

The European Commission's science and knowledge service

Joint Research Centre



JRC MARS– Crops yield forecasts: method and 2018 forecasts

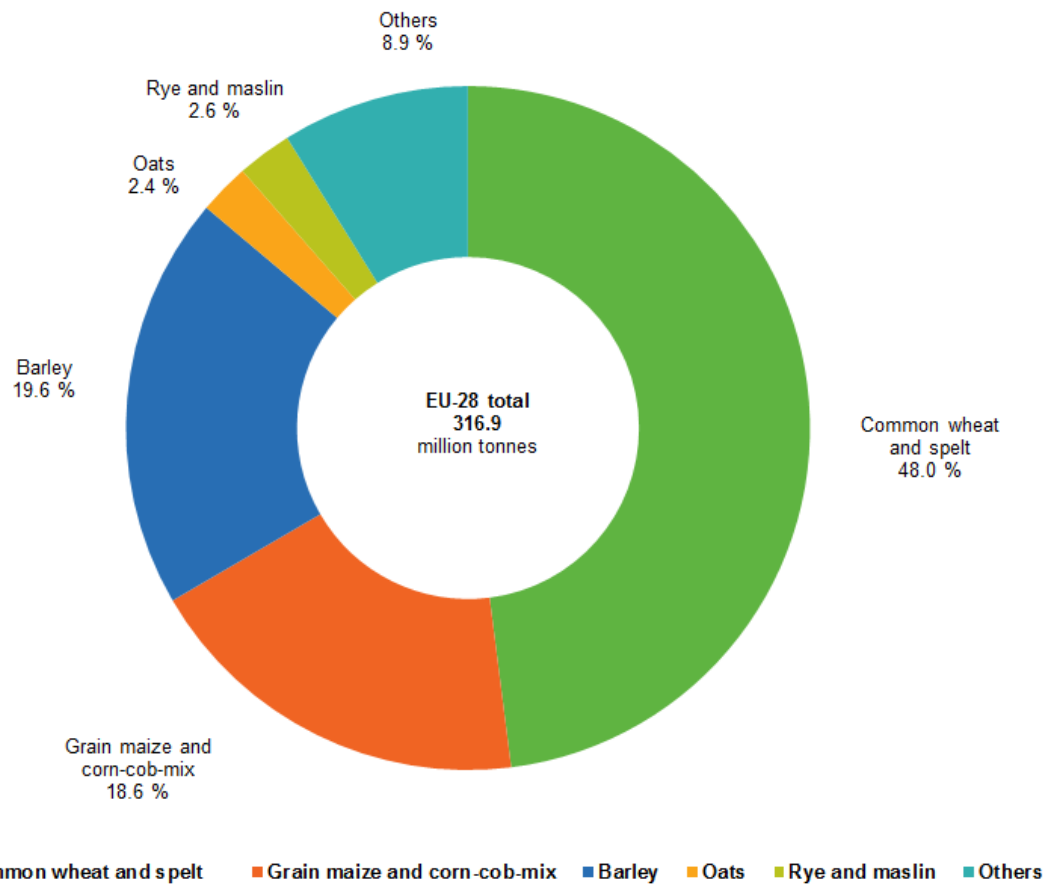
Bettina Baruth

Brussels 11/07/2018

Table of content

- Mars Crop Yield Forecasting System
- Access to data
- Review of the season so far
- Latest forecasts
- Latest weather forecast

European Crop Monitoring



Note: *Total cereals* includes cereals for the production of grain (including seed).
Rye and maslin includes mixture of rye with other winter sown cereals.
Others includes rice, triticale and sorghum.



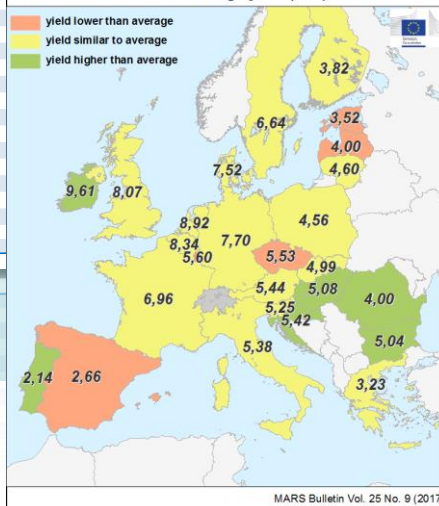
JRC MARS Bulletin – Crop monitoring in Europe

A quantitative yield forecast at national level for all major crops

EU yield forecasts for soft wheat - September 2017 Bulletin

Country	Area (x 1000 ha)					Yield (t/ha)					Production (x 1000 t)				
	Avg 5yrs	2016	2017	%17/5yrs	%17/16	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16	Avg 5yrs	2016	2017	%17/5yrs	%17/16
EU	23 938	24 281	23 605	-1.4	-2.8	5.84	5.56	5.86	+0.4	+5.3	139 725	135 078	138 295	-1.0	+2.4
AT	290	295	274	-5.3	-6.9	5.52	6.29	5.44	-1.5	-14	1 599	1 853	1 491	-6.8	-20
BE	213	216	215	+0.7	-0.3	8.53	6.71	8.34	-2.3	+24	1 821	1 446	1 792	-1.6	+24
BG	1 201	1 179	1 100	-8.4	-6.7	4.29	4.75	5.04	+17	+6.0	5 156	5 605	5 543	-7.5	-1.1
CY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CZ	830	840	832	+0.2	-0.9	5.88	6.50	5.53	-6.0	-15	4 879	5 455	4 597	-5.8	-16
DE	3 163	3 176	3 198	+1.1	+0.7	7.96	7.66	7.70	-3.3	+0.5	25 165	24 329	24 618	-2.2	+1.2
DK	612	583	562	-8.2	-3.6	7.54	7.21	7.52	-0.3	+4.3	4 614	4 202	4 225	-8.4	+0.5
EE	147	165	151	+2.7	-7.9	3.77	2.77	3.52	-6.7	+27	555	456	532	-4.1	+17
ES	1 812	1 800	1 711	-5.6	-5.0	3.25	3.84	2.66	-18	-31	5 895	6 913	4 553	-23	-34
FI	236	215	221	+6.3	+2.7	3.89	3.77	3.82	-1.9	-	-	-	-	-	-
FR	5 039	5 174	5 146	+2.1	-0.5	7.07	5.38	6.96	-1.6	-	-	-	-	-	-
GR	167	154	151	-9.7	-1.7	3.10	2.33	3.23	+4.0	-	-	-	-	-	-
HR	170	185	99	-42	-40	5.01	5.50	5.42	+8.1	-	-	-	-	-	-
HU	1 054	1 010	971	-7.9	-3.8	4.72	5.39	5.08	+7.6	-	-	-	-	-	-
IE	73	68	71	-2.3	+4.5	9.11	9.54	9.81	+5.5	-	-	-	-	-	-
IT	579	529	529	-8.6	+0.0	5.51	5.85	5.38	-2.4	-	-	-	-	-	-
LT	742	871	785	+5.8	-9.9	4.66	4.36	4.60	-1.2	-	-	-	-	-	-
LU	14	14	14	+1.7	+1.2	5.95	5.07	5.60	-6.0	-	-	-	-	-	-
LV	408	479	473	+16	-1.3	4.20	4.30	4.00	-4.7	-	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	143	127	125	-13	-1.6	8.89	8.01	8.92	+0.4	-	-	-	-	-	-
PL	2 267	2 384	2 327	+2.7	-2.4	4.53	4.54	4.56	+0.7	-	-	-	-	-	-
PT	44	35	30	-32	-15	1.82	2.31	2.14	+18	-	-	-	-	-	-
RO	2 085	2 126	1 981	-5.0	-6.8	3.50	3.93	4.00	+15	-	-	-	-	-	-
SE	410	448	474	+16	+5.7	6.53	6.32	6.64	+1.6	-	-	-	-	-	-
SI	32	31	32	-0.8	+2.0	5.08	5.19	5.25	+3.3	-	-	-	-	-	-
SK	367	374	332	-9.5	-11	4.95	5.94	4.99	+0.9	-	-	-	-	-	-
UK	1 840	1 823	1 799	-2.2	-1.3	7.87	7.89	8.07	+2.6	-	-	-	-	-	-

Soft wheat - yield forecast 2017
MARS forecast versus average yield (t/ha) 2012 - 2016



A bulletin reporting agro-meteorological conditions and a detailed analysis for major crops in Europe

3. Country analysis

3.1 European Union

France

Expectations slightly lowered by dry and hot weather

Overall conditions are still good and the yield outlook remains higher than average. Warm temperatures and moderately dry conditions contributed to a slight decrease in winter and spring cereals yield expectations. The yield outlook may drop further during the coming weeks if dry conditions persist.

The first half of May was warmer than average, particularly in the south where maximum temperatures reached 28°C in Aquitaine and Midi-Pyrénées. While the second half of May was milder and temperatures were close to average, the first half of June was again notably warmer than average throughout the country, with maximum temperatures reaching 31 to 33°C on 5 June. Since 1 May, except for Pays de la Loire, Poitou-

NUMBER OF HOT DAYS

from : 01 August 2017
to : 12 September 2017

Deviation:

Year of interest - LTA

Maximum temperature (°C) >= 30

Unit: days

< -15

> -15 <= -10

> -10 <= -5

> -5 <= -2

> -2 <= 0

no difference

> 0 <= 2

> 2 <= 5

> 5 <= 10

> 10 <= 15

> 15

14/09/2017

resolution: 25x25 km

AREAS OF CONCERN - EXTREME WEATHER EVENTS

(c) European Union 2013
Source: Joint Research Centre



Data source: MARS crop yield assessment system April 2013
Based on observed and forecast data from 01 March 2013 until 29 April 2013

Legend: Rain surplus, Rain deficit, Deficit of T sum

Legend: Rain surplus, Rain deficit, Deficit of T sum

Legend: Rain surplus, Rain deficit, Deficit of T sum

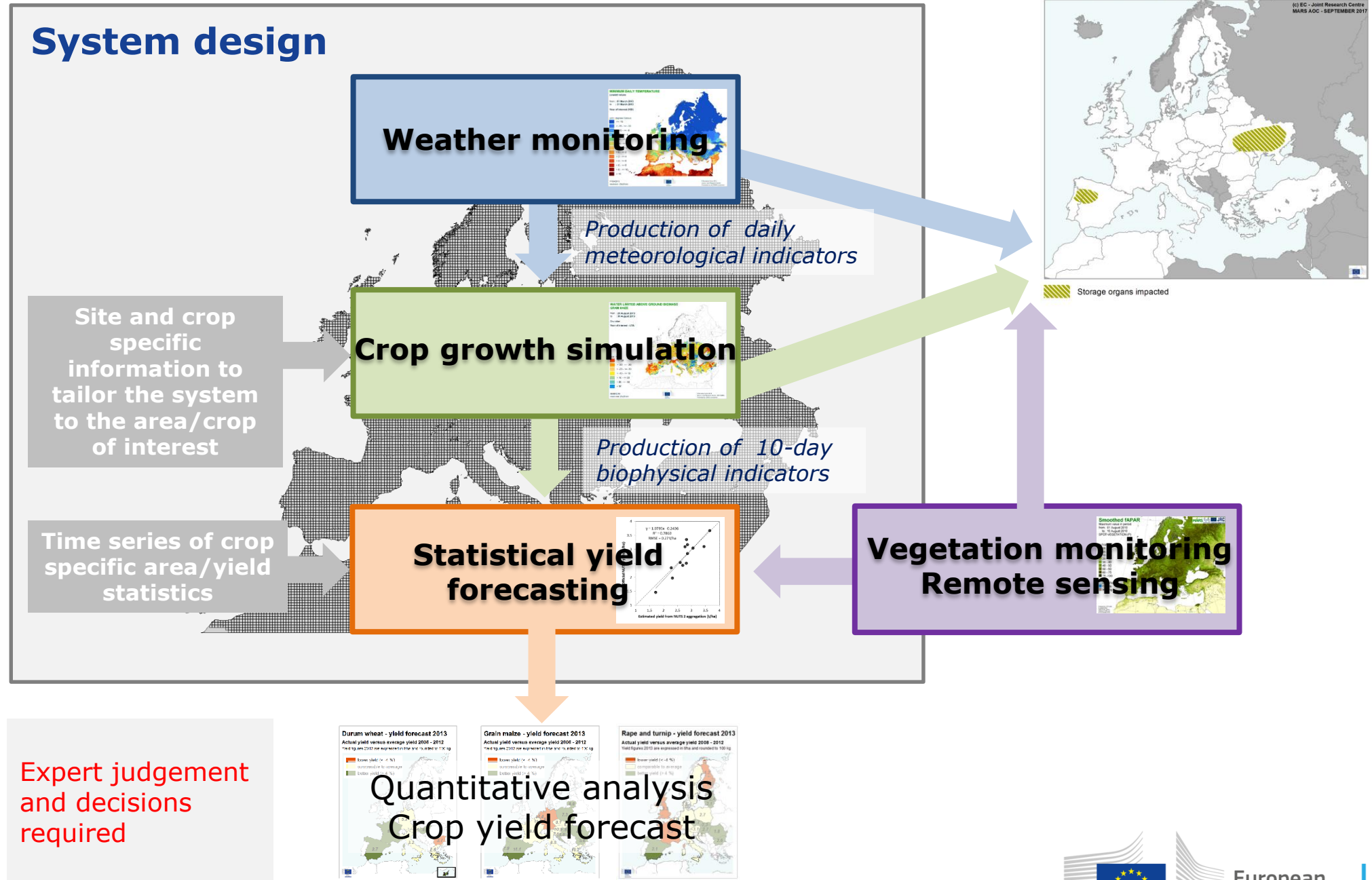
Legend: Rain surplus, Rain deficit, Deficit of T sum

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Legend: Rain surplus, Rain deficit, Deficit of T sum

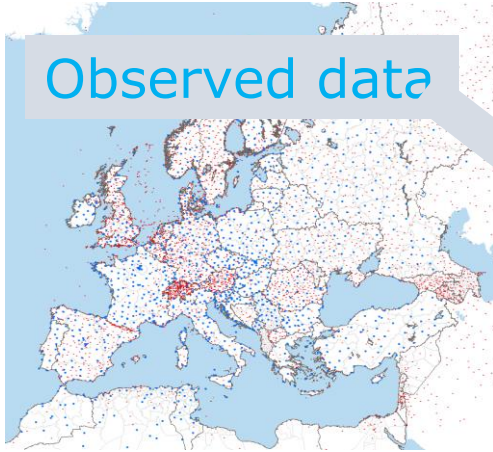
Legend: Rain surplus, Rain deficit, Deficit of T sum

A model and data driven decision support system



Meteorological infrastructure

Observed data

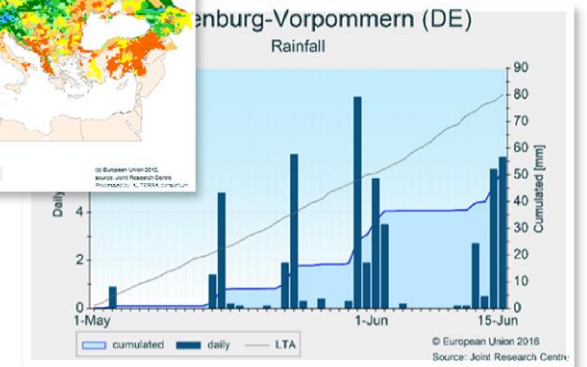
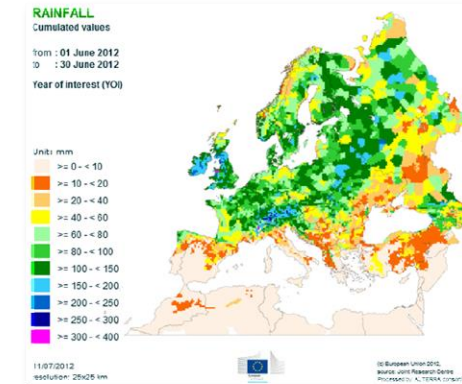


- Near real time
- Pan-European
- Daily, 10- daily, monthly,
 - seasonal,
 - long term average
- **METEO DB**

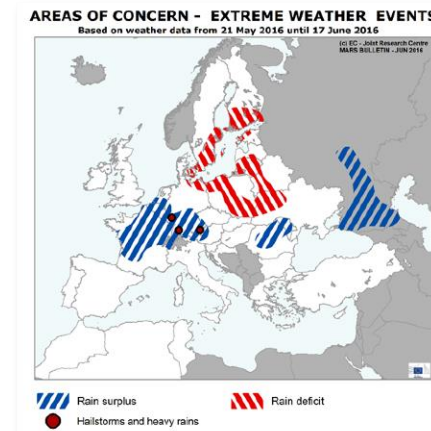
Weather forecast data

- Gridded data
- Aggregated data

Temperature
Rainfall
Radiation
Vapour pressure
Windspeed
Evaporation
Evapotranspiration
Climatic water balance
Snow depth



Agro-meteorological analysis
Crop growth models



Earth observation infrastructure

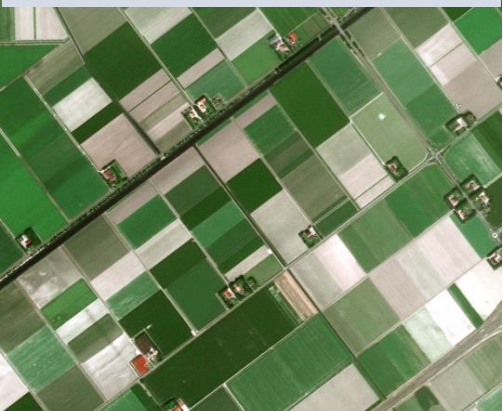
1km resolution



- Pan-European
- Daily, 10- daily, monthly,
- long term average

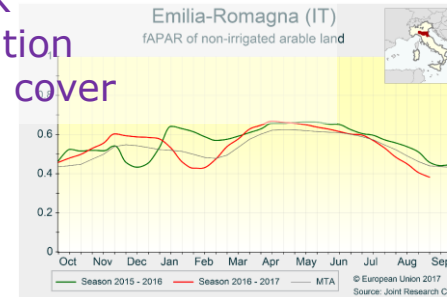
- MARS DB
- image repository

High resolution



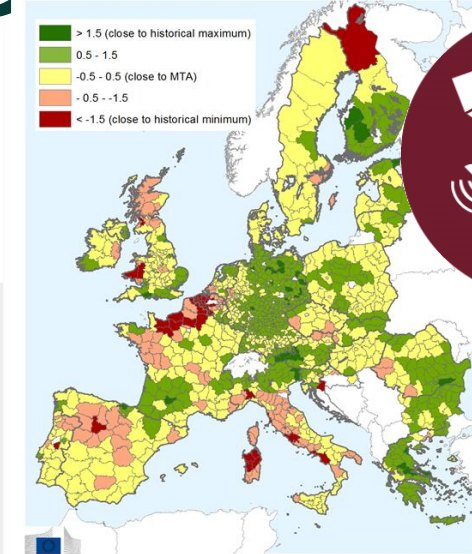
- compositing
- interpolation
- smoothing
- indicator computation

NDVI
fAPAR
Radiation
Snow cover



Relative index of pasture productivity

Period of analysis: 1 June - 10 September 2017
Index based on METOP-AVHRR smoothed fAPAR10-day product.
Historical archive (MTA) from 2008 to 2017



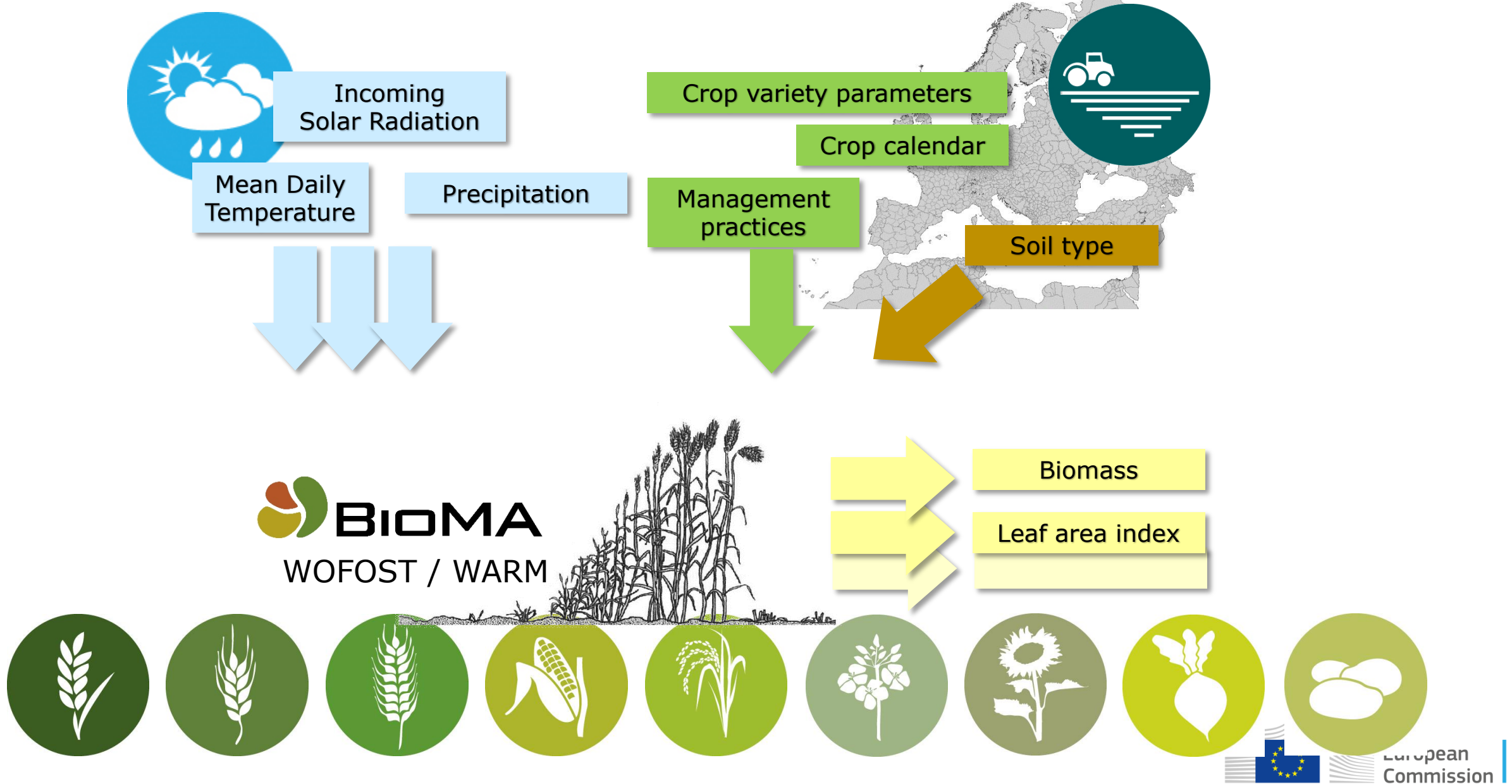
Qualitative

Independent source of measured biomass
Convergence of results

Quantitative

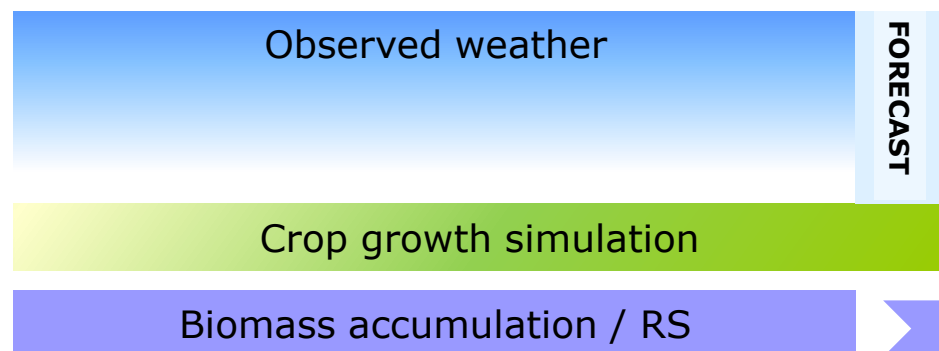
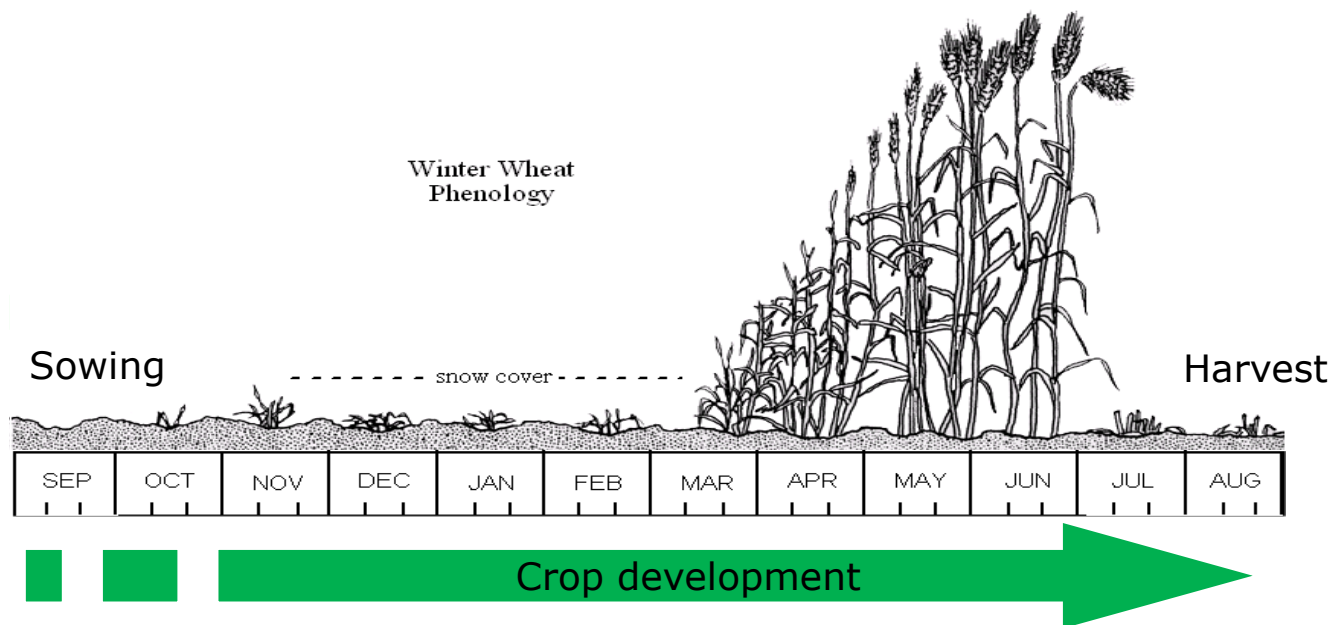
Crop yield forecasts (regional) based on RS derived vegetation state parameters only
Pasture productivity
Improvements meteorological infrastructure

Crop growth model infrastructure

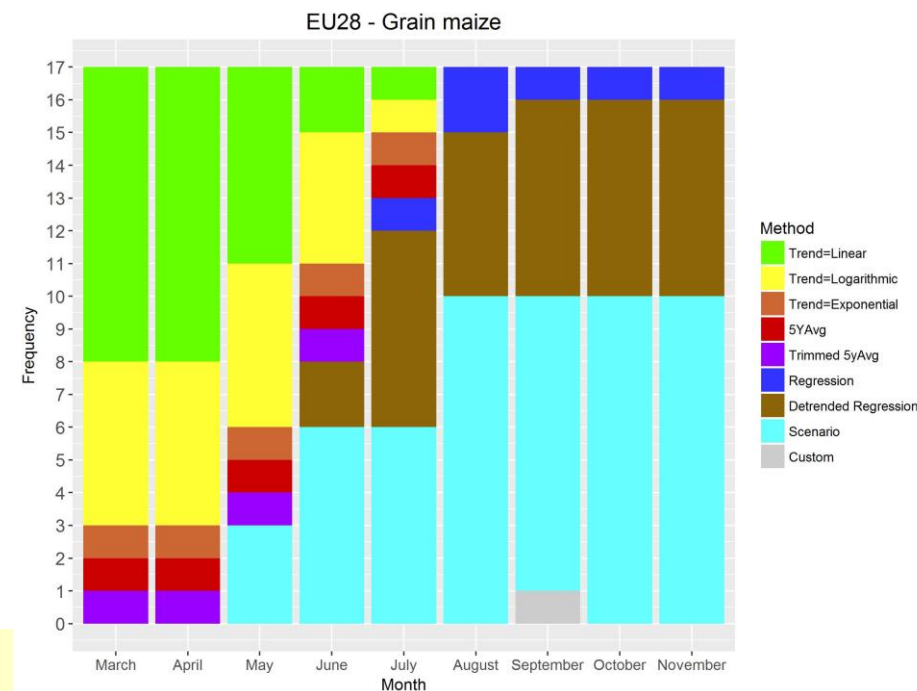


Statistical infrastructure

Weather has a significant effect on crop yield, accounting for most of the inter-annual variability

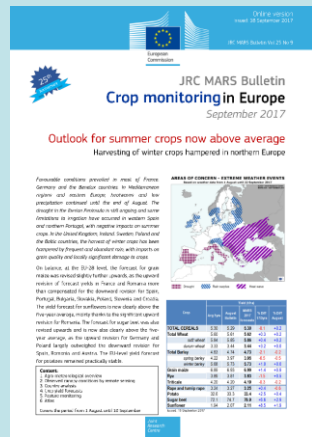


Statistical analysis + analyst expertise = published **FORECAST**

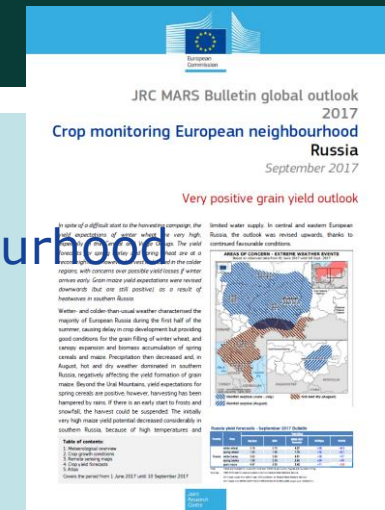


Bulletin - countries & crops covered

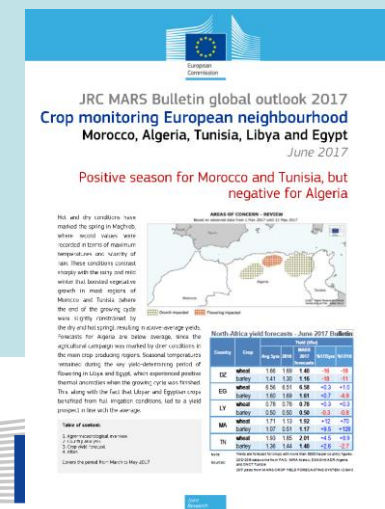
Monthly Bulletin Crop monitoring in Europe



Crop monitoring Eastern Neighbourhood



Crop monitoring North Africa

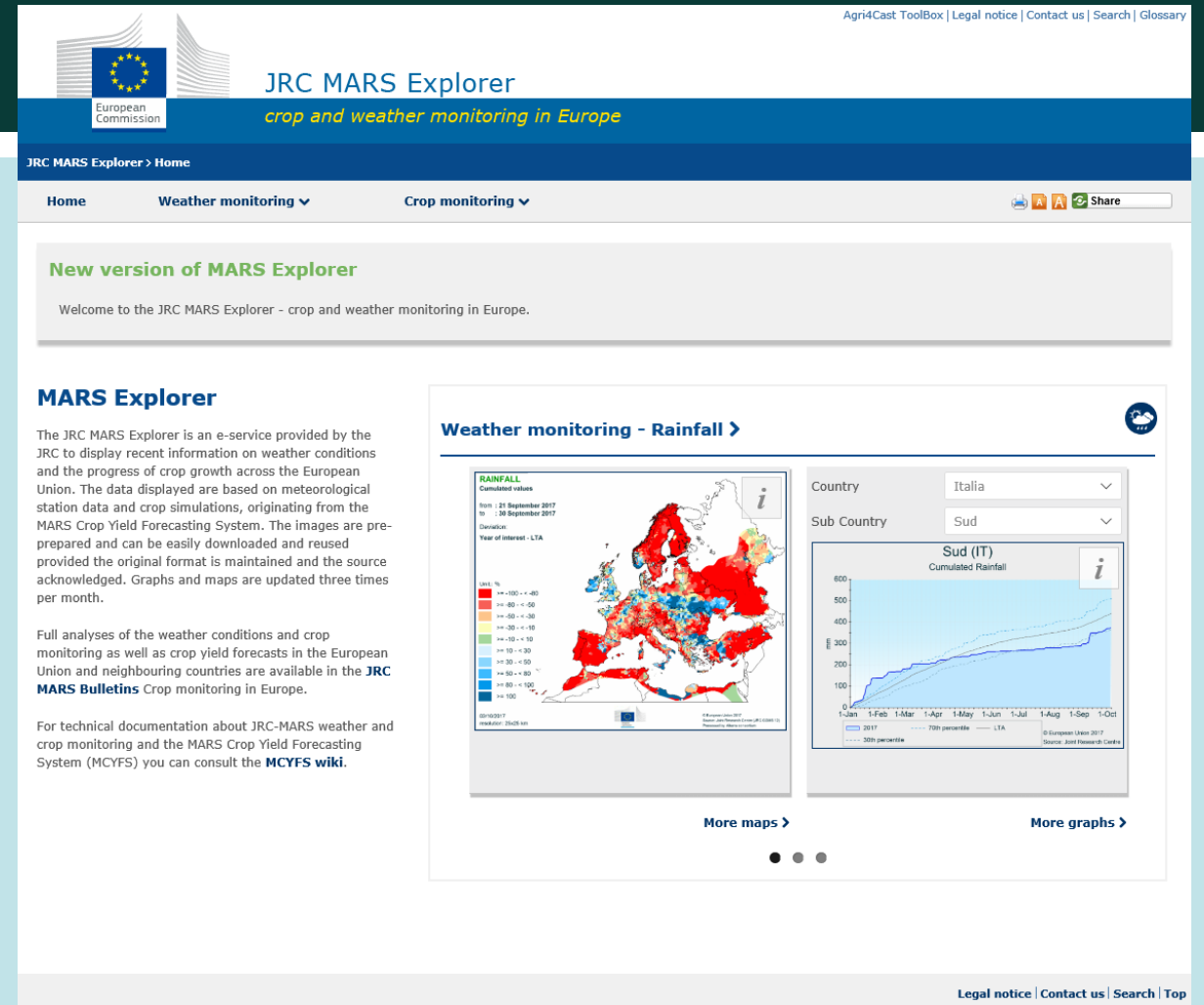


Soft wheat, durum wheat, winter barley, spring barley, rye, triticale, grain maize, rice, rape seed, sunflower, sugar beet, potato, green maize, pastures, (soybean)



JRC MARS Explorer

- Quick access to high-resolution maps and graphs
- Meteo & Crops
- EO to follow
- free download, reusable for your own reporting

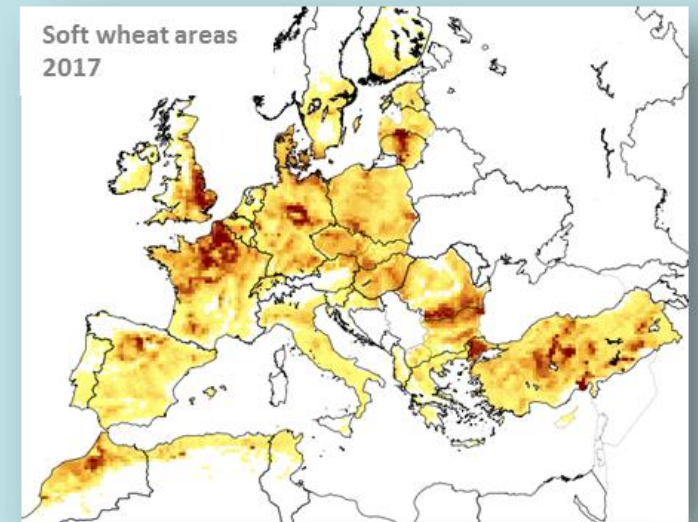


<http://agri4cast.jrc.ec.europa.eu/mars-explorer/>

AGRI4CAST Data and Tools

Open access to data and tools

- Many of the MCYFS data and software developed for research and operational activities are made freely available for access and reuse.
- Meteorological data
- Earth Observation data
- Crop area, crop calendars
- Modelling solutions (Bioma–Wofost)



MARS monitoring team at the JRC – Ispra

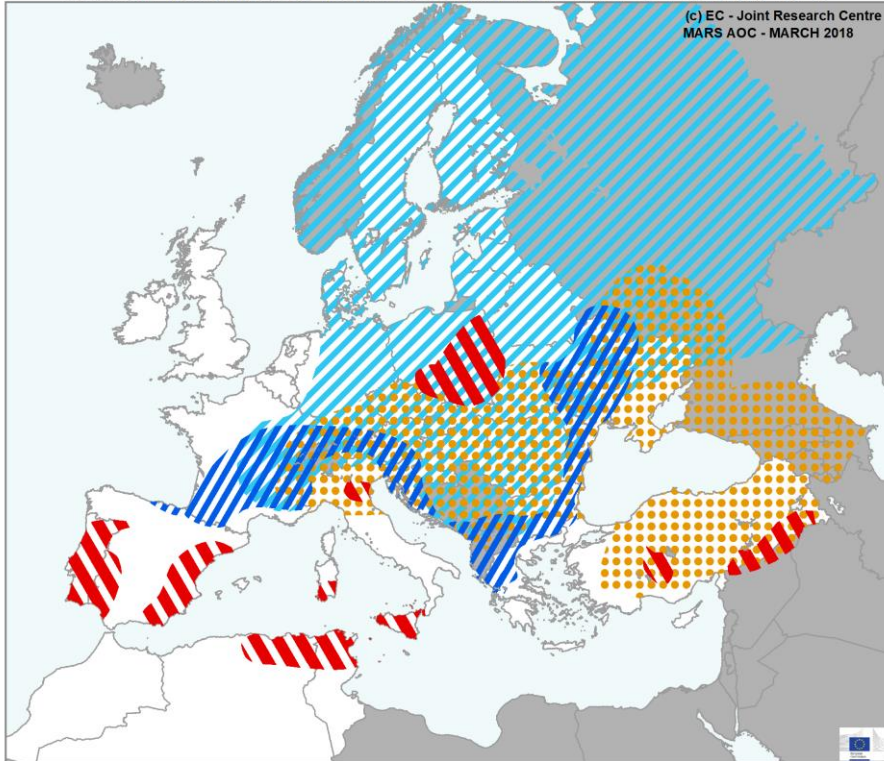


Review of the season



AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 December 2017 until 28 February 2018

(c) EC - Joint Research Centre
MARS AOC - MARCH 2018



 Rain deficit
 Rain surplus

 Temperature accumulation surplus
 Cold spell

Winter 2017/2018

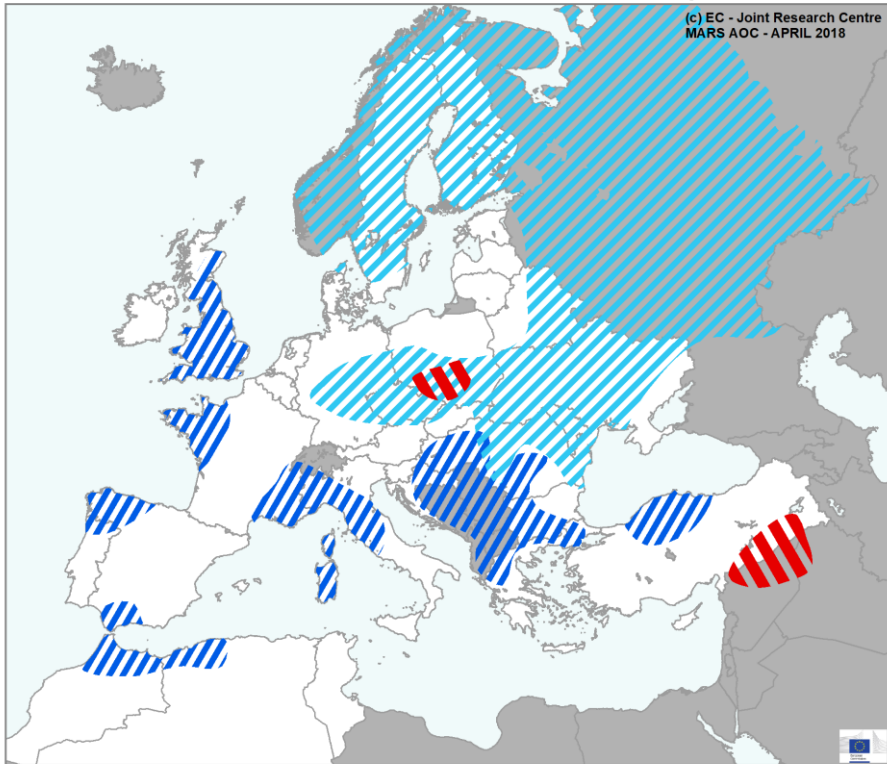
- Predominantly mild
- Delayed hardening of winter cereals
- Cold spell in most of Europe, end of February until beginning of March
- Limited frost damage
- Rain surplus in central and southern France, eastern Adriatic coast, in February
- Rain deficit in coastal Mediterranean regions

Review of the season

AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 March 2018 until 20 April 2018

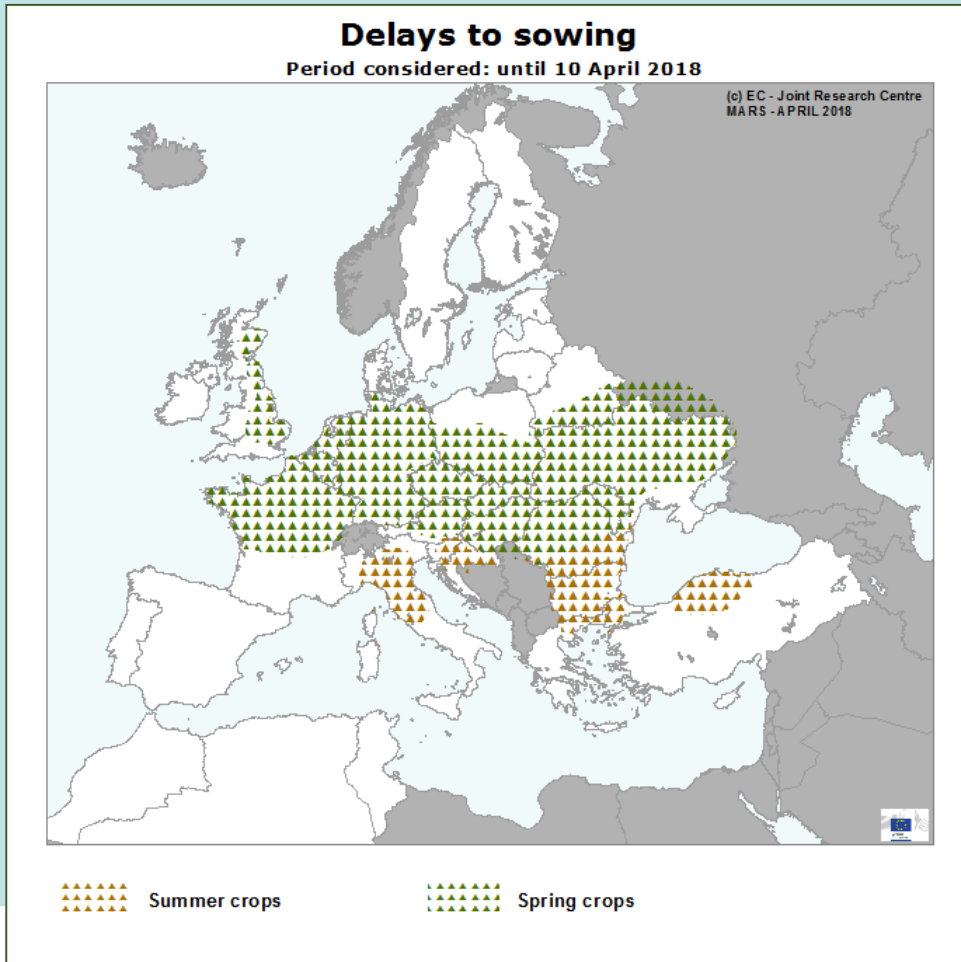
(c) EC - Joint Research Centre
MARS AOC - APRIL 2018



March/April 2018

- Another cold spell 2nd half of March in central and eastern Europe
- Excessively wet conditions in large parts of Italy, France, UK, Balkan region
- Sowing of spring and summer crops delayed in many parts of Europe
- Winter crops generally faring well

Review of the season



March/April 2018

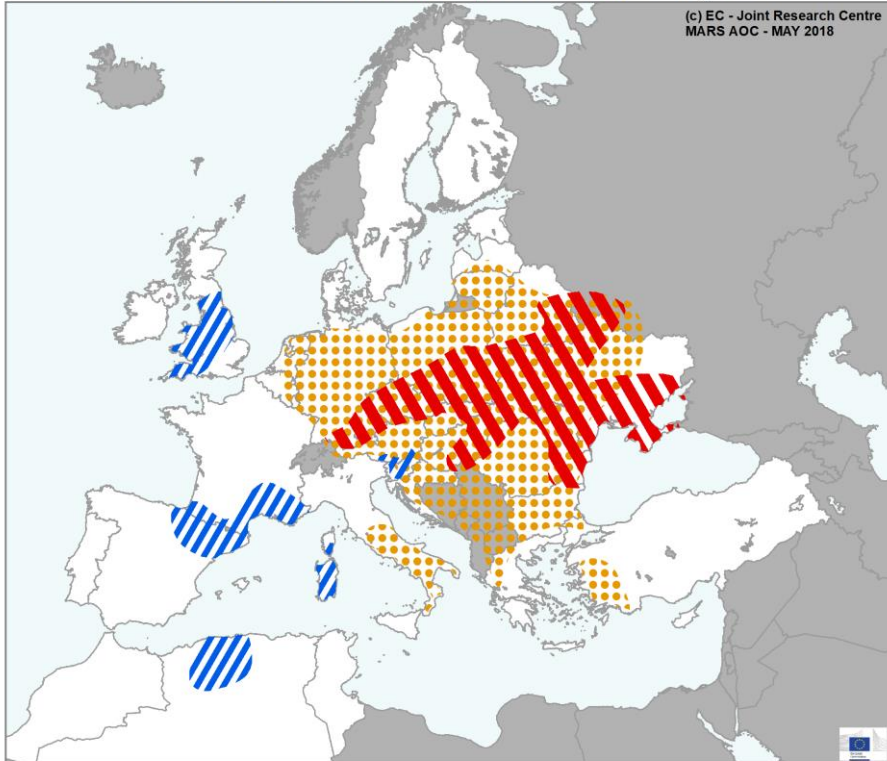
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- Excessively wet conditions in large parts of Italy, France, UK, Balkan region
- Sowing of spring and summer crops delayed in many parts of Europe
- Winter crops generally faring well

Review of the season


AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 April 2018 until 25 May 2018

(c) EC - Joint Research Centre
MARS AOC - MAY 2018



 Rain surplus

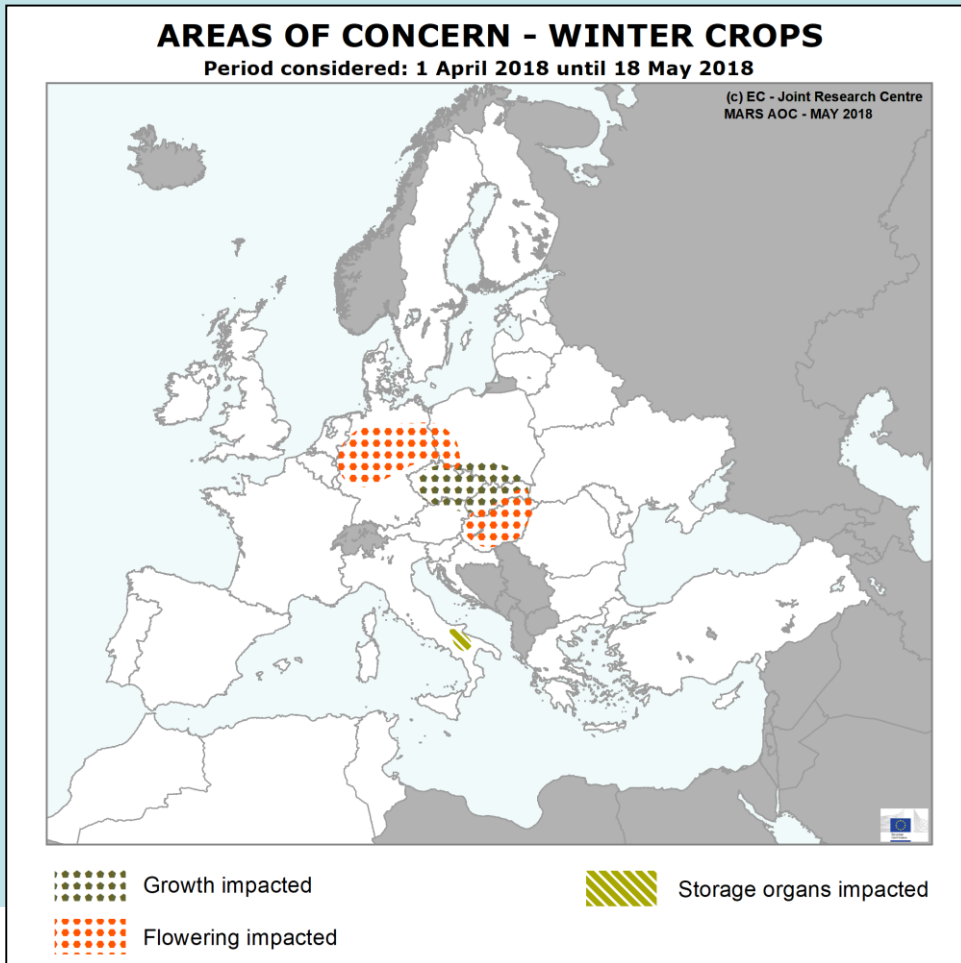
 Temperature accumulation surplus

 Rain deficit

April/May 2018

- Abrupt change in weather conditions in April
- Warm and relatively dry weather in most of Europe
 - Allowing spring sowings to be completed
 - Accelerating crop development
- Rain deficit in large parts of central and eastern Europe
- In central Europe exceptionally warm and drier-than-usual April negatively affecting flowering of rapeseed

Review of the season



April/May 2018

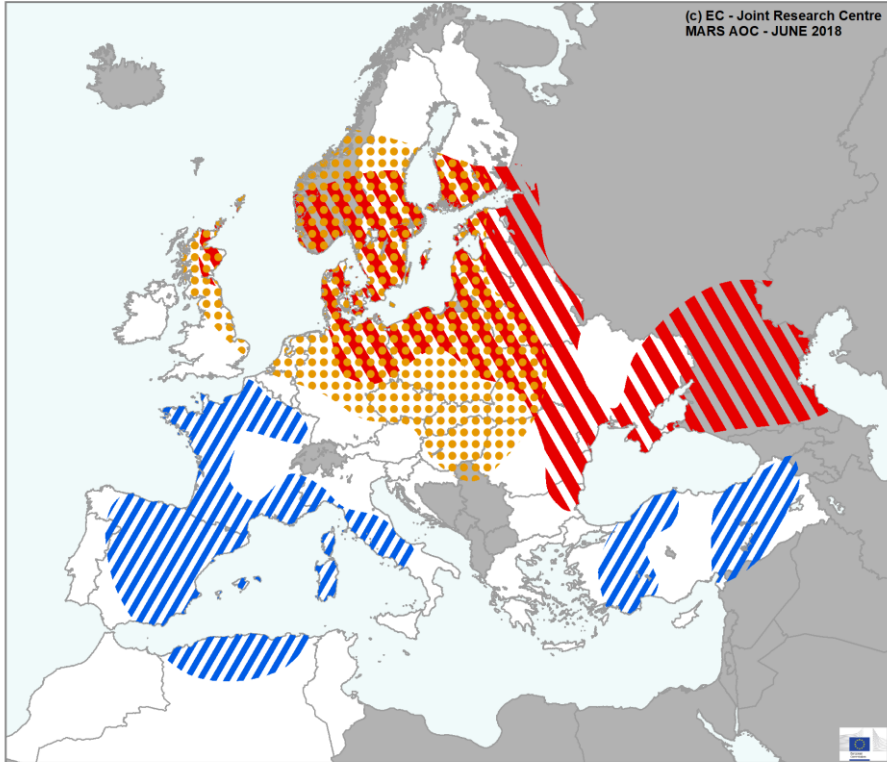
- Abrupt change in weather conditions
- Warm and relatively dry weather in most of Europe
 - Allowing spring sowings to be completed
 - Accelerating crop development
- Rain deficit in large parts of central and eastern Europe
- In central Europe exceptionally warm and drier-than-usual April negatively affecting flowering of rapeseed

JRC MARS June 2018 Bulletin 1 May - 12 June


AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 May 2018 until 22 June 2018

(c) EC - Joint Research Centre
MARS AOC - JUNE 2018



 Rain surplus

 Temperature accumulation surplus

 Rain deficit

- Warmer than usual, almost throughout Europe
- Exceptionally warm in central-eastern and northern Europe
- Rain deficit in many of these areas; often persistent
- Abundant rain in France, the Iberian Peninsula, central Italy and Turkey

Implications for crops

Central, eastern & northern regions

- **Winter and spring crops:**

- Warm conditions -> shortened grain filling period -> early ripening (most of southern central and eastern Europe)
- Water stress during grain filling affects yield formation and accelerates leaf senescence, further inducing early ripening
- Hot and/or dry conditions during flowering can cause flower sterility or abortion (e.g. northeastern Germany pp)
- Water stress during vegetative growth: Affect canopy formation and carbohydrate reserves in stems; and nutrient uptake from fertilisers (e.g. spring cereals in most of northern Europe)

- **Summer crops:**

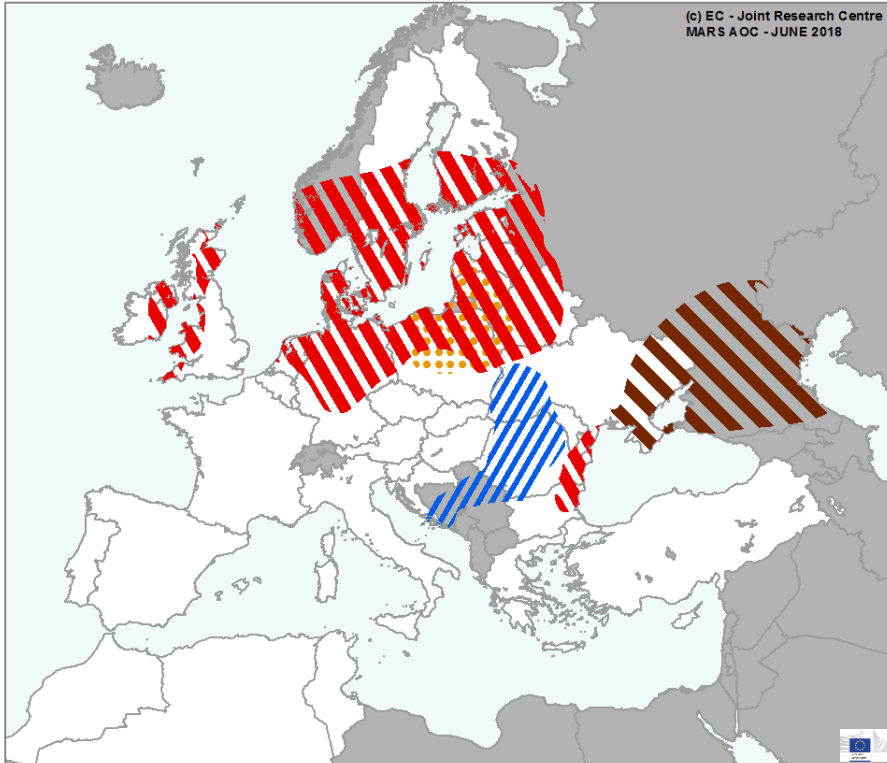
- Soil water reserves in most regions still sufficient;
- Warm weather contributed to recover delays due to late sowing;
- Vegetative growth negatively affected in some regions (e.g. Romania, Bulgaria)


Agro-meteorological update 13 – 24 June

AREAS OF CONCERN - EXTREME WEATHER EVENTS


Based on weather data from 13 June 2018 until 24 June 2018


(c) EC - Joint Research Centre
MARS AOC - JUNE 2018



 Rain surplus

 Rain deficit

 Temperature accumulation surplus

 Hot and dry conditions

- Persistent rain deficit in southern Scandinavia and Baltic region, extended further into Germany and Netherlands
- Substantially warmer-than-usual conditions continue in Lithuania and northern half of Poland
- Rain deficit developing in eastern Ireland and parts of the UK.
- Sparse rain in France, mainly beneficial to crops
- Distinct rain deficit continues in western Black Sea coastal region.
- Hot and continued dry conditions in eastern Ukraine and southern European Russia.
- Marked precipitation surplus in inland parts of Romania and central parts of Serbia and Bosnia and Herzegovina: benefits to summer crops.

JRC MARS Bulletin

Crop monitoring in Europe

June 2018

Yield forecasts revised downwards

Exceptionally warm in the north and east; wet in the south

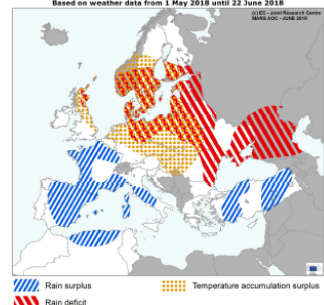
At EU level, yield forecasts for all winter crops, grain maize, and sunflower were revised downwards, mainly as a consequence of unusually warm and dry conditions in central, eastern and northern Europe. A noteworthy upward revision was made for Spain.

Abundant and locally very intense precipitation in central Italy and France caused lodging, water logging and increased pressure of pests and diseases. In France, fusarium head blight is of particular concern. Abundant rain in Spain and Turkey was mainly beneficial to crops. In large parts of central, eastern and northern Europe, warm temperatures, coupled with a persistent precipitation deficit affected winter crops during flowering or grain filling (e.g. Germany) or at heading (Denmark and Sweden). Spring crops are affected in Sweden, Denmark, central and northern Poland, Latvia, Estonia and Finland. In Hungary, Romania and Bulgaria, where winter crops have entered the ripening phase, below-optimal water supply combined with high temperatures limited biomass accumulation during grain filling and caused early ripening.

- Content:**
1. Agro-meteorological overview
 2. Observed canopy conditions by remote sensing
 3. Country analysis
 4. Crop yield forecasts
 5. Pasture – regional monitoring
 6. Atlas

Covers the period from 1 May until 12 June

AREAS OF CONCERN - EXTREME WEATHER EVENTS
Based on weather data from 1 May 2018 until 22 June 2018



Crop	Yield (t/ha)				
	Avg 5yrs	May Bulletin	MARS 2018 forecasts	% Diff 18/5yrs	% Diff May
TOTAL CEREALS	5.56	5.64	5.50	-1.0	-2.5
Total Wheat	5.73	5.93	5.79	+1.1	-2.4
soft wheat	5.97	6.19	6.04	+1.2	-2.4
durum wheat	3.40	3.56	3.52	+3.5	-1.1
Total Barley	4.91	5.04	4.98	+1.5	-1.2
spring barley	4.25	4.31	4.40	+3.3	+2.1
winter barley	5.79	6.05	5.80	+0.1	-4.1
Grain maize	7.30	7.64	7.35	+0.7	-3.8
Rye	3.93	3.83	3.71	-5.6	-3.1
Triticale	4.22	4.29	4.25	+0.6	-0.9
Rape and turnip rape	3.29	3.19	3.05	-7.4	-4.4
Potato	33.6	34.5	34.5	+2.6	-0.1
Sugar beet	74.8	76.1	77.5	+3.6	+1.8
Sunflower	2.12	2.31	2.27	+7.2	-1.7

Issued: 15 June 2018

Forecasts June Bulletin

Crop	Yield (t/ha)				
	Avg 5yrs	May Bulletin	MARS 2018 forecasts	% Diff 18/5yrs	% Diff May
TOTAL CEREALS	5.56	5.64	5.50	-1.0	-2.5
Total Wheat	5.73	5.93	5.79	+1.1	-2.4
soft wheat	5.97	6.19	6.04	+1.2	-2.4
durum wheat	3.40	3.56	3.52	+3.5	-1.1
Total Barley	4.91	5.04	4.98	+1.5	-1.2
spring barley	4.25	4.31	4.40	+3.3	+2.1
winter barley	5.79	6.05	5.80	+0.1	-4.1
Grain maize	7.30	7.64	7.35	+0.7	-3.8
Rye	3.93	3.83	3.71	-5.6	-3.1
Triticale	4.22	4.29	4.25	+0.6	-0.9
Rape and turnip rape	3.29	3.19	3.05	-7.4	-4.4
Potato	33.6	34.5	34.5	+2.6	-0.1
Sugar beet	74.8	76.1	77.5	+3.6	+1.8
Sunflower	2.12	2.31	2.27	+7.2	-1.7

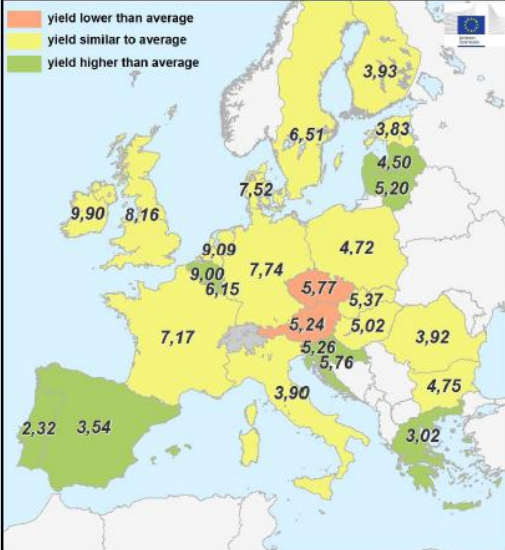
Issued: 15 June 2018

Country	TOTAL WHEAT (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	5.73	5.85	5.79	+1.1	-1.0
AT	5.68	5.12	5.24	-7.7	+2.4
BE	8.56	8.37	9.00	+5.1	+7.4
BG	4.59	5.35	4.75	+3.6	-11
CY	-	-	-	-	-
CZ	6.14	5.67	5.77	-6.1	+1.8
DE	8.00	7.64	7.74	-3.3	+1.3
DK	7.71	8.24	7.52	-2.5	-8.8
EE	3.84	4.20	3.83	-0.3	-8.9
ES	3.07	2.39	3.54	+15	+48
FI	3.99	4.13	3.93	-1.4	-4.7
FR	6.98	7.25	7.17	+2.7	-1.1
GR	2.84	2.93	3.02	+6.6	+3.1
HR	5.14	5.95	5.76	+12	-3.2
HU	5.06	5.44	5.02	-0.8	-7.8
IE	9.89	10.2	9.90	+0.1	-2.6
IT	3.82	3.86	3.90	+1.8	+1.0
LT	4.67	4.82	5.20	+11	+7.8
LU	5.88	5.48	6.15	+4.6	+12
LV	4.29	4.79	4.50	+4.8	-6.0
MT	-	-	-	-	-
NL	8.97	9.09	9.09	+1.3	-0.1
PL	4.67	4.90	4.72	+0.9	-3.7
PT	2.01	2.05	2.32	+15	+13
RO	3.93	4.88	3.92	+0.0	-20
SE	6.68	6.99	6.51	-2.6	-6.9
SI	4.99	5.03	5.26	+5.3	+4.5
SK	5.24	4.73	5.37	+2.5	+14
UK	8.20	8.16	8.16	-0.4	+0.0

Total wheat - yield forecast 2018

MARS forecast versus average yield (t/ha) 2013 - 2017

- yield lower than average
- yield similar to average
- yield higher than average

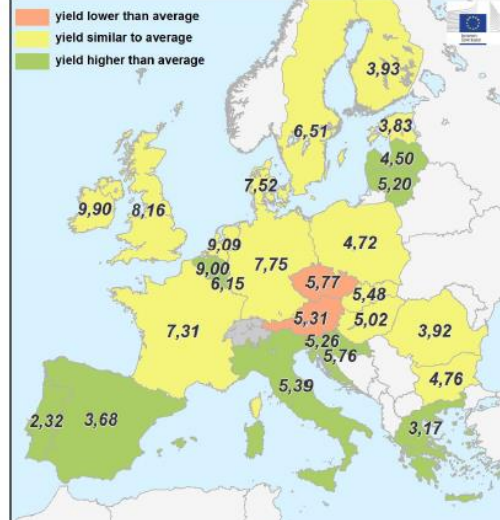


Country	SOFT WHEAT (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	5.97	6.11	6.04	+1.2	-1.2
AT	5.74	5.22	5.31	-7.5	+1.8
BE	8.56	8.37	9.00	+5.1	+7.4
BG	4.60	5.36	4.76	+3.5	-11
CY	-	-	-	-	-
CZ	6.14	5.67	5.77	-6.1	+1.8
DE	8.02	7.66	7.75	-3.3	+1.2
DK	7.71	8.24	7.52	-2.5	-8.8
EE	3.84	4.20	3.83	-0.3	-8.9
ES	3.18	2.30	3.68	+16	+60
FI	3.99	4.13	3.93	-1.4	-4.7
FR	7.10	7.36	7.31	+2.9	-0.7
GR	2.99	3.15	3.17	+5.9	+0.7
HR	5.14	5.95	5.76	+12	-3.2
HU	5.06	5.47	5.02	-0.8	-8.2
IE	9.89	10.2	9.90	+0.1	-2.6
IT	5.15	5.49	5.39	+4.6	-1.8
LT	4.67	4.82	5.20	+11	+7.8
LU	5.88	5.48	6.15	+4.6	+12
LV	4.29	4.79	4.50	+4.8	-6.0
MT	-	-	-	-	-
NL	8.97	9.09	9.09	+1.3	-0.1
PL	4.67	4.90	4.72	+0.9	-3.7
PT	2.01	2.05	2.32	+15	+13
RO	3.93	4.88	3.92	+0.0	-20
SE	6.68	6.99	6.51	-2.6	-6.9
SI	4.99	5.03	5.26	+5.3	+4.5
SK	5.30	4.79	5.48	+3.4	+14
UK	8.20	8.16	8.16	-0.4	+0.0

Soft wheat - yield forecast 2018

MARS forecast versus average yield (t/ha) 2013 - 2017

- yield lower than average
- yield similar to average
- yield higher than average

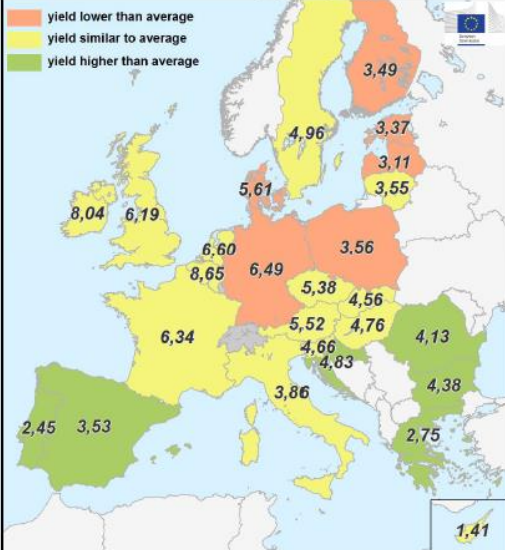


Country	TOTAL BARLEY (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	4.91	4.89	4.98	+1.5	+1.8
AT	5.64	5.60	5.52	-2.2	-1.5
BE	8.35	8.68	8.65	+3.6	-0.3
BG	4.10	4.68	4.38	+6.6	-6.5
CY	1.44	1.81	1.41	-2.0	-22
CZ	5.30	5.22	5.38	+1.5	+3.0
DE	6.94	6.93	6.49	-6.5	-6.3
DK	5.86	6.00	5.61	-4.3	-6.5
EE	3.55	4.10	3.37	-5.2	-18
ES	2.91	2.26	3.53	+21	+56
FI	3.68	4.08	3.49	-5.1	-14
FR	6.37	6.33	6.34	-0.4	+0.2
GR	2.64	2.69	2.75	+4.2	+2.3
HR	4.36	4.98	4.83	+11	-3.0
HU	4.74	5.27	4.76	+0.6	-9.7
IE	8.05	8.36	8.04	-0.1	-3.7
IT	3.81	3.93	3.86	+1.1	-1.9
LT	3.60	3.65	3.55	-1.2	-2.5
LU	-	-	-	-	-
LV	3.31	3.32	3.11	-6.0	-6.3
MT	-	-	-	-	-
NL	6.67	6.09	6.60	-0.9	+8.4
PL	3.79	3.96	3.56	-6.1	-10
PT	2.06	1.90	2.45	+19	+29
RO	3.63	4.52	4.13	+14	-8.7
SE	5.02	5.29	4.96	-1.3	-6.2
SI	4.63	4.81	4.66	+0.8	-3.0
SK	4.64	4.54	4.56	-1.9	+0.5
UK	6.20	6.09	6.19	-0.2	+1.6

Total barley - yield forecast 2018

MARS forecast versus average yield (t/ha) 2013 - 2017

- yield lower than average
- yield similar to average
- yield higher than average

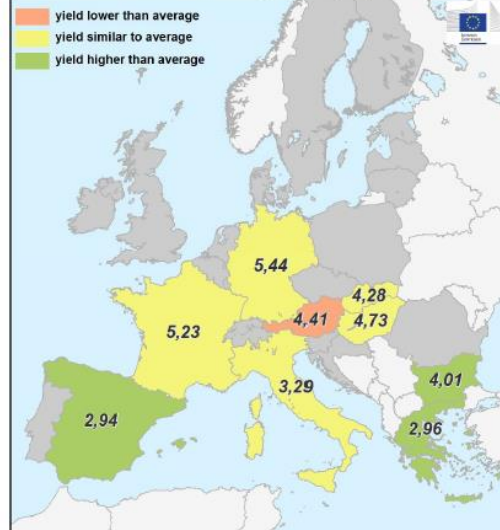


Country	DURUM WHEAT (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	3.40	3.51	3.52	+3.5	+0.1
AT	4.74	4.02	4.41	-7.0	+10
BE	-	-	-	-	-
BG	3.66	4.10	4.01	+10	-2.4
CY	-	-	-	-	-
CZ	-	-	-	-	-
DE	5.55	5.76	5.44	-2.0	-5.5
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	2.54	2.73	2.94	+16	+7.5
FI	-	-	-	-	-
FR	5.18	5.73	5.23	+1.0	-8.7
GR	2.77	2.85	2.96	+7.1	+3.9
HR	-	-	-	-	-
HU	4.78	4.71	4.73	-1.0	+0.5
IE	-	-	-	-	-
IT	3.26	3.23	3.29	+0.8	+1.7
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	-	-	-	-	-
RO	-	-	-	-	-
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	4.40	4.26	4.28	-2.7	+0.4
UK	-	-	-	-	-

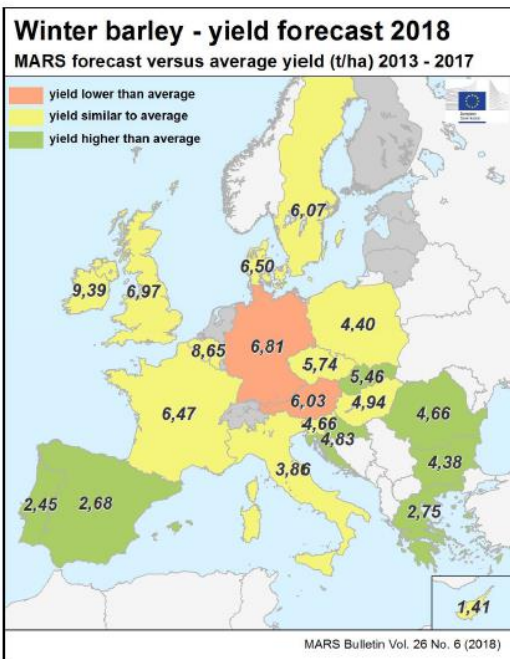
Durum wheat - yield forecast 2018

MARS forecast versus average yield (t/ha) 2013 - 2017

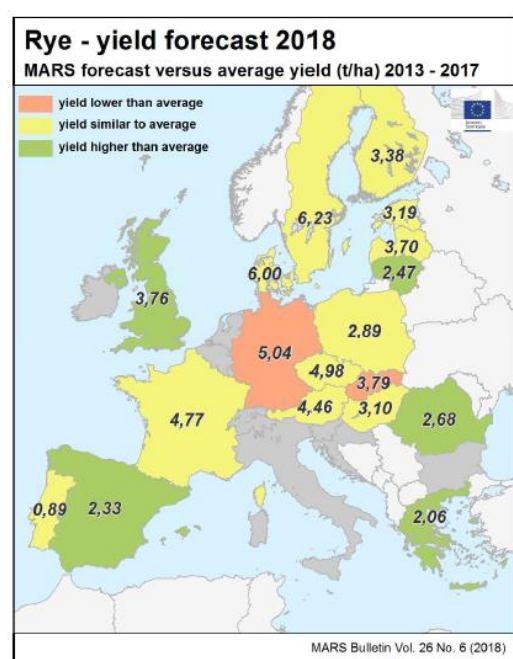
- yield lower than average
- yield similar to average
- yield higher than average



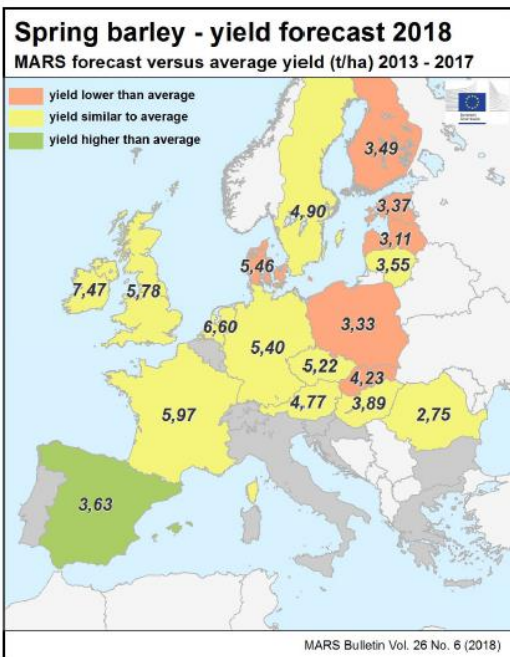
Country	WINTER BARLEY (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	5.79	5.98	5.80	+0.1	-3.1
AT	6.33	6.59	6.03	-4.7	-8.5
BE	8.35	8.68	8.65	+3.6	-0.3
BG	4.10	4.68	4.38	+6.6	-6.5
CY	1.44	1.81	1.41	-2.0	-22
CZ	5.52	5.85	5.74	+3.9	-1.9
DE	7.36	7.35	6.81	-7.5	-7.4
DK	6.54	6.78	6.50	-0.6	-4.1
EE	-	-	-	-	-
ES	2.41	2.00	2.68	+11	+34
FI	-	-	-	-	-
FR	6.51	6.48	6.47	-0.5	-0.1
GR	2.64	2.69	2.75	+4.2	+2.3
HR	4.36	4.98	4.83	+11	-3.0
HU	5.02	5.44	4.94	-1.6	-9.1
IE	9.33	9.11	9.39	+0.7	+3.1
IT	3.81	3.93	3.86	+1.1	-1.9
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	4.38	4.66	4.40	+0.3	-5.7
PT	2.06	1.90	2.45	+19	+29
RO	3.95	4.90	4.66	+18	-5.0
SE	6.11	6.42	6.07	-0.6	-5.4
SI	4.63	4.81	4.66	+0.8	-3.0
SK	5.17	5.27	5.46	+5.6	+3.7
UK	6.98	6.97	6.97	-0.1	+0.0



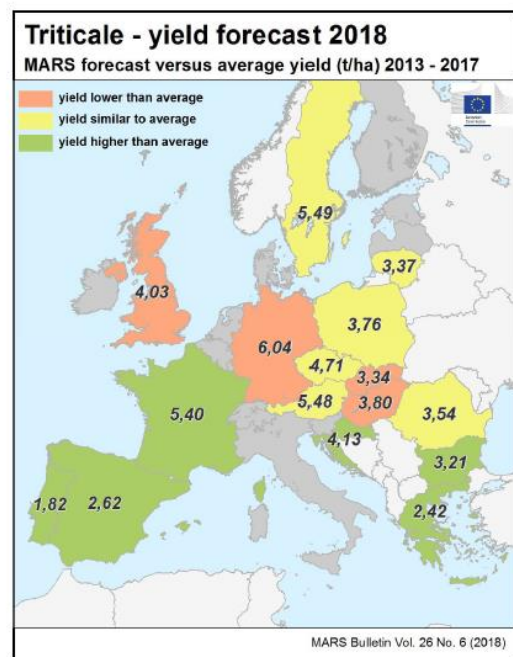
Country	RYE (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	3.93	3.76	3.71	-5.6	-1.3
AT	4.37	3.46	4.46	+2.0	+29
BE	-	-	-	-	-
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	4.90	4.92	4.98	+1.4	+1.2
DE	5.66	5.01	5.04	-1.1	+0.5
DK	6.09	6.49	6.00	-1.4	-7.6
EE	3.15	3.93	3.19	+1.3	-19
ES	2.00	1.21	2.33	+17	+94
FI	3.34	3.93	3.38	+1.2	-14
FR	4.64	4.59	4.77	+2.8	+3.9
GR	1.79	1.91	2.06	+15	+8.1
HR	-	-	-	-	-
HU	2.99	3.32	3.10	+3.7	-6.6
IE	-	-	-	-	-
IT	-	-	-	-	-
LT	2.33	2.44	2.47	+5.8	+1.0
LU	-	-	-	-	-
LV	3.60	4.07	3.70	+2.7	-9.0
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	2.98	3.08	2.89	-3.0	-6.2
PT	0.87	0.85	0.89	+2.1	+4.2
RO	2.55	3.20	2.68	+5.0	-16
SE	6.25	6.65	6.23	-0.3	-6.4
SI	-	-	-	-	-
SK	3.95	4.45	3.79	-4.2	-15
UK	2.63	1.42	3.76	+43	+165



Country	SPRING BARLEY (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	4.25	4.07	4.40	+3.3	+8.1
AT	4.65	3.99	4.77	+2.5	+20
BE	-	-	-	-	-
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	5.21	4.96	5.22	+0.2	+5.1
DE	5.49	5.40	5.40	-1.8	-0.1
DK	5.71	5.82	5.46	-4.4	-6.2
EE	3.55	4.10	3.37	-5.2	-18
ES	2.99	2.29	3.63	+21	+59
FI	3.68	4.08	3.49	-5.1	-14
FR	5.97	5.91	5.97	-0.1	+1.0
GR	-	-	-	-	-
HR	-	-	-	-	-
HU	3.75	4.37	3.89	+3.6	-11
IE	7.50	7.93	7.47	-0.4	-5.8
IT	-	-	-	-	-
LT	3.60	3.65	3.55	-1.2	-2.5
LU	-	-	-	-	-
LV	3.31	3.32	3.11	-6.0	-6.3
MT	-	-	-	-	-
NL	6.67	6.09	6.60	-0.9	+8.4
PL	3.63	3.77	3.33	-8.4	-12
PT	-	-	-	-	-
RO	2.66	3.31	2.75	+3.3	-17
SE	4.97	5.21	4.90	-1.4	-6.0
SI	-	-	-	-	-
SK	4.49	4.26	4.23	-5.7	-0.7
UK	5.76	5.60	5.78	+0.4	+3.3



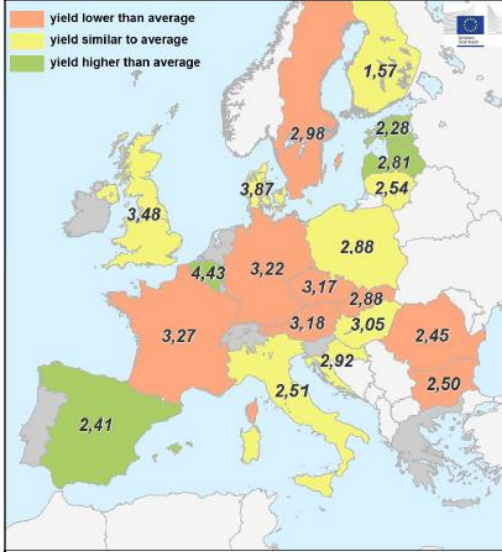
Country	TRITICALE (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	4.22	4.25	4.25	+0.6	+0.1
AT	5.45	5.16	5.48	+0.6	+6.3
BE	-	-	-	-	-
BG	3.07	3.17	3.21	+4.5	+1.2
CY	-	-	-	-	-
CZ	4.82	4.89	4.71	-2.3	-3.7
DE	6.44	5.96	6.04	-6.2	+1.4
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	2.25	1.81	2.62	+16	+44
FI	-	-	-	-	-
FR	5.09	5.20	5.40	+6.0	+3.8
GR	2.21	2.22	2.42	+9.5	+9.1
HR	3.92	4.50	4.13	+5.4	-8.2
HU	4.03	3.97	3.80	-5.6	-4.1
IE	-	-	-	-	-
IT	-	-	-	-	-
LT	3.36	3.26	3.37	+0.3	+3.4
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	3.74	3.93	3.76	+0.7	-4.3
PT	1.63	1.48	1.82	+12	+23
RO	3.68	4.39	3.54	-3.8	-19
SE	5.60	5.81	5.49	-2.0	-5.4
SI	-	-	-	-	-
SK	3.72	3.56	3.34	-10	-6.0
UK	4.30	4.50	4.03	-6.4	-11



Country	RAPE AND TURNIP RAPE (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	3,29	3,29	3,05	-7,4	-7,3
AT	3,34	2,89	3,18	-5,0	+1,0
BE	4,22	4,26	4,43	+5,0	+3,9
BG	2,75	2,98	2,50	-9,3	-16
CY	-	-	-	-	-
CZ	3,44	2,91	3,17	-7,9	+8,9
DE	3,82	3,27	3,22	-16	-1,4
DK	3,96	4,18	3,87	-2,2	-7,3
EE	2,11	2,24	2,28	+7,9	+1,8
ES	2,16	1,56	2,41	+12	+55
FI	1,54	1,65	1,57	+1,7	-5,1
FR	3,43	3,84	3,27	-4,7	-15
GR	-	-	-	-	-
HR	2,88	2,80	2,92	+1,3	+4,3
HU	3,17	3,44	3,05	-3,8	-11
IE	-	-	-	-	-
IT	2,42	2,66	2,51	+3,6	-5,5
LT	2,51	3,00	2,54	+1,2	-16
LU	-	-	-	-	-
LV	2,67	2,91	2,81	+5,4	-3,3
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	2,95	3,00	2,88	-2,1	-3,9
PT	-	-	-	-	-
RO	2,66	2,79	2,45	-8,0	-12
SE	3,18	3,30	2,98	-6,1	-9,7
SI	-	-	-	-	-
SK	3,05	2,99	2,88	-5,6	-3,5
UK	3,49	3,85	3,48	-0,2	-9,6

Rapeseed - yield forecast 2018

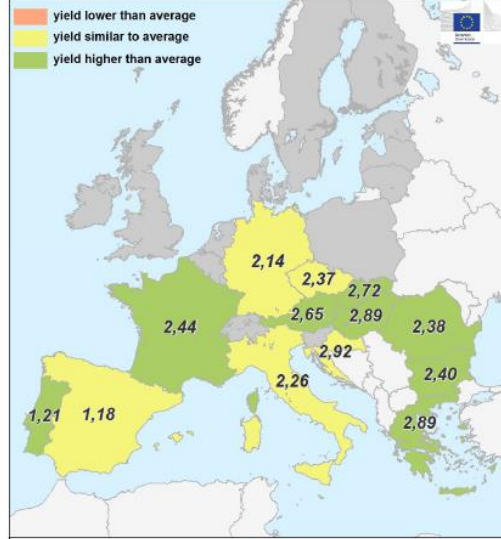
MARS forecast versus average yield (t/ha) 2013 - 2017



Country	SUNFLOWER (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	2,12	2,45	2,27	+7,2	-7,2
AT	2,54	2,33	2,65	+4,4	+14
BE	-	-	-	-	-
BG	2,26	2,29	2,40	+6,2	+4,6
CY	-	-	-	-	-
CZ	2,36	2,46	2,37	+0,3	-3,8
DE	2,13	2,20	2,14	+0,4	-2,7
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	1,13	1,24	1,18	+3,6	-5,2
FI	-	-	-	-	-
FR	2,27	2,76	2,44	+7,5	-12
GR	2,69	2,85	2,89	+7,4	+1,4
HR	2,93	3,12	2,92	-0,3	-6,4
HU	2,74	2,95	2,89	+5,7	-1,9
IE	-	-	-	-	-
IT	2,22	2,13	2,26	+2,0	+6,2
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	1,12	1,19	1,21	+8,3	+1,8
RO	2,17	2,97	2,38	+10	-20
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	2,54	2,51	2,72	+7,3	+8,7
UK	-	-	-	-	-

Sunflower - yield forecast 2018

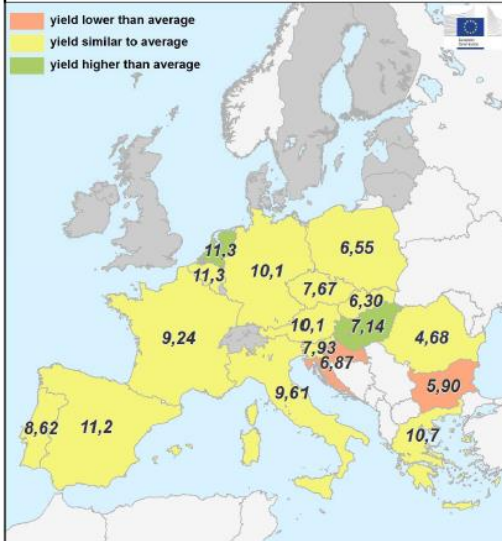
MARS forecast versus average yield (t/ha) 2013 - 2017



Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	7,30	7,85	7,35	+0,7	-6,4
AT	9,76	10,0	10,1	+3,0	+1,0
BE	11,0	12,3	11,3	+3,1	-7,5
BG	6,24	6,44	5,90	-5,6	-8,4
CY	-	-	-	-	-
CZ	7,56	6,84	7,67	+1,6	+12
DE	9,74	10,5	10,1	+3,5	-4,3
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	11,2	11,0	11,2	+0,5	+2,4
FI	-	-	-	-	-
FR	9,00	10,1	9,24	+2,7	-8,7
GR	10,8	9,92	10,7	-0,5	+8,1
HR	7,16	6,33	6,87	-4,1	+8,6
HU	6,84	6,89	7,14	+4,4	+3,5
IE	-	-	-	-	-
IT	9,71	9,30	9,61	-1,0	+3,3
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	10,5	13,4	11,3	+7,0	-16
PL	6,43	7,15	6,55	+1,9	-8,4
PT	8,45	9,24	8,62	+2,0	-6,7
RO	4,55	5,95	4,68	+2,8	-21
SE	-	-	-	-	-
SI	8,00	7,11	7,93	-0,8	+12
SK	6,37	5,74	6,30	-1,2	+10
UK	-	-	-	-	-

Grain maize - yield forecast 2018

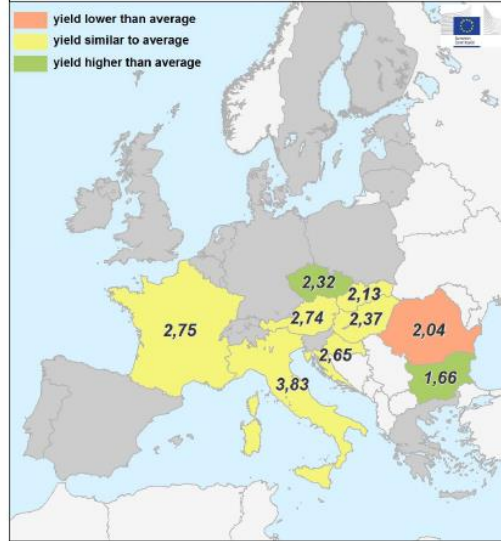
MARS forecast versus average yield (t/ha) 2013 - 2017



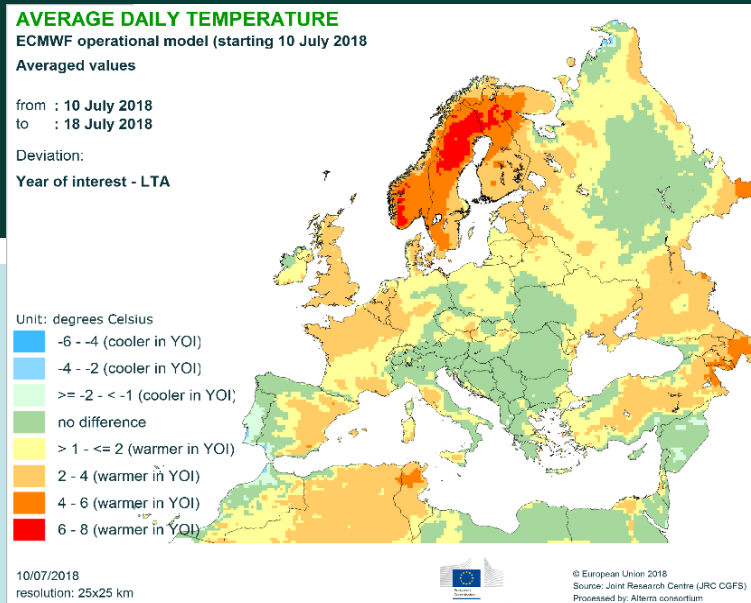
Country	SOYBEAN (t/ha)				
	Avg 5yrs	2017	MARS 2018 forecasts	%18/5yrs	%18/17
EU	2,90	2,93	2,92	+0,5	-0,5
AT	2,66	3,00	2,74	+3,0	-8,8
BE	-	-	-	-	-
BG	1,32	1,74	1,66	+26	-4,4
CY	-	-	-	-	-
CZ	2,21	2,41	2,32	+4,7	-3,9
DE	-	-	-	-	-
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	-	-	-	-	-
FI	-	-	-	-	-
FR	2,71	2,92	2,75	+1,2	-5,9
GR	-	-	-	-	-
HR	2,56	2,40	2,65	+3,2	+10
HU	2,33	2,10	2,37	+1,7	+13
IE	-	-	-	-	-
IT	3,72	3,66	3,83	+2,9	+4,6
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	-	-	-	-	-
RO	2,25	2,42	2,04	-8,2	-16
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	2,12	2,33	2,13	+0,5	-8,7
UK	-	-	-	-	-

Soybean - yield forecast 2018

MARS forecast versus average yield (t/ha) 2013 - 2017

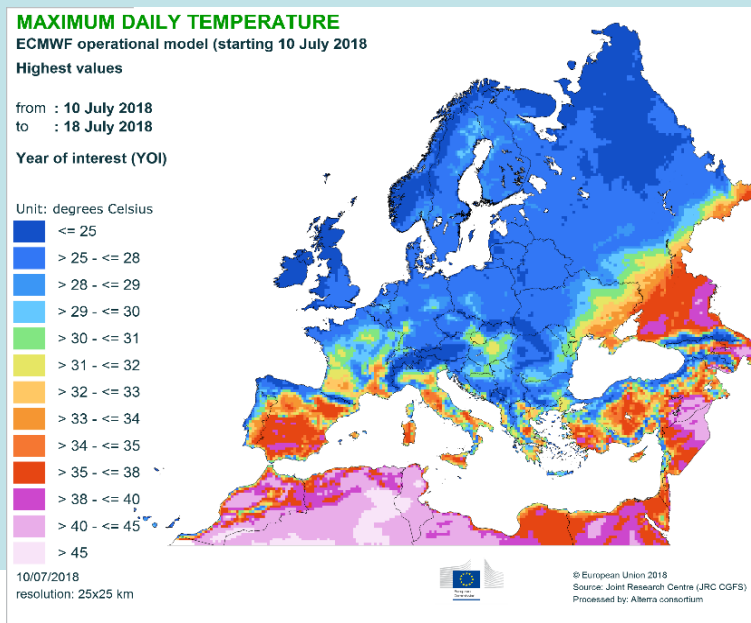


Weather forecast until 18 July

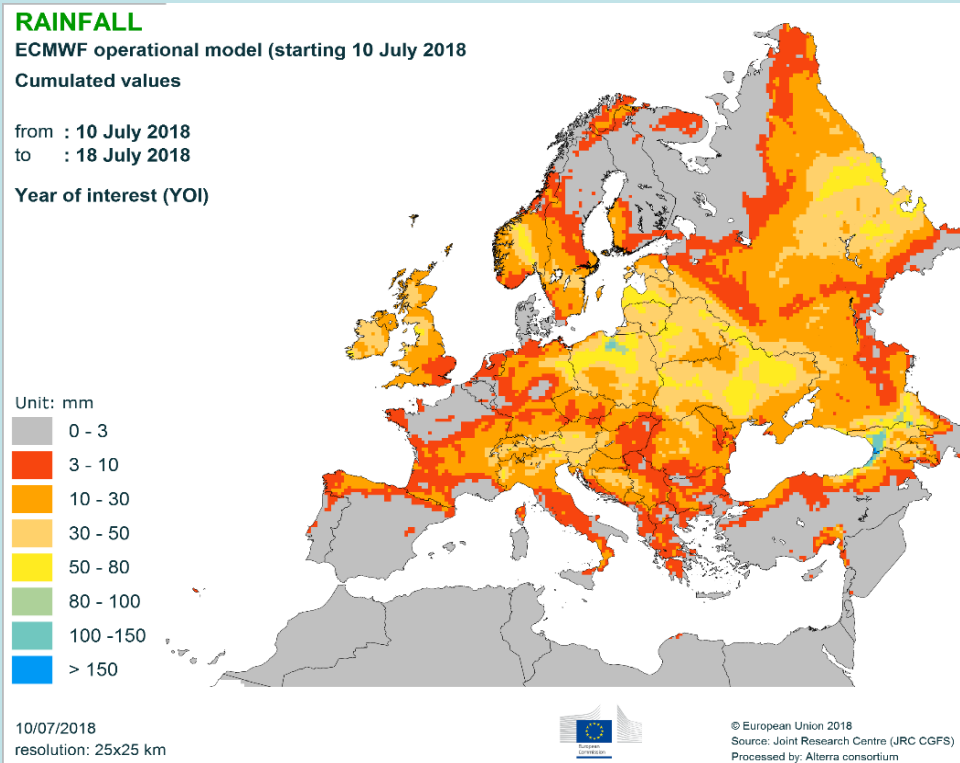


Air temperature

- **Warmer-than-usual** conditions are expected in northern, western and large parts of eastern Europe. Temperature anomalies could reach up to 8°C above the LTA in Scandinavia, whereas warm anomalies up to 4 °C above the LTA are expected in the remaining regions mentioned above.
- **Daily maximum temperatures reaching >30°C** are expected in southern Europe, central and southern part of France, central part of the Pannonian Basin, northern Black Sea areas and Turkey. Many Mediterranean regions as well as central part of Turkey and southern part of European Russia will be exposed to maximum temperatures above 35 °C.



Weather forecast until 18 July



Precipitation

- **Dry conditions with rainfall cumulates less than 3 mm are expected to appear** in southern Italy, Sardegna, northern half of Scandinavia, central and southern Balkans and major part of Turkey.
- **Dry weather will continue** in major part of northern France, the Benelux, Mediterranean part of France and the Iberian Peninsula.
- **Rainfall cumulates above 30 mm** are forecast large parts of central and eastern Europe, Alpine regions and western part of the British Isles.

Want to know more?

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Data and tools

- <http://agri4cast.jrc.ec.europa.eu/mars-explorer/>
- <http://agri4cast.jrc.ec.europa.eu/DataPortal/Index.aspx>

MARS Bulletins

<https://ec.europa.eu/jrc/en/mars/bulletins>