Grant and Jan have been part of Forages for Reduced Nitrate Leaching for four years.

SCIENCE PUTS COUPLE ON THE FRONT FOOT

Facing the challenge of reducing nitrate leaching while remaining profitable has spurred Canterbury farmers Grant and Jan Early to take part in the DairyNZ-led Forages for Reduced Nitrate Leaching research programme.
Grant and Jan farm near Mayfield in Mid Canterbury, an area deemed a ‘red zone’ under the Land and Water Regional Plan. The couple are required to reduce their nitrogen (N) loss by 15 percent by 2025 and 36 percent by 2035.

“That’s not going to be easy,” says Jan. “With the tools we have at the moment, it’s going to be very difficult, if not impossible. That’s why we wanted to be part of a research project looking at what you can do on-farm in a practical sense, and that’s going to mean we can reach that target.”

Foraging for solutions

Led by DairyNZ, Forages for Reduced Nitrate Leaching (FRNL) has focused on finding plants that better utilise N within the soil and reduce the amount of N passing through the cow into the urine patch – all while maintaining or improving profitability.

The six-year programme combines the expertise and resources of DairyNZ, AgResearch, Plant and Food Research, Lincoln University, Foundation for Arable Research and Landcare Research. The main funder is the Ministry of Business, Innovation and Employment, and DairyNZ is investing $450,000 of the levy each year.

A network of monitor farms has been established in Canterbury, including dairy, arable, sheep and beef, and mixed arable and dairy properties, as a way to test some of the promising science and research on a commercial scale.

For Jan and Grant, that’s meant trying a range of options, including adding plantain to their pasture mixes; growing fodder beet on the platform followed by a catch crop of oats; and reducing their stocking rate.

“Part of FRNL has involved modelling various mitigation options to evaluate the impact on the environment and profitability,” says Grant. “While never an absolute science, it does give us confidence to have a go with some of those options which we feel will work within our system.”

“Establishing plantain within a pasture renewal programme is relatively straightforward. The trick is how to economically achieve this on a larger commercial scale.”

Perks of plantain

Science shows that cows eating plantain excrete urine with a lower N concentration than when they’re eating the regular perennial ryegrass/white clover pastures. Also, plantain better captures N in the soil. Trial work suggests it needs to be 20 to 30 percent of a cow’s diet to be of significant benefit.

“Establishing plantain within a pasture renewal programme is relatively straightforward. The trick is how to economically achieve this on a larger commercial scale,” says Grant.
“Last autumn we trialled broadcasting a high rate of plantain seed (8kg/ha) with fertiliser after cow grazing. The trial paddocks were grazed again at 21 days and 29 days post-spraying, half of which were pre-mowed and half grazed normally.”

Grant says the seedlings are clearly visible and the next growing season will show how well the plantain establishes. Other monitor dairy farms in the FRNL programme are trialling direct drilling into existing swards and Lincoln University is carrying out similar trials on a small plot basis.

Contract milker Will Burrett is learning to manage plantain, including how to accurately measure its dry matter.

“Plantain measures differently to grass on the rising plate meter, especially with greater than 30 percent sward composition,” says Will.

“There is an equation to recalibrate the plate meter, but for simplicity, I take off 150kg DM/ha from the plate meter reading. It seems the grazing habits of the cows have an influence on the persistence of the plantain over time, with animals grazing the plantain consistently at 1400kg DM/ha.”

**Catch crops and cow numbers**

This year the Earlys planted a catch crop of green feed oats after the fodder beet in a bid to use N in the soil rather than allowing it to leach out in winter and early spring rain events.

“If you just left it fallow for the winter then it’s a prime target for leaching,” says Jan.

The Earlys have also reduced cow numbers from 1500 four years ago to 1400 now, looking for efficiencies to improve profitability.

“If you can get a better understanding through the FRNL programme that a different crop or pasture species, a different fertiliser strategy or improved animal genetics will convert dry matter into milk more efficiently with less environmental impact, this will be of benefit to the sector,” says Will.
Grant says the trial work hasn’t involved any radical changes to farm management, apart from a greater requirement for Will to collect daily data. This includes irrigation, supplements fed, effluent spread, cows’ daily movements, fertiliser applied, silage made, pasture renewal, production, rainfall and the composition of milk.

“Understanding all the little bits that go into every single day’s management decisions creates a clearer picture for us to improve our performance economically and environmentally,” says Grant.

Will says he doesn’t find the extra work collecting data onerous.

“That’s where high-performance farming is already and that’s what consumers are going to demand anyway. They’re going to want to know exactly what went into that litre of milk.”

Additional information includes soil tests and monthly tests of pasture swards and supplements, along with independent body condition scoring of cows at dry off and when returning to platform from the wintering block.

### On-farm visits

Will and the Earlys work closely with DairyNZ scientist Paul Edwards, who makes monthly visits to ensure data quality, capture management decisions and provide support.
Paul’s put a lot of time into designing the data-input spreadsheet. It’s an Excel-based system with a lot of moving parts, designed to capture common information across multiple farms,” says Will.

Four years into the programme, the farm has made an improvement to its N-loss figure (see the table on right) and Jan says some of the lessons they’ve learned are being picked up by other farmers.

“Low payouts have forced farmers to look at their stocking rates and supplements fed and by default some of these system changes have been beneficial to overall N loss,” she says.

“Nutrient losses are a real issue in this area so being involved in the FRNL programme is a way of front footing it and hopefully helping in a small way to address it.”

To learn more about FRNL and see reports from the monitor farms involved, go to dairynz.co.nz/frnl.

**EARLYS’ KEY NUMBERS**

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*In 2016/17, Grant and Jan adopted FRNL mitigations of low-N supplement, fodder beet on the milking platform, a catch crop of oats, and plantain on the milking platform. The benefit of plantain is not currently fully reflected in Overseer.