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SUMMER 2019

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IRRIGATION NEW ZEALAND

www.irrigationnz.co.nz

A message from IrrigationNZ's new Chair, Keri Johnston

By the time you read this, submissions on the Freshwater Reforms, on which there has been a huge focus, will have closed, Christmas will nearly be here, and 2019 will be coming to a close.

2019 has been a year of change for IrrigationNZ. We welcomed our new CEO, Liz Soal, in March and in recent months, Ella Stokes has joined the team as the Communications Manager, and Julie Wallace as the General Manager – Commercial Activities (GM). I want to personally thank our team for their hard work, commitment and passion. They have worked tirelessly ensuring the success of our organisation. We have also farewelled Alex Adams, who was the acting GM until the role was filled. I cannot thank Alex enough for the contribution he made to IrrigationNZ in his short time with us and I hope you get to stay retired this time!

At board level, we had a change in chair in June (wow – where has that time gone!) and we welcomed two new elected board members at our AGM. We have also advertised vacancies for independent directors, with the objective of complementing the elected board member skill set.

It has been a tough year financially for us. As a board, we have had to make some brave decisions for the future betterment and sustainability of the organisation and a review of our funding model is underway. We are in a time where water is really in the political spotlight and will continue to be on the back of the Freshwater Reforms and with an election looming. Therefore, the relevance and importance of IrrigationNZ in today's climate is critical. We are confident that the changes we have made have set IrrigationNZ up for the best chance of success, and we are really looking forward to 2020.

Keri Johnston
Chair of IrrigationNZ

A busy year for IrrigationNZ – and for all

2019 has been a busy year for anyone involved in the primary sector. A range of policy announcements and proposed changes from government (both central and local) have led to a lot of consultation, submissions, meetings, and discussions. The same applies to those working in the water sector. IrrigationNZ works at the intersection of both the primary and water sectors, and we have spent time on representing our members on freshwater reforms, dam safety regulation development, and consultation on highly productive land and access to water.

I would like to thank all of our members who took the time to come to our engagement meetings and provide input to our submissions on these various issues. We always want your input and it provides our work with credibility and "on the ground" reasoning.

Meanwhile, we have also been busy planning for our biennial conference, to be held in April next year in Christchurch. We have an exciting programme lined up, with some great tours, speakers, a panel debate, and social functions. See the special insert in this issue of our magazine to find out more.

The big issues confronting our sector will all be part of the discussion at the conference – from the future of water allocation, to the role of irrigation in diversifying land-use and providing rural resilience, to the latest in research and technology. We can't wait to see you there.

As 2019 draws to a close, I have been in my role at IrrigationNZ for nearly a year now. The time has flown by and I would like to pass on my thanks to our team for all their hard work:

- Kate Mills, Events Manager
- Kate Jefferd, North Island Technical Projects Manager (while Vicky Bloomer is on maternity leave)
- Steve Breneger, South Island Technical Projects Manager
- Julie Wallace, General Manager – Commercial Activities
- Andrea Vercoe, Financial Manager
- Elenore Dumaine, Office Manager
- Ella Stokes, Communications Manager

It's been such a pleasure working with you all. We are lucky to have such a committed team who are so passionate about the irrigation sector and what it does for our country's wellbeing. And a big thank you to Alex Adams who acted as our GM throughout much of the year.

I would like to thank all of our members who took the time to come to our engagement meetings and provide input to our submissions on these various issues. We always want your input and it provides our work with credibility and "on the ground" reasoning.

Please all have a restful and safe holiday period, I look forward to meeting as many of you as possible next year.

Elizabeth Soal
Chief Executive
IrrigationNZ

IrrigationNZ: out & about

GOODBYE SPRING

Calving and lambing season is finished for most but that doesn't mean things are slowing down on the farm. Now's the time to check your irrigation system for summer have a look at our website, www.irrigationnz.co.nz/PracticalResources/ToolsAndTips for some advice.

SHOW SEASON

The New Zealand A&P Show season is underway giving the hear of urban and rural communities the opportunity to come together. IrrigationNZ attended two of the biggest shows in New Zealand and had a great time.
Flick to page 12 to find out more.

FERTIGATION

IrrigationNZ hosted its second fertigation field day to show case the IrrigationNZ fertigation project and the ins and outs of fertigating on a dairy farm. You can read more about this on page 15.

SAVE THE DATE FOR THE INZ CONFERENCE & EXPO: 7–9 APRIL 2020

Our conference is getting closer. Find out more about the upcoming IrrigationNZ Conference and Expo in Christchurch on the feature pages within this issue, starting from page 27.

IrrigationNZ welcomes new staff

Two new staff joined IrrigationNZ recently. Ella Stokes replaces Allanah Jarman as our Communications Manager. Kate Jefferd came onboard as Technical Project Manager, North Island, whilst Vicky Bloomer is on maternity leave.

Ella Stokes, Communications Manager.

Kate Jefferd, North Island Project Manager.

ELLA STOKES

Communications Manager

Telling the story of the primary sector in New Zealand is something I'm extremely passionate about, therefore I feel privileged to have recently taken on the role as Communications Manager at IrrigationNZ.

My role, based in Lincoln, involves keeping our members and the wider community up to date with what is happening in the primary sector and more specifically the agriculture and irrigation industry, as well as day-to-day internal communications.

I grew up on a Canterbury sheep and beef farm, so I have grassroots farming experience and have been involved with agriculture from a young age. My rural passions extend beyond the farm gate as I have been involved with many rural events such as A&P shows and sports teams over the years and I appreciate how important these are for communities.

Following my secondary education, I went on to study journalism at the New Zealand Broadcasting School. I was then based in Otago where I was a rural reporter. There, I learned valuable knowledge about the primary sector, got the opportunity to meet a range of people and improve my journalism skills.

I have always wanted to dedicate my expertise to promoting excellence in agriculture, so I jumped at the opportunity to be Communications Manager at IrrigationNZ.

In my role, I hope to not only tell rural stories to those from a rural background but, also those who are from an urban setting. I want to create interesting and informative content and help others both become more knowledgeable about irrigation but also showcase those who are utilising innovative ways of farming to achieve good on-farm practice. Whether it's day-to-day work on farm or something a bit different, everyone has a story to tell and I look forward to having the opportunity to showcase this.

KATE JEFFERD

Technical Project Manager, North Island

I have recently taken on the fixed term role of Technical Project Manager, North Island, based in the sunny Hawke's Bay.

My previous role involved three years in local government, working for the Hawke's Bay Regional Council as a Technical Advisor in the water metering and management space. Thankfully for me, this involved getting out on farms and meeting people, to build positive working relationships with landowners. Much of this involved providing advice around how to best manage their water consents, as well as aspects of irrigation performance and efficiency. I look forward to continuing this line of work, though from a very different lens, and being able to expand on the good work already being done within industry and our farming sector.

Learning about the underlying regulations that now drive almost all farmer and grower operations is fundamental to providing the right support and education needed within our industry, and to represent our members effectively. I also have something of a vested interest in this area of work, coming from a background of sheep and beef farming, mixed cropping, and citrus orcharding on the East Coast of the North Island, just north of Tolaga Bay. Following primary and intermediate school locally, I went on to board at Wanganui Collegiate School, then headed down South to study at the University of Canterbury. Here I completed a Bachelor of Science degree, and discovered an interest in water management, having done some joint papers with Lincoln University. I also learnt there would be endless career opportunities in this space given the increase in attention around water as a fundamental resource. I look forward to building on current relationships with growers, farmers and industry bodies while in this role, not just at a local scale but expanding this across the whole of the North Island and building a greater presence up here.

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The value of water

View from here with Todd Muller, National Party Spokesperson for Agriculture.

Water will be the currency of success in the next century. In the 19th century it was coal, in the 20th century it was oil and in my view in the 21st century it is water. We have to grasp the strategic value that lies in the abundant water we are blessed with in this country. We have historically approached water through the lens of the enabler of agriculture, but that is a singular dimension of a multi-dimensional strategic asset. The ability to store it, will be a key infrastructural necessity if we are to leverage the value of water over the next few decades.

Yet much of the rhetoric surrounding irrigation in recent years has been well off the mark, and it's immensely disappointing to see the impact this has had on people's opinions. Many see irrigation as a simple extension of dairy farming rather than the valuable production tool, and environmental aid it can be. While irrigation is indeed important for dairy farming, in reality only 50 percent of irrigated land in New Zealand is used for dairy farming.

The environmental benefits of irrigation are many and should be celebrated when we discuss water storage. In previous droughts, Fish and Game have rescued fish from dried up rivers to put them into rivers fed by irrigation. Many irrigation schemes can boost recharging aquifers as farmers move to more precise approaches.

Done well, water storage delivers on environmental, social and economic factors equally.

There are clear environmental benefits, such as increased river flows; often improvement to local drinking water supplies which is a social benefit, plus the obvious economic activity water storage enables.

We've seen a notable decrease in large irrigation projects getting off the ground since the Coalition Government came into power, with those that have progressed being a result of the National Government's work. Most notably the Waimea Dam has produced enormous benefits for the Nelson-Tasman region with increased river flows and recharged aquifers. The dam also helps future-proof the region by allowing conversion from unirrigated pasture to higher value crops.

This is essential for the future of New Zealand. Our ability to spot potential market opportunities and change our land use accordingly is a key asset to our primary sector. Take Marlborough for example, which was once covered in large swathes of sheep and arable farming, but since then it has transformed into one of the most well-known Sauvignon blanc producers in the world. Attempting changes like this requires a significant amount of water, and having adequate water storage is key. The current Government has been eager to talk about the opportunities for changing land use in our primary sector, but they don't realise what it takes to achieve this.

The Government's recent fresh water proposals require a resource consent for all new irrigation over ten hectares, and a requirement of this resource consent be that no increase in nitrogen or phosphorus occur. This is going to make it substantially harder to grow our avocados, cherries and apricots, all industries that offer great opportunities for communities in places like Central Otago, Northland and East Coast. Even if growers believe they will reduce pollutants, a resource consent process can be expensive and unpredictable, while Overseer is not well setup to understand land uses other than pasture farming.

Water storage requires long term investment partners and in most countries such schemes are supported by federal or state equity or sponsorship. New Zealand is sorely lacking this currently as the Coalition Government abolished Crown Irrigation Investments Ltd. A decision that was short sighted and ideological to the extreme.

"The environmental benefits of irrigation are many and should be celebrated when we discuss water storage. In previous droughts, Fish and Game have rescued fish from dried up rivers to put them into rivers fed by irrigation."

The previous National Government worked hard to continually upgrade our water storage infrastructure in New Zealand, we committed $280 million towards irrigation and water storage projects because of the economic and environmental benefits of storing and using water. In total we committed to $400 million being made available over time.

Going forward we're working on comprehensive water storage policy to take into the next election. We think there needs to be a much bigger focus from Central Government to act as an enabler partly in funding, and partly in confidently stating stored waters place in our future.

Water is one of our nation's critical strategic assets, perhaps second only behind our people. We need to be planning for our future and investing in infrastructure that is going to ensure we have a thriving primary sector for years to come.

Irrigation in Australia: reforms focus on efficiency and sustainability

View from There by Bryan Ward, Irrigation Australia.

Australia is the driest inhabited continent in the world, so ensuring that the sustainable use of the nation's water resources accrues benefits to communities, irrigators and the environment has not been without challenges and argument.

Fundamental to water reform in Australia has been improving water use efficiency – or achieving more crop per drop.

Climate change has added complexity to the challenge of doing this; in many irrigation areas, runoff into rivers is predicted to decrease and we are already seeing great variability in terms of rainfall and weather patterns. Add to this the fact that much of the nation is currently in the grip of the worst drought in the last 100 years, and the challenges are even more critical.

One of the things that stands Australia in good stead is that it is a world leader in reforming water policy.

The reform process began in Australia in the 1990s, led by the Australian government with the support of the states. Important elements were establishing the water "Cap" in the Murray-Darling Basin (MDB) in 1997 and setting up the National Water Initiative (NWI) in 2004. Under the NWI, governments around Australia made significant commitments to water policy, including preparing comprehensive water plans, achieving sustainable water use in over-allocated or stressed water systems, introducing registers of water rights and standards for water accounting, and expanding trade in water rights.

Funding for modernisation required as part of the NWI is available under a variety of programmes and through partnerships with all the states. Through these programmes, on-farm and supply-level water efficiency projects have been implemented with the water savings being shared between users and the environment.

The Murray-Darling Basin spans 77,000 km of interconnected rivers. *(Source: Murray-Darling Basin Authority)*

MURRAY-DARLING BASIN – THE CENTRE OF IRRIGATION

The centre of irrigation in Australia is the MDB, which runs from Queensland, through New South Wales and the Australian Capital Territory, Victoria and South Australia (see map). As well as being home to 9,200 irrigated agriculture businesses whose gross value of production in 2017–18 was AUD$8.6 billion, the MDB has a myriad of unique natural assets such as wetlands, 16 of which are internationally significant, and it provides fresh drinking water to more than 3 million people.

The 1990s brought the first policy challenges for water management in the MDB, with concern growing about the pace and extent of irrigation development. An audit concluded that water use was unsustainable, and that continued growth would reduce security for existing users and exacerbate river health problems. In response, a "cap" was set with the maximum amount of water that could be diverted from rivers at 1993-94 levels of development.

The Cap, formally put in place 1 July 1997, has been critical to the long-term health of the basin's rivers and underpinned the emphasis since then on achieving greater efficiency in water use.

GOVERNANCE

The Murray-Darling Basin Authority (MDBA), an independent, expertise-based statutory authority set up under the Commonwealth Water Act in 2007, is responsible for planning the basin's water resources and ensuring that they are managed equitably, efficiently and sustainably.

The MDBA is overseen by a Ministerial Council whose members are representatives from the Australian and state (New South Wales, Queensland, Victoria and South Australia) and ACT governments. Several technical and other committees advise the authority, including a Basin Community Committee, which is made up of members with expertise or interest in water management, from local government, agriculture and Indigenous communities.

Participants in a metering workshop run by Irrigation Australia getting some practice in the field.

METERING PRIORITY

One of the most significant water reforms implemented in the 1990s was the separation of water allocation from land title, with the result that allocation can be traded either on a temporary or permanent basis. The principle behind this reform was that water would go to the highest value crop, e.g. growing crops rather than grass. This has slowly happened but with some effects only now becoming obvious, e.g. higher value crops such as almonds competing for permanent allocation and replacing lower value enterprises such as dairying.

Underpinning this change is a requirement to ensure greater compliance with water regulations by monitoring and measuring how much water is harvested by irrigators. While some of the water used for irrigation in most states is already metered, a national framework has been developed where all meters must now comply with standards to ensure water is being measured as accurately as possible. This means that many irrigation meters across the nation are being checked for compliance with these national standards, and compliant meters are being installed where necessary.

This is a huge task and is something Irrigation Australia is playing an important role in as the provider of training in meter installation and validation. As well, only people with certification from the association can check meters for compliance. In October, Irrigation Australia also reached agreement with MDBA to appoint a governance officer whose key role is to be network with regulators and develop processes to assist states and territories comply with metering requirements.

REFORMS CONTINUE

While big improvements have been made in water use efficiency, especially as a result of programmes funded by the Australian and state governments in the last 15 years, this is no time to stand still. Major reviews are underway into water trading and sharing of water, and the drought has highlighted issues with resource management. Adjustments will almost certainly be necessary, but the sector's demonstrated ability to adapt will ensure its continued viability.

IRRIGATION: ESSENTIAL STATISTICS

While irrigation occupies just 0.6 per cent of all agricultural land in Australia, it plays an important role in terms of production and productivity. The annual gross value of agricultural production in 2017–18 was $59 billion (Australian Bureau of Statistics) of which $17.7 billion came from irrigated agriculture.

In 2017 there were about 88,100 agricultural businesses in Australia, of which 22,100 (25 %) used irrigation. The total of water used for irrigating crops and pastures was 9048 GL.

Table. Gross value of irrigated agricultural production, Australia, year ended 30 June 2017. *(Source: ABS)*

	Value $AUD
Rice for grain	252.4
Cereals for grain and seed (excluding rice)	308.8
Cotton lint	1,517.9
Sugar cane – Cut for crushing	834.6
Nurseries, cut flowers and cultivated turf	1,326.4
Other broadacre crops	161.3
Hay	209.7
Vegetables (human consumption)	3,295.6
Fruit and nuts (excluding grapes)	3,525.4
Grapes	1,340.6
Dairy production (based on milk production)	1,623.5
Production from meat cattle	684.7
Production from sheep and other livestock (e.g. eggs, pork)	431.1
Total	**15,512.1**

IrrigationNZ heads to the show

IrrigationNZ enjoys getting to events throughout the country to engage with communities. Recently we attended two of New Zealand's largest A&P shows, with huge success. In October we headed North to the Hawke's Bay Royal A&P show where we were lucky enough to win the award for best site, shared with Waterforce. However, the winning wasn't over yet as we also received the award for best site at the NZ Agricultural Show in Christchurch in November.

Our site showcased the positive effect irrigation had on New Zealand and the world with some interesting facts and figures, a fun and engaging game for both young and old and a real working example of VRI (variable rate irrigation).

IrrigationNZ CEO Elizabeth Soal said shows were a great opportunity to engage with both urban and rural communities and just to have a general catch up with anyone interested in what IrrigationNZ does.

"Our interactive game where people have to place where they think food is grown with irrigation in New Zealand is great because it's very informative and demonstrates how important irrigation is for food production."

"We are very lucky to have Heartland Potato Chips and Barkers of Geraldine sponsor us, so we have something to offer people and showcase a top-quality product which creation process is hugely influenced by irrigation."

Speaking of irrigation, (from left) Ryan Salmon and Brent Loader (Waterforce), Kate Jefferd (IrrigationNZ North Island Technical Manager) Prime Minister Jacinda Ardern and Elizabeth Soal (IrrigationNZ CEO) at the Hawke's Bay Royal A&P Show.

At the Hawke's Bay A&P show with the award for best site are from left Lawrence Yule (MP for Tukituki), Brent Loader, Ryan Salmon (Waterforce) and Elizabeth Soal.

Food to make you smile. Kate Jefferd stands in front of one of the banners showcasing facts and figures about irrigation, with some Heartland Potato Chips for lucky visitors.

Elizabeth Soal and Kate Jefferd with the beautiful ribbon, trophy and certificate that IrrigationNZ received for their award of best site at the NZ Agricultural Show in Christchurch.

Starting them young, a visitor to the IrrigationNZ site at the Hawke's Bay Royal A&P Show is fascinated by the VRI demonstration.

Fertilising and irrigating: as a combo

With water being applied to pasture through irrigation it seems like a no brainer to put fertiliser on with it... right?

Fertigation is the practice of adding fertilisers (liquid or soluble solids) to irrigation water and distributing it through the irrigation system. Although not new to agriculture globally, fertigation is more commonly practiced in horticulture and viticulture in New Zealand. It hadn't been commonly used on large-scale pastures.

Fertigation allows smaller, targeted amounts of fertilisers to be applied more accurately to meet specific crop nutrient demand. Fertigation also allows farmers to better manage nutrient loss risks in dynamic climatic conditions.

Pāmu Farms' (Landcorp Farming Limited), Waimakariri dairy farm in Eyrewell installed a fertigation system in November 2018 after consultation with IrrigationNZ and after participating in the Fertigation Master Class held in June 2018. IrrigationNZ jumped on board to help support the future adoption of fertigation through a Sustainable Farming Fund (SFF) project which is examining the science behind fertigation. The study aims to help discover what the outcomes of fertigation on a large scale dairy farm are, for animals, pasture and the overall environment.

The Waimakariri dairy farm milks 1,000 cows at peak on 500 hectares (effective), 398 hectares of that is irrigated. The farm has now been home to the fertigation system for a year and is about to head into its second. IrrigationNZ along with other stakeholders in the project and Environment Canterbury visited the farm recently to discuss what effects changing to the fertigation system from more traditional forms of fertilising have had.

Pāmu Farms' Waimakariri farm business manager Brendan Stent said it was an easy decision to go to fertigation. "Our biggest driver is helping to reduce our nitrate loss."

The fertigation system installed by Rainer Irrigation involved having a 25,000 litre liquid nitrogen (N) tank on farm which is filled by local spraying

Farm manager Johan Joubert explains the fertigation system. He said the system was currently run on a basic structure but as he and his staff became more advanced, he would utilise its capabilities more.

The group involved with the fertigation project on the Waimakariri dairy farm in Eyrewell where the project is taking place. Pictured from left, Andy Nurse (Fertigation Systems), Tim Lissaman (Pāmu Farms), Brendan Stent (Pāmu Farms), Graeme Pile (Fertigation Systems), Raymond Williams (Ballance Agri-nutrients), Johan (Pāmu Farms), Murray Doak (MPI), Robin Brooks (MPI), Thomas Ginty (MPI).

contractors Gilchrest Bros Contracting. This is then transferred to a mobile 4,500 litre trailer that is towed to the centre of each of the four pivots. The trailer has a mounted Agri-Inject dosing fertigation pump that plugs directly into the pivot centre. In its first year of fertigating, the farm managed to decrease its applied nitrogen use from 200 units to 115 units, which has both a significant cost and N loss saving.

Farm manager Johan Joubert said although production decreased by less than 2%, it was hard to tell if this was due to the fertigation system or a challenging season.

"It could just be seasonal, we will have better understandings of the outcomes the longer we do it [fertigating] for."

"The longer period this project runs for the better we can get at using it and the better understanding we will have of the outcomes."

Mr Joubert said the most notable difference was the decrease in milk urea nitrogen.

"Less N going in means less N coming out … we know the losses are less because reaction of liquid is quicker than that of granules."

Mr Joubert was very passionate about fertigating and he was excited to see the results of the second season and what the future of his work might bring for other farmers and irrigator operators.

Making the change was something Mr Joubert had wanted to do for a long time however, with change comes challenges.

"There have been a few barriers from a farm management perspective but, it's just part of learning a new system … we're running it very basically at the moment. There is a lot more the system can do but we decided to keep it simple in our first season."

Although – like running any system – there was room for human error Mr Joubert said it was easy to manage from a farm safety perspective.

"We don't have to worry about the fert trucks going on and off the farm or waiting for them. We can put fertiliser on, on a Sunday … we know exactly where it's going so there is no risk of putting it in a waterway."

The main aim of the project wasn't just to make more money and for systems to be easier Mr Joubert said.

"We're all about being sustainable but remaining profitable."

Pāmu Farms' innovation specialist Tim Lissaman said it was important to keep the system simple.

"We've got to have a repeatable system that someone can pick up and run with."

Mr Lissaman said there was potential to use this system on other Pāmu Farms in the future, but there had to be better facts and figures about the ongoing effects first.

"We want to learn along the way and need to make sure the data we're providing is useful and accurate."

Environment Canterbury senior strategy manager Anita Fulton, said it was a good focus to see the fertigation system however, there was some concerns.

"We don't have to worry about the fert trucks going on and off the farm or waiting for them. We can put fertiliser on, on a Sunday … we know exactly where it's going so there is no risk of putting it in a waterway."

"There are some concerns around water and drinking water and what the outputs are … we're not across this enough."

IrrigationNZ Technical Manager Steve Breneger was overseeing the project.

He said it was exciting to be using fertigation in a pastoral dairy farming system.

"I'm looking forward to seeing the results of the second season … we need to investigate how to replicate this [fertigation] system and how it will fit in, in other farming operations."

"There are often questions about how the fertiliser will affect the pivots pipes and nozzles. This was a question that was asked at the Valley factory tour last year on the IrrigationNZ Nebraska study tour, the answer was simply – the most corrosive substance you'll ever put through your pivot is water, the dilution rates in fertigation systems makes the effects of the fertiliser are insignificant."

Although it may look like a normal irrigation system, this pivot not only irrigates but also provides fertiliser for pastures through a fertigation system.

One dairy farmer reflects on moving to New Zealand

Making the move to New Zealand was a daunting decision for one North Canterbury farmer but, he's never looked back.

Johan Joubert moved from South Africa to New Zealand in 2007, with his wife Carine and two children Pieter Johan (12) and Wilani (14). Mr Joubert and his wife decided to move to New Zealand both for them and their children.

"We decided there were better opportunities here."

Mr Joubert's first job was in the Waikato where he began working as a dairy assistant and in just over three years, he was managing the 700-cow property. He previously had farming experience, but it wasn't in dairy farming.

"I'd never milked a cow, and I thought I never would, to be fair."

He then spent a year working on a dry-land crop farm in South Canterbury. However, decided to go back to dairy farming as he thought it was a better career for him.

He then took on a herd manager role in Orari near Geraldine before he moved to Westport on the West Coast where he managed a 950-cow dairy farm owned by Pāmu Farms (Landcorp Farming Limited).

Johan Joubert at the Eyrewell dairy farm he manages.

In early 2014 Mr Joubert moved back to the East Coast of the South Island where he took the opportunity to be farm manager of a 1,000 cow dairy farm in Eyrewell also owned by Pāmu Farms and this is where he resides today.

Mr Joubert oversaw the day-to-day running of the farm and employed four full-time staff. He said staff could be challenging but also rewarding. "I'm a strong believer in progression, you get a lot of satisfaction out of helping someone progress in their job."

"Attitude is everything, it makes it easy … it's easy to have a successful career in dairy farming if you have a good attitude."

During the calving season, Ms Joubert as well as some extra staff, reared the calves. "Six months of the year we work together … my wife is great moral support for myself and the staff."

Although Mr Joubert said, "I never quite get used to the 4am wakeups," he loved his job.

"I enjoy the challenges of getting everything right … having milk in the vat every day and knowing you're doing your best to get it there is a good feeling."

Unlike many dairy farms, the Eyrewell farm Mr Joubert managed kept all their young-stock on the farm. He admitted this was a highlight of his job as he was "a bit of a closet beef farmer."

"I enjoy looking at a good quality animal, growing out youngstock is a good distraction from day-to-day work."

His commitment to his work was recognised when he won Pāmu Farms' top performing dairy farm in New Zealand last season. The award was based on a range of attributes which included financial, production and health and safety aspects.

The biggest challenge that came with moving to New Zealand was moving away from family and friends.

"We have no other family support in New Zealand … the hardest thing especially was leaving everything behind."

"Attitude is everything, it makes it easy … it's easy to have a successful career in dairy farming if you have a good attitude."

"People don't know how good it is to have family support."

However, he said it didn't take long for them to settle into the "Kiwi life".

"The cultures are similar. We share a lot with New Zealanders especially our passion for sport."

Their family was lucky to have made lots of friends in New Zealand who have become like family.

Mr Joubert said he never looked too far ahead in the future but, saw himself staying put for a while yet. "We're settled here, and I do enjoy working in this area and our children like it too … there's still a lot of things I want to improve on the farm."

The big decision: Lindis River

The decision around the minimum flows of the Lindis River came as a welcome one, but not for everyone.

In early October the Environment Court announced it had backed Lindis River farmers and water users on their preferred minimum flow limits.

The decision, led by Judge John Jackson, set a minimum flow for the river of 550 litres per second and a primary allocation of 1640 litres per second, which were the limits proposed by the Lindis Catchment Group (LCG). The LCG was formed to represent the interests of virtually all irrigators in the catchment.

This will cancel the limits set by Otago Regional Council-appointed commissioners (and adopted by the Council) of a minimum flow of 900 l/s and a primary allocation of 1200 l/s.

The Lindis River is situated in Central Otago and has a catchment area of 1055km^2, flowing into the Clutha River approximately 6km upstream of Lake Dunstan. Although the Upper Lindis Catchment area can receive large amounts of snow and significant rainfall (up to 700mm rainfall as an average), the lower Lindis is one of the driest areas in New Zealand with an average annual precipitation of 480mm.[1]

Since the introduction of the National Policy Statement for Freshwater Management, all waterbodies in New Zealand must have environmental limits for water quantity applied to them, being set by regional authorities. This will usually include a 'minimum flow,' meaning the low flow point (usually the threshold at which aquatic life is maintained) when water takes must cease. Water permits will also generally state how much water can be abstracted at any one time (a maximum rate or volume of take), and over the irrigation season or other defined time period (a seasonal volume). The permit will also usually specify what the water is to be used for.[2]

The LCG was pleased with the outcome however, the Otago Fish and Game Council has appealed the decision to the High Court, so the future outcome remains unknown.

Chief Executive of the Otago Fish and Game Council, Ian Hadland, said they were contesting what they believed to be several errors of law and that the Environment Court applied the wrong legal tests when giving particular regard to the value of trout and salmonids under the Resource Management Act 1991 (RMA).

"This appeal is focused primarily on seeking clarity on aspects of the judgment that have potential for national application – not simply for the Lindis River context," Hadland says. No further comment will be made now that the matter is before the High Court.

LCG deputy chairman, Lindis River farmer and water user, Bruce Jolly, said the decision was welcomed.

"It's great for farmers in the area."

Mr Jolly said the original minimum flow would have had detrimental economic and social outcomes and could have resulted in a "loss of jobs".

The LCG represented about 33 Lindis and Ardgour Valley water users.

The Lindis River from the Ardgour Road bridge, looking downstream.

LINDIS RIVER DECISION: A CLOSER LOOK

Lindis Catchment Group Incorporated v Otago Regional Council [2019] NZEnvC 166

On 7 October, the Environment Court, led by Judge John Jackson, released its decision on an appeal by the LCG against the Otago Regional Council (ORC) decision relating to the Lindis river catchment.

The appeal was filed by the LCG on two proceedings: a change to the minimum flow and setting of primary allocation limits under Plan Change 5A to the Otago Water Plan (which established a water management regime for both surface and groundwater in the Lindis catchment and Bendigo-Tarras Basin), and a suite of applications for water permits from the catchment (in addition to, and in replacement of, a group of 'deemed permits' in the catchment (see sidebar)).

Plan Change 5A as originally proposed by the ORC included a minimum flow of 750 l/s from October to May with a primary allocation of 1,000 l/s for the Lindis River. However, the ORC-appointed hearing panel recommended the elected council adopt a minimum flow of 900 l/s and a 1200 l/s primary allocation. This was subsequently adopted by the Council and was supported by Fish and Game, due to the significant presence of trout in the catchment.

The LCG argued that the increased minimum flow would have significant economic impacts on farming systems in the area, and was contrary to their proposed flow and allocation regime, which included closing races to improve efficiency and significantly improving on-farm efficiency through the replacement of surface irrigation with spray application.

[1] NIWA. [2] IrrigationNZ

The Court found there are seven key conclusions from the RMA and planning instruments, and these are significant for irrigators involved in planning processes:

- Planning takes place within the legal parameters set by the RMA, the National Policy Statement for Freshwater Management, the Proposed Otago Regional Policy Statement and the Otago Regional Plan: Water;
- A "no takes" (i.e. no taking of water from the catchment for irrigation) is not envisaged by the RMA or any of the subordinate planning instruments;
- The RMA and subordinate planning instruments recognise and provide for continued abstraction, within limits;
- A river with no abstraction (except for domestic use and stock water) is not the only benchmark for the plan change;
- Abstraction is subject to constraints that safeguard life-supporting capacity of water, and maintain natural character and aquatic ecological values, with priority being given to indigenous species;
- In decisions under the RMA about water takes, existing values must, as a minimum, be maintained; and
- In decisions under the RMA, there may be requirements for enhancement of the current environment to achieve specific objectives and policies.

Also of significance was the Court's consideration of trout, and how its habitat requirements should be considered. Judge Jackson stated that "it appears to us that the intrinsic (as opposed to human use) values of ecosystems which do not contain trout are often of higher value than those of ecosystems which do." That "from an ecological point [trout] are an introduced pest," and that "there is no such thing as a 'natural state' for trout in New Zealand." Therefore, it was not the natural flow of the river that was to be considered important for trout habitat, but rather the options proposed against the status quo. Even so, the cost to anglers of a 550 l/s minimum flow regime, compared to a naturalised flow regime, was found to be "minimal."

The Court held that either option for minimum flows put before the Court (as proposed by LCG) would have lower adverse effects on natural character than the status quo and that the adverse effects of the two options on flows and swimmability were found to have been "exaggerated." For example, the reduction of 5cm in the water level of a pool is unlikely to reduce the value of the pool for swimming.

Judge Jackson said that "assessing the options against the status quo option, it is clear that in all flow regimes there will be more water in the Lindis River than while the mining privileges [see inset] are being operated through the races, as currently."

In relation to climate change, the court considered it appropriate to impose review conditions on resource consents to ensure that there is sufficient opportunity to adapt those consents as change occurs in water availability and river flows in the future. The Court also stated that farmers will have to continue to evaluate their land use and business models as climate change effects become noticeable and they are best left to make change as they identify new opportunities and necessities.

The Court found that a higher minimum flow of 900 l/s was "likely to emit more nitrogen (and phosphorus) than the 550 minimum flow option because the former is less reliable and thus less spray irrigation will be installed (or if installed, used). Thus pollution rates under the 900l/s minimum flow option are likely to be higher because more border dyke irrigation will be retained."

The Court accepted the economic evidence provided by the LCG that the direct contribution to GDP from the 550 l/s minimum flow scenario was $7.97m compared to $2.67m for the 900 l/s minimum flow scenario.

Ultimately, the Court ruled that the minimum flow at the Ardgour flow recorder should be fixed at 550 l/s and the primary allocation should be fixed at 1,640 l/s.

On October 29, the Otago Fish and Game Council filed an appeal in the High Court against the decision of the Environment Court, alleging the Court made nine errors in law. The LCG intends to defend the appeal. At the time of writing, a hearing date for the appeal is yet to be set down.

DEEMED PERMITS – FROM GOLD MINING TO IRRIGATION

"Mining rights" or "mining privileges" were property interests or licences originally granted by mining wardens and later the Warden's Court for prospecting, mining, land occupation and water licences throughout areas identified as goldfields. These rights were granted from the late 1800s onwards.

This method of water allocation was widespread in Central Otago and allowed rights in perpetuity on a "first-in, first-served" basis, usually with minimal conditions around minimum flows and volumetric allocations.

After the gold rush passed, the rights were often converted to use for irrigation and allowed agriculture and horticulture to flourish in an otherwise semi-arid area.

When the RMA was passed in 1991 these mining rights were redefined as "deemed permits" so that they could continue to be used for taking water for irrigation. Under the Act, all deemed permits were given an expiry date of 1 October 2021. Anyone wishing to continue to take and use water after this date will be required to apply for a resource consent water permit in replacement. Deemed permits cannot be reviewed by consent authorities without compensation being paid.

Photograph of a gold mining area at St Bathans, Otago, with Scandanavian water race.
Ref: PAColl-9030. Alexander Turnbull Library, Wellington, New Zealand. /records/22805462.

The positive impact of irrigation shows in the area of North Otago

After six months in his role as North Otago Irrigation Company Chief Executive, Andrew Rodwell says he's loving the role.

Mr Rodwell took on the responsibility in May this year, replacing Robyn Wells who spent nearly nine years in the role.

The North Otago Irrigation Company (NOIC) began development in 2002 when its first resource consent from Environment Canterbury to take water from the Waitaki River was granted and the scheme was officially opened in 2006. By 2009 approximately 10,000 hectares of land was under irrigation. Following strong demand, the second stage of construction began in 2015 and was completed in 2017. Today NOIC provides irrigation to around 25,000 hectares of land.

The company is owned by its 162 shareholders. NOIC is the second most valuable irrigation company in the South Island, in terms of balance sheet assets, and irrigates a mix of farming types over a 68,000 hectare command area. Mr Rodwell said North Otago was historically a drought-prone area. "Irrigation has transformed farming and the economy of the Waitaki area."

Mr Rodwell said he had always had an interest in New Zealand's Primary industry. He has a BSc from Canterbury University and a finance diploma from Auckland University's Graduate School of Business. He worked in Los Angeles from 1996 to 2002, spending four years as New Zealand's trade commissioner where he specialised in food and AgriTech, he then formed and led a United States subsidiary for Telecom New Zealand. That was followed by seven years as CE of ArborGen, New Zealand's largest forestry plant stock producer. That entailed genetic engineering research, clonal propagation and running seven nurseries across Australia and New Zealand.

> "Water belongs to the nation, and we're privileged to have the opportunity to use it."

Mr Rodwell has also been chief executive of other engineering and manufacturing enterprises. He said he took on the role because it was a natural extension of his experience, interest in the primary sector and saw it as an exciting challenge. "I have learned a great deal about irrigation in the past six months. This company makes a very important contribution. What we do here is meaningful – the direct effect on 162, in some cases multi-million dollar, farming enterprises and, by extension, the many businesses that service the sector. An economic impact report commissioned a few years ago highlights how irrigation, in regions like North Otago, has profoundly changed

North Otago Irrigation Company Chief Executive, Andrew Rodwell.

the economy, with schools full again and employment opportunities for school leavers." He said he "loves" his role. "I am committed to working with the team and the board to create the best outcomes for our shareholders."

The use of irrigation and its effect that higher productivity has on water quality has always been a well-conversed topic, but even more so of late with the release of the National Policy Statement for Freshwater Management reform. Mr Rodwell said, "All farming systems can impact the environment. All farmers have a responsibility to take every possible measure

View looking towards Ngapara, North Otago.

to prevent the degradation of water."

"Water belongs to the nation, and we're privileged to have the opportunity to use it."

Mr Rodwell said it was difficult to say how the proposed NPSFM changes would affect NOIC specifically. However, his primary concerns were the rules around the expansion of irrigation which were "potentially irrational."

"I'm nervous about the broad-brush standards that don't take into account the unique characteristics of catchments."

He believed there was no question that farming would come through "this period of malaise."

"The world's population is growing and the demand for protein is rising. It's not binary – meat or vegan. Meat and plant-based proteins will co-exist. Those that choose meat and those that can afford it will demand to know it was produced sustainably. The New Zealand farming system is the most sustainable in the world. There will be a demand for premium protein, and we are the best-placed to supply it."

Mr Rodwell said addressing water quality is necessary in both rural and urban New Zealand. "It is an NZ-Inc issue and the messaging from the Ministry for the Environment should be absolutely clear on this. To single out the farming sector is to polarise the discussion and isolate the very people who are taking steps to fix the issue. Doing that doesn't look like effective leadership to me."

Irrigation has transformed the once drought prone area of North Otago.

In the future, Mr Rodwell sees the adoption of irrigation technology to enable more accurate application – taking account of soil capacity and soil types across a farm to precisely apply water. "Water may well be the next "currency", after coal and oil. It needs to be respected and used intelligently." He also wanted to take up opportunities to work with other irrigation schemes.

"We can work together to help each other, improve efficiencies and reduce duplication of resources. I am tremendously optimistic for the future."

The big build: Waimea Water

As the end of 2019 looms the Waimea Community Dam is starting to take shape.

The Waimea Community Dam development first began in March this year.

The dam is a significant local infrastructure project to augment the supply of water and add to the sustainability of the Nelson Tasman region.

Waimea Water Ltd (WWL) was fully funded by its shareholders, Tasman District Council (TDC) and Waimea Irrigators Ltd (WIL) with a project budget of $104.4 million.

Mike Scott was appointed CEO of Waimea Water in May, and said it's been an incredibly exciting role to be involved in.

Mr Scott has been a Richmond resident since 2012, and the dam itself, being built in the Lee Valley was only 20 minutes from his home.

"I'm excited about returning home to lead what is likely to be one of the most important and largest infrastructure projects for the region ever. The dam will significantly contribute to the region's future in many positive ways, including building water security for the region for the next 100+ years, economic prosperity and environmental benefits for the Lee and Waimea Rivers."

Waimea Water Ltd CEO, Mike Scott, at the dam site.

Mr Scott said the area was traditionally drought prone and the project's aim was future-proofing this.

"Future generations living and working in our region won't have to experience the difficult drought conditions that we saw last summer. I look forward to the day when we all look back and think, like Nelson's Maitai Dam, that Tasman made a sound decision that puts the region in a very good position for the future."

Prior to his role at WWL, Mr Scott was vice president North West Shelf Venture at Woodside Energy Limited in Western Australia, a top

15 ASX A$30B market cap company.

He also held the position as CEO for one of Australia's largest economic assets, the A$34B North West Shelf LNG Joint Venture Project (one of the most advanced, integrated gas production systems in the world).

He said his role with WWL has been both enjoyable and challenging.

"One of the greatest challenges for the project is the geology of the landscape. It's been encouraging to get down to good quality rock in the early stages of the build of the starter dam. Albeit early days, the rock is in line with what we expected following earlier exploration studies, and even better than expected in some places."

As the build of the dam progressed he said he hoped to maintain an excellent health and safety record and continue to achieve all the environmental and sustainability milestones while delivering the dam to quality, on time and budget.

"I'm really looking forward to getting on with the build of the dam and delivering on what we said we would do to secure the region's water supply for the future."

The Waimea Community Dam will be New Zealand's first large dam in over 20 years.

THE BUILD: AN UPDATE

- The three-year construction project is progressing well, with the upgrade of the 6.5km Lee Valley access road now nearing completion.
- Construction of three bridges along the access road to the dam site is also underway.
- Planning for the first diversion of the river is underway to allow construction of the 160-metre-long, 4 metre x 5 metre concrete diversion culvert on the right-hand side of the river. This will involve excavation work and construction of several bunds, Coffer Dams, to redirect the river flow in a controlled manner so concrete work can be completed in dry conditions. In 2020, the river will be rediverted through the newly constructed culvert to enable construction of the reinforced rockfill section of the dam over the culvert.
- The team onsite has cleared the right-hand and left-hand abutments (the structure on each side of the valley where the dam rests).
- The first concrete was poured this month within the dam footprint in the flat section beneath the left-hand side plinth (link between the ground and the dam).
- Permanent slope stabilisation above the right-hand side plinth continued.
- Vegetation clearance beneath the dam and reservoir footprint is well underway.
- Dam safety management systems and communications are in place.
- The supply of power to the site is expected to be completed this year.

AT A GLANCE: KEY FACTS

- Concrete-face rock filled dam – approximately 53m high 220m long, 6m wide at the crest
- Constructed from approximately 430,000m^3 of rock
- Lake created by the dam will contain approximately 13 billion litres of water
- Up to 2.2m^3/s of water will flow into the Lee and Waimea River systesm during drought
- Estimated economic benefit of $55 million in the first two years, and between $600–900 million over 25 years. (ref: NZIER Report 2017)
- Construction is scheduled to be complete in 2021, with reservoir filling and final commissioning expected in early 2022.

The dam underway – the view looking up the Lee Valley.

Careful construction – preparing the right-hand side of the dam.

Serving a purpose: more than irrigation

For what is an irrigation lake it provides much more both above and below the surface.

Chris Wright farms in Dunsandel, Canterbury. His irrigation lake, known as Lake Crichton, not only provided water for irrigation systems on his farm but had also hosted international water-skiing competitions and was home to grass carp fish.

Mr Wright took over the running of his family farm in 1974. He said the farm was previously a traditional sheep and beef property but, like many Canterbury farms over the years, shifted to being used for dairy grazing. After selling land to the neighbouring Synlait factory over ten years ago, the farm was now 103 hectares.

Mr Wright and wife Robyn have two children Hamish and Charlotte and he said it was obvious water skiing was in their children's blood from a young age.

"Both Charlotte and Hamish were learning to ski when they were really young … they started behind the jetboat and got a bit keen on competition and went from there."

Lake Crichton was put in 21 years ago and its purpose extended beyond farming.

Mr Wright said he also wanted to build it to support not only his family's water-skiing passions, but the wider communities as it became harder to get access to public lakes for tournaments and competitions.

Although Charlotte and Hamish no longer skied as much in their adult life, Mr Wright said the lake still got plenty of use.

It had hosted four international water-skiing competitions, still held triathlons and accommodated five to six local tournaments a year.

Mr Wright had never been a competition skier himself, he was "the one in the boat towing the skiers" and had been an international driver.

Each summer the lake was home to a water-skiing training course and Mr Wright was gearing up for another summer of driving and coaching.

"I enjoy seeing people get a thrill out of learning to ski."

"It's been a great distraction from farming over the years, we have friends all around the world because of it."

When the lake, which covers approximately 5.5 hectares, was built the base was constructed of shingle, a layer of clay, followed by a layer of topsoil.

Mr Wright said due to the fertility of the topsoil it meant it was only a matter of time before weeds started growing in the water and around the edge. Originally, he used to spray

Chris Wright stands in front of his irrigation lake, more commonly known as Lake Crichton. It provides much more than just water.

the weeds, which had to be done every three years, this was both costly and labour-intensive and damaged the water quality of the lake.

Mr Wright decided to investigate other ways to keep his lake clean and decided to purchase white amur fish more commonly known as grass carp (carp). He put 250 carp fish in Lake Crichton in 2009. Another irrigation pond was also being built on the farm at this time and had the same number of carp put in it two years later (2011).

He said the differences were recognisable straight away. "The water has been clean as a whistle since, in fact sometimes I don't know what they [carp] eat."

Water for the lake came from a private well, therefore, was pumped in and pumped out. With appropriate measures in place which included fish screens, there was no risk of the carp going anywhere or getting into any other water ways Mr Wright said.

He said the fish were $37.50 each which was a big cost at the time however, the overall cost for them was approximately the same cost as three sprayings and considering the carp have been doing their job for ten years now without having to add any additional ones it had "definitely been a benefit both for water and for cost."

The carp only bred under artificial circumstances, so numbers remained the same over time.

On a hot day you could often see the fish, which were impressive Mr Wight said. "They've gotten really big … they've achieved what I wanted them to."

He said he was unsure of how many were still there, but he would wait until weed started coming back before he put anymore in.

"I won't be putting them in just for the sake of putting them in."

WHITE AMUR: GRASS CARP

White amur more commonly known as grass carp are an herbivorous species of fish which are native to Eastern Asia. The New Zealand government introduced them to the country in 1969, however following several trials they were not used commercially until 1991. Although they are an introduced species they are classified as a restricted fish not a pest fish, as they cannot breed naturally in New Zealand waterways and had to be bred in specialist hatcheries. The carp only eat aquatic vegetation, so they pose no risk to other species.

New Zealand Waterways Restoration (NZWR) Ltd managing director Gray Jamieson breeds and sells the carp fish. He said, since 1992 when NZWR started supplying carp they have been placed in 13 lakes both public and private, 10 water-ski lakes, 90 detention ponds, 20 golf courses and over 300 private waterways. The carp were preferential eaters, Mr Jamieson said, as they didn't like to eat native weeds and preferred to eat exotic pest weeds, "A huge problem for irrigation dams, ponds and lakes in New Zealand is getting choked with Canadian Pond Weed, this can result in a loss of up to 20% storage capacity". The removal of invasive exotic weed species also allowed for native species to re-establish.

Mr Jamieson said they (carp) tended to live for around 15 years however there were records of some living up to 30.

To have the carp in a waterway you need a consent from the Department of Conservation, however Mr Jamieson said he was currently trying to make this consenting process more straightforward.

"In my opinion you shouldn't need a consent to install them as they pose no risk".

Going forward he hoped to get carp in more waterways throughout New Zealand.

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NZ Avocado building grower and industry eco-credentials

The avocado industry in New Zealand is on a significant growth path with an industry value in the 2018–19 season of $144.1m. The New Zealand market alone achieved a record $56.6m value compared with $29m in 2012–13.

This success is due in part to the industry setting audacious goals as part of their five year NZ Avocados Go Global Primary Growth Partnership (PGP).

The programme has made a significant contribution to the industry's growth in value leading to greater cohesion, greater collaboration and achievement of collective goals across the supply chain. The programme's success has led to its extension with an investment of $2.8m for a further two years with four core objectives:

- Market insights and fruit nutrient analysis
- Trusted supply chain and growing systems
- Evidence-based sustainability – verifying the industry's eco-credentials
- An industry breeding programme feasibility study.

Growing avocados in the New Zealand environment has its challenges. Irregular crop loads and weather requires industry to work hard to deliver consistency – in quantity, size and fruit quality.

Research programmes are focused on improving orchard yields and consistency, through benchmarking performance and refining tools and management practices to help growers get the best from their orchards. To achieve a better understanding of the trees and their growing environment there is increasing grower effort being made to monitor and measure. This activity in turn is providing information for improved on-orchard management decisions. Collectively this will begin to substantiate the industry's eco-credentials, promoting continuous improvement and sustainability.

Adequate soil moisture is an important aspect of growing avocados. Irrigation is increasingly playing a part in building consistent and sustainable avocado supply as the trees needs are becoming better understood.

The key avocado growing regions of New Zealand are Northland, Whangarei and the Bay of Plenty. Each region has different soil types, climates and rainfall. The rainfall, while generally sufficient to meet the needs of the avocado tree, is not always consistent or well timed. Insufficient rainfall at critical times will reduce the performance of the tree and grower returns. These critical times include flower-set in spring and fruit growth during summer and autumn.

In the Far North, having an irrigation system is essential due to reduced rainfall during the summer months and the predominately sandy soil that retains a relatively small amount of water.

In the Bay of Plenty irrigation has historically been less of a necessity, particularly in

A weather station and soil moisture monitoring being installed in an Avocado orchard.

established orchards due to the predominately loam soils storing a good amount of available water for trees. However, it is still a valuable management tool protecting trees against periods of summer drought, optimising fertiliser applications and is often set up to provide frost protection. Spring soil moisture levels in the Bay of Plenty tend to be naturally sufficient to support fruit-set but as the industry develops and the value of the crop increases it is becoming increasingly important to growers to monitor and measure moisture levels. The same goes for fruit growth where size and quality is reliant on summer/autumn rainfall and this too is increasingly managed to ensure optimal crop outcomes.

With the recent release of *Action for Healthy Waterways* discussion document on a national direction for freshwater by central government, considerable urgency around water management will be placed on all primary industries. Avocado growers must consider their daily on-orchard management practises.

Growers understand that their daily irrigation management decisions on-orchard can play a role in maintaining and achieving these wider community goals of achieving healthier waterways. NZ Avocado recognises these pressures and has proactively worked to provide growers with direction and access to online resources they will need. These resources are now complete and an agreement with IrrigationNZ has meant that all NZ Avocado members will also gain access to the IrrigationNZ online knowledge and tools.

Tony Payton, a Northland avocado grower, fixes a sprinkler head.

This article was created by Chris Coughlan, Director, CBM Strategic Ltd.

Three waters: what an upgrade to water systems might mean

Although water has been the running conversation for many due to the Government's release of the reform of the National Policy Statement for Freshwater Management, water quality targets also lie elsewhere. The Three Waters Review began in mid-2017 and is looking at ways to improve the regulation and supply arrangements of drinking water, wastewater and stormwater (three waters). Most three water assets are owned and delivered by local councils.

Waimate District Council (WDC) Chief Executive Stuart Duncan said the review was timely, "We (New Zealand) have slipped back somewhat in asset management," although he was concerned what the implications of the review might be. The Three Waters Review is a cross-agency initiative led by the Minister of Local Government, Hon Nanaia Mahuta. It ran in parallel to the latter stages of the Havelock North Inquiry into drinking water safety following the campylobacter outbreak in 2016. Up to 5,500 people were ill as a result and four people are thought to have died from associated causes.

The initial findings of the review were consistent with many of the Havelock North Inquiry's findings, and raised broader questions about the effectiveness of the regulatory regime for the three waters, and the capability and sustainability of water service providers.

Mr Duncan has a long history of dealing with water management. He previously held positions with the Department of Natural Resources and Mines in Australia having responsibility for the scoping, design, operations and maintenance of government funded water and wastewater treatment facilities in North Queensland, before taking on the role as Chief Executive of various councils from 2004.

In July the Government approved a range of regulatory reforms to help ensure safe drinking water, and deliver improved environmental outcomes from New Zealand's wastewater and stormwater systems. This will include mandatory disinfection of water supplies with the possibility of high-level exemptions for some, stronger obligations for water suppliers, local authorities managing risks to sources of drinking water, and strengthened compliance.

Although regional councils will remain the primary regulators, there would be stronger central oversight of wastewater and stormwater regulation. A new dedicated water regulator will be established to oversee the regulatory regime. Mr Duncan's major concerns were that this review would bring tighter regulations around drinking water which could be complex, difficult to implement and costly for rural schemes. "We're home to 830km of rural pipelines and service 3,166 rural connections."

"To supply treated water at the farm gate … some water goes 300m to a dwelling whereas some goes 5km to the homestead with the possibility of side-connections to water-troughs, milking sheds and other on-farm facilities, so it is hard to manage the risk of that."

Mr Duncan said it was important to include the property owners in the development of approved solutions and arrangements for rural water supplies, where for example, more than 85% of the water is used for stock or horticulture; and not radically change the provisions. But reasonable, practical steps need to be taken to protect human health and well-being. Mr Duncan said he felt the three waters review was very close to home for the Waimate area due to so much of their water systems being on a rural supply. He wanted the Minister in charge of the review to come and see it for herself.

Recently Minister Nanaia Mahuta visited the Waimate District and said it was eye-opening to see the "practical challenges that need to be overcome." Min. Mahuta, said she understood that the regulator couldn't be a "one size fits all approach", due to the vast differences of water supply situations especially for those who were on their own water supply opposed to a community supply. Min. Mahuta also recognised there was concern around the implementation of the standards, and the cost of service delivery. "There will need to be lots of work done during the transition period."

"People and councils need to be confident wherever they live they have safe drinking water … people need assurance their drinking water is safe, there is high source protection, and there is protection of water being discharged back into the natural environment."

Min. Mahuta said work was currently being done on the legislation which would hopefully be introduced to Government before the end of this year and passed sometime next year.

She said it is proposed there would be a five-year transition period for small supplies (under 500 consumers) which was important especially for rural communities to overcome any hurdles.

At the Waikakahi Rural Water Supply are from left, Councillor Sheila Paul, Councillor Miriam Morton, Councillor Sharyn Cain (Deputy Mayor), Minister Nanaia Mahuta, Mayor Craig Rowley, Paul Roberts (water and waste manager), Dan Mitchell (assets group manager), Dion Glenie (utilities supervisor).

IRRIGATION NZ
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Kia ora koutou

I am thrilled to invite all our members, partners, industry representatives, farmers, and the whole community to our 2020 Water for Life Conference and Expo in Christchurch.

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Irrigation is just one way that community wellbeing is supported through good water management. Our 2020 Water for Life Conference will bring together a range of thought-provoking speakers across a range of water uses – beyond just irrigation.

From stimulating and enjoyable pre-conference tours, to international irrigation entrepreneurs, from in-depth panel discussion to hearing from key national-level decision-makers, there really is something for everyone on the programme.

IrrigationNZ represents several thousand members across the irrigation sector and beyond, and we look forward to hosting you in Christchurch, in April.

Elizabeth Soal, Chief Executive

Registrations are open! We look forward to seeing you there.

IRRIGATION NZ
CONFERENCE AND EXPO

Conference Programme

We are bringing our conference and expo back to Christchurch in the heart of Canterbury. The Airforce Museum is a fantastic location and site, allowing our plenary, breakout sessions, dinner, and expo to be held on one site, in a fascinating setting. Our Pre-Conference tours will also take place in Canterbury, see our full programme below.

Tuesday 7 April

8.30am-5.30pm	**PRE-CONFERENCE & PRE-TOUR REGISTRATION**
	PRE-CONFERENCE TOURS The Pre-Conference Tours are back for 2020 and will be held on Tuesday 7 April. There will be two tours to choose from: **Tour 1: Paddock to Plate** Join us as we travel down through the Canterbury plains into South Canterbury. Our farm and grower visits are still being finalised, but will include Barkers and Heartland Chips, including a scrumptious lunch at Barkers brand new café in Geraldine. **Tour 2: Paddock to Bottle** How does your beer get to the bottle?! Join us on a discovery tour to Gladfield Malts in Dunsandel, and then onto the Wigram Brewing Company, to tour and taste the end product. The tours will start from the conference venue, the Air Force Museum of New Zealand, (times TBC), and return by 5.15pm, for the Welcome Function in the venue Exhibition Hall.
3.30pm-5.30pm	**CONFERENCE EXHIBITION OPEN**
5.30pm-7.30pm	**WELCOME FUNCTION** Held in the exhibition hall

Wednesday 8 April

7.30am	**REGISTRATION DESK OPEN**
7.30am - 5.00pm	**CONFERENCE EXHIBITION OPEN**
7.30am - 8.30am	**WELCOME COFFEE**
8.30am - 9.00am	**CONFERENCE WELCOME & OPENING** Powhiri IrrigationNZ Chairwoman, Keri Johnston John Penno

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(Wednesday 8 April continued...)

9.00am - 10.00am	**THE NEW ZEALAND FARMING STORY SO FAR** Keith Woodford, Honorary Professor of Agri-Food Systems at Lincoln University. ***Living with elevated nitrate in our water; why and what's to be done?*** Dr Jenny Webster-Brown.
10.00am - 10.30am	**MORNING TEA**
10.30am - 12.00pm	**THE FUTURE – RESILIENCE AND DIVERSIFICATION** ***A new business model enabling sustainable land use transformation:*** Susan Goodfellow, Leftfield Innovation ***Waimea Community Dam, a public-private partnership to secure our region's future:*** Mike Scott, CEO, Waimea Water
12.00am - 1.00pm	**LUNCH**
1.00pm - 2.30pm	**PANEL DISCUSSION** **WHISKEY AND WATER - the future of water infrastructure** ***Moderator***: Donna-Marie Leaver ***Panelists:*** Susan Kilsby, ANZ Agri-Economist Sarah Perriam Elizabeth Soal, CEO, IrrigationNZ Carl McGuiness, The Nature Conservancy Gary Kelliher, Otago Regional Council
2.30pm - 3.00pm	**AFTERNOON TEA**
3.00pm - 4.30pm	**KEYNOTE** **MAKING EVERY DROP OF WATER COUNT** ***Monty Teeter, Teeter Irrigation:*** Developer & CEO of Dragon-Line Mobile Drip Irrigation (Ulysses, Kansas)
7.00pm	**CONFERENCE DINNER** Venue Aircraft Hall

IRRIGATION NZ
CONFERENCE AND EXPO

Thursday 9 April

7.30am - 2.00pm	**REGISTRATION DESK OPEN**
7.30am - 2.00pm	**CONFERENCE EXHIBITION OPEN**
8.00am - 8.45am	**DELEGATE NETWORKING BREAKFAST IN EXHIBITION HALL**
9.00am - 10.00am	**KEYNOTE** **TRANSFORMING LANDSCAPES USING DIGITAL TECHNOLOGIES AND VISUALISATION.** ***Dr Seth Laurenson,*** Ag Research.
10.00am - 10.30am	**MORNING TEA**
10.30am - 12.00pm	**FUTURE FOCUSED PRESENTATIONS** **How technology will support better farming outcomes** ***Stu Bradbury:*** Business strategy advisor, technologist, and thinker outside of squares. ***Reducing Nutrient Loss Through Irrigation Efficiency:*** Greg Sneath, Fertiliser Association of New Zealand ZIMMATIC BY LINDSAY **POLICY: the future of water allocation in Aotearoa** ***Legal Implications:*** David Goodman, Anderson Lloyd. ***Policy debates and social media - Don't be a Drip:*** Chelsea Millar, Grass Roots Media **Water use and the future of farming** ***The Future of Farming and Growing:*** Angela Hogg, FMG. ***The relative impact of soil variability on the value of VRI strategies:*** Joanna Short, Plant and Food ***Mt Cook Alpine Salmon:*** Brian Blanchard, Director of Aquaculture
12.00pm - 1.00pm	**LUNCH**
1.00pm - 1.30pm	**CEO WRAP UP** Elizabeth Soal
1.30pm - 1.45pm	**CONFERENCE CLOSING** Keri Johnston (IrrigationNZ Chairwoman)

Speaker Bios

Sarah Perriam

Sarah Perriam is a rural broadcaster passionate about connecting the curious consumers with our passionate producers with a new show due to launch in January 2020. Sarah runs Perriam Media, a communications consultancy specialising in agri-business & agri-science becoming outstanding thought leaders in their field.

Sarah previously co-hosted 'Rural Exchange' on Magic Talk and her Friday 'rural' segment with Duncan Garner on the AM Show as a platform to regularly talk about the big issues in agri-business.

In 2018, she hosted the 50th FMG Young Farmer of the Year live-broadcast on Newshub.co.nz and was nominated as a finalist in the Westpac Women of Influence.

She has recently been involved as a speaker & MC at many events around New Zealand, including the 2019 Boma Grow Summit.

Sarah Perriam has a passion for sharing the stories of New Zealand's premium food & beverage producers environmental, animal welfare and global trade business practices are often misunderstood by the public.

Gary Kelliher

I am a sheep and deer farmer near Alexandra in Central Otago.

Our property is irrigated from the Manuherikia Irrigation scheme with storage in dry periods from Falls dam. I have a civil engineering background, and have held a number of Manuherikia Catchment roles including chairman of the Manuherikia Irrigation Scheme, and chairman of the Manuherikia sub-committee of the Otago Water Users Resource Group established to transition the catchment through scheme consent renewals and minimum flow plan changes. I was also the deputy chairman under an independent chair, of the Manuherikia Catchment Water Strategy Group. I was an Otago Regional Councillor from 2013 to 2016, and have recently been re-elected to the Council. On re-election I stood down from my catchment roles to focus fully on playing my part at the Council table. I also was involved with the Dairy Creek Irrigation Scheme and led this project through feasibility studies until it was taken up and completed by a grouping of contributing landowners and our local power company.

I am very community focused, and believe in balance and sustainability in all aspects of communities' current and future aspirations. This is critical to decision making involving infrastructure alongside ensuring the environmental health of the rivers and waterways that are unique to Central Otago.

Susan Kilby

Susan rejoined ANZ Bank in the Agriculture Economist role in October 2018, having previously been employed by ANZ in a graduate role earlier in her career.

Susan was previously at NZX where she headed up a team of agriculture analysts providing market intelligence to many leading global dairy businesses by way of regular reports, news and online tools. While at NZX she was involved with launching the dairy derivatives market, including the milk price future and options products. Susan worked alongside Massey University to develop a milk price calculator and a milk production predictor tool. Susan has authored several reports on New Zealand and China's dairy industry and has presented regularly at local and international conferences.

Susan studied Agricultural Economics at Massey University. She was raised on a dairy farm in Toko but now lives with her partner and two children on a small sheep and beef farm in Martinborough.

Monty Teeter

Monty started in the Irrigation Industry in 1972 and started his own business in 1977.

He has been a distributor, designer, and installer of centre pivots for 40 plus years, and has experience in SDI (Sub-Surface Drip Irrigation) for 20 plus years. This experience of selling more than 3,500 pivots and thousands of acres of SDI has allowed Monty to become proficient in the understanding the technologies and benefits of both irrigation applications. In addition, he started developing Dragon-Line nine years ago, the Orange Mobile Drip Irrigation. Today, he is going to share his vision with us about "How to make very drop of water count!" and the benefits of Mobile Drip Irrigation.

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Social Functions

Welcome Function

The Welcome Function will be held on Tuesday evening in the Exhibition Hall from 5.30pm to 7.30pm. If you do go on one of the Pre-Conference Tours during the day the bus will return you to the Air Force Museum of NZ in time for the Welcome Function. A great way to start your time at conference by having a drink with friends and colleagues, new and old.

Gala Awards Dinner | $155

Don't miss the Gala Awards dinner on the evening of Wednesday 8th of April. The Gala Awards dinner will be a vibrant and exciting evening of food, drinks, and entertainment. We will be celebrating and presenting a variety of awards in irrigation, including the Ballance Agri-Nutrients Innovation in Irrigation Award.

Tickets to the Gala Awards Dinner are an additional cost to all registration types this year, and there are a limited number of tickets available so we recommend early booking. Partners are welcome.

Note that sales end on 25 Mar 2020 for catering purposes, so don't miss out.

Ballance agri-nutrients

Innovation Awards Sponsor

Delegate Breakfast

The Delegate Breakfast is being held on the morning of Thursday 9th of April from 8am to 8.45am. Wake up with this networking breakfast and start the final day of Conference on the right footing. If you intend to come along to the Delegate Breakfast, please advise at the time of registration for catering purposes.

Pre-Conference Tours

The Pre-Conference Tours are back for 2020 and will be held on ***Tuesday 7 April*** in Canterbury. There will be two tours to choose from:

TOUR 1: PADDOCK TO PLATE

TOUR 2: PADDOCK TO BOTTLE

Expo Information

A major feature of the Conference is our Expo. A high traffic area where all delegate catering will be served. The Expo has been designed specifically to showcase industry products & services, and offers your organisation presence, and a prime opportunity to communicate directly on a personal basis with your potential clients. Our event organisers, Beck & Caul, creative design masterminds, are available to assist you in the design of your site ensuring you get maximum exposure. As with our previous conferences these sites are selling out fast, with well over half of the sites already sold. If you do want to be part of the Expo we suggest you do this as soon as possible. You can view the latest floorplan at waterforlife.kiwi/exhibitor-info

Registration Info

REGISTRATIONS ARE NOW OPEN.

You can register by heading to ***waterforlife.kiwi.*** If you have any questions regarding registration please contact: **Jane@beckandcaul.co.nz**

Accommodation

The Conference has secured block bookings in many hotels in the Christchurch CBD for the duration of the Conference. We will provide a list of partner hotels and discount codes on our conference webpage ***waterforlife.kiwi/conference*** – check back regularly for updates.

If you would like further information regarding registration or accommodation, please contact: **Jane@beckandcaul.co.nz**

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Full Registration

MEMBER: $699
| EARLY-BIRD PRICE OF $580 UNTIL 12 FEB 2020

NON-MEMBER: $870
| EARLY BIRD PRICE OF $740 UNTIL 12 FEB 2020

Includes:

- Welcome Function
- Conference satchel and handbook
- Attendance at the two day, three stream conference programme including technical and practical breakout sessions
- Access to the Trade Expo
- Conference Catering: morning/afternoon tea and lunch
- Delegate Breakfast

Day Registration

MEMBER & NON-MEMBER $470

Includes:

- Conference handbook
- Attendance at sessions on the specified day
- Access to the Trade Expo on the specified day
- Conference Catering on the specified day

Industry Group Package

$1,551 | PACKAGE AVAILABLE UNTIL 12 FEB 2020

Receive three registrations at a discounted price. It is possible to change delegate details at a later date. Individuals within the package receive:

- Welcome function
- Conference satchel and handbook
- Attendance at the two day, three stream conference programme including technical and practical breakout sessions
- Access to the Trade Expo
- Conference Catering: morning/afternoon tea and lunch
- Delegate Breakfast

Irrigation Scheme and Water User Group Package Registration

$2,000 | PACKAGE AVAILABLE UNTIL 12 FEB 2020

Receive four registrations at a discounted price. It is possible to change delegate details at a later date. Individuals within the package receive:

- Welcome function
- Conference satchel and handbook
- Attendance at the two day, three stream conference programme including technical and practical breakout sessions
- Access to the Trade Expo
- Conference catering: morning/afternoon tea and lunch
- Delegate Breakfast

Please note:
The Pre-Conference tours and the Gala Awards Dinner are not included within the registration price. Tickets to the Pre-Conference tours and Gala Awards Dinner can be purchased separately. We recommend that you book now with your registration.

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For more information please contact **Julie Lee, Conference Manager**
m. 027 739 1832 **e. jules@irrigationnz.co.nz**

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Cutting emissions: a tricky business

Cutting stock numbers may be the only way to reduce greenhouse gas (GHG) emissions for deer farmers.

A case study carried out by agribusiness consultant Alesha Cooper from AgFirst Manawatu-Whanganui commissioned by the Deer Industry NZ (DINZ) has shown that only small reductions have been achieved without reducing stocking rate.

New Zealand livestock farming results in biological emissions of methane and nitrous oxide. The main source of methane is rumen digestion with a small amount coming from manure. Nitrous oxide is mainly sourced from nitrogen applied to the soil via animal urine, dung deposits and fertiliser.

Four farms were selected by DINZ to represent a range of deer farms across New Zealand. Two were North Island hill country farms, and two in the South Island, one being high country and another flat to rolling country. The farms targeted different avenues with two being breeder-finishers, one velvet focused and another a venison finisher.

GHG emissions were determined using Overseer FM which uses a farm's physical characteristics and management data to estimate emissions.

All four farms were running deer, cattle and sheep at ratios ranging from 22% to 79% deer. Across all operations sheep had lower carbon emissions per stock unit than deer or cattle which had similar emission levels.

Methane emissions are largely related to the amount of dry matter eaten while nitrous oxide emissions are influenced by the amount of nitrogen in the system. Reductions in emissions were achieved through increased per animal performance, lowered stocking rate, reduced replacement rate, optimised N fertiliser use, lowered N content feeds, and reducing the ratio of higher emitting stock classes and replacing with lower emitting stock.

On-farm examples included increasing calving/lambing percentage and reducing mixed age numbers or replacing breeding stock with stock classes to be finished.

"Increasing per animal performance and a lower stocking rate gives farmers the opportunity to maintain or improve profitability while reducing dry matter intake and therefore methane emissions," said Ms Cooper.

Implementing changes to a farm system without impacting on profitability could reduce emissions by 5–10%. The reduction that can be achieved depends on the current farm system.

A study has found minimal options to reduce farm emissions without reducing stocking rate or offsetting with trees.

Trees may go some way towards offsetting emissions, however which trees can be considered and the emissions that can be offset are still being determined.

The study found carbon sequestered by trees (including shelter belts) established post-1989, resulted in a zero to 46.5% offset of farm emissions.

The incorporation of new tree areas on the farms was considered. In some scenarios this resulted in a reduction in GHG emissions and the offsetting of emissions. Ms Cooper said it was important to understand plantation forestry was not a permanent solution for offsetting emissions as additional trees would need to be planted every harvest.

"For example, assume 100ha of forestry is sufficient for offsetting emissions on a farm, following the first harvest after 28 years, the initial 100ha would need to be replanted to offset the carbon removed at harvesting, plus an additional 100ha would need to be planted to offset continuing emissions. "

If you are considering forestry for carbon sequestration and offsetting it is important to get good advice."

Ms Cooper identified several mitigation options might become available in the future, these included methane and nitrification inhibitors.

Methane inhibitors for deer could be delivered, however it would be difficult in farms where stock was not handled regularly and were predominately fed pasture.

"The challenge will be supplying methane inhibitors to stock in a way that will be effective."

Nitrification inhibitors have been shown to reduce nitrous oxide emissions, however, are unable to be used on New Zealand farms.

"There is potential for nitrification inhibitors to be become commercially available in New Zealand in the future," said Ms Cooper.

Methane emissions also vary from animal to animal, a difference that had a genetic basis, so selecting for low emitters would likely become possible one day.

Action on agricultural emissions

The Government decision in late October to work with the primary sector to reduce greenhouse gas emissions was a welcomed one.

The agreement means for horticulture there will be no additional Emissions Trading Scheme (ETS) tax on fertiliser. In return, the pastoral sector and horticulture have undertaken to make progress on climate change mitigation in partnership with the Government.

There will be no cost imposed from 2020 to 2025, however farmers and growers will have to implement farm plans and calculate their emissions and offsets at the farmgate from 2025.

"We are pleased that the Government has recognised that it does not make sense to bring agriculture into the ETS and that we have a pathway to work with the Government to develop a more appropriate framework," the sector said in a joint statement.

"We welcome this pragmatic and sensible decision by the Government to work in partnership with industry to achieve tangible on-farm change and hope that it might provide a blueprint for the way we work together to solve environmental challenges in the future."

Progress will be reviewed in 2022 and if the Government is unhappy it will revert to the original legislation.

HISTORY OF THE EMISSIONS TRADING SCHEME

Emissions trading is a tool for sending price signals to producers, consumers, and investors that encourage and enable them to reduce the greenhouse gas (GHG) emissions that contribute to climate change. Globally, 25 emissions trading systems have been implemented or scheduled as of 2018. The New Zealand Emissions Trading Scheme (NZ ETS) began operation in 2008 and continues to serve as a principal element of New Zealand's policy response to climate change.

The NZ ETS puts a price on greenhouse gas emissions. It creates a financial incentive for:

- businesses to reduce their emissions
- landowners to earn money by planting forests that absorb carbon dioxide as the trees grow.

One emission unit, the New Zealand Unit, represents one metric tonne of carbon dioxide or carbon dioxide equivalent (i.e., the amount of another greenhouse gas that does as much damage as one tonne of carbon dioxide).

The Government gives eligible foresters units for carbon dioxide that is absorbed by their trees. The foresters can sell these units on the NZ ETS market. Businesses with surrender obligations (legal obligations to hand over units) must purchase enough units to cover their emissions. These units are then surrendered to the Government.

For example, a business emitting 2,000 tonnes of greenhouse gases would need to purchase 2,000 emission units on the NZ ETS market. If the emitter reduced their emissions by 500 tonnes of greenhouse gases they would only need to purchase and surrender 1,500 units.

It is up to the emitter to decide whether they wish to reduce their emissions or purchase units. The price which the emitter pays for units, sometimes called the carbon price, is set by supply and demand. Where demand for units increases and supply remains constant, the price of units will generally increase. The price will decrease where there is an abundant supply of units.

WHAT DO THE EXPERTS HAVE TO SAY ABOUT THE DECISION?

Director of the New Zealand Climate Change Research Institute Professor Dave Frame said it was a good thing methane emissions were not in the ETS. He believed they should be managed and priced through a different scheme.

"This 'two-basket' approach is what both the Productivity Commission and the Parliamentary Commissioner for the Environment recommended last year. The details of their recommendations differed in important ways for farmers, but the essence of both groups was that we should take different approaches for fossil carbon and methane, to be consistent of the differences between pollutants with temporary effects and those with effects that accumulate."

Prof. Frame said the ETS as a whole wasn't an effective system.

"The price is too low to achieve much in the way of behaviour change. The logic of cap and trade systems implies a cap, and that this cap reduces over time. The price of carbon dioxide and nitrous oxide should rise if our actions are to match the targets that have been set."

> "Scientists need to be able to measure on-farm emissions, and the policy and agricultural communities need to work together to create a practical, effective system with high environmental integrity."

For the ETS to be effective for both agriculture and horticulture there needed to be viable options for farmers to innovate.

"Scientists need to be able to measure on-farm emissions, and the policy and agricultural communities need to work together to create a practical, effective system with high environmental integrity."

At this time assessing environmental implications involved with agriculture was well conversed due to both the ETS decisions and also the Action for Healthy Waterways discussion document released by central Government in early September. However, Prof. Frame said this was justified because the idea that polluters should take responsibility for their pollution is universally held.

"Farmers should not be required to pay twice for the same pollution, but they should pay the social costs. It's reasonable for New Zealanders to want to lighten the human footprint on the environment, and policy, including price, has a role to play in doing this. At the same time, we ought to apply the same principles to urban New Zealanders and to visitors to our country. And climate change warrants a strong, global response. We should play a part in this, and so should our competitors. It's reasonable to negotiate with them about how to make progress together."

Forest & Bird chief executive Kevin Hague said the Government and agriculture industry had taken a step in the right direction but the change was too slow.

"We need all industries to do everything they can to reduce greenhouse gas emissions right away."

"The longer we leave it, the faster the agriculture sector will have to cut emissions to limit warming to 1.5 degrees, the harder it will be for farmers. Procrastination and half-measures already mean we have almost run out of time."

"We believe in farm level inclusion to help drive individual behaviour change, but the incentive needs to meaningful for farmers and includes all greenhouse gas emissions," Mr Hague said.

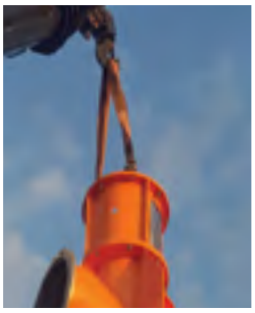
He said the changes for measuring and pricing emissions are important and align with other environmental reforms like changes to freshwater rules.

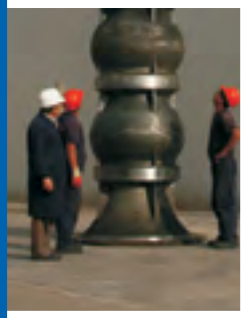






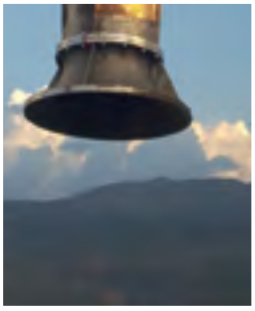
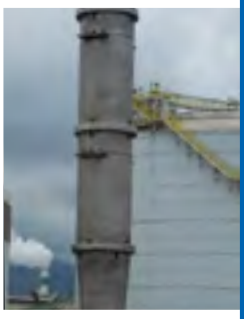






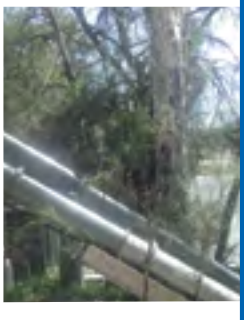










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Reflecting on their time at IrrigationNZ

IrrigationNZ board members Rab McDowell and Nicky Hyslop have recently retired from their roles within the organisation.

What is your history with IrrigationNZ?

NICKY: I have been involved with IrrigationNZ for over five years. Having been on the board of our local irrigation company, Opuha Water Limited and having converted all our property to irrigation in 2004/2005, I had experienced first-hand the incredible value of irrigation in providing for farming resilience. I became increasingly aware of the need for wider industry conversations about that obligation water users must ensure they are using a precious resource responsibly and sharing this information with policy makers and the wider public.

RAB: I farm an arable, dairy support and lamb finishing farm in Mayfield and first became involved with irrigation eight years ago through Barhill Chertsey Irrigation. On beginning to use irrigation on my farm I became interested in the issues and advocacy associated with it. When the opportunity came up to be on the IrrigationNZ board I took it as I wanted to learn more about the irrigation sector and help promote it.

What has your role involved?

NICKY: My role has evolved from being a board member to vice and then Chair in (check IrrigationNZ for year). Being a board member of IrrigationNZ has had the obligation of being an ambassador for excellence in irrigation, to share an understanding of why and how we irrigate to the wider public and the role we have in our community, to acknowledge the impacts of intensive farming under irrigation and to challenge our members with continuous improvement. Both the vice but, particularly Chair has an additional role of supporting management interaction with government and officials to ensure a deep understanding of irrigation and its challenges/opportunities. The interaction with central government must be bi-partisan and committed as much to listening as to sharing information and collaboratively looking for solutions. Standing strong on particular issues has also been important.

RAB: It has been an interesting period to be involved with IrrigationNZ. It has been a period where the focus has shifted from technical in the field irrigation issues to more political and advocacy work. Advocacy work has become more important during my time on the board.

Nicky Hyslop.

Rab McDowell.

How has your role changed over time?

NICKY: There has been both an organic and committed move to collaborative engagement as opposed to adversarial. What is frustrating is the time in which this takes to achieve solutions and that not all parties and organisations have committed to this approach.

RAB: As I said previously IrrigationNZ has become more advocacy focused. Previously there was more importance on training irrigation users but as both users and schemes have become upskilled – this is still important but is no longer required as much.

What have you enjoyed about being a part of IrrigationNZ?

NICKY: I have been privileged to meet and engage with some incredibly capable people including those with divergent views. You cannot help but respect those who engage with honesty and integrity. I have really enjoyed being part of the primary sector which is so much more aligned on the direction of travel we are now on. We must continue to work hard and show leadership to ensure this continues.

RAB: Doing my bit. Showing how irrigation is essential for across board production, beyond on-the-ground farming.

Where do you see the future of water usage going for New Zealanders – specifically for people with irrigation?

NICKY: All water users will need to demonstrate that their use of water is responsible, effective and efficient. I strongly believe that water storage is an important conversation for all New Zealanders going forward, but particularly for irrigators as this has the potential to reduce run of the river and groundwater take abstraction. Strategic and sensible water storage will be vital in many east coast districts to provide reliable water sources for all users; domestic, recreational, irrigation while also providing relief to the environment and ecosystem when summery dry conditions would otherwise result in rivers/streams running dry. Climate change will provide even more necessity to have this conversation.

RAB: It's essential that we're going to have an increasing need of how we can justify our water use and get it in the right place at the right time while considering all the environmental aspects and needs. New Zealand is a water rich country we need to utilise it without harming it.

What are your future plans now you have finished on the IrrigationNZ board?

NICKY: I have other governance roles within the primary sector, (BLNZ, Opuha Water Limited, Ravensdown) where I will be able to share the knowledge and governance experience and connections I have gained through IrrigationNZ to champion and challenge farmers in their role of sustainable food and fibre production. Ultimately, spending time with family and dedicating time to our farm business to continue to explore opportunities to grow sustainable food while enjoying the wonderful environment of farming with nature is a great outlook.

RAB: I have enjoyed my time at IrrigationNZ and was lucky to have the opportunity to expand my knowledge. I will continue farming and developing other interests.

Stepping back after a long career – driven by a passion for law and environment

After a successful career, which spanned over five decades, Professor Peter Skelton has closed the final chapter of his working life. Prof. Skelton was most recently an Environment Canterbury Councillor however, the recent elections saw him step down from this role. At the age of 80 the decision to retire was well deserved as Prof. Skelton has effectively had four separate careers in his working life. Prof. Skelton completed his tertiary education at Auckland University where he gained his law degree.

"At that time students worked in law offices during the day and went to lectures at night or in the early morning … it allowed me to get a good grounding in the practice of law."

Following completion of his studies he became a partner in a law firm in Hamilton for 14 years. During this time Prof. Skelton became involved with the early stages of planning and resource management.

"I could see planning was going to become very important … not just planning but, resource management generally, was developing rapidly in a rapidly developing country."

Prof. Skelton began to discover his passion for the environment and its future and how his knowledge around resource management and the law worked together.

Prof. Skelton was appointed a Judge of the Environment Court of New Zealand in 1979 and with his wife and three children he returned to his home town of Christchurch to take up that appointment. This role saw him spend a lot of time travelling around New Zealand, "it was good because I got to see a lot of my own country."

Prof. Skelton was an Environment Court Judge when the Resource Management Act was passed in 1991. "It was an interesting and demanding time as I had to learn to work with a new piece of legislation." He said the Act was a good piece of legislation because prior to this there had been several different statutes providing for the management of natural and physical resources in a largely un-coordinated way.

In 2000 Prof. Skelton retired from the Environment Court and later that year he was appointed a Companion of the New Zealand Order of Merit for his services to Environmental Law. In the same year he went on to teach environmental law at Lincoln University. "Its been great to see later in life, students that I taught and helped come through and work with them in their professional roles." In 2006 he finished his time at Lincoln University. On retirement he was awarded the position of Honorary Professor.

> "There are a lot of benefits from farm planning which I believe outweigh the negatives associated with this resource hungry task. I have a huge admiration for the people who choose to adapt and do this planning not just for their benefit but for the benefit of the whole nation."

He then went on to do independent hearing commissioner work, first for the Waikato Regional Council relating to a ground breaking plan variation to control nitrate losses from pastoral farming in the Lake Taupo Catchment and later for the Canterbury Regional Council relating to a series of water applications in the Lower Waitaki Valley. He said this work helped him in his next role of an Environment Canterbury Commissioner to which he was appointed by the New Zealand government in 2010. Prof. Skelton stayed in this role until 2016 and following this spent three years as an appointed councillor in a partially elected and partially appointed Council. Although Prof. Skelton said he felt like he still had plenty of work left in him the time had come to step down from his role, and he was privileged to be able to sit back and reflect on what he had achieved in his career.

Prof. Skelton's extensive experience over the years had seen a huge change in environmental planning and resource management. Although water was currently front of mind for many, he said much more needed to be considered around environmental management generally.

How have you seen environmental planning change over time?

Early on I could see that one of New Zealand's major industries, primary food production would require more forward planning the more intensive it became. I also saw the beginning of the environmental consequences of intensification and helped put measures in place to control these. I was involved in the development of the first ever spray effluent irrigation facility at a dairy factory in the Waikato.

Professor Peter Skelton.

It was a matter of recognising the implications not only for water but also the environmental implications of other practices such as spraying harmful pesticides into the air, farming where odours were emitted and quarries which emitted extensive dust. It wasn't only in a rural context either. The urban context was also involved. In the early stages of working at a law firm I could see Hamilton wasn't going to stay small forever and that urban development on farmland could have negative implications in the long run.

Where do you see the future of farm planning going?

Farm management planning is very resource hungry and can take a lot of time. However, the primary sector needs to carry out planning just like any other industry. People now have an obligation to plan. There are a lot of benefits from farm planning which I believe outweigh the negatives associated with this resource hungry task. I have a huge admiration for the people who choose to adapt and do this planning not just for their benefit but for the benefit of the whole nation.

What did your experience with Environment Canterbury involve?

In 2010 the New Zealand Government, through a special statutory process, appointed seven very experienced people to govern Environment Canterbury and I was one of those appointed due to my judicial experience in the Environment Court. In that role I helped develop catchment-based planning around water quantity and water quality issues and solutions. We realised how important it was to have water management zone committees working at the catchment level These committees enabled area specific issues to be addressed and made the solutions more achievable. I also helped develop region-wide and sub-regional rules for a variety of activities including air discharges; nutrient discharges and the allocation of water for different uses.

I enjoyed getting involved with planting programmes with the younger generation. Informing the younger generation is so important. I believe it is more important to inform the younger generation than the older ones. We need to encourage the attainment of knowledge about all our natural and physical resource uses from a young age to ensure things don't go backwards.

What is the biggest change you have seen in water management?

Peoples' attitudes and behaviour. Its one thing to have rules, it's another to get people to follow them. The positive change from most farmers has bought about well-controlled water use and water quality and there is now a good understanding of this within the farming community. What we are dealing with here are the consequences of decades of largely uncontrolled rural and urban activities that will take decades to put right. There will be significant financial implications for us all, including both the farming community and those of us who live in urban environments. I think most people now recognise these implications and are prepared to face up to them over time.

Where do you see the future of resource management going?

I'm optimistic about the future. There are systems in place to enable us to go forward with more environmentally acceptable behaviour. Central government too has become more active in the area of water management – this helps local authorities to play their part and helps the communities themselves. I was pleased to see the recent publication of Essential Freshwater package that includes a revised National Policy Statement for Freshwater Water Management. In the Canterbury region we have been giving effect to much of this policy for more than six years now. However, the timelines in the package are very optimistic. It's good to be ambitious, however you can be too ambitious. It's also very important that those making the policy realise that a one size fits all approach is not realistic. There needs to be flexibility depending on the region and right down to a catchment level.

"It's good to be ambitious, however you can be too ambitious. It's also very important that those making the policy realise that a one size fits all approach is not realistic. There needs to be flexibility depending on the region and right down to a catchment level."

Election results across the five main irrigating regions

Elections of members of local authorities are held once every three years and this year was one of them. We took this opportunity to catch up with all the new councillors across the five main irrigating regions in New Zealand: Canterbury, Waikato, Hawke's Bay, Marlborough and Otago. New Councillors elected on 12 October have started their term in office.

WAIKATO

Jennifer Nickel

In 2030, Jennifer wanted people to look back and say, "I'm glad they thought of this ten years ago!"

Jennifer was future-focussed, open-minded and confident to make bold decisions with good quality data. "I expect innovative and flexible solutions towards ambitious goals and am skilled in collaboration. Balancing environmental needs adequately with our economic and social desires is critical to ensure a prosperous future for our region. We can do better when it comes to waterway health, biodiversity and our footprints. I've served on leadership teams at several Waikato-based Fonterra manufacturing sites with a mandate of controlling and improving environmental risk and compliance, managing industrial wastewater teams and building relationships with local communities, councils and Iwi."

She also holds a Master of Science degree in biology, a Graduate Diploma in Sustainability and has over five years of cancer research experience.

Angela Strange

Angela believes the Waikato region is a great place to live, work, and raise a family.

"It's important that growth is well-planned and sustainable, with the health of our environment at its core. I am committed to prudent financial management, ensuring smart investment in infrastructure, and providing core services cost-effectively. We must ensure our transport network is balanced, efficient and accessible, providing a diverse range of options. Water is an essential resource, requiring protection for future generations; the health of our waterways is an important component of this. It's important we value healthy air and soils, biosecurity and ecological restoration. Environmental education develops the ability to think and act sustainably, I have been a keen supporter of the Enviroschools programme for many years."

Pamela Storey

Pamela is a proud food producer and wife of a fourth generation Waikato dairy farmer.

"I am a business owner, experienced board member, and long-standing community and environmental leader. I have lived in the Waikato for 23 years, and I want to provide a strong voice for our rural communities. I am committed to growing strong rural communities through sustainable economic development, connecting rural communities through quality transport and infrastructure, protecting our native flora and fauna for future generations. In addition to having brought Kaivolution and the Huntly Energy Efficiency Trust to our community, I'm currently a director of Primary ITO, the Dairy Women's Network, and the Good Collective. I have the right balance of established relationships throughout the rural communities in our region to help make my vision a reality."

Andrew MacPherson

"My wife and I live in Te Awamutu. I am an experienced businessman, board director and well-known former Te Awamutu vet. The Waipā-King Country electorate needs Regional Councillors who have the proven skills and experiences to represent both rural and urban communities and develop sensible policies. I have both. A vote for me is a vote for: development of evidence-based policies which protect and enhance our environment; promotion of sound economic development; and building of vibrant communities. There is growing inequality in our community, the Waikato Regional Council has a role in fixing this. My focus will be on genuinely listening to and enacting the views of urban rate payers and real farmers. Cambridge, Te Awamutu Otorohanga and Te Kuiti deserve a strong voice at the Council. I support less politics and more action for Waipā-King Country's benefit."

Denis Tegg

"As a (retired) lawyer and community campaigner I have the knowledge experience and vision to serve as your regional councillor. Thames-Coromandel already faces daunting challenges. Coastal flooding, droughts, and destructive rainstorms are occurring more frequently. Numerous species face extinction. Many rivers are un-swimmable and unsafe for drinking. These issues already adversely impact our wellbeing and economy and will severely worsen unless we act now. They are core regional council responsibilities and will be my focus. Our children and grandchildren will not inherit a prosperous and liveable planet unless regional council and central/local government lead with vigorous immediate action. I have lived in Thames for 45 years. Twenty years ago, I proposed a law which still protects many beaches and forests from mining. The successful Thames public bus service was my brainchild. I coaxed TCDC into addressing coastal flooding. Imagine what I can achieve as your regional councillor."

HAWKE'S BAY

Martin Williams

Martin is a first term councillor representing the Napier constituency. Martin and his wife moved to Napier in early 2008 and have since raised their two children in the area and are now completing their final years of high school in the region. His branch of the Williams family has lived in Hawke's Bay since the 1860s, although he grew up elsewhere in the North Island, with his parents returning to live in Napier in 1985. Martin has worked as a lawyer specialising in local government and environmental law since 1995, graduating in law after first completing an honours degree in biological science at Massey University.

Will Foley

Will was born and raised in Takapau, Central Hawke's Bay. He completed a Bachelor of Applied Science in Agriculture in 1998 at Massey University before returning home to work in the family farming business. He is married to Abbie with two young boys at home in Hatuma and two older boys at secondary school in Wellington.

"I love the opportunity to help Hawke's Bay prosper environmentally socially, culturally, and economically. Recently I joined the board of trustees at St Joseph's, Waipukurau and will look to upskill myself where needed to assist in my new role as Regional Councillor."

Jerf Van Beek

"I want to help build and be part of a prosperous community – one where the local industries create jobs and wellbeing whilst protecting and improving our natural environment. Hawke's Bay has plenty of water especially when we invest in storage. It is just how we as a community are going to manage it for the future wellbeing of community and the environment. I have a proven record in collaboration and know what the key issues are affecting our businesses and local families. I am a local grower and a hard-working member and supporter of the TANK process."

Jerf is chairman of the Twyford Irrigator group and of PickHB which is a 50 plus grower labour co-op. He is the national co-ordinator for seasonal labour for Horticulture NZ in which capacity he helped to develop the Recognised Seasonal Employer scheme. Jerf and his wife Carla have five children.

Hinewai Ormsby

Tēnā koutou, ko Hinewai Ormsby āhau. Hinewai is a proud local and descendant of the first settlers in Hawke's Bay.

"My experience as a science teacher, business owner, native tree nursery grower, trustee on three boards, community project manager and mother of two, has prepared me for this Regional Council role. It will be a pleasure to represent Hawke's Bay, with all the greatness our region has to offer. I am looking forward to collaborating with fellow Councillors, staff and our community to drive long term restoration of our natural environment for the benefit of this generation and the generations to come."

Craig Foss

Craig lives on a small farm at Waimarama. He totally enjoyed representing Hawke's Bay as a MP 2005-2017, always "Backing the Bay" and holding a wide variety of Ministerial portfolios." Of all the places have lived around the world Hawke's Bay is simply the best!

"I enjoy fishing from my jet ski, walking the beach with my wife, helping with our daughter's equestrian sport, chilling out at cafes and wineries and of course, our home."

"I am a member of Transparency International, a Director at Horse of The Year, and am involved with companies that use technology and business opportunities to improve our environment."

Charles Lambert

Charles and partner Vilma and have five children and are proud to call Mohaka home.

"We have 35 acres there and we enjoy fishing on the Mohaka and the amazing lifestyle on offer in the Wairoa district."

As one of the new councillors Charles is very keen to get alongside our communities to work towards a healthy and thriving region. Economic development is high on the agenda, carbon neutral is high on the agenda, and protecting our water is up there as well.

"It's going to be an exciting three years – looking forward to it."

MARLBOROUGH

David Croad

David has lived in Blenheim for 38 years and has over 25 years of business ownership and management experience. In 2013 he semi-retired from his business to create more time for family and recreation including his passion for the Marlborough Sounds and all things boating.

Thelma Sowman

Thelma has lived in Blenheim for most of her life and has extensive business and governance knowledge after spending time managing radio stations and as a director of her family's exporting business. Thelma has also been a trustee on various local voluntary organisations, including the Nelson/Marlborough Rescue Helicopter Trust, First Light Foundation and the Marlborough Heritage Trust.

When she isn't working Thelma enjoys cycling, yoga and gardening.

Barbara Faulls

Barbara grew up in Linkwater and after studying, travelling and working overseas she returned home and joined the New Zealand Army as a Regular Force Officer. After serving for just over six years, Barbara and her husband were lured back to Linkwater where they run a holiday park.

Barbara has volunteered on a number of committees over the years and is currently a trustee of the Link Pathway, Destination Marlborough and Holiday Parks New Zealand.

Francis Maher

Francis returns after a six year break, having previously served as a Councillor for 15 years. Francis is passionate about the environment and farming.

During his time away from Council he has spent time working on projects, including an extensive native plant restoration programme on his family farms.

Continued over...

CANTERBURY

Megan Hands

Megan is co-chair of the Selwyn-Te Waihora zone committee and a self-employed environmental consultant, with a degree in Environmental Management and Planning and qualifications in nutrient management. She campaigned on a platform of collaborative decision-making using evidence, science and responsible spending to sustain our regions economic growth and protect the environment.

Her priorities are a healthy environment, safe drinking water and clean air, maintaining and enhancing biodiversity, providing affordable and accessible public transport, and ensuring a balance of environmental responsibility with fiscal responsibility.

Jenny Hughey

Jenny has a masters degree in law and has spent 11 years in governance and community support and leadership roles at Christchurch City Council. She campaigned on a platform of knowing how councils work and the need for community engagement based on experience as an Environmental Inquiry Commissioner, extensive work at CCC in governance, insurance claims and the Styx River community project. Her priorities are reducing carbon emissions, transition to regenerative agriculture and de-intensifying dairy farms, protecting the aquifers from further pollution and nitrate leakage, moving to one public transport agency and rebuilding democracy.

Ian Mackenzie

Ian runs a diversified irrigated, family farming operation producing grain, seed, meat and milk in Eiffelton, including protected wetlands providing habitat for Canterbury mudfish and other native fish and bird species. He has a Bachelor of AgSci, was involved in the early days on the CWMS developing the zone committees, and has had various roles for federated farmers at a regional and national level. He campaigned on a platform of being an Ashburton voice on the regional council, who understands rural and urban environments and can advocate for water and the environment.

Vicky Southworth

Vicky is a trained geologist and has recently completed a Master of Water Resource Management at the University of Canterbury. A community representative on the CWMS regional committee, she has 15 years professional experience in the environmental sector. She campaigned on a platform of collaboration, supporting positive changes for natural resources and land use and effective monitoring and enforcement. Priorities are improving urban and rural water quality, protecting biodiversity and advocating for remit to consider greenhouse gas emissions in plan development.

Tane Apanui

Tane is a trained commercial pilot and personal trainer. He is a Hornby resident and former candidate of the Hornby ward. He campaigned on a platform of providing practical hand at the table to ensure necessary changes are fit for purpose. He believes public transport should be for people not profit. He has worked for five years to conceptualise a high capacity commuter rail network to and through Christchurch, servicing Canterbury's large towns. He also believes its time to manage our precious water resource.

Elizabeth Mckenzie

Elizabeth has spent the last 17 years working in geo chemistry, forensic science, environment chemistry and biomedical science. She campaigned on a platform of remedying the disconnect between science and local government. Her priorities are to develop and implement a Climate Change Emergency Mitigation and Adaption Plan, accelerate implementation of the new government policy for freshwater management and lead restoration of diverse insect habitats to protect biodiversity and safeguard our food ecosystems.

Phil Clearwater

Phil has been a Christchurch City Councillor for six years and Community Board Chair for 18 years, chairing committees on infrastructure, transport, environment and community development. He campaigned on a platform of bringing integrity, experience skills and leadership essential for a new democratic Environment Canterbury. His priorities are protecting Canterbury's groundwater, rivers and aquifers from pollution and exploitation, reducing carbon emissions from agriculture and transport and developing the public transport system.

Craig Pauling

Craig is of European and Ngāi Tahu descent. He is an environmental consultant and qualified RMA hearings commissioner, trustee of Te Ara Kakariki Greenway, planting trees in Canterbury, and Te Taumutu Runanga representative on Osbornes Drain Working Party. He campaigned on a platform of being action and solutions-focused, ready to make tough decisions and explore more diverse land use opportunities. His priorities are to address the poor state of ground and surface water, protecting and enhancing unique biodiversity, and responding to challenges of climate change.

Nicole Marshall

Nicole is an environmental scientist. She will transition from being a groundwater scientist at Environment Canterbury to her new role as councillor. She campaigned on a platform of conscientious, transparent and accountable decision-making that challenges the status quo. She believes her strong understanding of our natural environment and insight into resource governance will help the council achieve healthy environments and healthy communities. She intends to champion actions that deliver sustainable solutions and mitigate the effects of climate change.

Grant Edge

Grant is an outgoing Waimakariri Water Zone committee deputy chairman. A landscape architect with background in urban and rural design planning. He campaigned on a platform of sensible forward thinking governance with a necessarily urgent focus on dealing with climate change and water quality issues. He believes the Canterbury region needs to adopt sustainable land management practices and environmental improvements. Interested in promoting special character or unique natural environments for growth in tourism and recreational opportunities.

OTAGO

Hilary Calvert

Hilary's aim is to protect waterways, control pests and take our rules seriously.

Hilary believes, "Otago has a beautiful landscape and deserves no less. I will bring to Council common sense, fair decision-making and extensive experience in law, politics and business. The Otago Regional Council (ORC) should conduct its business in an open and transparent manner. If it needs to be done in secret it usually shouldn't be done at all; demand quality information and reports. "It's hard to make good decisions with bad information; spend ratepayers' money, and it's all ratepayers money, wisely and carefully. Let's keep those rates down. We can do better. We will do better."

Marian Hobbs

"I have three young grandchildren. They will be in their forties in 2051. I want their lives to be as safe, and as happy as mine has been. So I owe them focussed work on air quality, water access and quality, biodiversity and a reduction in greenhouse gases. These are areas I worked on as a former Minister for the Environment, but there is so much more to be done. I commit to studying the issues before us, making decisions informed by asking those affected, informed by science and informed by my Labour Party principles of social justice and fairness. I commit to working with Ngāi Tahu as kaitiaki. The Otago Regional Council sets rules to protect air and water quality. These rules need to be monitored and publicly reported on. I will work with urgency: we have much to do."

Alexa Forbes

"In the face of growth, change and disruption, the communities of Dunstan need high quality information and a coherent strategy to drive a multi-level approach to long term environmental and community health," Alexa said. Climate change and biodiversity are global urgencies needing local responses.

"Management of water, air, soil and pests, and the improvement of transport and disaster infrastructure, are regional imperatives. ORC needs to evolve to keep up with the growing demand to meet the challenge of developing a strategy that inspires and focuses its own actions while empowering communities to develop theirs. This requires a holistic, inclusive approach backed by objective scientific evidence. As an incumbent Queenstown Lakes District Councillor, qualified sustainability practitioner, communicator, researcher and tertiary educator, I am focused on my part in building our shared future."

Gary Kelliher

Gary was previously a councillor however is returning after not being on the council in the last triennium.

"I stand for balance, sustainability, environment and opportunity – seeking the sweet spot between protecting the environment we value, and the economic outcomes critical to a thriving Queenstown Lakes and Central Otago. Our communities are growing at unprecedented levels. The pressure is immense on regional and local government to get the future right. I was an ORC Councillor from 2013–2016. ORC desperately needs strong stable leadership. My commitment to serve and my past experience offers you this. I have long established family, and business connections across both Queenstown Lakes and Central Otago regions, with family dating back to the earliest Wanaka settlers. Our businesses include agriculture, roading/quarrying and administration. My community commitments involve chairing catchment water groups, and a regional research institute establishment committee. I am a civil engineer by profession, an accredited Resource Management Act commissioner, and a member of the Institute of Directors."

Kevin Malcolm

"I am Otago born and bred and have lived in the Moeraki Constituency since 1981. The ORC is responsible for managing Otago's land, air and water resources on behalf of the community but it is us as residents who must take the ultimate action to determine our destiny. Our province has reached a point where it is essential for all of us to take responsibility to ensure we deliver an exciting and sustainable future for the generations that follow. We must be confident that both our social and physical environments are shaped to allow this to happen. I have the skills, experience and determination to ensure that policies and operational activities are shaped to build the very best Otago possible. Expenditure must be justified and prudent."

Adding value to our primary produce

By Susan Kilsby, ANZ Agriculture Economist.

Much of New Zealand's economy relies on the production and export of agricultural and horticultural goods. Production and processing of agriculture and horticulture products directly accounts for 9%[1] of New Zealand's GDP, but indirectly the impact on the economy is much greater, as these figures don't include industries that rely on the primary sector, such as rural accountants.

Much of our primary production is exported in a raw format or only partially processed, and these goods often require further processing offshore before they are consumed. For example, milk powders are the largest dairy production category for New Zealand but they are then further processed offshore into products such as reconstituted milk, infant milk powders, or used as an ingredient in biscuits and sweets.

New Zealand has long grappled with the challenge of trying to add extra value to our primary goods. But cheaper manufacturing offshore and a lack of capital investment in further processing in New Zealand means little progress has been made in preparing goods to a retail-ready format.

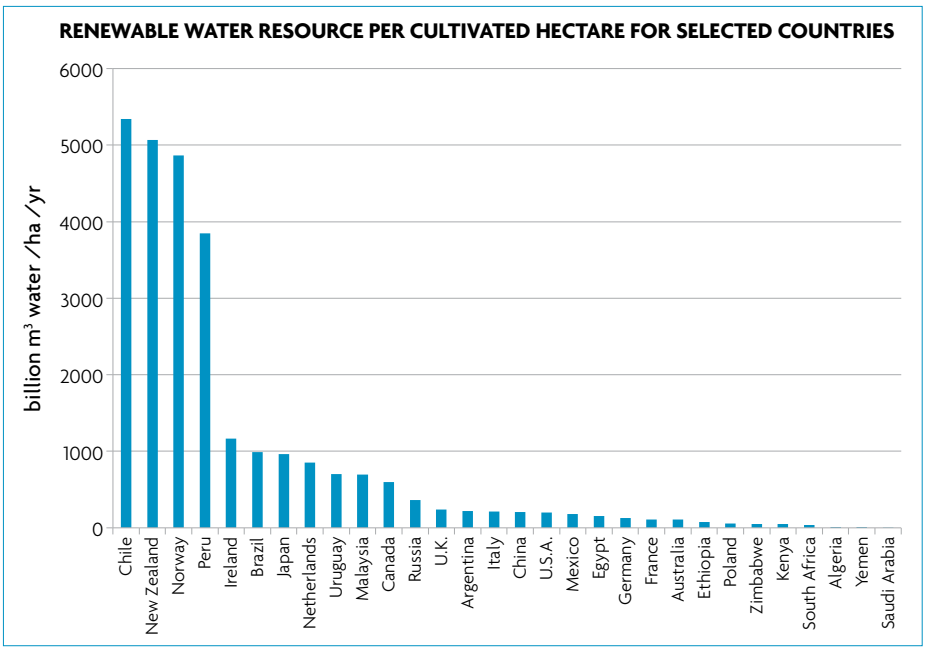
But there are other ways of adding value to our primary produce and one of those is highlighting attributes relating to 'how' our goods are produced.

A growing proportion of consumers are now asking more questions about where their food comes from and how this food has been produced. Consumers are looking for products that have been sustainably produced in an ethical manner without exploiting workers, animals or the environment. Such goods are more likely to be able to command a price premium in the future.

Consumers are also looking for purchases that make them feel good; they are also looking to connect emotionally with their purchases. Data enables people to make rational purchasing decisions, but how many of us do that? An emotional connection is what gets consumers excited. The data help them justify the goods they choose to purchase.

Tightening environmental regulations in New Zealand mean farm environment plans will become commonplace for many of our farmers in the future. In some areas they are already a mandatory part of consents to access water or discharge nutrients.

These plans have the potential to provide consumers with important insights as to how their goods are being produced. Farm plans could potentially become a marketing tool, not just a cost that the producer has to bear.



Renewable water resource per cultivated hectare for selected countries. *(Source: FAO Aquastat)*

There are a lot of aspects of our production systems that we don't tend to market – possibly because we take them for granted – such as air and water quality.

Many parts of the world are facing a crisis in terms of access to clean air and clean water. Data from the United Nations show that 90% of the world's population breathe unhealthy air, while 4 billion people experience severe water scarcity at least one month of the year.[2]

Air quality is particularly a problem for urban dwellers in highly populated cities in Asia and the Middle East.

New Zealand has more renewable water per capita than most other countries in the world. We also have one of the highest levels of renewable water relative to the area of land in arable production or permanent pasture.[3]

But we don't tend to market that our fruit, vegetables and farm animals are grown in an environment where air quality is good, and water supply more renewable than in many countries, though it still needs to be managed very carefully.

As we focus more on minimising greenhouse gases and nutrient emissions it will become increasingly important to produce in an efficient manner that minimises inputs relative to outputs. High-productivity livestock will be favoured due to higher output of milk or meat relative to their emissions of greenhouse gases and nutrients. Likewise, plants will be favoured if they are able to soak up more nutrients, require less water to grow, or are able to reduce the greenhouse gas or nutrients emissions from the livestock that graze them.

Agriculture and horticultural production will become increasingly sophisticated, using advanced technology and information that will improve efficiency. And technology and information will also help consumers make more informed choices about the food they buy and the growers they choose to support.

1. Average of GDP from 2010 to 2017 related to dairy, sheep, beef, poultry and arable farming and horticulture and the processing of these products.
2. World Economic Forum, Four billion people facing severe water scarcity, Mesfin M. Mekonnen* and Arjen Y. Hoekstra, Feb 2016.
3. FAO. 2016. AQUASTAT Main Database, Food and Agriculture Organization of the United Nations (FAO).

Research to uncover crucial knowledge on braided rivers

A new five-year research programme is aiming to help regional councils manage their water resources and meet the Government's freshwater quality standards by 2025.

Lincoln Agritech Ltd has been awarded almost $8m in MBIE funding for the project, which will provide the first accurate information about how much water is lost from braided rivers into groundwater.

Lincoln Agritech Hydrogeologist, programme lead Scott Wilson said braided rivers were unusual worldwide, but very important in New Zealand.

"Because of their provision of natural habitat, sources of agricultural and drinking water, and their recreational use."

"Regional councils currently set water limits and identify management plans for braided rivers without knowing how much water is lost, as rivers traverse their alluvial plans. The impact on groundwater recharge and river flow during dry periods is also unknown."

The programme would deliver new knowledge regarding the Selwyn/Waikirikiri, Wairau and Ngaruroro rivers, along with models allowing councils to estimate water loss from any part of any braided river. It would also quantify the environmental and economic benefits of different river management strategies.

Mr Wilson said the research would help regional councils to enact policy with defensible freshwater quality and quantity standards to meet the Government's National Policy Statement on Freshwater Management (NPS-FM) requirements by 2025.

"Our new understanding will help manage the trade-off between environmental and economic benefits, ensuring that rivers can continue to have a role in agriculture, while providing high-quality drinking water, recreational activities and important native habitat."

The multidisciplinary research team includes experts from Lincoln Agritech Ltd, as well as NIWA, Lincoln University and its Agribusiness and Economics Research Unit (AERU), University of Canterbury, Waterways Centre for Freshwater Management, Flinders University (Australia), Technische Universität Dresden (Germany), and Aarhus University (Denmark).

The Waimakariri River in Canterbury, one of New Zealand's many braided rivers.

The team has the required range of skills in field data collection, hydrological modelling and cost benefit analysis to make this a major step forward in understanding New Zealand's braided rivers.

Lincoln Agritech is wholly owned by Lincoln University, with an independent board of directors.

Proactive crisis communication enhances company reputation

By Steve Attwood, Convergence Communications & Marketing.

What do you do when you have a 50 metre high earth dam holding back millions of litres of water, and your engineers have just confirmed an official 'dam safety deficiency', due to potential erosion within the dam structure?

South Canterbury Irrigation company, Opuha Water Ltd (OWL), found itself in this situation at the end of September 2019.

Thankfully, the situation was not as bad as it sounded. The risk of sudden collapse was extremely low. Engineering investigations suggested that while there was enough evidence of possible internal erosion to trigger a dam safety deficiency declaration, there was no actual emergency. There was time for further investigations to determine if there was actual erosion and, if so, how much. Time, too, to develop a mitigation strategy and to implement it without increasing risk to the public in the meantime.

However, the phrases *dam safety deficiency* and *internal erosion* are highly emotive to anyone outside the technical world of large dam engineering, and could cause widespread public alarm. Anyone who searches Google for 'internal erosion + dam' will find dramatic stories of dam failures – something OWL was only too aware that many concerned locals and journalists might do.

OWL's communications challenge was how to meet its obligation to advise stakeholders, authorities and the community of the 'dam safety deficiency' without raising unnecessary fears of a wall of muddy water crashing downstream through farms, bridges and towns.

Many companies or organisations in this sort of situation will say nothing and hope it all goes away quietly. This is an understandable, but flawed, strategy. When the news eventually gets out – as it inevitably does – the decision to **not** inform people about theoretical risks makes things worse … much worse. Trust in the company and its brand can be destroyed and can be difficult, if not impossible, to recover from. There is a long list of failed companies that learned the hard way that trying to keep bad news under wraps led to their demise, rather than preventing it.

Front footing a potential crisis is almost always the best option. To its credit, OWL never considered saying nothing and hoping that its interim measures – lowering the lake level by about 10 percent, increasing manual inspections and maintaining round-the-clock real-time digital monitoring – might buy enough time to resolve the issue quietly.

Accepting the advice of its public relations consultants, Convergence Communications & Marketing, OWL agreed to a proactive public information campaign based on transparency, accountability, and freely available information.

Key stakeholders, such as the company's farmer shareholders, local and regional authorities, civil defence, iwi, local environmental organisations, and irrigation and dam owner professional bodies, were involved in planning the communications outreach. The objectives were simple:

- Demonstrate community responsibility and accountability
- Convey the facts
- Provide assurance and prevent unnecessary alarm
- Create and/or retain trust that the situation is in hand and that there is time for solutions to be developed and successfully implemented.

A media statement was prepared with the collaboration of key stakeholders. The release included comprehensive information and assurances, plus an extensive FAQ. It was released under embargo and a media stand-up held before the embargo expired, allowing journalists to ask their own questions.

An Opuha Water Facebook page was created and went live as the embargo was lifted. It included informative articles, photos and comments demonstrating transparency and accountability. It also provided assurance. Activity on the page was monitored and questions promptly answered. The same information featured on a "dam safety page" on the company's website.

What did all this achieve? Almost nothing … precisely the desired result.

Media coverage was localised and low key. It reflected the key messages and FAQs provided. There were no dramatic comparisons to international dam failure incidents. The company was even congratulated by some media for its approach and the easy availability of information and spokespeople.

Providing up-front and comprehensive information prevented public panic. There were a few comments on social media, mostly saying it was good to get the information so readily; but no negative feedback. Sharing of online material was largely confined to informing friends and neighbours and didn't result in unnecessary escalation of the issue. Questions asked on Facebook were sensible and expected; and the responses appeared to be well accepted.

Media interest at the time, and in the following weeks, was low-key and focused more on the next steps, rather than any post mortem about who might be to blame for the situation.

OWL, by having both the courage and the natural inclination to accept Convergence's advice to run a proactive, open campaign, have, indeed, enhanced their reputation, strengthened their brand and grown their credibility in the community.

In spite of the overwhelming evidence that this strategy works, too many companies in similar situations will choose to go down the 'hide and hope for the best' route.

They run a grave risk.

PRODUCT & SERVICES DIRECTORY

Seasonal climate outlook November 2019 to January 2020

OUTLOOK SUMMARY

ENSO neutral conditions continued during October 2019, although the Southern Oscillation Index (SOI) and sea surface temperatures (SSTs) were on the El Niño side of neutral. The SOI was -0.5 and SSTs in the central Pacific were warmer than average during October.

Oceanic ENSO neutral will most likely continue (70% chance) over the next three months, although the atmosphere may have an El Niño-like response at times. During October, New Zealand's coastal sea temperatures were near average.

A near-record positive Indian Ocean Dipole event is expected to influence New Zealand's climate over the next three months.

For November to January, air pressure is forecast to be lower than normal to the south-west of New Zealand and higher than normal to the north. This is expected to be associated with a westerly quarter air flow anomaly.

Heavy rainfall events are possible in the South Island and western North Island during November, which may elevate the risk for flooding. Below average seasonal temperatures are unlikely, with all regions expected to have near average or above average temperatures.

For the current tropical cyclone season (November 2019 to April 2020), NIWA's Southwest Pacific Tropical Cyclone Outlook indicates that the risk for New Zealand is near normal. On average, one ex-tropical cyclone passes near the country each year. Significant rainfall, damaging winds, and coastal damage can occur during these events.

November 2019 – January 2020 temperatures have about equal chances of being near average (35–40% chance) or above average (35–40% chance) for much of New Zealand, except the east of the North Island where above average temperatures are most likely (45% chance) and the west of the South Island where near average temperatures are most likely (45% chance).

Increased westerly air flows during the season are likely to transport warm, dry air from Australia, which is experiencing drought conditions. This may contribute to warming SSTs in the Tasman Sea and New Zealand coastal waters during November, which may influence air temperatures during the upcoming three month period. November 2019 – January 2020 rainfall is about equally likely to be near normal (35% chance) or below normal (40% chance) for the north and east of the North Island, near normal (35–40% chance) or above normal (35–40% chance) in the west and east of the South Island, and most likely to be near normal in the remaining regions of New Zealand (45% chance).

Heavy rain events in the South Island and western North Island during the first half of the upcoming three-month period may mean a higher than normal risk for flooding events.

November 2019 – January 2020 soil moisture levels and river flows are most likely to be near normal (35–40% chance) or below normal (35–40% chance) in the north and west of the North Island and west of the South Island. In the east of the South Island, below normal soil moisture levels are most likely (40% chance) while river flows are equally likely to be normal (35% chance) or below normal (35% chance). Near normal soil moisture levels and river flows are most likely for the remaining regions of New Zealand.

PREDICTIONS FOR NOVEMBER 2019–JANUARY 2020

Probabilities are assigned in three categories: above average, near average, and below average.

Northland, Auckland, Waikato, Bay of Plenty

- Temperatures are about equally likely to be near average (35% chance) or above average (40% chance).
- Rainfall totals are about equally likely to be near normal (35% chance) or below normal (40% chance).
- Soil moisture levels and river flows are about equally likely to be below normal (40% chance) or near normal (35% chance).

The warmer months of the year have rolled around again.

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

- Temperatures are about equally likely to be near average (35% chance) or above average (40% chance).
- Rainfall totals are most likely to be in the near normal range (45% chance).
- Soil moisture levels and river flows are about equally likely to be near normal (40% chance) or below normal (35% chance).

Gisborne, Hawke's Bay, Wairarapa

- Temperatures are most likely to be above average (45% chance).
- Rainfall totals are about equally likely to be near normal (35% chance) or below normal (40% chance).
- Soil moisture levels and river flows are most likely to be near normal (40% chance)

Tasman, Nelson, Marlborough, Buller

- Temperatures are about equally likely to be near average (40% chance) or above average (35% chance).
- Rainfall totals are most likely to be in the near normal range (45% chance)
- Soil moisture levels and river flows are most likely to be near normal (40% chance)

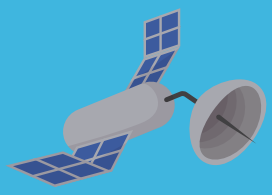
West Coast, Alps and foothills, inland Otago, Southland

- Temperatures are most likely to be near average (45% chance).
- Rainfall totals are about equally likely to be near normal (35% chance) or above normal (40% chance).
- Soil moisture levels and river flows are equally likely to be near normal (35–40% chance) or below normal (35–40% chance).

Coastal Canterbury, east Otago

- Temperatures are about equally likely to be near average (35% chance) or above average (40% chance)
- Rainfall totals are about equally likely to be near normal (40% chance) or above normal (35% chance)
- Soil moisture levels are most likely to be below normal (40% chance).
- River flows are equally likely to be near normal (35% chance) or below normal (35% chance)

This is an extract of the Seasonal Climate Outlook published by NIWA.



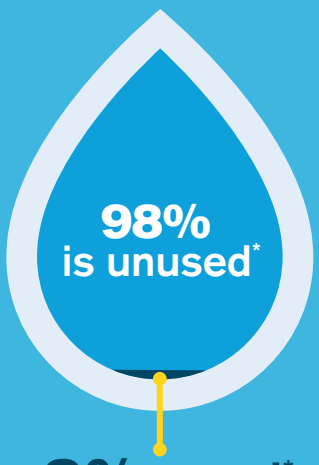
In New Zealand, there are more than 425,000 km of rivers and streams and about 4,000 lakes and over 200 underground aquifers.

Annual water flow is 145 million litres per person.

Source: https://en.wikipedia.org/wiki/Water_in_New_Zealand#cite_note-1.

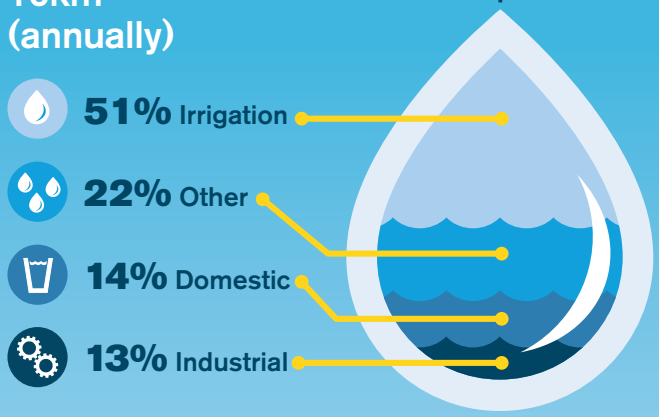
How much water we get

550km³ (annually)

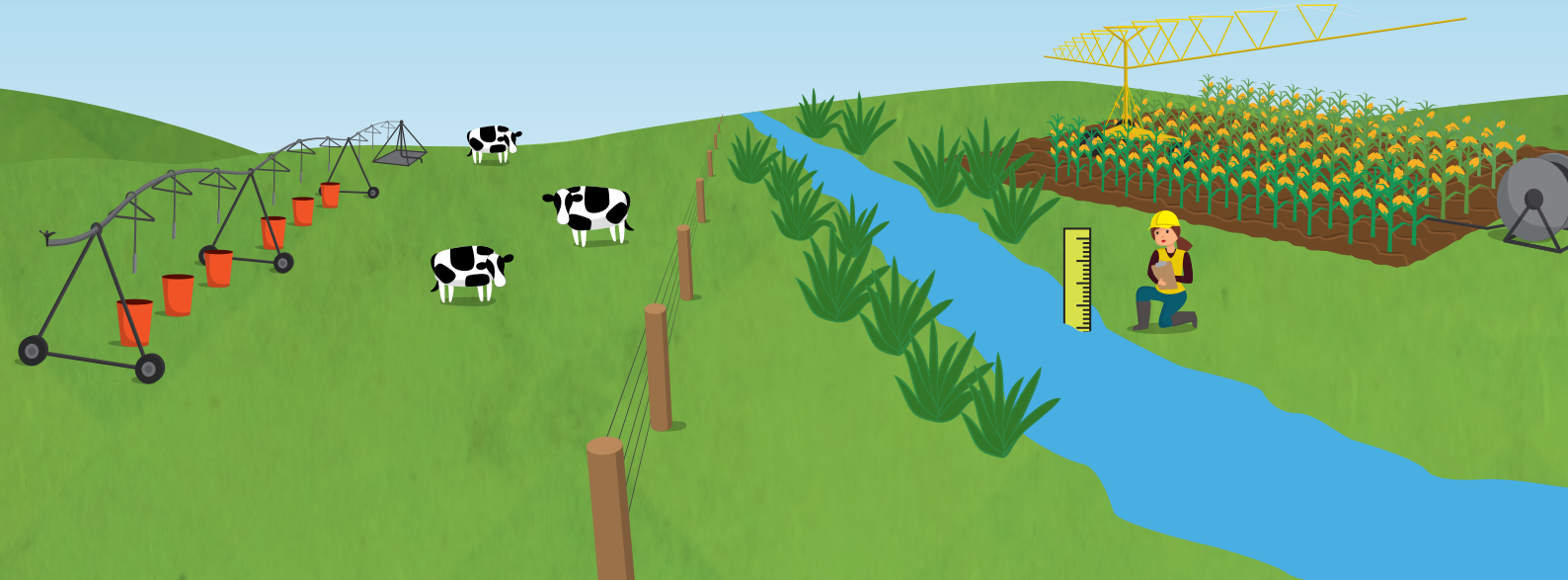


How we use water

10km³ (annually)



Source: Ministry for the Environment, National water allocation statistics for environmental reporting 2016.



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