



Integrating harvest and agronomic operations into the suite of services for sugarcane

eLEAF's long trajectory of developing digital-based solutions for sugarcane is expanding further with the implementation of 'CostCutting4Sugercane' a demonstration project in Colombia supported by the Netherlands Space Office (NSO) and European Space Office (ESA) via the ESA-BASS programme (Business Applications and Space Solutions). CostCutting4Sugarcane targets harvest operations and optimal use of agronomic inputs. Two new services will be developed: yield forecast and fertiliser advice. These two services will complement eLEAF's current suite of commercial services for crop monitoring, optimising water use and productivity improvement by the end of 2020.

Rationale

There is a good offer of digital solutions for farming operations in sugarcane. These solutions focus mostly on in-field agronomic support and exclude other parts of the value chain that could hamper mill revenue optimization. Harvest operations and fertiliser management are important items taking up to 60% of the total costs of sugarcane production. Current bottlenecks to reducing these costs are: a) limited insight in fertiliser requirements and b) limited insight in the expected sugarcane volumes at the mill.

Mills tend to buy fertiliser in bulk for their productive supply area. Fertiliser stocks and applications are based on generic rules of thumb, and do not take into account field heterogeneity. This results in excess fertiliser applications and unnecessary stocks of fertiliser reducing mill's cash flow.

Accurate yield predictions can only be done late in the growing season when the crop is close to harvest and any steering management decision will have a limited or no impact on yield. This results in fluctuating volumes of sugarcane throughout the harvest season entering the mill facilities and, thus reducing the crushing capacity of the factory.

Reducing these costs offer opportunities to increase mill revenue on the short to mid-term and this is exactly what our CostCutting4Sugarcane project is focussing on with the development of two services for yield forecast and fertiliser advice.

Technology

eLEAF combines optical and radar imagery with agronomic models to integrate these data components in an operational service to generate crop growth information. This information is the backbone of the CostCutting4Sugarcane services.

The yield forecast service implements two separate model inputs: meteorological and crop phenology, both sourced from satellite imagery. Region specific climate conditions for the last 20 years are updated with current weather conditions to fit estimates with current measurements during the growing season.

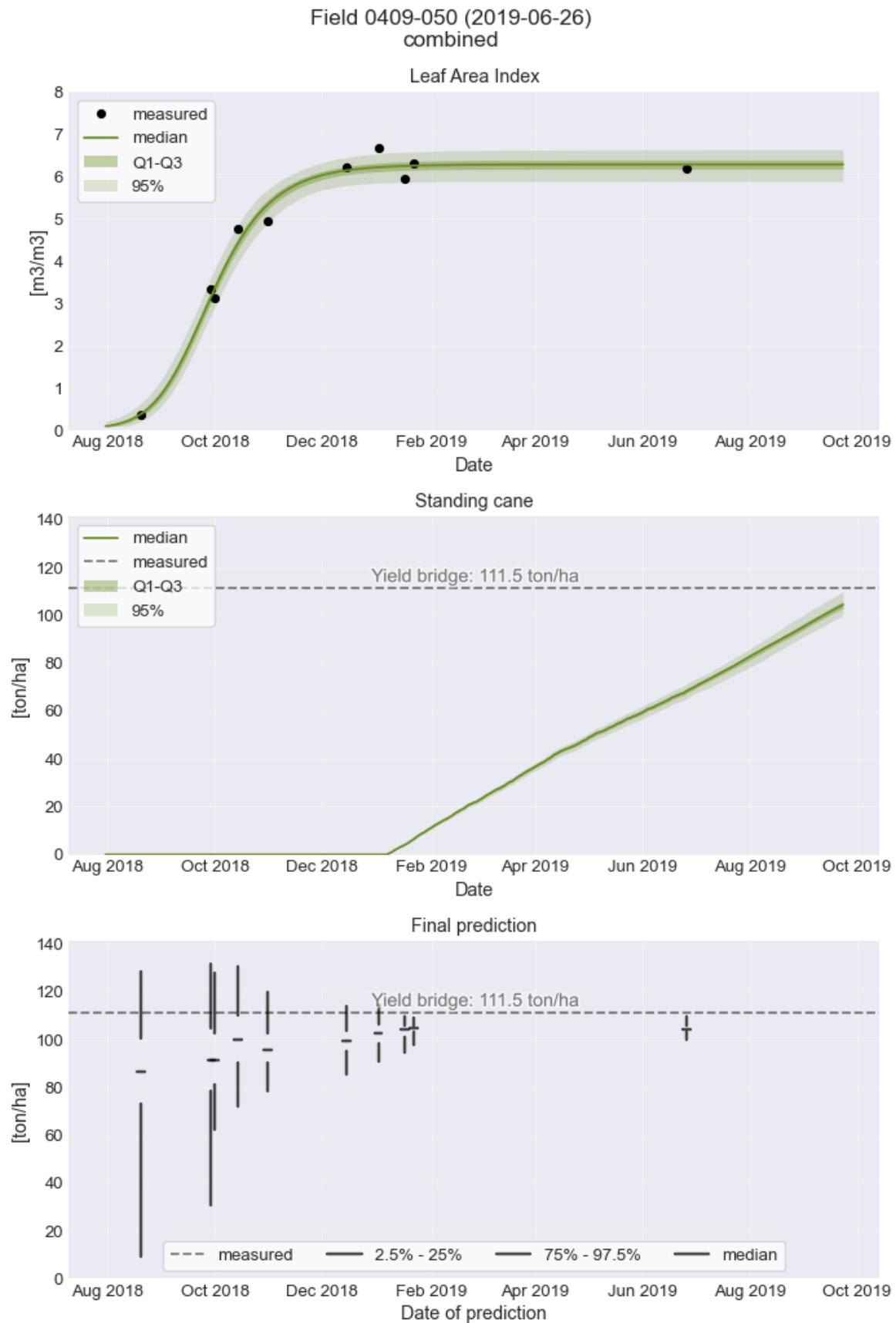


Figure 1 - Example of yield forecast for a single field. The upper graph shows the predicted phenology curve, the middle graph shows the cumulative yield over time. The lower graph shows the yield prediction at various dates during the growing season.

This results in specific yield estimates as early as 4 months into the 12 month long growing season. Mill managers have much better insight into what volumes of cane to expect in the mill at any given time. This guides optimal mill planning and supports the complicated logistics of harvest operations.

Fertiliser advice provides insight into how much nutrients have been removed from the soil and indicates the amount of fertiliser that needs to be added before the next growing cycle to replenish soil requirements.

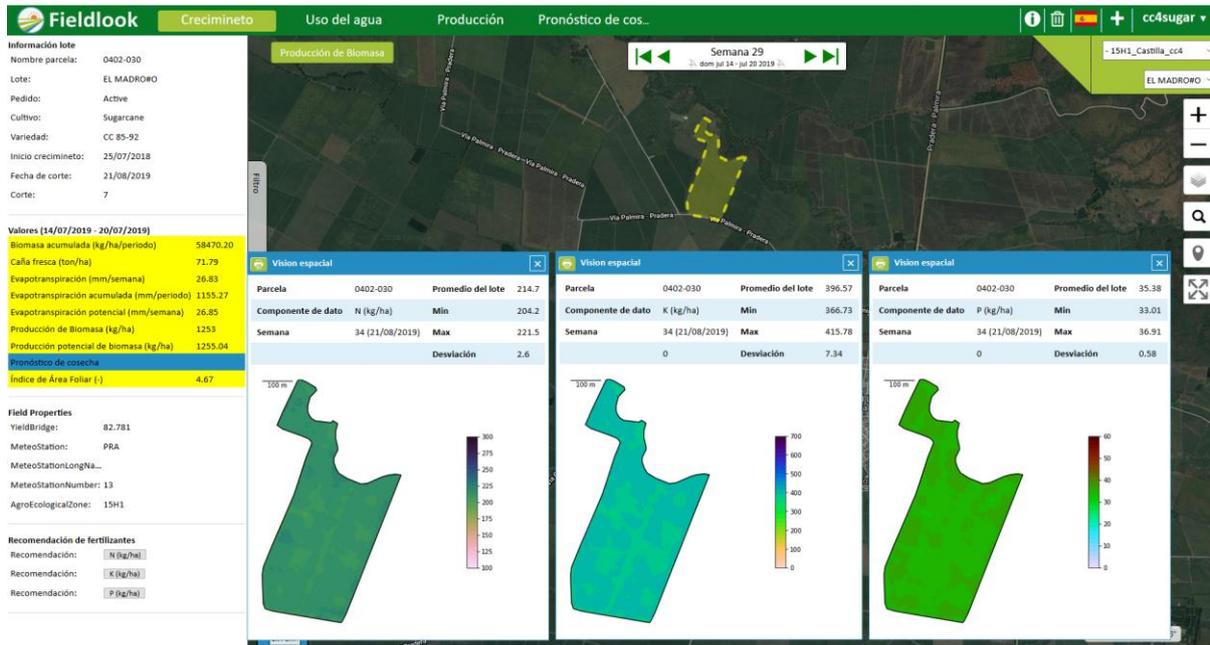


Figure 2 – FieldLook webpage showing spatial view of nutrient requirements nitrogen (N), phosphorus (P) and potassium (K) for the next season.

This information will provide the end-users with spatial insight in localised nutrients requirements to optimize fertiliser applications at field level, which will minimize fertiliser stock at estate level.

These two services will be available 24/7 through FieldLook platform offering a friendly and flexible environment to visualise fields and estate information even with low or none internet connectivity.

Added value

The customers of the services we target are large players in the sugarcane sector, mainly large commercial producing companies, sugarcane growers associations and sugarcane mills.

This customer base can be divided into three customers segments: Mill managers and operators, Agricultural and field managers and Precision Agriculture Specialists. The value propositions of the services are summarized as:

- Weekly field-specific forecast of yield volumes to improve the planning of harvested fields.
- One-click overview on crop performance over the whole estate for agronomic and mill operations where mitigation measures to increase yield are still possible.

- Optimised use of agricultural inputs with localised information on nutrient requirements that help reducing the amounts of fertiliser applied at field level and thus field production costs.

Outlook for 2021

During Phase two of CostCutting4Sugarcane, the services will be demonstrated on commercial sugarcane fields of three sugar mills in Colombia. Riopaila Castilla S.A (www.riopaila-castilla.com), Manuelita S.A (<https://www.manuelita.com>) and Providencia S.A (<https://www.ingprovidencia.com/en/>), localised in the Cauca Valley region in Colombia. These mills will receive weekly information on their sugarcane fields. This information will be accompanied with a comprehensive training package to maximize the potential of the services.

eLEAF and local sales channel AgroAP (<https://agroap.com/>) will work on the service offer, training and support with the final mission to market and sale the services to new customers.

eLEAF and CENICAÑA (Sugarcane Research Centre of Colombia, <https://www.cenicana.org>) will continue in the knowledge exchange of sugarcane and remote sensing for targeting the technological issues for the service offer.

Do you want to receive more information about our CostCutting4Sugarcane? Please contact Ernesto Bastidas at ernesto.bastidas@eleaf.com