



# Fertigation for the future

*The recent introduction of fertigation to Summit dairy farm in Oxford, Canterbury has been an exciting project for owner Cam Henderson, who said the investment was all about providing resilience for the future to his pastoral farming operation.*

Summit dairy farm is a 238-hectare property, 215 of which is under irrigation and home to 730 cows. Mr Henderson converted the farm to dairy in 2011. He has a background working in automation, so the idea of simplifying and being able to remotely control fertilising and irrigation appealed to him. This, coupled with seeing progress from a neighbouring farm, encouraged him to install his own fertigation system. They had installed fertigation, enabling them to reduce their nitrogen use, which had a flow on effects on spending.

“We spent a lot on fertiliser spreading every year and were finding it financially unviable to spread less than 50 kilograms (kg) per hectare of urea\* by truck. We are on very light soil so we thought a ‘little and often’ approach would be more suitable for us than large periodic applications.”

After investigation into the systems available, in January this year Mr Henderson installed a fertigation system on two of the three pivots on his farm. The third pivot has recently been decked out with a fertigation system.

All urea arrives on the farm as a liquid, and is stored in a bulk tank that is bunded and can drain to the effluent pond in case of leaks. This tank is connected directly to one pivot while the other two pivots each have their own 5,000L bunded tanks. These smaller tanks are filled fortnightly using a 5,000L tank on wheels.

“Each pivot has a variable-speed pump and backflow preventers installed. The pivots and pumps have remote control functionality fitted, along with proof of placement recording. We looked at saving on cost by having one movable tank and pump, but wanted to be able to have more than one pivot fertigating at once. It also means less skill is required to operate the system. We can get very dry up here so wanted a fertigation system that would not interrupt our irrigation patterns. This meant fertigating



on multiple pivots at once. The irrigation and fertigation are controlled through the same app, with the hope that we have proof of placement for irrigation water soon. We don’t have a cleaning program as the fertigation rates are so low we regularly check pipes, fittings, and tanks for leaks.”

Mr Henderson said at this stage they were just applying liquid urea through the fertigation system, at a maximum of 4.5kg of nitrogen per hectare per week which equated to 120kg of nitrogen per year. Alongside a first round of solid nitrogen fertiliser, total annual N application is budgeted to be 150kgN/ha, where previously 220kg was applied per year. He said fertigation will be a great tool in helping the farm comply with the new 190kg N/ha limit.

Due to pastoral fertigation not being common in New Zealand, Mr Henderson said there weren’t a lot of protocols or guidelines, however, they chose to be forward thinking to make sure they were as resilient as possible.

“Backflow prevention was the only council regulation we had to comply with, to ensure that no fertiliser can get back into the groundwater. Bunding on the tanks is likely to become a future regulation, as if there is a spill or leak liquid urea can make its way into the soil and aquifers much faster than solid urea. We were also unsure about underground piping of liquid urea so avoided this design option too.”

Although they hadn’t done a full season with fertigation, Mr Henderson said they were already seeing some savings.

**Fertigation:** The application of liquid fertilisers through an irrigation system.

**\*Urea:** Urea fertiliser is a processed form of ammonia. Urea contains a percentage of nitrogen, making it an ideal nitrogen source.



*Cam Henderson stands next to one of the pivots fitted with a fertigation system.*

“We hope to save 70kg N/ha a year to what we were previously doing, as well as eliminating the cost of spreading, which works out at approximately \$45,000 a year over 215 hectares with current urea prices. If we have a hot period, we stop fertigating, if we have a big rain event we stop, and when conditions look better we can apply fertiliser to the whole farm in a day rather than follow the cows. Doing this we saved approximately 30 percent of our autumn fertiliser costs this year with no apparent loss in pasture growth.”

Mr Henderson said all up the cost of installing the fertigation system was \$90,000 for all three pivots. “It will pay itself back in three years just with savings on fert spreading alone.”



Mr Henderson said making sure the set up was right was important. The system was calibrated multiple times and they have created written guidelines on fertigation for each pivot while the remote-control system and app are still under development. “We are providing a lot of feedback about how the app could be improved. We keep a manual record of placement for backup.”

Mr Henderson said he had really enjoyed developing the system and managing it.

“My background is in automation, so I love this kind of technology ... in my mind I wanted to press a button on an app once a week and have the fertigation system look after the fert. spreading on its own, and we are on our way to achieving that.”

“For us we needed to think of every scenario that could go wrong, such as if the pivot stopped and the fertigation didn’t – developing the technology as we go, you’ve just got to be patient and think of things before they become a problem.”

Mr Henderson was looking forward to reflecting on what impacts the system had after a full year, continuing to fine tune it, and make it easier.

“Now that we are under more environmental pressure than ever before, I see it as a real tool to reduce our nutrient use.”

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