

CASE STUDY

MARK CASTELANELLI



Who

Mark and son Andrew Castelanelli

Location

Maidavale, 8km north of Ayr

Catchment

Sheep Station and Plantation creeks

Rainfall

956mm

Property size

415ha

Landuse

Sugarcane production

Family history

Mark was born and bred in the Burdekin, going straight from school to working full-time on the family's 77ha farm.

By the time Mark took over full management in 1985, the farm's size had been increased by 80ha to 157ha. Today the family farms 415ha.

Mark's son Andrew started working on the family farm in 2012 after completing a trade as a fitter and turner and working abroad as a project manager in civil engineering.

Andrew now manages the contract harvesting portion of the family business cutting their own and surrounding neighbours cane.

Under Mark's guidance Andrew is now extending his management responsibilities to the cane production side of the enterprise.

Practices

The Castelanelli farm is operated at 1.52m centres, GPS guided in a single row system.

The farm is irrigated by flood in a furrow system, with a combination of open, underground and recycled water. The farm is designed to utilise and recycle water in natural catchment areas, catching around 80 per cent of the farm's runoff which is re-used to water approximately 84ha of the farm.

Mark is looking to further extend the capacity of the recycle system to catch the whole farm's irrigation water. Mark has also started EM mapping the farm which will be applied to variable rate in block application of gypsum.

Fallow rotation is sprayed with a knockdown herbicide, and a legume crop is planted on any extended fallow.

Mark recently purchased earth moving equipment so that the business now has the capability to restructure block sizes and gradients.

"We need to update our current farm structure to become more economical," said Mark.

As the next step in improving the farm management efficiencies Mark plans to adopt automation within his irrigation management.

Chemical practices

All Mark's spray equipment is fitted with GPS guidance and flow rate monitors to track all herbicide applications, with full calibration of equipment carried out twice yearly.

Rates and timing for herbicide and pesticide applications are guided by Mark's experience combined with agronomist advice and label ranges. Wild sorghum and guinea grass are specifically targeted in the farm block specific weed management plan.

The farm has three spraying apparatuses all with dual herbicide application ability: a standard broad acre boom, Irvin leg booms and a high clearance tractor



to allow longer access into the cane crop. Mark's herbicide program is generally done in two passes, one application knockdown herbicide and PSII herbicide dependant on weather.

Mark points out the importance of weed control in plant cane, as this affects ratoon herbicide use. "Good control now, saves hassles down the track," said Mark.

Nutrient practices

Historically Mark has used standard straight fertiliser blends under advice of local agronomists. He has used some special fertiliser blends when required for 'poor paddock' areas identified from soil testing.

Mark continually EM maps the farm during fallow rotations, with accompanying soil tests, using this data to start apply fertiliser at a variable rate. This is backed up by a GPS guidance system which allows continuous monitoring of all blends applied on the farm in the four identified soil zones.

A granular fertiliser is applied via subsurface with both a stool splitter and side-dresser. Mark has concerns around the effectiveness of using a stool splitter in comparison to side dressing. From his experience he has noticed that different varieties of cane respond differently to placement of fertiliser stool splitting versus side dressing.

Motivators for change

Mark and Andrew are in the process of restructuring the whole farm to allow efficiencies in irrigation,

cultivation and management. Nutrient application methods and rates is one factor that he has been looking into and the enhanced efficiency fertilisers have the potential to reduce his inputs.

Mark is very interested in the economics, productivity and water quality results coming out of the trials.

Challenge

There is significant cost to using nitrification inhibitors (ENTEC) and controlled release formulations (AGROCOTE) and uncertainty around their reliability. Further assessment is needed to determine cost versus benefit. Other major challenges to the trials include soil type, matching nutrient requirement and reducing losses from the farm.

Project involvement

Mark is hosting one of 12 GameChanger replicated Enhanced Efficiency Fertiliser Trials which are looking at breaking down the barriers to the adoption of enhanced efficiency fertiliser in the Burdekin, through environmental, economic and social monitoring.

Treatments

T1- Urea @220N
T2- Urea@180N
T3- Entec @180N
T4- CR25% @180N
T5- CR50% @180N

Monitoring

The Enhanced Nitrogen Efficiency Trials were designed by Farmacist to identify production differences between N formulations and ratios

based on different soil types, application rates and application timings throughout the year.

Results

Using these more efficient formulations to target delivery of N has the potential to not only increase production but also reduce N losses, resulting in improved water quality.

Results from the 2015 harvest season indicate no significant difference in productivity between all treatments. Treatments T2, T3, T4 and T5 had better nitrogen use efficiencies than T1 (control). No productivity was lost through reducing rates from 220N to 180N. All treatments have been reapplied and will be further investigated in the 2016 harvest season.

Showcasing to broader community

Born and bred in the Burdekin, Mark is an integral member of the local sugar industry and brings a wealth of knowledge to the NQ Dry Tropics Sugar Innovations Programme.

He was a member on the Pioneer Canegrowers Committee for 10 years, the North Burdekin water board for over 22 years and continues to serve on the newly amalgamated Lower Burdekin Water Board. He also served as a community representative on the South Burdekin Water Board.

In previous years, Mark has been a councillor on the Burdekin Shire Council and was a member of the Ayr Pest and Productivity Board for six years.



TRIAL...

Farmacist staff prepare
fertiliser for application.

Who are we?

NQ Dry Tropics is an independent, not-for-profit, non-governmental organisation that supports the Burdekin Dry Tropics community to sustainably manage its land and water. As the leading Natural Resource Management body for the 146,000km² Burdekin Dry Tropics region, NQ Dry Tropics views innovation as crucial to the future of the agriculture sector.

The Programme

NQ Dry Tropics Sustainable Agriculture programme offers information, training and support to assist agricultural producers to use best management practices for resilient landscapes and productive enterprises. Within this programme, the Sugarcane Innovations Programme delivers a number of projects that support innovative farmers with opportunities to trial their practice ideas with the assistance of technical experts. Delivery partners are Farmacist, the Queensland Department of Agriculture and Fisheries and the Burdekin-Bowen Integrated Floodplain Management Advisory Committee.

The Projects

The fast-tracking adoption of game-changing sugarcane nutrient and pesticide management practices (GameChanger) project is funded by the Australian Government Reef Programme. GameChanger management practices focus on using precision agriculture technologies and advanced planning to provide opportunities for cane farming to be more economically and environmentally sustainable.

Project Catalyst is a pioneering partnership funded by the Coca-Cola Foundation through the World Wildlife Fund, which reduces the environmental impact that sugar cane production has on the Great Barrier Reef. The project is grower-led and involves a group of innovative farmers that are developing and testing management practices that improve the quality of the water leaving sugarcane crops. Growers receive support for projects through Reef Programme Water Quality Grants.

The Australian Government Reef Programme is reducing the impacts of agriculture on the Great Barrier Reef through implementing a water quality improvement programme to achieve sustainable agricultural practices in the Burdekin Dry Tropics NRM region. The targeted extension and financial incentives programme aims to improve water quality by focusing on reducing sediment, pesticide and nutrient loss from Burdekin properties.

For more information

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Australian Government



Queensland Government