought in Russia, lack of rain affected summer crops in western France. Normal conditions throughout central Europe, from normal to fairly good season in the Mediterranean and Black Sea regions.

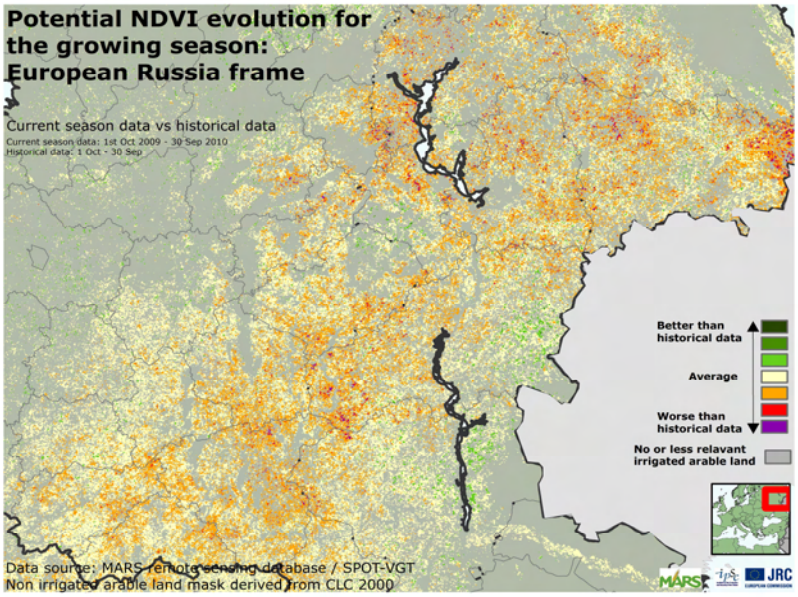
Analysis of cumulated NDVI

The 2009/2010 season is illustrated in the map below. The **scenario map** summarizes the full seasonal biomass dynamics (from beginning October 2009 till end September 2010). The Russian and eastern Ukrainian crop suffered a severe drought, with biomass accumulation significantly below normal. Lesser severely negative conditions were also observed in western France, although in this area normal development of winter crops tended to counter-balance the subsequent negative summer season. North Germany, Denmark and the United Kingdom display slightly below-average to normal biomass development. Normal to good conditions prevailed across the other regions of Europe, with a strong gradient North-South indicating better conditions at lower latitudes.



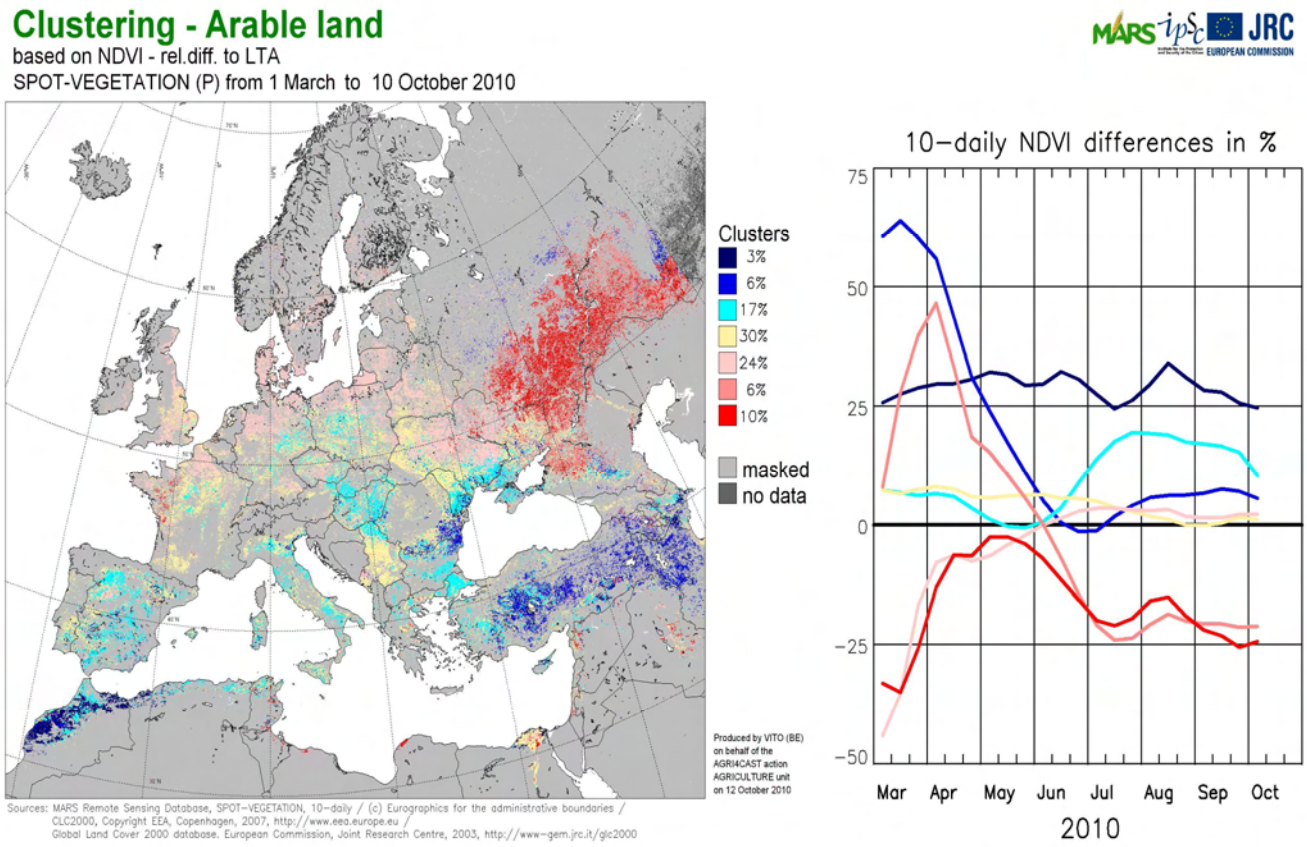
Focus on European Russia

The map below focuses on the main agricultural regions in European Russia, displaying the seasonal pattern between October 2009 and September 2010. The negative balance, compared with the historical series, emerges with increasing intensity as the summer season progresses.



NDVI cluster time-series analysis

The cluster map below shows the average time profiles of seven main NDVI classes identified across Europe. The negative development of summer crops discussed above is displayed by the red profile and by the dark pink profile. The pink and yellow profiles map the NDVI trend in regions with biomass development similar to the LTA. The light blue area showed positive seasonal development — mainly for summer crops — while the blue and dark blue profiles indicate very good canopy growth over the entire season..



B. New 2010/11 season — 1 September to 20 October 2010

1. Agrometeorological overview

Normal agrometeorological conditions across most of the EU, cooler than the LTA in eastern parts of the EU and wetter in southern Italy, the Balkans and Turkey.

Temperature

Normal GDD accumulation across most of the EU (despite lower than average minimum temperatures), lower in eastern parts of the EU, but higher in Turkey and Morocco.

September brought extreme conditions in the eastern and western regions of the continent and also in the Maghreb countries. East of the EU borders, and also in the Black Sea region and in Portugal and eastern Spain, both the minimum and maximum daily values were 3 to 4 °C above average. Consequently, the GDD accumulation presented large surpluses (20 to 30 % above the LTA) along the whole of the north-eastern side of the continent (from Finland to Turkey).

By contrast, the central regions of the EU (France, Germany, the Benelux countries, Austria, the Czech Republic, Slovakia and Hungary) experienced temperatures slightly cooler than average. In the warmer areas, these temperatures created favourable conditions for germination of winter crops. However, at the beginning of October the synoptic circulation changed, with mainly northerly air flows. As a result, temperatures dropped rapidly; the minimum daily values, in particular, slipped below normal. At the end of the month, the cumulated GDD values in the EU were 20 to 30 % below the LTA almost everywhere east of France, with the exception of northern Scandinavia. In the other areas of the EU, more normal values were recorded. Moderate frosts occurred: -2 to -3 °C in central/northern France, -4 to -5 °C in northern Spain (Castilla y León), Austria and southern Germany and -6 to -7°C in Slovakia, the Czech Republic, Poland and Romania, as well as in Ukraine and Russia. However, the temperatures dropped relatively slowly, over

more than ten days. Therefore, in general, germination occurred under favourable thermal conditions and the gradual fall in temperatures ensured that the frosts caused no serious damage to crops.

Rain

Generally good water supply, except in France (too dry), in the Balkans and Turkey (too wet). Favourable rain in southern Spain, Portugal and Morocco. Very persistent rain in Denmark, Sweden and the UK.

At a glance, the spatial distribution of precipitation was generally favourable in most of the EU countries. Despite the exceptions described below, on average 20 to 30 mm of rain were recorded almost everywhere. These amounts were sufficient to guarantee adequate soil moisture for both germination of winter crops and the early stage of plant development.

The most critical conditions occurred in the Balkan peninsula (especially Greece and Bulgaria) and in southern Italy (Sicily and Sardinia), eastern Germany, Slovenia, western Turkey and south-eastern Ukraine, where the rain was very abundant (120 % to 300 % above the LTA). Depending on specific local soil characteristics, this rain could have led to nitrogen losses from run-off and leaching.

In September, the rain was more concentrated in northern countries, whilst practically none fell in Portugal and the Mediterranean basin. Conversely, in October the rain was more abundant in the Mediterranean region and scarce or absent at higher latitudes, in particular in Poland.

In southern Spain (Andalucía), southern Portugal (Alentejo) and Morocco, higher than normal amounts of rain were recorded in this period. In these areas, this rain will play a valuable role in refilling soil water reserves for the months ahead, to the benefit of crops in the post-emergence stages.

In Denmark, the UK and Sweden, although the amounts of cumulated rain were relatively modest, they were nonetheless distributed over more than 25 rainy days. The associated cloudy conditions led to lower than normal solar radiation and also hampered all field activities.

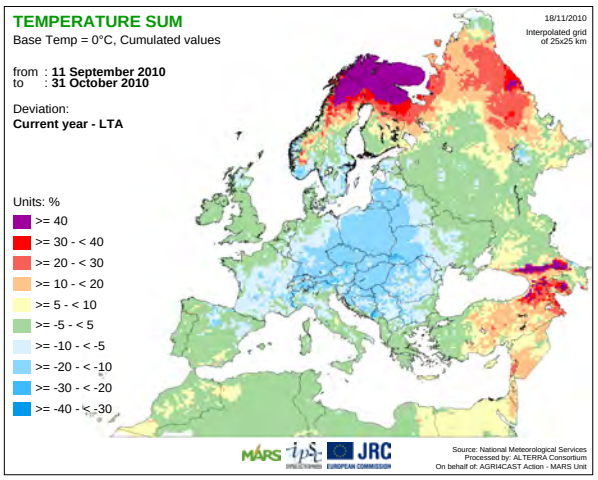
2. Winter crop sowing overview 2010

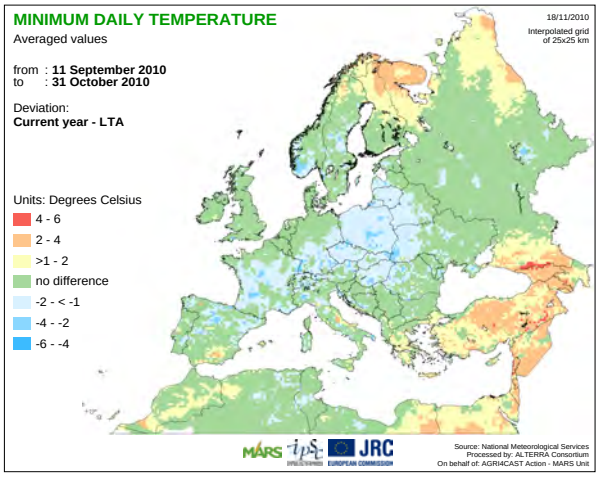
EU-27

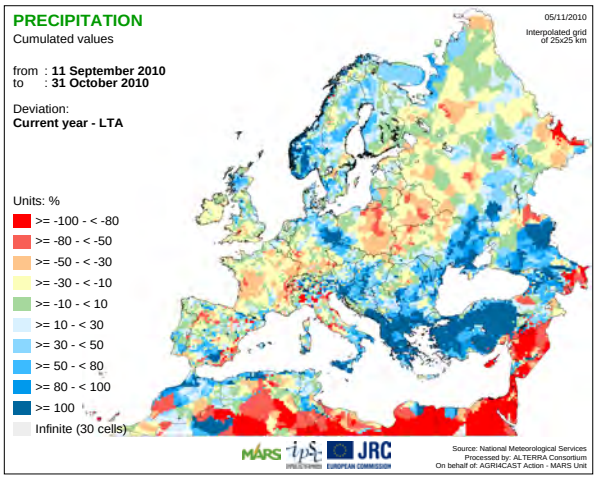
WINTER WHEAT - Early sowing occurred under optimum conditions, but heavy precipitation in October hit the Balkan area and south-eastern Europe.

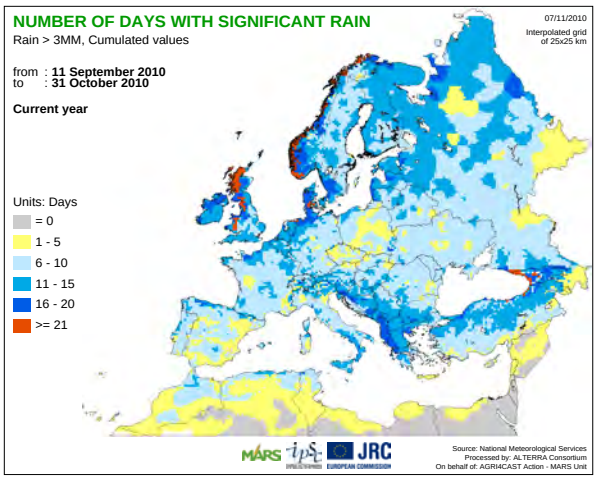
Precipitation around the sowing period strongly affected the Balkan area and south-eastern countries like Romania, Bulgaria and Greece where the cumulated rainfall over this period totalled more than double the long-term average. Along the border between Germany and Poland too, the intense precipitation, combined with already very high soil moisture values, might have prevented access to fields.

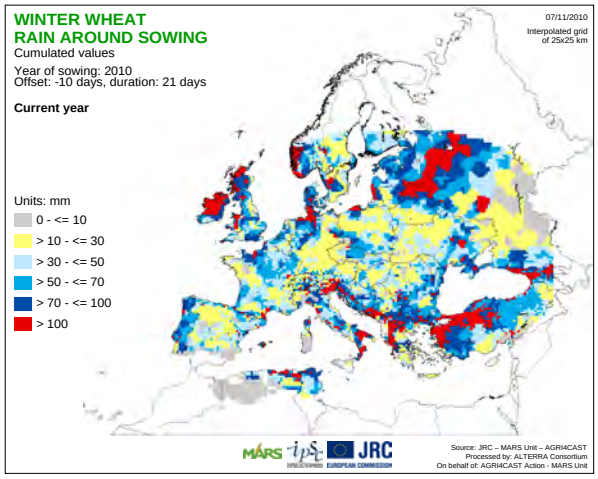
October was also marked by low temperatures, especially in the eastern part of Europe, in the Black Sea area and in Russia, delaying the emergence of winter wheat. By contrast, with the exception of Ireland and northern parts of the UK, most of the other countries where sowing occurred in September experienced optimum conditions, both at sowing and at emergence.

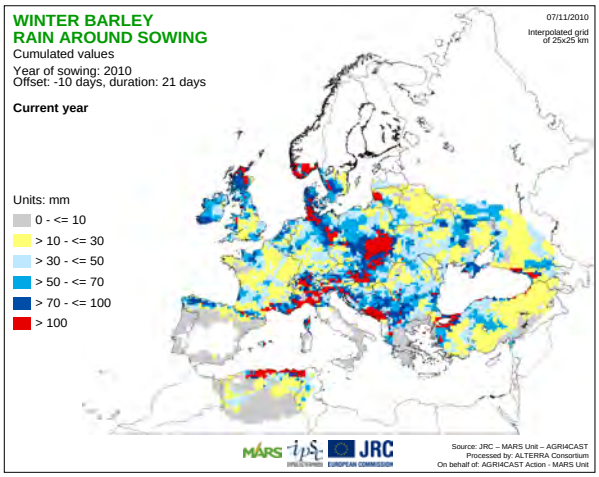


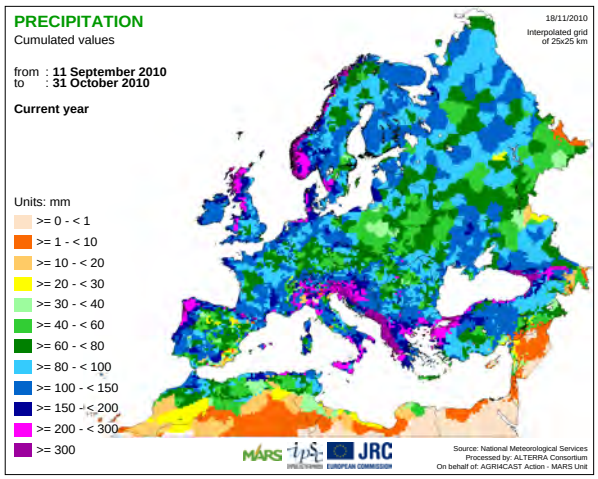


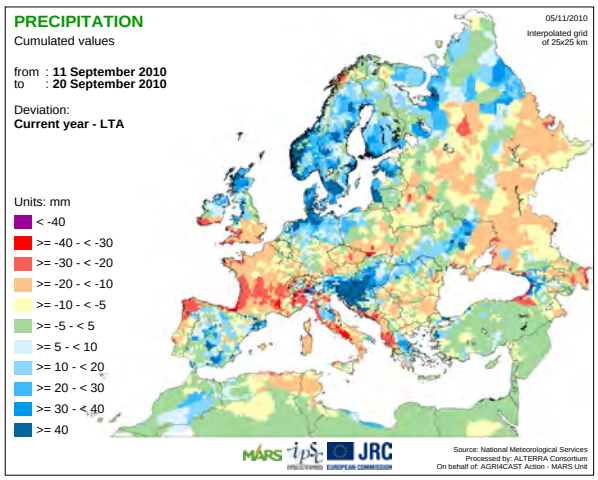












Very dry conditions are now prevailing in southern Spain and Portugal; therefore unless significant rainfall occurs within the next few weeks, sowing will take place with critically low soil moisture values.

WINTER BARLEY — Heavy cumulated rain during September and October affected sowing in eastern and central regions.

The first sowing operations in Europe were affected by heavy rain during the first twenty days of September in areas of southern Poland (Południowy region), Slovakia, southern Finland and Sweden. By contrast, in the Czech Republic and in central and northern Poland, water soil content values were near field capacity and lack of rain at this period allowed normal sowing operations.

On the other hand, average temperatures recorded in this period were below normal values, potentially delaying emergence. Weather conditions were also quite favourable for sowing in Romania, with the exception of central areas, where significant levels of rainfall were observed. Northern and north-eastern Germany, Denmark, eastern Austria and western Hungary were also affected by very high cumulative rainfall (70 to 120 mm) during the last ten days of September and the first ten days of October.

These events possibly delayed sowing in all these areas. In the United Kingdom, only Scotland was affected by moderate rains, but the rest of the country enjoyed favourable conditions for sowing. Early-sowing regions in Italy (Lombardia, Piemonte and Veneto) were adversely affected by high levels of rainfall. By contrast, weather conditions in France and Spain (only northern areas) were favourable. However, soil water content remains quite low and rain is needed in the next few days to get the season off to a good start.

WINTER RAPESEED — Generally wet conditions in central Europe, but favourable in France and the Mediterranean region.

The main sowing activities took place between the last ten days of August and mid-September. The second ten days of August were wet in Germany, northern France, northern Italy, some regions bordering Poland and Slovakia, in the Baltic States, Denmark and southern Sweden, which reported local readings of more than 80 mm in ten days. By contrast, areas around the Mediterranean Sea and the Black Sea, along with Finland, had little rain. The next ten-day spell was very wet in central Europe. North-eastern Germany received more than 100 mm of rain; abundant precipitation was recorded in Austria, Poland and the southern UK.

Soil moisture conditions were good in Romania, Ukraine, Bulgaria and France. The first ten days of September were favourable for sowing and germination of rapeseed in Germany, most of France, the Czech Republic and the western part of Poland. In southern France, eastern Poland and around the border with Ukraine and Slovakia and in Hungary, intense precipitation hampered sowing. In areas with excessive soil moisture, pre-sowing and sowing activities were difficult. In central Europe, sowing activities were completed by the second ten-day period of September. Meteorological conditions for emergence were quite good.

BLACK SEA AREA

Early sowing benefited from mild September weather, although heavy rains in October could have some negative impact.

Warmer than normal conditions were observed during September in all countries in the Black Sea area, with both minimum and maximum temperatures continuously above the long-term average. This led to a significant surplus in thermal accumulation by the end of the month, creating optimum conditions for rapeseed and winter wheat in Belarus and in the northern part of Ukraine. By contrast, the first ten days of October brought a drop in temperatures (to -2.2 °C on 8 October in Belarus), which remained below average, delaying the start of the barley season in most countries and of the wheat season in southern Ukraine and Moldova. Rainfall during September and the first part of October was well distributed, guaranteeing access to fields for sowing operations across the whole Black Sea region, with seedlings benefiting from optimum water availability. Nevertheless, the abundant precipitation in the second part of October might raise soil moisture values significantly above the average, increasing the anoxia risk to young seedlings.

EASTERN COUNTRIES

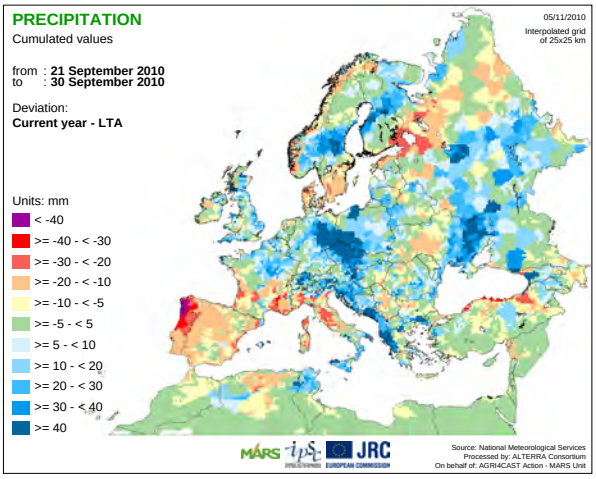
RUSSIA — Generally favourable conditions.

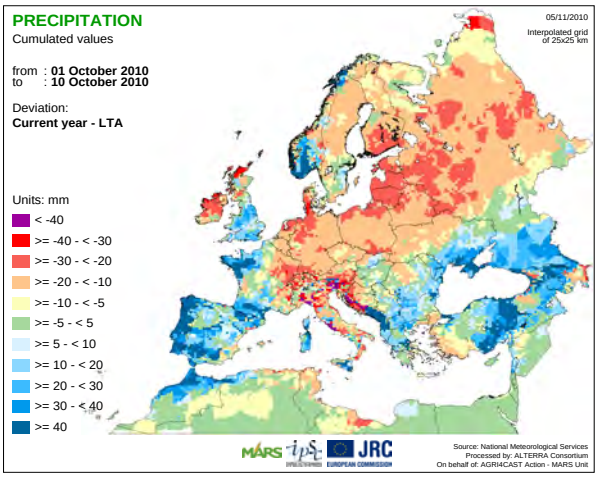
Meteorological conditions in autumn 2010 were mild and close to average. More specifically, the air temperature in September and October was close to the long-term average in all the main agricultural regions. Southern oblasts reported temperatures and precipitation levels that were slightly higher than normal. In general, soil moisture was favourable for winter sowing. Normal crop development is expected up to winter dormancy.

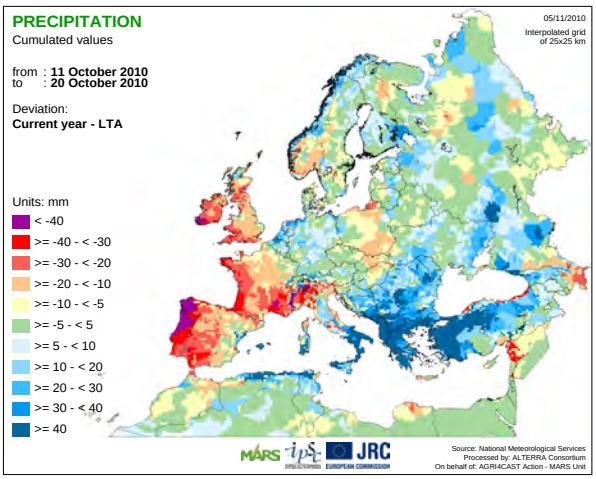
MAGHREB COUNTRIES

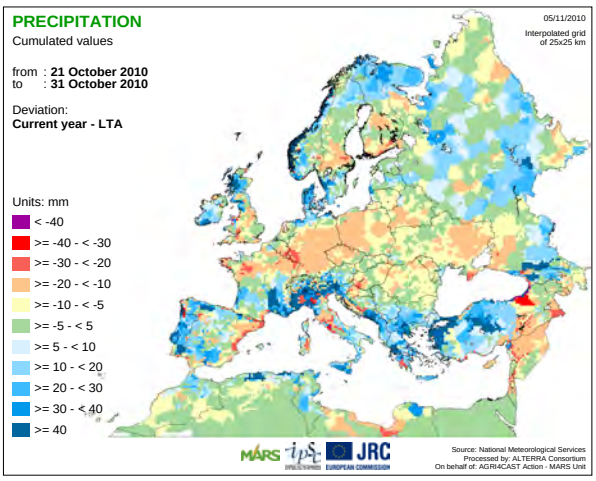
Good sowing conditions in Morocco, different cumulated rainfall values in Algeria, with conditions ranging from too little to too much rain from west to east. Good sowing conditions in Tunisia, with some slight delay in eastern regions.

Sowing conditions are rather good in the main producing regions in Morocco. In particular, in the Nord-Ouest and Centre-Nord regions, the cumulated rainfall by the end of October stood at around 100 mm. At the same time, maximum temperatures have been in their normal range since the last ten days of September — a significant improvement from the abnormal heat waves that occurred in August. In Algeria, where sowing takes place a little later than in Morocco, the situation is markedly different between the west and the east of the country. In the main producing regions there has been a lack of rain in the west (Sétif), a good supply in the centre (with 70 mm of cumulated rain in Tiaret) and too much rain in the east (200 mm cumulated in September and October in Médéa). Maximum temperatures were often outside their normal range in October, especially during the first ten days. In Tunisia, sowing took place under good conditions in November in regions like Béja, where temperatures were favourable and the rain supply exceeded 100 mm by the end of October. In the other main growing regions, like Le Kef or Kairouan, rain supply is still slightly lower than average. A slight delay in sowing of winter cereals is therefore expected.





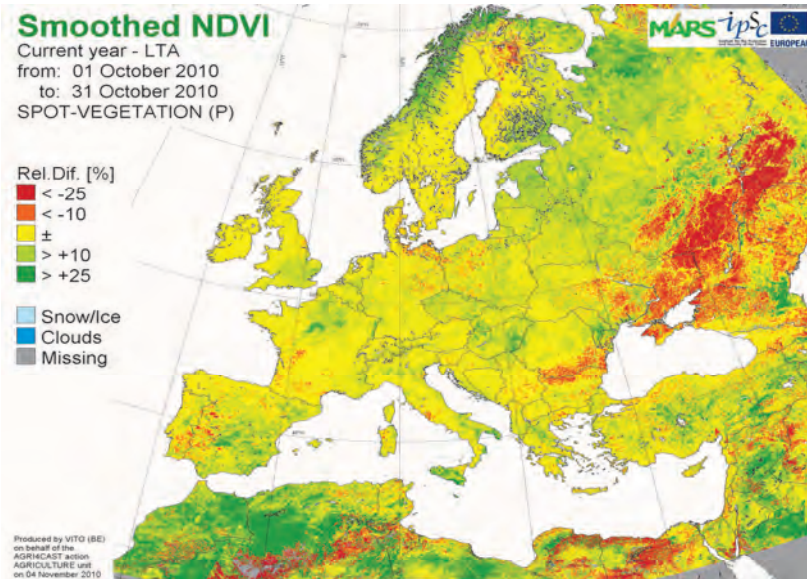




3. Satellite analysis — SPOT Vegetation

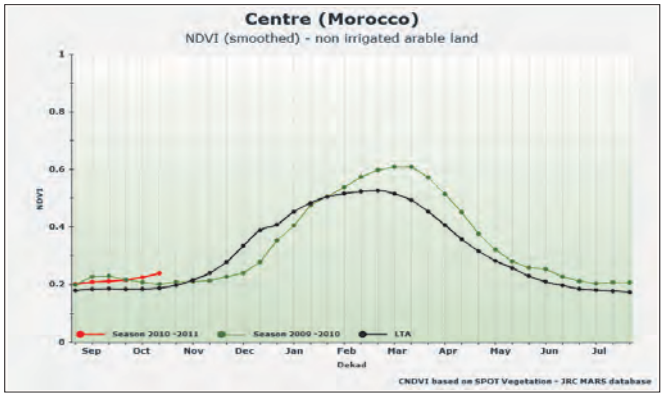
Map highlights — new season

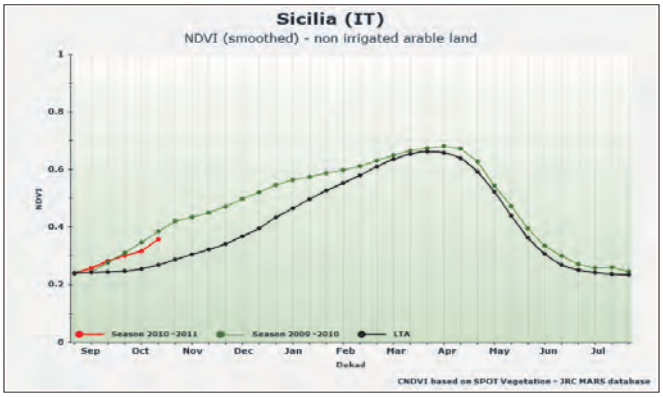
The map shows the relative differences between the maximum composite NDVI values for the current (2010/11) season and the long-term average for October. The Maghreb regions show good canopy development at the beginning of the new season. This same trend is visible across the whole Mediterranean basin, but stronger in the western regions. In central and northern European regions, the map shows average to slightly better than average conditions. The new season got off to an earlier start than normal, with some regions reporting significantly lower than average NDVI values. Of these, Russia is still suffering from the preceding negative summer season, while Bulgaria and Romania experienced excessively wet conditions in October.

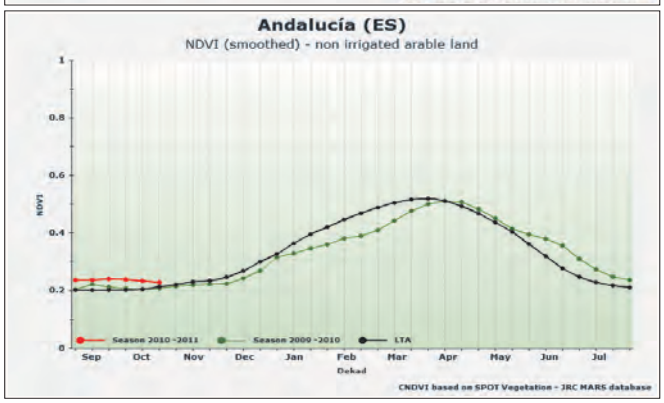


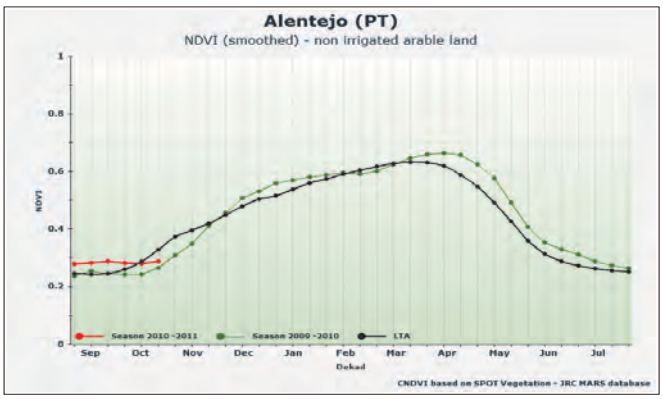
CNDVI — highlights

The NDVI profiles for arable land show an early vegetation boost in the north-western area of Morocco (Centre). The earlier than average increase in the NDVI can be related to the unusually abundant October rainfall. Rain in the southern Iberian peninsula may also have allowed an early start to the growing season. The early start but subsequent flattening of the NDVI curve visible in the profiles for both Alentejo and Andalucía suggest that the early rains were initially positive. Above-average precipitation fell in many other Mediterranean regions. In Italy, these weather conditions led to a boost in vegetation, with earlier than normal canopy development of winter crops (see the NDVI profile for Sicilia).









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