

ADAPTING TO A CHANGING CLIMATE: CASE STUDY 21

# WATER
# Making irrigation go further

## THE FARM

- Dairy farm in Dunsandel, Canterbury.
- Area of 180 hectares (175 hectares effective milking platform) on flat country with 50 percent Chertsey soils and 50 percent Lismore soils.
- Milking 650 cows, producing 1800 kg/ha milk solids.
- Average rainfall is 650mm. Irrigated by three Briggs Roto-Rainers (M200) on an 11-day rotation.
- Water is sourced from two groundwater bores on the property.

## THE FAMILY

- Stuart and Gayle Litchfield.

*Stuart and Gayle Litchfield use soil moisture measurement technology on their Canterbury dairy farm to ensure that they aren't wasting water.*

Like other Canterbury dairy farmers, Stuart Litchfield is well aware of how important irrigation is for consistently producing high quality pasture. "Water is precious. We need to use the right amount of water – not waste it."

With demand for water resources already high and climate change projections indicating that Canterbury will be drier and hotter, making the best use of available water becomes increasingly important. "If we are all smarter about using water, we will be better able to share what we have around and make the best use of it," he says.

Stuart also knows that, as an industry, dairy farmers are under considerable pressure to demonstrate good environmental performance including efficiencies in their use of water and energy. "The energy cost of running our irrigation is about $580 per day. Every day that we don't irrigate saves both water and electricity."

### INVESTING IN IRRIGATION

Stuart recently invested in Aquaflex soil moisture and temperature monitoring technology that can be interrogated at any time to see what is going on. "It's not cheap, but when you've got staff it's important that they can understand what is going on, as well as you. Then, even when you're not there, they can make good decisions."

With existing knowledge of the farm's soil properties, they can use the soil moisture and temperature data to determine when to irrigate. The objective being to maximise the pasture produced per unit of water.

With an 11-day cycle to get water around his property, Stuart needs to irrigate continuously during the summer months, unless there is significant rainfall, so it is the spring and autumn seasons that soil moisture monitoring makes the most difference. If he starts irrigating too late in the spring and the soil is already dry, he may never catch up. Alternatively, if he continues too late into the autumn when soil temperature is low and the grass isn't growing, then it is a waste of both water and energy.

### COLLECTIVE LEARNING

As part of a project on improving water use, Stuart and Gayle are letting their property be used as a focus farm for those in the area to see what can be done to improve water

*"Water is precious. We need to use the right amount of water – not waste it." Stuart Litchfield*

use. Some of the topics that the group wants to address are:

- refining irrigation practices;
- using less water while maintaining production;
- getting simple and effective systems that staff can use;
- the cost and consequences of poor irrigation practices;
- getting practical information on how to manage with new restrictions on seasonal water allocations that are expected to start in the next few years.

The project is only part-way complete but an evaluation of Stuart's irrigation system has already shown that although it operates extremely well, there are some inexpensive changes that could be made to save an estimated 145 500 cubic metres of water per year and $10 000 per year in electricity charges (based on 150 days of irrigation).

This is in addition to savings Stuart can make using the information that he is getting from his soil moisture monitoring.

Stuart notes that under new rules for irrigation allocation proposed by the Regional Council, he would face such a major reduction in his water allocation that it could be difficult to maintain the profitability of his dairy farm. He is one of many Canterbury irrigators working with Irrigation New Zealand to ensure that new rules for allocations are practical and provide sufficient water for effective production. Irrigation New Zealand is also promoting efficient water management with the development of Codes of Practice and Design Standards.

# Key points

1. **If everyone gets smarter then the water that is available will go further.**
2. **Climate change projections for Canterbury are for warmer and drier conditions which means less water for irrigation and greater losses from evaporation.**
3. **Measuring soil moisture and soil temperature gives key information that can be used to determine irrigation requirements for plant growth.**
4. **Providing staff with continuous access to data enables them to understand what the business is trying to achieve.**

**POTENTIAL ENERGY AND WATER SAVINGS (AS IDENTIFIED BY SYSTEM EVALUATION)**

| | ENERGY SAVING ($/DAY) | ENERGY SAVING ($/YEAR) | WATER SAVING ($M^3$/DAY) | WATER SAVING ($M^3$/YEAR) |
|---|---|---|---|---|
| Reduce mainline pressure by up to 5 m (1 m ≈ 1 ½ kW) | 25 | 3 500 | 0 | 0 |
| Reduce end-of-run irrigation by 1 hour/run (avoids ponding at end of runs) | 30 | 4 500 | 650 | 97 000 |
| Shorten all runs by 10 m (avoids watering lanes) | 15 | 2 250 | 320 | 48 500 |
| **TOTAL** | 70 | 10 250 | 970 | 145 500 |

**THIS IS ONE IN A SERIES OF CASE STUDIES CALLED *ADAPTING TO A CHANGING CLIMATE* THAT CAN BE FOUND AT WWW.MAF.GOVT.NZ/CLIMATECHANGE**

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## FOR MORE INFORMATION

- Reports on MAF's Sustainable Farming Fund project C07/004 *Adapting to a drier environment by improving irrigation practices* are available from the Sustainable Farming Fund website **www.maf.govt.nz/sff/**
- Irrigation New Zealand outlines the Irrigation Code of Practice and Design Standards **www.irrigationnz.co.nz**
- For information on the Aquaflex soil moisture meter visit **www.streatsahead.com/Pages/Aquaflex Menu.html**