Fertigation delivers quantum leap forward in efficiency and productivity

The switch from furrow irrigation to an automated drip fertigation system is delivering a massive jump in productivity and water use efficiency for MSF Sugar's Mousa Farms near Mareeba on the Atherton Tableland.

BY BRAD PFEFFER

While Mousa Farms had been growing cane under the previous owners, it also had a history of cattle production and the soils of the property had been deemed as unsuitable for cropping by the Queensland Department of Agriculture and Fisheries.

Under its previous furrow irrigation set-up, the blocks on Mousa Farms were all bordered by drains or rivers that ran through trees, which meant no tailwater could easily be captured and recycled.

The soils are also extremely variable with poor water holding capacity, which meant MSF Sugar used up to 17 megalitres per hectare to grow an average of 75 tonnes of cane with furrow irrigation.

"It was an extremely wasteful use of our most limiting resource," explained Rik Maatman, Operations Manager for Tableland Farms. "The crop was costing us money to grow, so we really had to do something to improve the situation."

Working in collaboration with Netafim, the sub-surface drip development was commissioned in February 2017 with the cane planted in March of that year. It is due for harvest in July this year, with the official estimate being 145 tonnes/hectare, but with hopes it could push higher.

The drip irrigation has slashed irrigation usage to 10ML/ha, plus effective rainfall. Rik added that they were particularly pleased with the results given the farm had its challenges for drip due to many rocky outcrops on the farm and subsequent issues when pre-ripping the beds.

With harvest underway, Tableland Farms is hoping that their sub-surface drip irrigation (SSDI) water use efficiency (WUE) will be around 12 to 13 tonnes of cane per ML (effective rainfall plus irrigation), which compares to their furrow irrigation of about 8 tonnes of cane per megalitre.

The change in irrigation and fertilising has also changed the focus of labour units, thanks to the opportunity to practice fertigation. The previous frequent furrow irrigation obviously required significant manual labour, but, as Rik explained, this work has now shifted to managing the automation and the batching of the fertiliser in the 25,000 litre tanks at the control shed.

He said that the system is also improving their nitrogen use efficiency.

"In most of other cane growing situations, we would be applying 160-180 units of nitrogen (N) up-front," he said.

"If there's a big rainfall event there will commonly be losses to leeching, but in this situation the maximum amount that we could lose to leeching is seven kilograms of N, which is the most that we are applying within one week."

Rik said nitrogen is applied through the drip when the crop starts tillering and becomes hungry for N, with the rate incrementally increased up to about six months old, when the rate is then tapered down to finish at about seven months (for a 12-month crop).

"Applying N too late in the season can create a risk of production losses in

ripening, but we continue to apply potassium sulphate up to month eight or nine, as it is important for cellulose production and enhances the translocation of sugars."

While the fertiliser rates may change, the ratio of fertiliser in the bulk tanks always stays the same, with MSF Sugar Tableland Farms Irrigation Supervisor Aaron Moore adjusting the dose accordingly, delivering the nutrient direct to the active root zone of the plants at weekly intervals.

With the system driven by two variable-speed drive pumps, they are able to ensure that energy use is precisely what is needed to move each megalitre of water.

The WiSA software puts irrigating and fertilising behind a computer rather than in the paddock with a tractor or a shovel.

"So all this work brings the latest technology and computer programing to cane farming," Rik said.

Aaron Moore said drip irrigation was by far the better option for irrigating cane, subject to suitable soil types and the environment.

"With mounting pressure on our finite water resources across farming in general, the need for growers to use water more efficiently has never been greater," Aaron said.

"Growers chase yields but in order to best utilise the water that is available to us, we need to be looking at more efficient methods of applying irrigation."

Sugarcane in the Tableland region has been traditionally irrigated using overhead or furrow.

Rik Maatman said that while the system at Mousa Farms was at the top end of investment in drip, there were several different investment options for growers.

"For example, one of the family farms here on the Tableland has installed fertigation drip, using a v-tank system similar to that used on horticulture," Rik said.

"The pumps aren't on a variable speed drive but they match their shifts to run the pump at 90 percent efficiency and they've put the system in for probably around a third of the cost. So there are opportunities at different levels of investment." ■

For more information on irrigation work at SRA contact Adoption Officer Andres Jaramillo on
E ajaramillo@sugarresearch.com.au
T (07) 4783 8612

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(Over page) *Rik Maatman at Mousa Farms earlier this year, where the fertigation has been established.* ***(Above left)*** *Netafim Business Development Manager, Peter Durand, with MSF Sugar's Aaron Moore and Rik Maatman.* ***(Above right)*** *Inside the heart of the fertigation operation at Mousa Farms.*