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European crop monitoring and yield forecasting in 2018

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The Joint Research Centre (JRC) of the European Commission (EC) forecasts crop yields and production across all European Union (EU) Member States (MS). This is done to anticipate production levels and contribute to the management of agricultural markets with adequate, timely, and coherent information – implementing Article 22 of the EU regulation (2013) 1306 on Monitoring Agricultural Resources. The JRC crop yield forecasts are reported each month in the MARS Bulletin, along with agro-meteorological analyses and country-specific overviews of crop conditions. The readership of the Bulletin is diverse. Stakeholders from more than 96 countries download the MARS Bulletin, in peak-season up to 1500 downloads occur in the first days after publication.

In spring and summer 2018, Europe was characterized by rainfall deficits in the north and rainfall surpluses in the south. The drought affected the production of arable crops and animal feed, leading to damages and financial losses across the agricultural sector. In 2018, information from the JRC MARS crop yield forecasting system (MCYFS) and associated crop monitoring activities helped DG-AGRI to identify those MS where measures to help farmers deal with droughts – additional to the existing support under the Common Agricultural Policy – was warranted. According to preliminary reports from MS, overall European soft wheat and rapeseed yield levels were down by about 4.5% and 12% respectively compared to the last 5-years' average. At EU-level, the predominantly beneficial conditions in the south partly compensated the production losses in the north; especially for soft wheat and barley. For example, in Germany, soft wheat and rapeseed yields were down by about 15 and 20% respectively, whereas in the Iberian Peninsula soft wheat and spring barley yields were respectively 15 and 20% above the 5-year average.

The MCYFS anticipated both the below-average yields in the north and the higher yields in the south in a timely manner. Both the MCYFS remote sensing and crop-modelling infrastructures detected the developing drought impacts as described in the May, June and July 2018 issues of the MARS Bulletin. As the predictors used for the statistical forecasting capture the impact of water stress on crops, the yield impact of the drought was anticipated as well. Analysis shows that the June EU soft wheat production forecast was +6% above the preliminary reported statistics. The continuing drought impact in the latter half of June and throughout July led to a further reduction in the forecasts. The resulting July EU soft wheat forecast underestimated the final 2018 drought impact only by +1%. The positive yield anomaly in the Iberian Peninsula was also anticipated in advance. The 2018 rainfall deficit was so severe in some of the affected regions that it will also have repercussions on the expected crop production levels in 2019.

In recent years, extreme and sometimes unprecedented weather across Europe has seriously affected crop production. While the MCYFS performed satisfactorily in 2018, such unprecedented conditions pose a challenge to yield forecasting. The in-season monitoring and forecasts also provide numerous lessons for climate impact research.