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IrrigaSys – a decision support system for irrigation management in the Sorraia Valley region, Portugal

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IrrigaSys is a decision support system (DSS) for irrigation water management based on online, open
access tools. The system includes remote access to local meteorological stations for weather conditions, a MM5 model for weather forecast, the MOHID-Land model for the computation of the soil water balance and irrigation scheduling, and a MySQL database for data repository. Despite its complexity, the data necessary to run IrrigaSys is minimal, and include the location of the agricultural
field, crop type, sowing and harvest dates, soil texture, irrigation method, and daily/weekly irrigation
depths applied by the farmer. Based on this information, the system automatically downloads the weather data from the meteorological station located closest to the agricultural plot, as well as the weather forecast for the seven days following the current date. The soil water balance is then computed for the previous and following week as well as the crop irrigation needs using the MOHIDLand
model. Results are made available via a web interface, a mobile app, SMS, and email. Besides the model outputs, the IrrigaSys further provides the Normalized Difference Vegetation Index (NDVI) for
the agricultural field. The NDVI is computed from Sentinel 2 spectral bands with a resolution of 10m,
and is updated every time new Sentinel 2 imagery data (with cloud cover < 10%) is available. The IrrigaSys has been developed in close cooperation with the Water Board Association of the Sorraia Valley irrigation district (15360 ha), southern Portugal, over the last 5 years, supporting 103 plots of
30 farmers during the last irrigation season. As a result, the main limitation is naturally associated to
the difficulty in providing reliable estimates for all field plots based on calibrated model data. As the
next step, the service should start automatically identifying the culture status based on satellite information as well as providing fertigation recommendations to farmers.