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A quality assessment of the MARS crop yield forecasting system for the European Union

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Timely information on crop production forecasts can become of increasing importance as commodity markets are more and more interconnected. Impacts across large crop production areas due to (e.g.) extreme weather and pest outbreaks can create ripple effects that may affect food prices and availability elsewhere. The MARS Unit (Monitoring Agricultural ResourceS), DG Joint Research Centre, European Commission, has been providing forecasts of European crop production levels since 1993. The operational crop production forecasting is carried out with the MARS Crop Yield Forecasting System (M-CYFS). The M-CYFS is used to monitor crop growth development, evaluate short-term effects of anomalous meteorological events, and provide monthly forecasts of crop yield at national and European Union level. The crop production forecasts are published in the so-called MARS bulletins. Forecasting crop yield over large areas in the operational context requires quality benchmarks. Here we present an analysis of the accuracy and skill of past crop yield forecasts of the main crops (e.g. soft wheat, grain maize), throughout the growing season, and specifically for the final forecast before harvest. Two simple benchmarks to assess the skill of the forecasts were defined as comparing the forecasts to 1) a forecast equal to the average yield and 2) a forecast using a linear trend established through the crop yield time-series. These reveal a variability in performance as a function of crop and Member State. In terms of production, the yield forecasts of 67% of the EU-28 soft wheat production and 80% of the EU-28 maize production have been forecast superior to both benchmarks during the 1993-2013 period. In a changing and increasingly variable climate crop yield forecasts can become increasingly valuable – provided they are used wisely. We end our presentation by discussing research activities that could contribute to this goal.