



LOCATION



Belgium

PARTNERS



3.4

Open Platform for Improved Crop Monitoring in Potato Farms

CHALLENGE

Farmers with large areas of potato fields, spread out geographically over several communities, often suffer from lack of sufficient ground truth data (measured yields, crop variety, exact planting date). This hampers the calibration and validation of crop growth models and the provision of specific advice on field management practices. Early identification of the fields that need extra activities (irrigation, fertilisation) to boost production, and estimating the expected crop yield as a result of these activities, can optimise the farmer's revenues. At the same time, an estimation of crop yield is important for the downstream potato processing industry, securing storage facilities, and accepting purchase orders. However, this data is not always readily available.

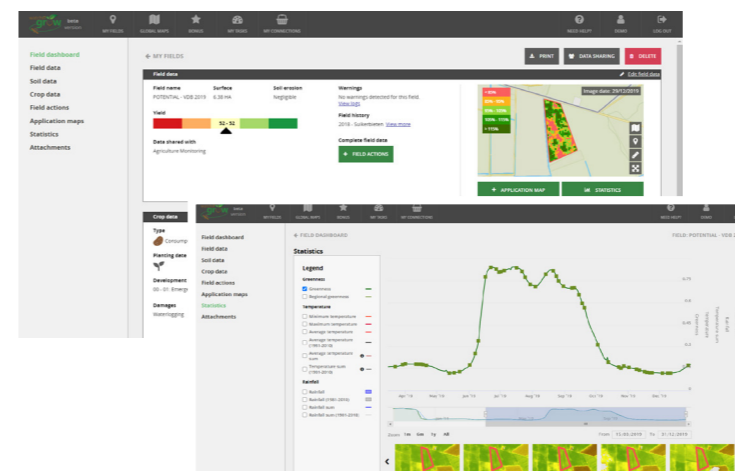
AIM

This pilot aims to integrate field machinery data from AVR potato harvesters with remote sensing, meteorological and soil data into the WatchITgrow (WIG, watchitgrow.be) platform, to increase ground truth data. Using detailed data from the machinery in the field (detailed yield information, planting dates), the manually fine-tuned physical crop model can be replaced by a purely data-driven approach using machine learning (ML) techniques.



HOW

AVR Connect is the recently started IoT cloud platform that collects data from the AVR field machinery (potato planters, yield sensors on the potato harvesters) using 4G communication and makes the data available to third parties. Geotagged yield data are collected at a frequency 1Hz, which leads to very detailed yield maps. The data collected via AVR will be used as training data for machine learning models that predict yield based on satellite imagery (Sentinel 1 and 2, Copernicus program), weather and soil data.



BENEFIT

Physical crop growth models need to be manually fine-tuned for every crop type and variety, using ground truth data. The increase in ground truth data (AVR harvesting machines) is expected to lead to better crop growth and yield prediction models, while the conformance to DEMETER standards ensures that the data is discoverable and accessible to third parties that might want to develop their own algorithms.



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DEMETER Integration

An automatic and standardized data exchange between WatchITgrow and AVR Connect platforms was set up using DEMETER AIM (Agriculture Information Model) standards. Through WatchITgrow farmers can create task maps for variable rate applications for fertilization or irrigation, making use of DEMETER's "Variable rate" component. The yield data from AVR's potato harvesters are also used to train a yield prediction model for potatoes. Therefore, we used DEMETER's "Plant yield estimation" component. Both components are available in the DEMETER Enabler Hub (DEH), with inputs and outputs defined in the AIM format so that the components are ready for integration in other pilots or other platforms if needed.

Feedback From Farmers

Through the connection of WatchITgrow and AVR Connect digital platforms, potato farmers in Belgium, Northern France and the Netherlands can visualize their yield data and compare them with data from other sources, such as satellites. This way, farmers can gain a better knowledge of their fields. They get an idea of the yield potential of their fields which allows them to better steer the inputs. Thanks to DEMETER, potato farmers can also benefit from more reliable yield predictions for their fields, not only farmers that have AVR machinery, but also other farmers that are growing potatoes in the same region.



Outcomes

This pilot developed a solution to assist potato farmers in using the data they collect, specifically data from harvesting machines, to make well-informed decisions for future field-operations and downstream supply chain actions. Thanks to DEMETER, AVR and VITO were able to connect their platforms (AVR Connect and WatchITgrow), allowing potato farmers to visualize yield data, compare them with satellite, soil and weather data, create task maps for variable rate fertilization or irrigation and get yield forecasts for their potato fields. Together with other stakeholders from the Belgian potato sector, VITO and AVR are contributing in this pilot to the promotion of the use of digital tools for decision-making and help potato farmers in the transition towards sustainable and future-proof agriculture.

