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FLUROSENSE: POWERING AGRONOMIC DECISIONS WITH THE FUSION OF REMOTE SENSING AND AGRICULTURAL DATA

Abstract

The value of remote sensing data to agricultural sector through applications like crop nutrient status monitoring and soil moisture stress mapping has been proven. Yet the adoption of the remote sensing-based solutions is slow. The barriers to adoption, identified by a recent report from Australia's 15 Rural Development Corporations (RDCs), are 1. isolated data silos, requiring time-consuming manual specialised processing and 2. lack of knowledge in how to process data together lead to 3. reactive management approaches and missed opportunities. An innovative agronomic decision support platform, offering a solution to this problem, FluroSense (TM) has been developed based on de-noised remote sensing data, combined with in-field observations, weather data, soil/tissue testing and yield maps. The platform offers access to vegetation indices calculated from satellite and aerial-based remote sensing data, demonstrated within the context of the crop growing cycle to enable on-the-spot management decisions. By short-cutting the labour-intensive process of collecting the remote sensing and agricultural data, and making it accessible to scientific crop models and machine learning algorithms, FluroSense provides the users with actionable stream of agronomic analytics. User-defined workflows enabled by a combination of layers, models and algorithms in FluroSense produce crop-specific nutrient recommendations, track crop performance, detect stress in the fields, identify outbreaks of disease, and water-logging. The analysis-ready agronomic dataset enabling these applications relies on a combination of innovative applications in a range of data processing and modelling techniques from machine learning models for cloud and shadow masking to those trained for stress detection using user-labeled anomalies. FluroSense as a platform, which democratises the access to remote sensing data, contextualises it by bringing it together with weather data and agronomic records is a state-of-the-art example of innovative application based on the data extraction of information from Earth Observation data systems and methods for making the results available to decision makers in agriculture. The platform has been deployed in Australia and the US and now has been used in 7 countries across the globe.