

State of the art - on irrigation farms

Sub-surface Drip Irrigation of Lucerne

Who: Brett Dixon

Where: Merrigum

Enterprise: Dairy

What: Subsurface Drip Irrigation

Before committing to the purchase the Dixons spoke to tomato growers, Netafim and Danny Bergamin (a local dairy farmer that has been growing lucerne with a SDI system for some time) to learn about the technology.

The benefits according to Brett

Brett identifies 3 main benefits of the system:

1. Higher production compared to conventional surface irrigation (Brett estimates 23-24 t/ha). He finds that he has greater control over irrigation so he's not alternately waterlogging and then drought stressing the crop, as occurs with surface irrigation – SDI provides a more constant moisture regime. In addition the Dixons can irrigate quickly after cutting which gets the plant going sooner, allowing an additional cut per year.
2. More effective water use — the application of irrigation water is not open to the air therefore there is less evaporation. In addition they can match the water application to the plants requirements.
3. Decreased labour input — the out-block where the SDI system is installed is about 5 kilometres from the home farm and if surface irrigated would need much greater hands-on management. With the automated SDI system they can control it remotely and there is less need to be checking it, saving considerable time.

The Dixons see fluctuating feed cost as a significant risk to their business, and the SDI system allows them to better control feed costs by reducing the need for bought-in fodder.

“When we installed the system we only needed a 10% allocation of water to be able to water that 22 hectare block (the SDI block). We know what it costs us to grow, cut, bale and cart it. We aim to get 600-700 tonnes off that block (hay and/or silage). We have been getting 23-24 tonnes/ha (approximately 520 tonnes off 22 hectares).”

Brett believes they are using 7-8 ML/ha (of irrigation water without rainfall). They don't have a flow meter on the system and can't measure it, so Brett bases this estimate on what Danny Bergamin gets.

What would it cost?

It cost the Dixons \$8,000 per hectare for pumps, pipes and equipment. Power connection was an additional \$16,000 which might not be required on some properties. There were some earthworks required and the lucerne sowing costs (fertiliser, seed etc). All up it cost the Dixons approximately \$250,000 (\$11,360/ha).

Did the benefit outweigh the costs?

The Dixons believe so — the cost of bought in feed was significant in the first 2 years of operation (2007/08 and 2008/09). Compared to other systems, the ease of irrigating reduced the labour component which saved both time and money. The Dixons don't have to be closely managing irrigations as they would with other systems. Being on an out-block away from the home farm, the time saved has been significant.



On the farm

Background

Brett Dixon works a dairy farm east of Merrigum that has been in the family since 1975 when it was purchased by his father. Brett has worked on the farm since 1986 and with a succession plan in place will take full control of the operation this year.

The property is 800 hectares in total and the Dixons aim to irrigate most of this each year (excluding a small non-commanded section). The bulk of the property is sown to annuals, with approximately 162 hectares at the home farm sown to perennials and 22 hectares of a 60 hectare, unlasered out-block under subsurface drip irrigation (SDI) and sown to lucerne.

When the operation is at its peak 620 cows are milked.

The home farm soils are predominantly Shepparton fine sandy loam with some Lemnos loam. The out-block where the SDI system is installed is predominantly Lemnos loam soil.

Low water allocations drove the Dixons to consider ways to reduce their water use whilst maintaining or improving forage production.

What was done?

The Dixons looked at a number of options for increasing production while using less water, including centre pivot and lateral move systems, but weren't convinced these systems could deliver greater production with less water use when compared to SDI. In addition the out-block shape was not suited to centre pivot systems, being 1.6 kilometres long and only 400 m wide.

A SDI system was installed on 22 ha and sown to lucerne in September 2007.

Is there anything I should look out for?

Brett believes that you only get one go at getting it right so don't take short cuts, do it properly. It's not like lasering or above ground technologies where you can go back and touch it up or easily modify it. It would be a negative experience if the system was not designed and installed properly because it would not deliver the benefits.

Brett would also advise others to consider putting in a flow meter - it's an extra cost but it would be good to know what the water use is.

"People sometimes try to use old tomato systems to grow lucerne but these are not designed for it, Ray Sellwood does it pretty well but he's probably an exception. Old tomato beds are hard on machinery as well".

The Dixon's system is on an unlasered block so some areas get a bit wet with significant rainfall. Lucerne doesn't like being wet and there are some patches that Brett reckons look a bit ordinary. Although it looks bad he doesn't believe it equates to a massive reduction in production across the paddock. In fact Brett believes the production is higher than would be achieved using alternative irrigation methods.



Research

Pressurised irrigation systems such as SDI typically feature relatively large, upfront capital costs. They can however provide a good return on that investment over time, provided they produce more fodder with a high value and/or save on high value inputs such as labour and water.

In the Dixon's case, their out-block was not landformed and needed development in order to be productive. By opting for an SDI system, they have saved the cost of landforming and earthworks that would have been associated with establishing a surface irrigation system. The out-block is remote from their home farm, so the savings in time and labour associated with managing an automated SDI system have also been significant. Finally, their out-block is an awkward shape, which an SDI system could irrigate more effectively than either surface or spray systems, meaning they could have a greater proportion of the developed area under production, and productive for more of the time.

SDI seems to have met all their requirements. It has enabled them to maximise the area of the out-block under production and minimised their labour costs. They believe that they are saving water, but without a meter on the pump, there is a bit of guesswork in this. Water savings would be expected, though. An experiment at Tatura comparing SDI with other irrigation systems for perennial pasture production used 2 ML/ha/yr less than surface irrigation, with much greater control over the amount of water applied, and achieved 10% more pasture production.

What has made the Dixon's adoption of SDI so attractive, however, has a lot to do with timing. They had the system in place and

efficiently producing good quality fodder at a time when bought-in fodder costs were very high, water was scarce and expensive and milk prices were high. The Dixons clearly did their homework prior to committing to the investment, consulting widely with other farmers experienced with the technology as well as service providers.

To get the most from their system, installation of a flow meter is recommended so they will know how much water they are applying. Use of soil moisture probes to assist with irrigation timing and how much water to apply would also be valuable for saving water in dry years, as well as saving crops under wetter conditions.

Compared with alternative development options the Dixons could have pursued at the time, their investment in SDI has proved to be a good one, providing their dairy operation with an effective fodder strategy during dry conditions. Under different circumstances it might not look so positive though. As with any major investment, risks will be reduced with a thorough financial analysis that assesses potential development options with respect to farm business circumstances, management capacity, attitude to risk and likely future scenarios with respect to prices and costs.



In field secondary filter and control valve



Further information

- Talk to Brian Holmes at DPI Echuca on 03 5482 1922
- Talk to manufacturers of the technology or an irrigation surveyor and designer.
- Also a good idea to talk to other farmers that have implemented this change in your local area.
- Consider enrolling in an Irrigation and Risk Management course, more information can be obtained from Melissa Spain at DPI Echuca on (03) 5482 1922.

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