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The iPot Project: improved potato monitoring in Belgium using remote sensing and crop growth modelling

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Belgian potato processors, traders and packers are increasingly working with potato contracts. The close follow up of contracted parcels on the land as well as from above is becoming an important tool to improve the quantity and quality of the potato crop and reduce risks in order to plan the storage, packaging or processing and as such to strengthen the competitiveness of the Belgian potato chain in a global market. At the same time, precision agriculture continues to gain importance and progress. Farmers are obligated to invest in new technologies.

Between mid-May and the end of June 2014 potato fields in Gembloux were monitored from emergence till canopy closure. UAV images (RGB) and digital (hemispherical) photographs were taken at ten-daily intervals. Crop emergence maps show the time (date) and degree of crop emergence and crop closure (in terms of % cover). For three UAV flights during the growing season RGB images at 3 cm resolution were processed using a K-means clustering algorithm to classify the crop according to its greenness. Based on the greenness %cover and daily cover growth were derived for 5x5m pixels and 25x25m pixels. The latter resolution allowed for comparison with high resolution satellite imagery. Vegetation indices such as %Cover and LAI were calculated with the Cyclopes algorithm (INRA-EMMAH) from high resolution satellite images (DMC/Deimos, 22m pixel size). DMC based cover maps showed similar patterns as compared with the UAV-based cover maps, and allows for further applications of the data in crop management.

Today the use of geo-information by the (private) agricultural sector in Belgium is rather limited, notwithstanding the great benefits this type of information may offer, as recognized by the sector. The iPot project, financed by the Belgian Science Policy Office (BELSPO), aims to provide the Belgian potato sector, represented by Belgapom, with near real time information on field condition (weather-soil) and crop development and with early yield estimates, derived from a combination of satellite images and crop growth models. An intuitive web based geo-information platform is being developed to allow both the Belgian potato industry and the potato research centres to access, analyse and combine the data with their own field observations in close collaboration with the farmers, for improved decision-making.