

RESEARCH

Reducing nutrient losses through improving irrigation efficiency

A pilot desktop study* lead by Dr John Bright (Aqualinc) has found that changing irrigation practices can significantly reduce nutrient losses.

CASE STUDIES

12 Canterbury dairy farms

RESULTS

Reductions in modelled nitrogen loss to water: 27% on average (ranged from 4% up to 58%)

Effect on average pasture production: Negligible

Current practice

- Soil moisture trigger value: Irrigate when soil moisture content drops below 50% of its plant available water.
- Soil moisture target value: Apply enough water to refill to 90% of full point, often higher.

New method

So that soils can better capture rainfall:

- Vary irrigation trigger level. The research found that it's good to vary the soil moisture trigger level during the irrigation season, at times to significantly lower levels than current practice. To better utilise rainfall, allow soil to receive less frequent irrigation in spring and autumn.
- Choose appropriate application depth. Refill soil water content to no more than 80% of plant available water capacity. Leave 20% for rainfall, throughout the season.

The result... **Reduced nitrate leaching**, minimal impact on pasture production.



Recipe for success

- Routinely measure soil water content using reputable soil moisture sensors and use the data or an experienced soil moisture monitoring service provider; for irrigation management.
- Use an irrigation application system that can be adjusted to apply relatively small amounts of water with a short minimum return interval (depth depends on the soil water holding capacity and the difference between the irrigation target and trigger), e.g. centre pivot or solid set sprinkler system.
- Ensure irrigation water supply and on-farm infrastructure is reliable.

Can it be done in Canterbury?

About 72% of the irrigated area in Canterbury uses methods that could easily implement these irrigation rules. The balance of the area would require a range of capital investments to modify or replace existing irrigation methods to be able to implement these irrigation rules. However, any additional investment would pay for itself over time.

Why change approach?

- For many farms, evidence-based management of irrigation trigger and target levels is the simplest way to meet the N-loss reduction targets set by the regional council.
- An opportunity to make a real difference to the environment.
- Reduced operating costs, particularly if stored water is purchased on a volumetric basis.

To read the full report or summary, visit www.fertiliser.org.nz

*The research is based on three computer models: IriCalc (irrigation system simulation model), DairyMod (pasture growth model), and Overseer (nutrient loss model).