The European Commission’s science and knowledge service

Joint Research Centre
Limited impacts of heatwaves on winter cereals
Mixed outlook for summer crops

The overall yield outlook for cereals at EU level slightly decreased due to the impact of the June heatwave that affected large parts of Europe resulting in a limited harvest in areas with ongoing forecasts of frost. In south-western Europe, spring crops were revised upwards due to the favourable conditions in southern Spain and Iberia with a continued increase in yield forecasts. The dry season in the Mediterranean area continues with the exception of north-eastern and eastern Europe where the situation is improving.

Most parts of Europe were affected by an unusually early and intense heatwave during June 2019 as a consequence, good filling of summer and winter cereals was interrupted and affected negatively, especially in Spain, France, Luxembourg, Germany, Poland, Czechia, and Slovakia. Although with the growing season nearing its end, these negative effects were minimal in Lithuania and Latvia. Flowerability was affected. The positive outlook for summer crops in south-western Europe contrasts with the unfavourable conditions found in large parts of Austria, Germany, Czechia, the Benelux countries, and France. Soil moisture levels in these regions are low, and the risk of temperature and shortage of rain forecast for the coming days will aggravate the situation.

Crop

<table>
<thead>
<tr>
<th>Crop</th>
<th>Average yield [kg/ha]</th>
<th>Average yield [ha/ha]</th>
<th>Average yield [ha/ha]</th>
<th>Average yield [ha/ha]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter wheat</td>
<td>5.5</td>
<td>3.0</td>
<td>4.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Spring wheat</td>
<td>4.0</td>
<td>2.5</td>
<td>3.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Rye</td>
<td>3.0</td>
<td>1.5</td>
<td>2.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Barley</td>
<td>2.0</td>
<td>1.0</td>
<td>1.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: The table covers the period from 1 June until 30 July.
Content

- Areas of Concern – Extreme weather events
- Meteorological overview 15 July – 3 August
- Remote sensing - arable land
- Pasture productivity
- Focus on France
- Weather forecast until 13 August
Areas of Concern – Extreme weather events

- Intense heatwave, with exceptionally high temperatures and no rain in western Europe in the 3rd dekad of July
  - Tmax reaching > 40 °C in northern France and locally in the Benelux and north-western Germany.
  - Tmax > 35 °C in south-eastern UK, southern France, large parts of Germany and the Iberian Peninsula.
- Marked rain surplus in central Great Britain, northern and eastern Alpine / Adriatic region, central and northern Romania and bordering regions in Hungary, Slovakia and Ukraine.
Meteorological overview

15 July – 3 August 2019
Distinct warm weather anomaly for the review period as a whole, in central and north-western Europe; with daily temperatures 2-4 °C > LTA (long-term average) in large parts of Germany, northern UK, the Benelux countries and southern Scandinavia.

Very intense heat wave, between 22 and 26 July in western Europe.

- Maximum temperature reached > 40 °C (often exceeding historical record values) in northern France and locally in the Benelux countries and north-western Germany.
- South-eastern UK, southern France, major part of Germany and major part of the Iberian Peninsula experienced maximum temperatures between 35 °C and 40 °C.

Colder-than-usual conditions persisted in north-eastern Europe, with temperature anomalies down to 4 °C below the LTA.
Precipitation

- **Dry conditions** with less than 3 mm of rainfall cumulates occurred in southern part of the Iberian Peninsula, eastern Turkey, and regionally in northern Scandinavia.

- **Moderate, mostly below-average, rainfall cumulates** in north-eastern France, Germany, Poland, western Ukraine, major part of Scandinavia, northern Portugal, southern Italy, Northern Macedonia, eastern Turkey and southeastern Iberian Peninsula. Rainfall cumulates in most of these regions did not reach above 20 mm.

- **Abundant rainfall** with cumulates above 90 mm occurred in the northern UK, eastern Alps, north-eastern Black Sea regions, and north-eastern part of European Russia.
Even though rainfall during the review period (15 July – 3 August) has not been exceptionally low, the climatic water balance (precipitation – potential evapotranspiration) since the beginning of May is distinctly below the seasonal average in north-eastern France, central and north-eastern Spain, parts of the Benelux, north-western Germany, southern Poland and Lithuania.

In several of these regions, the climatic water balance is among the lowest in our records (since 1979), especially when considering the summer period (since 1 June), so far.
Remote sensing analysis
arable land and pastures
Remote sensing – arable land
Early senescence in northern Europe

- In north-eastern **Italy** summer crops (e.g. maize and soybean) still present deficit of biomass accumulation and the window for potential recovery is almost closed.

- In the northern half of **Germany** and central and southern **Poland** unfavorable conditions (hot and dry), since the beginning of summer, accelerated winter crops senescence and reduced the biomass accumulation of summer crops (e.g. maize, sugarbeet, potato)

- In **Latvia** and **Lithuania** winter and spring crops grain formation and grain filling were shortened by the hot and dry conditions.

- Separate slides (17-19) are dedicated on **France**
Further expansion and intensification of negative PPI due to continued hot and relatively dry conditions:

- From Vendee to Auvergne and northeastern France
- Eastern Benelux
- Central and Northern Germany
- Poland
- Czechia
- Lithuania
- Northern Italy
- Spain and Portugal
• Considering the last two dekads only (11-31 July), indicates continued aggravating conditions.

• Lowest PPI values in our records (since 2007) in France, Benelux, Germany, Poland and Lithuania
Relative index of pasture productivity
Period of analysis: 11 July - 31 July 2019
Index based on MetOP-AVHRR fAPAR 10-day product.
Historical archive (MTA) from 2007 to 2018

- > 1.5 (close to historical maximum)
- 0.5 to 1.5
- -0.5 to 0.5 (close to LTA)
- -1.5 to -0.5
- < -1.5 (close to historical minimum)
- regions with non-significant pasture area

Siauliu Apskritis (LT)
fAPARs metop of pasture forage grassland

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Source: Joint Research Centre

Cáceres (ES)
fAPARs metop of pasture forage grassland

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Source: Joint Research Centre
Relative index of pasture productivity

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Jerichower Land (DE)
fAPARs metop of pasture forage grassland

Moravskoslezsky Kraj (CZ)
fAPARs metop of pasture forage grassland
Relative index of pasture productivity

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- gray regions with non-significant pasture areas
Focus on France
France
Exceptional early drought

In the southern half, limited impact of drought thanks to rainfall observed beginning of July and a better winter/spring recharge.

Distinct water deficit since mid-June, reinforced by the heat wave, following another drought in 2018, without a full recharge of the groundwater during winter.
No real improvements are foreseen for the next 10 days: no substantial rainfall is forecast

Summer crops yield forecasts are expected to be revised further downwards:

- **Grain maize** was sown late this year. The delays in phenology will reinforce the impact of the drought. Temperatures above 40°C have been recorded during flowering, with additional negative impacts.

- Only a small share of **potato** and **sugar beet** fields are irrigated and temperatures have been well above critical thresholds.

- **Sunflower** yield potentials are also impacted, but good conditions have prevailed in Aquitaine compensating for (part of) the losses elsewhere.
JRC MARS

Weather forecast 6-13 August
Weather Forecast, 6 - 13 August

- Substantially warmer-than-usual conditions in southern, south-eastern and part of central Europe. Air temperatures up to 6 °C above the LTA are expected in these regions. Maximum temperatures will reach between 35 °C and 40 °C (locally this could be even exceeded).

- Colder-than-seasonal weather with temperature anomalies down to 6 °C below the LTA will continue in north-eastern Europe.
Weather Forecast, 6 – 13 August

- Southern and south-eastern Europe, northern Black Sea regions and Turkey are expected to remain dry.
- Precipitation with cumulates around 30 mm is expected in a belt extending from southern France to central European Russia.
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