

Water Optimisation

NEW ZEALAND DAIRY FARM USES VRI TO MAXIMISE PASTURE PRODUCTION

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

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

Based on John Wright's calculations, and those of the experts involved, the new variable rate irrigation (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 Precision VRI.

The 495ha (effective) Wainono Dairy property in Fairlie milks 1770 cows with a forecasted milk production for the 2011/2012 season of 750,000kg's. Three centre-pivots irrigate 284ha and Rotorainers irrigate a further 152ha. 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 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.

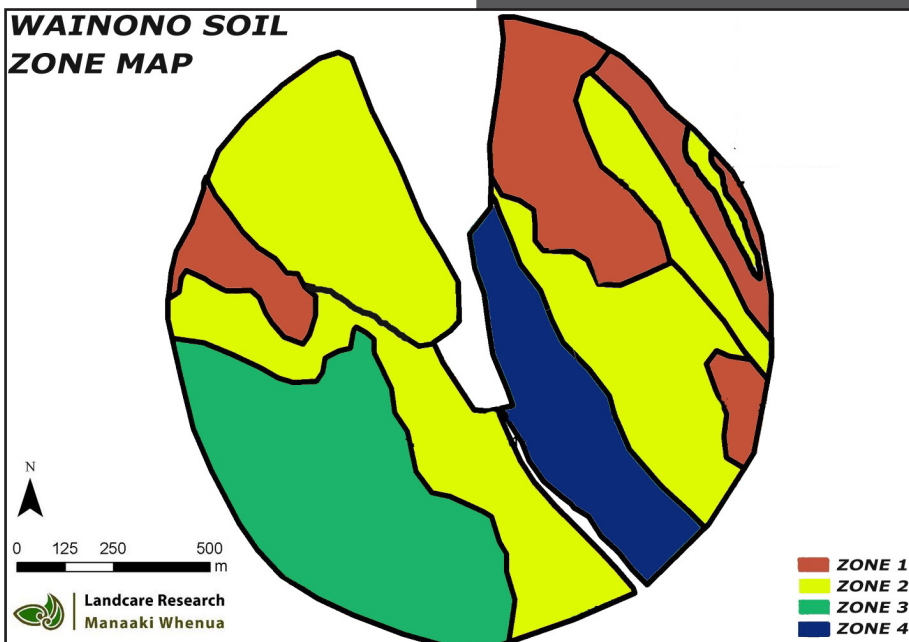
The large variation in soil available water holding capacity provided the opportunity to improve irrigation efficiency by better allocating the limited water supplies to the soils that require water by employing Precision VRI technology rather than the standard blanket irrigation approach of typical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



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

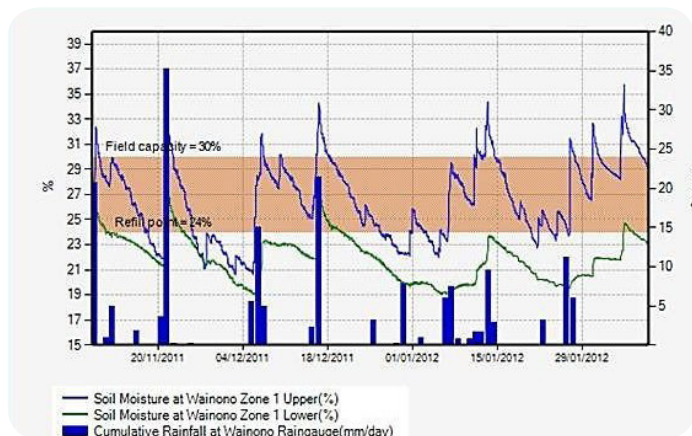
WAINONO SOIL ZONE MAP



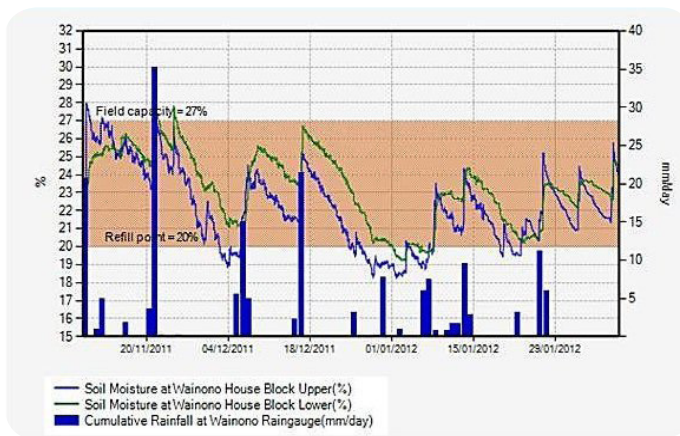
Landcare Research characterised these zones by soil differences, including available water holding capacities to enable variable rate irrigation scheduling under the pivot.

Wainono Dairies 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. The project has been co-funded by DairyNZ and FAR.

Soil Moisture and Rainfall Chart - Zone 1



Soil Moisture and Rainfall Chart - Zone 2



Precision Irrigation's variable rate irrigation (VRI) technology was installed on all three centre-pivots. Variable rate irrigation 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 Irrigation 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 charts

above show the soil moisture for soil zones 1 and 2, the peach coloured band depicts the optimum soil moisture range for the particular soil zone.

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

VRI scheduling delays irrigation to soil zones with larger available water-holding capacity (AWC), utilising the natural ability of these soil zones to hold and supply more water to plants.

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).

The savings came from avoiding watering 33ha 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 have allowed Wainono to expand the irrigated area. The redistributed water produced an additional 4320kg DM/day, which when extended over the year equates to 518,400 kg DM.



ADDITIONAL 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 how Lindsay's Precision VRI system could benefit you contact your local Zimmatic dealer or visit www.precisionirrigation.co.nz.

