Willy Lucas

Irrigation Automation and Telemetry

REGION: Burdekin Dry Tropics | Osborne (Home Hill)

Annual average rainfall: 867.4 mm
Property size: 194 ha
Farming since: 1998 (15 years)

Family History

Willy Lucas is a 4th generation sugarcane farmer currently farming 194 hectares in the Osborne area, south of the Burdekin River. After finishing school Willy attended the Burdekin Agriculture College for two years before purchasing a cane haulout business that he expanded after 3 years to include herbicide spraying locally for the next 10 years. During this period, Willy was actively involved in the family farm until he bought it out in 1998.

Practices

GPS guidance with 1.52m single rows is used in a minimum tillage system with cultivation only used when necessary to overcome compaction issues associated with harvesting or weather. Fallow management includes planting legumes of which, dependant on weather, 50% is harvested and 50% incorporated as green mulch.

The entire farm is furrow irrigated with 30% water supplied from channel systems and the remainder coming from underground bores. Approximately a quarter of the irrigation run-off is caught in a recycle pit system and re-used on the farm.

Chemical practices

Predominantly knockdown herbicides are used in weed management programs, occasionally PSII residuals are strategically used dependant on weather patterns. Willy has set up three separate spraying configurations to be used, broadacre, irvin and dropper legs. A broadacre boom is used in fallow and legume management and irvin legs for standard control in ratoons. A dropper boom configuration is used with a high clearance tractor carrying twin tanks, so that duel chemical applications can be applied in the one pass for problematic weed pressures.

Nutrient practices

With highly variable soils, soil testing data and EM mapping has been gathered to identify three soil zones (good, average and poor). Combined with mill yield data, this information was used to develop a nutrient management plan to match yield potential and fertiliser (granular mix) application.

The farm is being progressively EM mapped over a full 5 year crop cycle and will be re-mapped in the following crop cycle to allow for continual improvement in soil health. For this to be economically viable, there will need to be an increase in the profit margin.

Motivators to change

Due to the extremely labour intensive irrigation system currently in place, lifestyle was the main driver when developing new and innovative management systems on this farm. This combined with increasing electricity costs and issues with deep drainage of irrigation water on the farm have led to the need for a fully automated irrigation system.

Challenge

Sourcing suitable base stations, end of row sensors and automatic valves that can handle a high density crop like sugarcane, at a cost effective price has been the main hurdle when designing and implementing the new system. Outside industry innovative technology companies have provided prototypes for the componentry, which then leads into issues around support and maintenance for the system once established. The goal is to develop a reliable and cost effective system that will be commercially available to farmers in the wider sugar industry.

Variety: Q240
Class: Plant
Treatments:
T1: Telemetry and Automation
T2: Conventional Irrigation

Monitoring

Comparison between a fully automated and a standard irrigation system will be undertaken to measure the impact of this practice change in regard to the environmental (water quality), economical, productivity and social outcomes. This will be measured through total water volume applied; total power used; total yield; and labour.

Economic analysis

The economic analysis will compare the profitability of a cane block using irrigation telemetry and automation with a similar block without telemetry and automation. Important factors that may affect crop growing expenses include:

- Electricity costs – expected decrease in irrigation run time and the potential for tariff optimisation from greater night-time irrigation efficacy
- Irrigation labour requirements from automation
- Reduced vehicle usage to monitor irrigation progression.

In addition, any variation in yield or commercial cane sugar between the treatments will be scrutinised in the gross margin analysis to take account of potential application efficiencies and improved utilisation of irrigation infrastructure. The initial capital outlay will be subject to an investment analysis to determine the overall viability of the telemetry and automation investment.

Expected results

The water quality benefit is expected to be immediate with the implementation of the automated system. Precision within irrigation will significantly reduce irrigation run-off from the farm and subsequently reduce nutrient and chemical losses.

Showcasing to broader community

Willy Lucas has been involved in Project Catalyst since 2010, during this time Willy has presented on his trials at a number of Forums and opened his farm to farmers and support staff to share his management practices and the innovation on his farm.

Right (from top):
Willy Lucas, a fourth generation grower, presents at a field day on his Home Hill property.

Middle: With a demonstration valve.

Bottom: Trial site.