

Forage systems to reduce nitrate leaching

Canterbury farmers are participating in a research programme led by DairyNZ to develop profitable solutions that reduce nitrate leaching.

The six-year programme 'Forages for Reduced Nitrate Leaching' aims to reduce nitrate leaching losses by 20 percent by delivering proven, adoptable and profitable pasture and forage crop options.

Dairy, arable (crop) and sheep and beef farms are involved in the cross-sector project which is focusing on three areas – alternative pasture species, crops and farm systems.

Alternative pasture species

Experimental research is underway on crop and pasture species now available to farmers and initial results can be expected within a year.

Alternative pasture species with lower nitrogen (N) content, cool-season growth or which are deeper rooting (including chicory, plantain, Italian ryegrass and lucerne) are being compared for yield, N uptake and plant characteristics, such as N content.

Crop and pasture management

The effect of management on crop and pasture yield and quality is also being investigated, which includes irrigation, grazing, fertiliser application, crop establishment, crop rotations and effluent management.

The research will look at how management can improve the plant N uptake from the soil and reduce surplus intake of N by grazing animals, ultimately reducing N excretion and nitrate leaching.

Farm systems

Another focus involves co-developing farm systems that incorporate new mitigation options developed through the programme.

Research results will be built into plant, animal and farm system models (such as the DairyNZ whole farm model) to test scenarios and new mitigation options will be demonstrated on-farm.

Farmer participation

A network of monitor farms in Canterbury has been established, with farmers selected through regional field teams within the industry.

The group consists of farmers who are keen to adopt new ideas, have an interest in sustainability and a long-term

commitment to their farm.

At present nine farms are in the Canterbury monitor farm network, spread across the region: four dairy farms, two arable farms, two sheep and beef farms, and one mixed arable and dairy farm.

Monitor farmers will contribute to the direction of the research, influence priorities, share experiences and provide a practical check to research.

This first season of the project, the farmers are monitoring current practice to establish base data.

Information being collected includes daily grazing and supplementary feed records, application levels of irrigation, effluent and fertiliser, as well as stock and feed movements on and off the property.

After base data is collected, each farm will be modelled and nutrient loss estimated. Different scenarios from the research will be evaluated with the farmers, with one or more adopted on-farm.

The farmers will also play an important part in identifying risks, barriers to adoption and whether new skills or resources are required for implementation on-farm. Later, farm field days will be held so other farmers can see first-hand how the mitigation options work in practice.

The geographic spread of the monitor farms and range of systems represented means every farmer in Canterbury should have a farm they can identify with.

Research aims

- Reduce livestock urinary N excretion.
- Sustain high levels of feed and animal production.
- Hold more N in soil and reduce the amount of potentially leachable N.
- Maximise yield and N use efficiency in forage crops.
- Provide solutions that can be readily integrated into dairy, arable, beef/sheep or mixed farming systems.

Monitor farmers add value

Grant and Jan Early
Dairy farm owners
Mayfield, Canterbury

Why did you decide to join the project?

"Nutrient management is going to affect everyone. The sooner we have some tested solutions on how we can mitigate nitrate leaching, while still farming profitably, the better it will be for the industry as a whole. It's our way of learning more ourselves as well as helping the industry in a small way."

What do you hope to get out of the project?

"We hope to find the best nitrate leaching mitigations specific to our farm and area, while maintaining or improving profitability."

How will farmers and the industry benefit?

"We see the monitor farms as a way of integrating experimental and modelling work and applying it at a whole working farm level. Hopefully it will engage farmers at a grass roots level and get them thinking about how different options could fit into their own farming business."



Monitor farmers Jan and Grant Early.

Farm facts

Area: 375ha, 90% irrigated

Number of cows: 1465

Production: budgeting 680,000kg MS 2014/15 season

Support block: 550ha dry land (250ha pasture, 150ha barley/wheat, 135ha kale, 15ha fodder beet)

Community groups

Around each monitor farm, a wider community group will be established, consisting of several local farmers and rural professionals. The community groups will provide practical advice when adopting new mitigation options and share results and information with their network of contacts.

Interested in participating?

To register your interest to be part of a community group (surrounding your local monitor farm) please email paul.edwards@dairynz.co.nz. Community groups will be established in 2015.

Cross-sector approach

The cross-sector approach is the first of its kind on this scale and is a commitment from the industry to work together to improve environmental and economic sustainability.



Forages for Reduced Nitrate Leaching is a DairyNZ-led programme in partnership with AgResearch, Foundation for Arable Research, Landcare Research, Lincoln University and Plant & Food Research. The principal funder is the Ministry of Business, Innovation and Employment; all partners co-fund the programme.