Fernside dairy farmer Julie Bradshaw discusses an irrigation pilot project with NIWA hydrologist Dr MS Srinivasan next to a weather station on her farm (photo by David Allen)

Co-innovation project advances irrigation practices

A five-year project involving NIWA and Waimakariri farmers has seen a shift from a "just-in-case" approach to irrigation to a "justified" approach, where landowners use real-time data and forecasts to make science-based decisions.

Farmers have been given daily data including rainfall, soil moisture, soil temperature, drainage and estimated evaporation as well as two, six and 15-day rainfall and weather forecasts.

Soil moisture is measured at eight locations vertically down the soil profile, 10 centimetres apart. This keeps track of the amount of water and depth it reaches to help farmers work out how much water is needed. The soil moisture sensors give an indication of how wet or dry the soil is through the top 30 to 40 centimetres, while the lower levels help identify drainage below the plant root zone.

NIWA hydrologist Dr MS Srinivasan says the study, funded by MBIE, has created a close bond between the original five farms and his team of researchers.

"We have been adapting our models and information tools as we go, keeping an open mind and making sure farmers' voices are an equal part of the discussion," he said.

"Twenty farmers in the study have been able to use the information we have gathered both operationally and for the development of their FEPs and audits."

The five-year study will end in September, but the group will continue to work together. NIWA has developed easily interpreted visual information and regular weather videos. Farmers can log on to the website and see their current and historic soil moisture data, together with a customised local forecast and longer-term predictions.

Dairy farmer Julie Bradshaw says a phone call from Environment Canterbury Waimakariri Land Management Advisor Anna Veltman led to the formation of the first group of five farmers farming near the Cust Main Drain. At a recent gathering of the group, Julie shared the learnings that both farmers and scientists have gained from working side-by-side.

"We've had a Cust Water Users' Group for about 20 years and this project gave us the opportunity to formalise our approach to data gathering for irrigation. Everyone has been open to sharing their data and we can see that we are all compliant in terms of water takes and usage.

"Gaining the scientific knowledge of what's happening on our farms has been a real game changer."

Julie says having a package of data available in an easily digestible format gives the group a good overview of each irrigation season and enables efficient water allocation, while also helping with compliance requirements.

"We had a lot of restrictions over the last irrigation season but knowing what is ahead and being able to see what's going on in terms of the soil moisture data and weather means we've been able to provide everyone with enough water," she said.

"Providing the audit data is simple as everything is in one place. My auditor was really impressed with what we were able to produce. We got an A grade this year for our audit. I was confident in the decisions we had made because we had the facts to back everything up."

Understanding farmers is the key to successful conversations

Environment Canterbury recently farewelled one of its longest-serving experts. Leo Fietje has spent years helping farmers, scientists and planners work together for a better environment. He may be retiring, but his work isn't finished yet...

Back in the 1980s, a much younger Leo Fietje had a choice to make – keep working as a pig farmer or take up a job in the city as an investigating officer for the North Canterbury Catchment Board.

With five years on the farm already under his belt at the time, it was not an easy call. But the peace of mind that comes with a reliable income stream was tempting.

"The idea of working a job where money was coming in every fortnight no matter what, compared to the uncertainty around money and everything else when it comes to farming, it was a no-brainer for me at the time," Leo says.

Leo shares the story of Canterbury water with colleagues.

He took the city job. That catchment board later became part of what is now Environment Canterbury, and as the regional council has changed over past 35 years, one thing has remained – Leo and his passion for his work. That work has seen him take on a number of roles, including principal planning advisor, his final job title before retiring in May.

His vast knowledge of Canterbury's rivers, lakes and waterways has been shared with hundreds of colleagues. Most new Environment Canterbury employees have got to know Leo through an orientation day field trip to the Waimakariri River, where he has explained to many busloads how water moves through the plains from the mountains to the sea.

Building resilience in rural communities

Leo says his years of working as a farmer gave him a sound base of knowledge, helping him understand the unique challenges farmers face and giving him the ability to see things from their perspective.

"It's allowed me to get on with farmers much better because I do understand that side of things and the stuff they're going through," Leo says.

"The uncertainties, the unexpected events, the resilience they have to keep building all the time. I certainly have empathy for those who work hard to feed us."

Leo understands the challenges the rural sector faces, balancing day-to-day work on the farm with preparing for change brought on by weather, climate and regulations, as farmers are asked to do more to improve water quality.

He says the farmers he had been dealing with recently realise that rule changes being made now – although they may seem difficult to implement – will ultimately benefit the environment. But the rural community will need more support to get things underway on the farm.

"Sometimes we can't actually afford to wait to have all the answers to all the questions we need answered," Leo says.

"I feel that sometimes we just need to act to help save waterways and help reverse some of the damage that's been done."

Throughout his time at Environment Canterbury, Leo says he never meet a farmer who was not passionate about doing their bit for the environment and for future generations.

"I'm constantly impressed with the farmers I work with, for the passion they have for the environment," Leo says.

"What they're willing to do, sacrificing income to get good environmental outcomes. They want their kids to be able to swim in the rivers they swam in and be able to fish in the waters they fished in as kids."

Retiring, but not leaving

He may be retiring from Environment Canterbury, but Leo's not bowing out entirely. He'll be volunteering his services to the North Canterbury Rural Support Trust.

This new role will see Leo using his years of expertise to continue to assist farmers with a helping hand and a shoulder to lean on when needed.

The Rural Support Trust has been around for nearly 40 years. It was set up to help farmers in need of help and guidance following deregulation and the removal of agricultural subsidies in the 1980s.

The Trust also provides help during weather events such as droughts and floods – they are directly connected to Civil Defence, and can provide information and assistance on movement of stock, financial support and labour.

> *"I'm constantly impressed with the farmers I work with, for the passion they have for the environment"*

"My role is to help farmers however they need," says Leo.

"Those who may want to sell up, or who may just need some support when everything happens at once.

"It's more often than not just reaffirming that help is there and being a shoulder to lean on for the farmers. So it's fair to say I'm retiring, but I'm not out of the game."

Time for personal passions

With a little bit more time up his sleeve, Leo is also looking forward to getting into his huge vegetable garden and spending time with his grandchildren.

"Gardening is a great way to unwind for me. I've also got quite a large whānau – the children have left home now but we enjoy our whānau time with the grandkids."

And he won't be leaving his beloved rivers and waterways behind either. Leo lives near the top end of the Styx River, and will continue to support the Styx River Living Laboratory Trust as a volunteer coordinator.

Lending a hand to a river in need

After years of planning and construction, the Waikirikiri / Selwyn Near River Recharge project is now fully functioning, and able to add thousands of litres of Rakaia River water every second to the Waikirikiri / Selwyn River system.

With irrigation season over and groundwater levels very low in the catchment, testing took place in May. The system uses already-consented water from the Rakaia, and delivers it through Central Plains Water (CPW) piping infrastructure. At a site near where the CPW pipe passes the main channel of the Waikirikiri / Selwyn River, a valve house hums as it reduces the water pressure, discharging thousands of litres of clean Rakaia water into a large drainage basin.

The basin slowly fills, and bubbles appear on the surface as the water begins to infiltrate into the ground. Eventually the basin starts to overflow through a culvert into a dry river channel, and within a few hundred metres all that water has disappeared back into the ground.

Project partners from the Selwyn Waihora Zone Committee, Te Taumutu Rūnanga, Environment Canterbury, Selwyn District Council and CPW visited the site in late May to see a full drainage basin and more than 3 cumecs of water entering the system.

A river of gravel

As it runs across the loose leaky soils of the Canterbury Plains, the Waikirikiri / Selwyn River naturally loses flow to the ground and large stretches of the river typically run dry. Its name even acknowledges this fact – Waikirikiri translates approximately to “river of gravel”.

The Near River Recharge project is consented for use when there is sufficient water in the Rakaia, and the Waikirikiri / Selwyn is dry near the project site, avoiding a direct mixing of the two waters.

Water that infiltrates the ground feeds springs in the Hororata River a few kilometres away. Downstream the flow again disappears to the ground, reappearing in the springs of the lower reaches of the Irwell and Waikirikiri / Selwyn rivers.

The project doesn’t just increase the amount of water in the Waikirikiri / Selwyn system – it aids the whole ecosystem.

The springs it feeds support some of the most important ecosystems for the endangered kōwaro (Canterbury mudfish), while native seedlings at the recharge site will grow to create an important habitat for native birds, and specially placed rock piles are perfect for lizards.

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For more information on the Waikirikiri / Selwyn Near River Recharge project, visit ***ecan.govt.nz/near-river-recharge.***

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha