

# Water Optimisation

## NEW ZEALAND DAIRY FARM USES VRI TO MAXIMISE PASTURE PRODUCTION

Variable rate irrigation (VRI) has given Wainono Dairies the ability to apply water where it is most needed, when it is most needed with precision of application.

Based on part owner of Wainono Dairies John Wright's calculations, and those of the experts involved, the new VRI technology coupled with infrastructural changes on the farm should be bringing in an extra \$155,400 in profit every year for an investment of \$335,000.

The entire project included the use of several new technologies including a new sprinkler system able to apply small depths accurately, GPS and electromagnetic (EM) soil mapping, a soil moisture sensor network and Growsmart® by Lindsay Precision VRI.

At the beginning of the project the Wainono Dairy property in Fairlie had 495 ha's effective area with three centre-pivots irrigating 284ha and Rotorainers irrigating a further 152 ha. The irrigated pastures produce on average 14 tonnes of dry matter per hectare (estimated 16 tonnes DM/ha under the centre-pivots and 11 tonnes DM/ha under the Rotorainers).

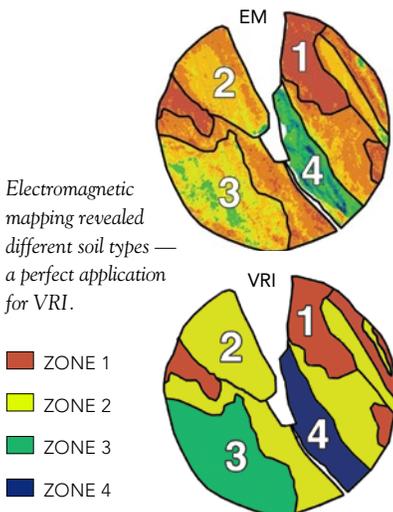
The major limiting factor to the irrigation system is water availability. Wainono have a consented take of 155 litres/second (41 gallons/second) but the water supply is not altogether reliable and the allocation amount falls short of the farms requirements.

An EM (electromagnetic) survey of the property carried out by Precision Irrigation revealed four predominant soil zones on the Wainono property.

### FAST FACTS: WAINONO DAIRIES

- Wainono Dairies new variable rate irrigation (VRI) technology should be bringing in an extra \$155,400 profit every year for an investment of \$335,000
- That makes the ROI a massive 46% per year
- 1790 cows were milked in 2011/2012, and 1900 in 2012/2013 with an additional 20ha on the platform
- Wainono milk production for 2012/2013 as 807,651 kgMS
- Three centre-pivots irrigate 284ha while Rotorainers further irrigate 152ha
- The irrigated pastures produce an average of 14 tonnes of dry matter per hectare
- Wainono is one of three trial farms which have been part of a MAF Sustainable Farming Fund project, headed by Carolyn Hedley of Landcare Research NZ, and is co-funded by DairyNZ and FAR

The irrigation enhancement project has been a great success on the property with massive expected return on investment of 46% per year.



The large variation in soil available water holding capacity provided the opportunity to improve irrigation efficiency by better allocating the limited water supplies to the soils that require water by employing Precision VRI technology rather than the standard blanket irrigation approach of typical spray irrigation systems.

Landcare Research characterised these zones by soil differences, including available water holding capacities to

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*"Every day we're not irrigating or pumping into the lake that's a saving of \$500-\$700 per day."*

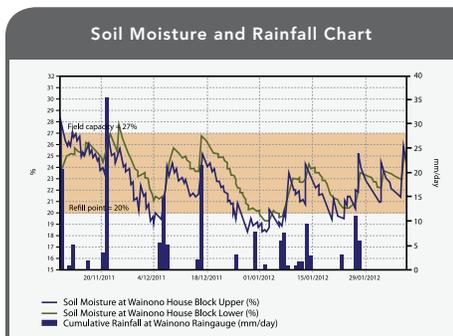
- John Wright  
Wainono Dairies part owner

VRI technology has allowed 50 litres per second of irrigation water to be saved without any negative impact on pasture production (pasture readings were recorded daily).

enable variable rate irrigation scheduling under the pivot.

Growsmart by Lindsay Precision VRI technology was installed on all three centre-pivots. VRI allows you to vary the application depth along the length of the irrigator. The system achieves this by individually pulsing valves on every outlet and controlling the ground speed of the irrigator. The Precision VRI technology had a complete, installed cost of approximately \$50,000 per irrigator.

Soil moisture is maintained at optimum range in the root zone, minimising pasture stress and maximising production. The chart (Figure A) shows soil moisture for a VRI soil zone, the peach coloured band depicts the optimum soil moisture range for this particular soil zone.



Growers can plan VRI irrigation effectively based on soil moisture analysis. (Figure A)

John uses the soil moisture readings to schedule irrigation events to maintain the moisture within these limits as much as possible.

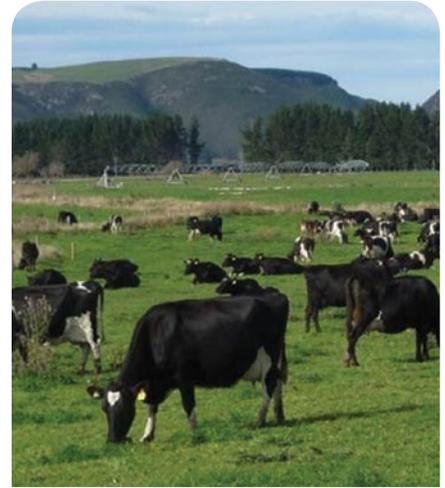
With Precision VRI, irrigation can be delayed to soil zones with larger available water-holding capacity (AWC), utilising the natural ability of these soil types to hold and supply more water to plants.

Significant savings on the property came from avoiding watering 33 ha of ineffective area (tracks, creeks, troughs and swamps) and the differential watering of the four soil zones.

The savings and the ability to store and redirect water allowed Wainono to expand their irrigated area. For the 2012/2013 season, an additional 20ha was also added to the platform while 1900 cows were milked, producing 807,650kgMS.

The irrigation optimisation project contribution an additional 4320kg DM/day production and, when extended over the year, equated to 518,400kgDM. For the 2012/2013 New Zealand dairy season, this resulted in \$239,000<sup>1</sup> of additional revenue with a total payout of \$6.18/kgMS from Fonterra.

<sup>1</sup>Assuming 15% DM wastage and 11.4kgDM eaten to produce 1kgMS



## OTHER BENEFITS OF PRECISION VRI AT WAINONO

- Reduced runoff and drainage.
- Reduces the risk of nitrate leaching.
- Reduced track maintenance costs and fewer lame cows.
- VRI helps pasture management by excluding irrigation to specific areas under pasture renovation.
- Less damage to paddocks from fertiliser, spray and general vehicle traffic running through wet, boggy patches in the paddocks.
- Better control of applied water at either end of the pivot.
- Opportunities for site-specific chemigation and fertigation.

**For more information about Zimmatic® and Lindsay irrigation solutions, visit [www.zimmatic.com](http://www.zimmatic.com) or talk to your local Zimmatic by Lindsay dealer.**

For more information about how Lindsay's Precision VRI system could benefit you, contact your local Zimmatic dealer or visit [www.precisionirrigation.co.nz](http://www.precisionirrigation.co.nz). SOURCE: John Wright and Lindsay Corp. 2012

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