

SRA Adoption Support Officer Jarrod Sartor and Maryborough cane farmer Darryl Cronau with the mechanical subsoil applicator.

## Sub soil amelioration produces above par results

*The adoption of sustainable soil health practices is vital to profitable sugarcane cropping and the long term viability of the industry. By Kate Daly and Jarrod Sartor*

Ameliorants such as gypsum, lime and organic matter have long been used to improve the physical, chemical and biological condition of the top soil in agriculture. Now, an emerging body of work looking into addressing subsoil constraints through similar practices is gaining attention throughout the industry.

In Maryborough, Andrew Dougall, Group Agronomist from MSF, and local growers Darryl, Lester, and Brad Cronau have undertaken practical trials to assess the effect of deep soil ameliorant application on sugarcane crops that are limited by sub soil constraints.

Such conditions are common in Maryborough with up to 40 percent of the agricultural production area located on a sodic duplex soil type. Compaction, poor aeration, reduced water-holding capacity, stunted root growth, increase of plant available aluminium and manganese are among the sub soil constraints which limit yield in the region.

The Cronaus' philosophy is to look for management options which improve yield and profitability, while adopting good soil health practices.

Darryl Cronau considers the implementation of improved soil health management an integral part of their long term farm plan and essential for profitability in the future.

This led to the exploration of the use of subsurface applied compost in 2012. In these practical trials, compost was incorporated at a rate of 10-15 t/ha into the subsoil by deep ripping with a compost applied through a tube attached to the back of a tyne.

The results were rewarding with yield increases of 6-10 percent attributed to improved subsoil aggregation, increased water holding capacity and better soil biological activity.

However, the application was labour intensive and not commercially viable in a system where yield averages are 80 t/ha.

But through adversity comes innovation and the Cronaus could see the benefits were there, if they could make their concept practical and economical. Thus the idea for a mechanical sub soil applicator was conceived.

The Cronaus, working as the DAG grower group, received partial funding and support through an SRA Grower Group Innovation Project and a Reef Rescue Water Quality Improvement Grant, which allowed them to work on their ideal machine.

There were no blueprints to work from, just a few chalk drawings on the cement floor of the shed and the rest was in Darryl's head.

The mechanical sub-soil applicator works exceptionally well and a larger feed belt is the only modification that the Cronaus would alter in a re-design.

Andrew, who has supported the project, explained that the process opens a window into the subsoil allowing for healthy root growth.

"The compost window improves root penetration, nutrient uptake and moisture availability," he said. "The applicator gives us the capacity to apply compost to sub soil layers at depths of up to 40cm conveniently and cost effectively meaning we can increase the area treated, assess the most beneficial application rate and determine the economic viability of the treatment," he added.

In subsoils where aeration, soil water-holding capacity and root growth are impeded, amelioration applications such as compost may assist in the prevention of waterlogging through enabling drainage to the deeper soil profile.

SRA's Dr Barry Salter is currently leading a project to determine the varying response rates in treatments that are applied to different soil types and to determine the long-term feasibility of subsoil ameliorant applications.

Interest in this field is growing with a number of other projects underway throughout the industry and our knowledge of farming on marginal soils steadily improving.



**Above image:** MSF Group Agronomist Andrew Dougall.



**Left image:** Highlighted in the red circle is where the compost was originally placed in 2012. You can see the higher density of root mass in this area 'opening a window' for root growth in the surrounding sub-soil; ideally increasing the available moisture and nutrient uptake.

## NCEA receives funding for smarter irrigation

Dr Joseph Foley and a team of National Centre for Engineering in Agriculture (NCEA) researchers have started working with 16 R&D partners and up to 19 farmer-managed learning sites in a \$3.7 million Federal Government funded Rural R&D for Profit programme to improve the profit of each individual irrigator enterprise across the cotton, dairy, sugar and other agricultural sectors by \$20,000-\$40,000 per annum.

This project is being led by the Cotton Research and Development Corporation (CRDC) in conjunction with three others RDCs; Sugar Research Australia, Dairy Australia, and the Rural Industries Research and Development Corporation (RIRDC).

"This is a large-scale, ambitious project designed to achieve a 10-20 percent improvement in water productivity, efficiency and farmer profitability, while also improving cross-sector industry research collaboration," said Bruce Finney, Cotton Research Development Corporation Executive Director.

"It is designed to increase on-farm profitability by integrating new irrigation scheduling and delivery technologies into good irrigation practice.

"It will build on previous research to drive additional improvements in cotton and rice, and will transfer learnings from the cropping industries to dairy.

"Our aim is to increase on-farm profit through the adoption of automated and precision application technologies across all industries."