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AquaCrop and the Belgian collaborative agriculture monitoring (BELCAM) platform

Content

To assist Belgian farmers in their crop monitoring and yield estimates, Belgian Science Policy (BELSPO) funded the Belgian Collaborative Agriculture Monitoring (BELCAM) initiative. BELCAM is an interactive web-based geo-platform build around AquaCrop. In a first research phase, AquaCrop was calibrated and validated for maize, winter wheat and potato, based on several years of field observations. In a second application oriented phase, the AquaCrop stand-alone version was integrated in a web platform. Farmers are invited to delimitate their parcels on a Google Earth base layer and enter basic agricultural itinerary data (planted crop, sowing/planting date and sowing/planting density). All other required input data are automatically retrieved for each parcel from authoritative data housed and updated on the BELCAM server, and reformatted for AquaCrop input. Soil physical characteristics are taken from the Soil Geographical Database of Europe (SGDBE) subset for Belgian use and soil-hydraulic properties calculated using Saxton pedo-transfer functions. Daily climate data are received by ftp-transfer from the Royal Meteorological Institute; consisting of 10 km x 10 km grid cells interpolated from 125 weather stations. Time series of median satellite fCover values are calculated from imported Sentinel-2 satellite images. A crop specific method was developed to clean the parcel level time series by outlier elimination, interpolation and smoothing procedures. Maximum canopy cover and emergence date are derived from these time series and assimilated into AquaCrop (i.e. a unique crop file is created for each field). Adapting emergence date and maximum canopy cover individually for each field considerably improved simulation results. A user-friendly graphical interface was developed on the platform to monitor canopy development throughout the growing season and estimate final dry yields ± 2 to 3 weeks before harvest. The BELCAM case successfully presents the potential of combining satellite fCover, authoritative soil and climate data, all available at field level, with AquaCrop to monitor vast regions of agricultural fields and improve yield estimates. However, farmer's observations remain necessary to identify situations that satellites can see but (AquaCrop) not explain (e.g. presence of weeds, diseases, etc.)

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