

## Chris Lyne (Manager, Ayr Farming)

### Enhanced Efficiency Fertiliser Trial

REGION: Burdekin Dry Tropics | Plantation Creek

Annual average rainfall: 956.7 mm  
 Property size: 420 ha  
 Farming since: 2003

#### Family History

In 2003 Chris completed a Bachelor in Applied Science - (Applied Agriculture in irrigation) and began working in 2003 at Hillston in NSW for Westgate Irrigation. Chris then made a change to AUSCOTT as an irrigation supervisor for four and a half years, before moving to the Burdekin in 2008 with his wife Kate. This was so Chris could take on the role of Farm Manager on Ayr Farming's property. "The attraction of farming in the Burdekin was its unique irrigation scheme," Chris said.

#### Practices

Ayr Farming uses a 1.5m single row conventional (billet) planted system on it's sandy loam soil and fallow management involves legume rotational crops which are harvested when possible, otherwise utilised as a green manure. Standard furrow irrigation is undertaken across the farm and tail-water (approximately half) is captured in two recycle pits which is then re-used on farm.

#### Chemical practices

As cane grubs are currently an issue on the farm, Confidor is applied to all ratoons. Knockdown herbicides are predominantly used in spray programs, utilising residuals only in problematic areas and unexpected weather events.

#### Nutrient practices

Under the guidance of local agronomist, nutrients are applied via side dressing fertiliser box using custom granular blends as a single application done before the second irrigation.

A majority of the farm is EM mapped, and there have been two major soil types identified and soil tested accordingly, with variety and class also being taken into account. Ayr Farming now uses four different fertiliser blends across the farm to address the individual soil types.

#### Motivators to change

Chris has brought a wealth of knowledge from his experience with irrigation practices in grains and cotton. This has enabled him to bring a different perspective to the table when evaluating farm practices in Sugar Cane. Positive experiences in cotton with split nutrient application through

the crop cycle and the resulting increased yields has led him to investigate strategies for split applications in sugarcane.

#### Challenge

The window of opportunity to apply nutrients in a furrow irrigated system is finite and the cost of running machinery to apply two applications is not viable. The commercially available alternative enhanced efficiency fertilisers may provide an alternative within the sugarcane production system.

Chris is working to determine the appropriate cost, product/ blend for the soil type and application rate required to maintain or increase yield.

**Variety:** Q183

**Class:** 2R

**Treatments:**

T1: Urea @ 220N

T2: Urea @ 180N

T3: Entec 2 180N

T4: CR25% @ 180N

T5: CR50% @ 180N

#### Monitoring

The full cycle of nitrogen (what's going on and off) is being measured in the Enhanced Efficiency Fertiliser trials. Inputs being recorded include:

- The amount nitrogen applied in fertiliser blends and through irrigation water to the trial
- Losses through irrigation is being measured using auto-flumes catching the first 20 runoff events from the trial areas
- Both irrigation and rainfall (comparing both wetting mechanisms) are being monitored to track the loss of nutrients from the full set of treatments (1 in 3 replicates)
- Lysimeters and gas chambers have been installed in the soil profile measuring nitrogen losses through soil leaching and volatilisation

All samples are being sent for analysis by the Department of Science, Information, Technology, Innovations and Arts (DSITIA) to identify the rate of release of nitrogen from applied fertiliser

#### Right:

Chris Lyne is working to determine the appropriate cost, product/ blend of fertiliser for the soil type, as well as the application rate required to maintain or increase yield.

#### Below:

Chris Lyne presents at a Field tour at Ayr Farming.



## Economic Analysis

The economic analysis will compare the profitability of each enhanced efficiency fertiliser treatment on Chris's farm. Key factors in the investigation include crop growing expenses such as fertiliser product costs and fertiliser application expenses. In addition, yields and commercial cane sugar will be examined to compare the overall profitability of each treatment.

The graph below examines the crop nutrition expenses for each treatment in the trial. Comparing each of the treatments finds that the Urea treatment with 180kg/ha of nitrogen has the lowest cost, while the controlled release treatment with a 50% blend has the highest cost. Interestingly, the 220kg/ha of nitrogen (N) treatment and the ENTEC treatment, which delivers 40kg/ha less nitrogen, both have similar costs.

To put these cost differences into context, the next graph examines the yield change required for each treatment to maintain the same profitability as the 220kg/ha of nitrogen

(base scenario) treatment, assuming a constant CCS level for each treatment.

As the Urea treatment with 180kg/ha of nitrogen has the lowest cost, it can afford to take a hit to yield of almost 2 tonnes of cane per hectare before it becomes less profitable than the 220kg of nitrogen treatment. On the other hand, the controlled release treatment with a 50% blend would require a yield increase to maintain profitability.

Importantly, this analysis of cost only tells some of the story; the inclusion of production results from the trial will provide a better understanding of the relative profitability of each treatment.

Immediate water quality benefits are expected by both enhanced efficiency fertilisers as the delayed release in both forms would expect to reduce loss of nitrogen through run-off, leaching and volatilisation. Additionally lower rates of these new fertilisers would be able to be used to maintain, if not increase crop yield.

Figure 1: Crop nutrition expenses for each treatment per hectare

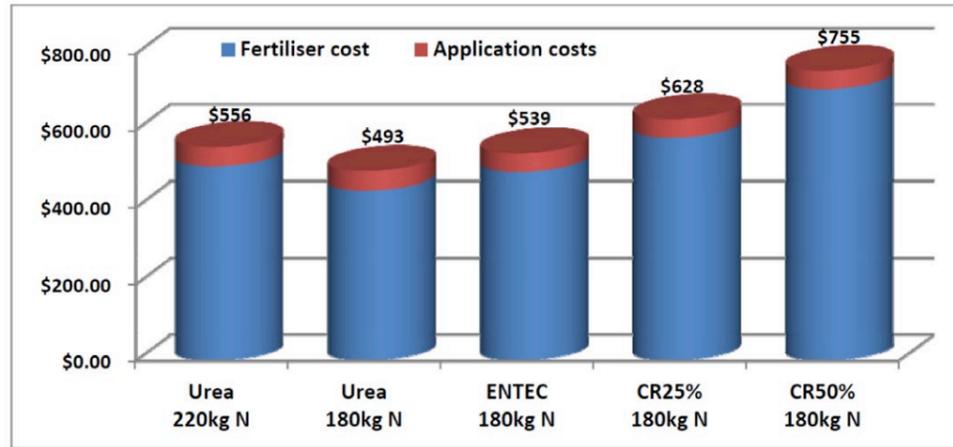
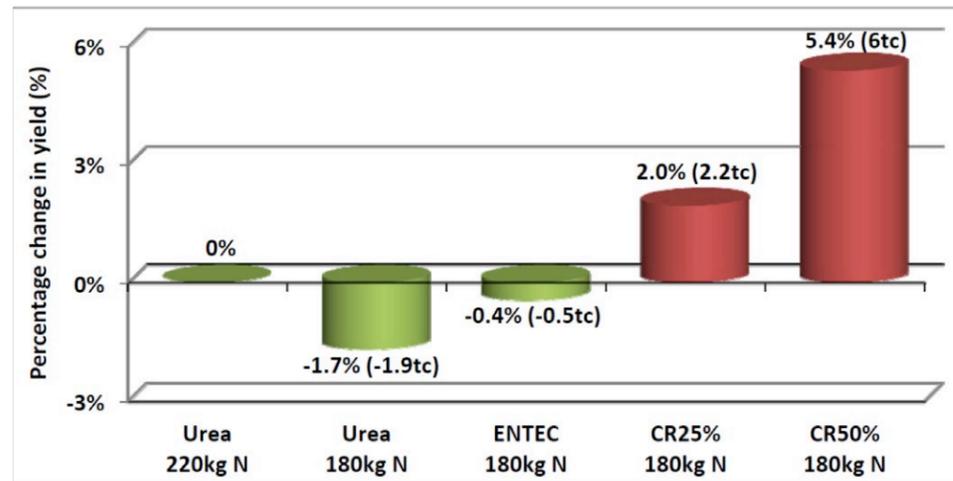


Figure 2: Yield change required for each treatment to maintain the same profitability as the 220kg/ha of N (base) treatment



## Showcasing to broader community

Ayr Farming is a new member of Project Catalyst and Chris also represents the company as an active members in the NQ Dry Tropics Sugar innovations program. Ayr farming has readily opened the farm and current Catalyst trial to the wider sugar industry during a recent field tour. Chris is aware of the quality of water draining from the farm into Plantation Creek and is always motivated to learn about new practices which can improve farming management.

## About NQ Dry Tropics

NQ Dry Tropics is a community run, not-for-profit company that is a leading delivery agent of land and water management change across the Burdekin Dry Tropics region (approximately 146,000 square kilometres) since 2005. As the leading Natural Resource Management body for the region, NQ Dry Tropics places a very high importance on innovation to the future of the agriculture sector.



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Inkerman Lime & Gypsum has been operating and servicing the Burdekin and outer areas since 1932. The current owners are Joe and Rosetta Tama of Home Hill. The Tama family are no strangers to the Burdekin region and the land, having lived there for nearly half a century, and are also no strangers to the various industries that keep our region ticking away. They are personally involved and have interests and investments in sugar cane, small crops, mangoes and high value cabinet timber forestry in the Burdekin region. The Tama's have been aware of the benefits of lime and gypsum products and have used them extensively over the years. Gypsum & Lime has been used for more than 200 years as a soil amendment and fertiliser, with many benefits well documented. Gypsum & Lime for various reasons can substantially increase crop yields - anything from 10 to 50 percent is very common.



Joe Tama, grower (Burdekin) and owner, Inkerman Lime and Gypsum.