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SUMMER 2020

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A message from IrrigationNZ's new Chair, Keri Johnston

Summer is upon us and the end of 2020 is nigh (and many would say thankfully). I am writing this column from Wellington having spent yesterday with the chairs of our fellow primary sector organisations (a collective known as the Food and Fibre Leaders Forum) followed by a meeting with Prime Minister Ardern and Ministers Parker, O'Connor, Allen and Nash. These meetings are an opportunity for us to discuss the things that really matter to the primary sector, in a free and frank manner, with the objective being to offer solutions to the PM and her team rather than just present a raft of problems.

On yesterday's agenda was water storage. In terms of approach, IrrigationNZ wants to move the conversation toward how we can use irrigation to mitigate a changing climate and we expect this to be up taken especially as we move into summer and the droughts and weather extremes become more noticeable. But also, it is a key enabler for transitioning to higher value land uses. There was also a discussion on the potential challenges that implementation of the National Policy Statement for Freshwater Management 2020 (NPSFM 2020) will present for regional councils, particularly how Te Mana o te Wai – giving priority to the health of the water – will look in a planning context. It is vital that as a sector, we continue to use these meetings to be constructive rather than destructive. To really take leadership of the issues that will affect us and our ability to help with post COVID-19 recovery and continue to produce sustainable food and fibre products for us and many others worldwide.

It is also important that as an irrigation sector, we stay united, clear in our vision and focused on not only the job at hand but looking ahead. Irrigation is critical to so many of our businesses. Our focus now is to move the conversation into water security (of which storage is a part), infrastructure, precision application, and the commuity, cultural and environmental benefits of well designed, well managed irrigation. By being that voice for you, we can use a whole of country and whole of economy approach that moves the discussion away from the concept of wealth transfer.

We are looking forward to having you all along with us as we set out on this journey and being part of our collective voice.

Nga mihi nui

Keri Johnston
Chair of IrrigationNZ

Correction

In the spring edition of IrrigationNZ News published in September (2020) the infographic on page 49 named 'Economic Output by Land Use Sector' appeared to reflect New Zealand as a whole. A caption should have been included to indicate that the data related to a specific case study in Northland, therefore does not relate to land use for the entire country.

Filling the shoes as IrrigationNZ CEO

One month into the job, and a lot of water under the bridge already (terrible pun I know, but I'm finding I can't help but repeat them the more entrenched in irrigation I get). 2020 has been a year to remember and one to forget for a lot of us. No one would have expected we would be at the end of the year with closed borders, restrictions and shortages on labour in the horticulture sector and about to embark on a Christmas like no other. I am hopeful that the cherries will still be picked, the strawberries packed and new potatoes stocked. I am also hopeful that we can continue to contain this virus, even if we can't eliminate it, so we can continue to enjoy the relative freedoms many across the world are not. As I sit in the cricket stand and watch West Indies and Pakistan this summer, I will truly be grateful to the five million kiwis that have supported each other and their fellow essential workers so we can have gatherings and games and some fun.

And while we do reflect on the year, and the upheaval and change, it's important to also reflect on how well New Zealand has managed such a change, and how our strengths of growing great food and producing quality exports have helped us to an envious position economically.

And what a part water; capture, storage, and irrigation have to play in that story. We are blessed with good rain and snow in most parts of the country, but we have to ensure we move with the climatic changes and prepare for the changing environment to de-risk ourselves and ensure we can continue to produce the food the world wants, in the places we do. Recent reports suggest a significant under-investment in water capture and storage, and one we need to remedy.

This past month in the new role has taught me a lot about the importance of irrigation, and of water more generally. Always known to be the life blood and touted as the new gold, I believe now more than ever the country and in particular the government understand its importance. Not just from the health and wellbeing of our rivers, or the importance of flow, but of not taking it for granted, of investment in capture and storage. This understanding is changing the conversations from water quality to water quantity and how that quantity, (if managed well), can actually improve the environmental outcomes for our country, our drinking water, and our economy. They do not have to be trade-offs, and in fact some of the more recent investments have been just that, community first, profit second. And many of the past investments demonstrate just this opportunity. The reforms under the COVID fast track system and the changes proposed under the RMA review will help support ongoing investment in water, and we need to be ready for those changes, and prepared to work with our communities to truly create win-win outcomes.

The first month has also taught me how passionate people involved with irrigation are; the schemes, the irrigators, the technical experts, the suppliers and the support services. I have been blessed with open conversations, offers of support and a truly welcoming approach as we all work for a common goal of better water infrastructure and use. If COVID has taught us anything it's the importance of working together for a common purpose and how that can also lead to better outcomes for all.

And as we celebrate the festive season, and hopefully spend time with friends and family and feel blessed that we can, we will enjoy the fruits of farmers and growers labour, from the wine and beer we sip, to the lamb and ham on the bone, to the berries on the pavlova – all made with hard work, a bit of sweat, and a good helping of water. The important ingredient that makes lives and livelihoods.

Take care this summer, be proud of the essential part you have all played in 2020, and get ready for more change, but also lots of opportunity, for 2021.

Vanessa Winning
Chief Executive, IrrigationNZ

IrrigationNZ: out & about

UP AND RUNNING IN WELLINGTON

The new IrrigationNZ office has been up and running in Wellington since the beginning of October – a great location for the organisation to continue to engage with Government officials. Picutured is Minister of Agriculture Damien O'Connor with IrrigationNZ chief executive Vanessa Winning after their meeting in November – a great opportunity to discuss primary industries and the importance of water storage infrastructure and use for New Zealand. Go to page 9 to hear from Minister O'Connor.

A VISIT TO THE FAR NORTH

Elizabeth Soal has been on the ground in the regions in her new role as Regional Policy and Planning Manager. In late November she was in Northland where she visited various irrigation and water storage projects. Pictured above is the Mapua Avocados orchard in the Far North, supported by micro-irrigation (right). Ms Soal said it was great to learn more about the potential of freshwater to develop New Zealand's high-value horticultural sector, and the social and economic development of the area.

AGM

It was great to see some familiar faces as well as some new ones at the IrrigationNZ AGM in November. There was also an awards ceremony to honour the winners of the prizes that were planned to be presented at our 2020 conference which was unfortunately cancelled. Find out more about the award winners in our AGM wrap up on pages 16–21.

Elizabeth Soal: Reflects on her time as CEO

As I write this piece, reflecting on my time at the helm of IrrigationNZ, I have just been in Northland, getting to know the "lay of the land" around what will be New Zealand's newest water storage projects. These projects, overseen by Te Tai Tokerau Water Trust, will provide essential water and infrastructure to the Kaipara and mid-North areas of the region, bringing opportunities for land-use diversification, essential community supplies, community resilience in the face of extreme weather caused by climate change, and opportunities for Māori economic development.

Although our sector is facing a number of challenges around increasing regulations, an unstable global economy ravaged by COVID-19, uncertainty around the future of the Resource Management Act, and a changing climate, spending time with people on the ground who are committed to investing in water for the future of their community really reminded me of why our sector is so critical.

IrrigationNZ has gone through significant changes over the last 18 months, so it is a strange feeling looking back thinking about how different the organisation is now compared to when I started.

Change is never easy, and it is something many are having to cope with in 2020.

At the start of this year, I was fortunate enough to be sponsored by Water Strategies LLC in America to travel to the USA before COVID took hold to spend time with irrigators in Arizona and learn about their challenges and opportunities.

Everyone I spoke to was keen to learn and understand about irrigation in New Zealand and are constantly impressed by our innovation and ability to punch above our weight in the world. As with my time in Northland this week, it brings home to me why I love our sector so much.

It brings social and economic opportunities to our communities, it feeds the world, and it showcases the best of New Zealand's primary sector.

I am so pleased to be able to continue to work for IrrigationNZ with our members in the regions. The next five years will be critical for how we as a country manage and govern our freshwater, for ourselves and for future generations.

I have learnt a lot in my time as IrrigationNZ CEO and I am thrilled to be able to continue to support our vital sector, albeit in a different role.

I look forward to seeing you all "on the ground" in the regions.

Ngā mihi,
Elizabeth Soal

Myself, (left) and IrrigationNZ Chair Keri Johnston.

It was a privilege to represent IrrigationNZ and New Zealand water management on the other side of the world!

I have been so fortunate to work with and learn from a range of people – and look forward to continuing to do so.

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Water more important than ever

View from Here with Damien O'Connor, Agriculture Minister.

It is no surprise that water is an important focus of the Labour Government. Access to water is vital for our farmers, growers, and rural communities. Now even more so than ever, with primary industries and exports one of the main planks of our economic recovery from the impacts of COVID-19. As a Government, we have a lot going on in water, so let me give you a run down.

Over the past year, the primary sector has reinforced its importance to New Zealand economic prosperity. In fact, export revenue has continued to grow despite the challenges presented by COVID-19. Our meat, dairy, fruit, vegetables, and wine continues to attract strong prices in the market.

As we rebuild the economy following the effects of the global pandemic, we have an opportunity to build back better than before and factor in resilience for our productive primary sector. Earlier this year, our Government released the *Fit for a Better World* roadmap that identifies key opportunities to help boost the primary sector and get more value for our great exports.

This roadmap identifies small scale water storage as important for helping farmers and growers access higher value land use options, product supply chains and higher employment. Our Government has invested $134 million over the past two years in water storage initiatives.

New Zealand cannot take water storage for granted. We will need to store water into the future.

Improved water storage and security is key to business and community resilience as it enables farmers and growers to diversify and reduces exposure to drought and climate change events. We are currently undertaking foundational work to collate current data on water availability, identify information gaps, and explore options for future steps to work collaboratively with the sector, including with IrrigationNZ.

> "As we rebuild the economy following the effects of the global pandemic, we have an opportunity to build back better than before and factor in resilience for our productive primary sector."

We know that with climate change, we can expect more acute weather events, so it is important we help farmers and growers get their businesses ready for future drought. Irrigation is necessary and this Government has supported the ongoing investigation and development of smaller and focussed irrigation schemes.

However, irrigation schemes must be environmentally and economically viable, with vital regional infrastructure supported by the Government. Technology allows us to use irrigation in a much more targeted way than we used to. I have visited farms and gardens where irrigation is used in an incredibly high-tech and precise way. And I am committed to working with the sector and IrrigationNZ to identify and enable the smart use of water to boost our economic potential.

Irrigation should be connected to our joint work with farmers and growers to improve freshwater quality. As a country we must improve the quality of our freshwater; something both farmers and urban Kiwis agree is necessary. This will not only protect our farmers' international reputation for sustainably produced food and fibre, and it will safeguard the premium price we can demand for our commodities. It will leave our freshwater resources in a good state for our kids, and their kids.

Our Government wants all New Zealanders to enjoy our waterways, and we are working alongside our farmers to improve the health of these ecosystems. That is why in 2019 we announced the Essential Freshwater package to stop further degradation of our waterways and ecosystems within five years, and reverse past damage within a generation.

Through our $1.3 billion Jobs for Nature package, we are partnering with a range of community and farmer-led catchment management groups around the country to improve water quality, support a range of other environmental benefits and create jobs. By funding catchment projects, we are supporting farmers to make on-farm changes including riparian planting, fencing of waterways and wetland protection. This work also includes supporting farmers in developing farm environmental plans.

Helping farmers develop integrated farm planning system is a big priority for me personally. Through the Integrated Farm Plan Programme, the Ministry of Primary Industries has been working closely with industry bodies, farmers and farm advisors, and regional authorities to design this new system. It will help ease costs on farmers and help improve freshwater quality, as well as make other sustainability gains. These plans will not only help those farming now, but they will also create sustainable building blocks for future generations of farmers. We have committed a $50 million fund to partner with industry and develop integrated farm plans.

Our country also faces huge infrastructure challenges about drinking water, wastewater, and stormwater. Our Government has addressed that through our $761 million Three Waters stimulus and reform funding for councils.

So, as you can see, the new Labour Government begins the new Parliamentary term with a huge reform programme for water. One that will make our country more sustainable and more productive – and that is good for everyone.

Irrigating pasture-based dairies in the middle of the world highlands

View from There with Jaime Ubidia, Sustainable Business Development at SEMAGRO in Ecuador.

Ecuadorean highlands present a unique topography. Two parallel high mountain ranges cross the country from north to south creating valleys with diverse climates between them. The temperature is regulated by the elevation since equatorial weather has no seasons, except for the ones created by rain or the lack of it. As you would expect in this topography, all available water comes from slowly disappearing glaciers, high mountain snowfalls and highland rains. Some of the water will roll down the valleys though rivers, but most of it will be absorbed by the high mountain ecosystems to be released slowly throughout the year. In the last decade we have seen multiple climatic challenges: high-water demand from cities and agricultural areas, higher rain concentration in fewer months in the year, higher temperatures and longer dry seasons. It is imperative we use our water better if we want to continue producing year-round with half our mainland territory involved in some sort of agricultural production.

TRADITIONAL WATER USE BECOMES A CHALLENGE

Increased demand and lower water availability will change the way water has been managed traditionally by producers. Inefficient flood irrigation and uncontrolled pollution of water must be improved and regulated. Precision irrigation and streams protection from animal and industrial contamination will have a dramatic impact on water use efficiency and sustainability.

Over the years, the number of farmers mindful of the exact amount of water needed to grow their crops has been small, mainly because this was usually the responsibility of the irrigator. As a result of lack of technical support, control and maintenance, a portion of each farm ended up not being irrigated. The use of flood (about half the areas irrigated today) and uncontrolled irrigation meant ponding and runoff indicated when an area received enough water.

After the last census in 2018, a large portion of the installed irrigation infrastructure was found to be underused. In state-run irrigation systems, 47 percent of the installed capacity is currently not irrigating. In community-based irrigation systems, about half of the area isn't being watered, mainly due to lack of technical compliance and erratic maintenance. For similar design and infrastructure issues, in privately-owned farms, 29 percent of the area under irrigation schemes is currently not irrigated.[1] Overall, close to 747.3 hectares of installed capacity is down and in need of adjustments country wide.

Furthermore, the climate changes we have seen in the last years have left some areas in the country with a need to irrigate during most months of the year, when rain just is not enough.

These matters, added to the steep slopes in Ecuadorian highlands (Sierra), inappropriate methods of irrigation, and the lack of skilled irrigators in many areas have made efficient irrigation a challenge.

It is also important to note that different industries such as mining, oil and agroindustry have been mismanaging waste for a long time, having noticeable effects on the available water. Although some guidelines are already in place, there is still a lot of room for the development of legislation that regulates and enforces water care and quality around the country. Moreover, in areas such as dairy farming, regulation is practically nonexistent, with only certain broad recommendations regarding the management and application of effluents.

TAKING PASTURE TO PASTURE-BASED

Historically, dairy farming has always been an important economic activity in our country. Over the last 30 years, a low-cost production system became increasingly important as industry quality demands and supplement costs have become a challenge to profitability. At the centre of this system, like in New Zealand, lies a reliability on pasture production.

As we moved slowly towards low-cost

Rainfall just simply isn't enough to keep up with production demands.

> "Over the last decade we've been adopting New Zealand technology and best practices to push our boundaries in terms of feed production."

1. MAG (2012); SENAGUA (2018) Elaboración: Equipo IICA-SENAGUA, 2018

Effective water management has allowed for substantial yields of Brassicas and other forage crops.

feed in our dairy sector, we found ourselves in a favourable situation: we could run dairy operations all the way from 0–3800 metres above sea level. With an additional bonus: because of the altitude and our geolocation, in most of our highlands we can produce high quality pastures all year round.

Now, realising the importance of pasture production in our business model has highlighted the significance of efficient irrigation in taking pasture production from another feed option to the standard way of farming for high profitability dairies.

As a profit-focused decision, efficient irrigation became a must when seeking better results from each paddock. Yields in pasture production with the right amount of water and proper management reach 20TDM per hectare without much effort, reaching productions of 25TDM per hectare in top performers. This, in terms of our production system, has been a game changer, making dairy farming an attractive business.

Moreover, efficient irrigation has been a way of building resilience into feed production. In many farms over the past years, adjusting irrigation to boost production in slightly dry seasons has allowed for feed silage and stable productions throughout the year.

Areas where traditionally dairy farming had depended heavily on supplement feed due to low production, impermeable soils ("cangahua" or undegraded volcanic ash) have seen results with low-application-rate systems over longer periods of time, finding production of low-cost feed possible.

Achieving efficient irrigation and high production is a challenge.

LOOKING AHEAD

Ecuador has been looking at New Zealand as an example in terms of dairy management and pasture production. Over the last decade we've been adopting New Zealand technology and best practices to push our boundaries in terms of feed production. Today, low application rate/effective irrigation systems such as K-Line and G-Set, have accounted for drastic changes in the yields of several dairy farms.

The review and readjustment of existing systems such as pivots and guns to respond to soil type analyses, infiltration rates, and the skill level in each farm has allowed for changes in the pasture production culture and as a result: a need for skilled irrigators.

As Ecuadorian farmers face a production system with pasture at its core, the main challenge today lies in defining the role of irrigators within this system. As we look at what's been done in New Zealand, South Africa and other similar pasture-based production countries, we understand the next steps towards achieving efficient irrigation lie in training skilled designers and irrigators on proactive irrigation scheduling, water management optimisation and the critical importance of maintenance.

Getting to know IrrigationNZ's new Chief Executive, Vanessa Winning

Where did you grow up – how did you become interested in agriculture?
Born in Hamilton, but I grew up in Tauranga, then moved to Auckland for University, and pretty much stayed. As a student growing up in Tauranga, there wasn't a lot to do, so most of my friends and I picked and packed kiwifruit for extra money and quite a few laughs. Back then Tauranga was a sleepy retirement town, blessed with great weather, and excellent growing conditions. It wasn't the city it is today.

My step-dad was a butcher by training, so we always had great meat and local produce available. I always knew where my food came from, having time in the orchards, or our friend's dairy farm, and so it was always a natural part of our lifestyle to not be too far away from food production.

What have been some career highlights for you? What has led you to want to be the CE of an organisation? What have been your biggest challenges and learnings? What do you hope to achieve in your role?
As a young person, I was lucky to have some important jobs. I was the youngest office clerk that the Warehouse had employed, counting money and doing the weekend banking at the age of 15. It gave me a strong appreciation for finance, and lead to a degree in commerce at Auckland University, in economics and management, and a Post Graduate in Marketing. My career started as a graduate at a telco called Clear that some of you may remember. It was an awesome opportunity that led into product management roles at Ergo (New Zealand's first internet bank), AMP, HSBC, and later ANZ. My career in banking spanned about 18 years all up, and I loved it. Setting interest rates and learning more about econometrics, I had some pretty interesting roles at some of the biggest institutions in New Zealand and the world. And that grounding led to a love for the people who contribute so strongly to New Zealand's economy. Working both at HSBC and ANZ, it was the farmers, growers, aquaculture specialists, the food producers, the food processors, and the exporters that made up about 65 percent of our business. An underestimated value that food is the ingredient that keeps this country humming. I had many trips overseas helping exporters grow their business, and showcasing New Zealand produce. I came to love working with the agriculture sector more and more.

> "Coming to IrrigationNZ I feel it's the perfect time to be talking about irrigation, the importance of water, and the opportunities we have as a country to be world-leading in food production, and improved environmental outcomes."

In 2012, I completed the Agri Womens Development Trust Escalator programme, and part of my governance and leadership journey was being welcomed by John Luxton, Chair of DairyNZ to their two-day strategy session at the end of that year. I was so impressed with how focused they were on the environmental impacts and the importance of water quality. The work that the Strategic Investment team was trying to do to help farmers be better farmers, I wanted to be part of that. I volunteered for more activity in the dairy space and continued to keep an eye on what was going on. In 2014 I moved into the not-for-profit space, working with the Parenting Place, and the Heart Foundation among others, to help them with marketing, sponsorship and business development, and realised that I had a lot to give. While banking had set me up, and trained me well it was time to give back too. I moved to DairyNZ in 2015, and loved working with farmers to help them, and encourage adoption of new techniques and technologies to improve their impact and their bottom line – helping them to understand that it was possible to do both. I led a large team of dedicated and passionate people across the country and felt privileged to be supported by – essentially – DairyNZ's shareholders. From there I was lucky to get involved in a COVID-19 project earlier this year with MPI and MSD on getting people into the dairy industry, and then with the Federation of Māori Authorities on greenhouse gas mitigation support for Ahuwhenua (Māori farmers). The latter was a significant growth opportunity as I learned more about Māori values and the importance of inter-generational approaches. Coming to IrrigationNZ I feel it's the perfect time to be talking about irrigation, the importance of water, and the opportunities we have as a country to be world-leading in food production, and improved environmental outcomes. This is going to be a big growth opportunity for the sector if we can work together, collaborate, understand true win-win outcomes and work with Tangata Whenua on meaningful long-term relationships. I am very excited about our future.

Getting to know the CE:

Tea or coffee?
Coffee, 1–2 a day before lunch, but tea later in the day. Triple shot long black if I really need a pick me up.

What did you want to be when you were growing up?
Stock broker.

Who is your favourite author?
I don't have one – I read prolifically so I always have at least one book on the go. Right now I have *'New York'* by Edward Rutherford, *'Lionheart'* by Sharon Kay Penman, and *'Troubled Blood'* by Robert Galbraith all on the go.

If you could eat one meal for the rest of your life what would it be?
Creamy mushrooms on ciabatta (or sourdough).

If you were a superhero what super powers would you have?
Haha, I am a superhero, a working mum who volunteers on a couple of important charities, a coach, and marathon runner (plodder). Multi-tasking well is my secret power, and letting it go.

If you could chose anything to do for a day what would it be?
A big walk/hike that culminates in a delicious meal, preferably at a winery. Do the exercise and feel great about the reward at the end.

If you could meet anyone dead or alive who would it be?
Kate Sheppard – I'd love to know how she had the strength and resilience to keep pushing that barrier. We have come a long way in New Zealand, but we still have more to do.

What is your favourite treat to eat?
Blue cheese with wine.

What is your dream car?
Probably not a dream car as such – I'm quite practical, but those Mercedes Benz X-Class Utes look pretty cool.

What is the most significant thing 2020 has taught you?
The importance of letting the small things go.

Vanessa Winning, speaking at the recent IrrigationNZ AGM.

Introducing: Lynn Lawrence

Lynn Lawrence joined IrrigationNZ in October as the Business Support Manager picking up final preparations for the November 2020 Annual General Meeting in Christchurch. Her role covers accounting, administration, business and membership services support for IrrigationNZ from its office now relocated to Wellington.

With a background in human resources management, Lynn has completed a Diploma in HR/Organisational Development through Massey and a postgraduate Diploma in Accounting at Victoria University in Wellington. Over the years she has worked in accounting, HR, administration and education for accounting firms Arthur Young and KPMG Peat Marwick, the New Zealand Society of Accountants, and the New Zealand Law Society's education and membership event services.

She has a strong focus on supporting organisational direction and board and committee activities, the importance of customer and membership service delivery, and reliable information management through accounting systems and processes. Her last position was based at Parliament as the office manager/event coordinator for a contractor providing specialist infrastructure services for parliamentary and ministerial events and ceremonies. She sees all this past experience meshing well for the diversity of her role as the Business Support Manager for IrrigationNZ.

Family business activities in agri-business take her to the South Island at regular intervals, encouraging a keen interest in the lay of the land and its resources and challenges. Joining IrrigationNZ has been a real bonus in crystallizing this interest.

Lynn has a partner who is a forensic economist and strategic management consultant in Wellington, and three adult daughters. In her spare time, she likes to tackle cryptic crossword puzzles, watch movies, travel, listen to music and go to the occasional rock concert.

She is really enjoying her start with IrrigationNZ and looking forward to working with members and the industry on developments and initiatives.

Lynn Lawrence – Business Support Manager at IrrigationNZ.

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IrrigationNZ AGM

IrrigationNZ held its Annual General Meeting on November 21 in Christchurch. IrrigationNZ chief executive Vanessa Winning said it was great for people to come together and have the event well attended.

As the IrrigationNZ biennial conference could not be held this year due to COVID-19, a number of prizes that would have been presented at the conference were instead presented at the AGM. These included the IrrigationNZ Innovation in Irrigation award, the Ron Cocks award for service to irrigation in New Zealand and the recognition of the IrrigationNZ honorary member.

Ms Winning said she enjoyed the event as her first in the chief executive role "it was great to see some familiar faces and some new ones. Unfortunately the conference was cancelled however, it was great to have an important event on our calendar where everyone could come together before the end of 2020. I hope we get plenty of opportunities to host gatherings and attend them in 2021."

Thankyou to Ballance Agri Nutrients for sponsorship of the Innovation Award, and Anderson Lloyd for sponsoring drinks and nibbles after the AGM for everyone to enjoy.

Please see the following pages to learn more about the award winners.

IrrigationNZ Honorary Member: John Donkers

Honorary membership recognizes outstanding service and the significant contribution of time and knowledge to Irrigation New Zealand. This year the recipient was Canterbury man John Donkers. We caught up with him to hear about his involvement with irrigation and IrrigationNZ.

John Donkers speaks at the 2020 AGM after recognition of becoming an Honourary Member.

When did you first get involved with irrigation and IrrigationNZ?
As a farmer and a dairy farm consultant for over 25 years and with IrrigationNZ since 2003. I first became involved with irrigation in 1989 when I was a farm supervisor for corporate dairy farmer Applefields Dairy Co. Ltd. We established our own dairy farming operation in 1994 near Dundsandel and in 1997 expanded, buying a farm at Te Pirita where we drilled for water and ultimately developed several farms. At that time there was significant new development of irrigation from groundwater in the area and there were significant questions being raised about the reliability of the groundwater supply. This led to a group of us establishing the Dunsandel Groundwater Users Association (DGUA). The DGUA assisted in funding science and modelling work to better understand groundwater systems on the Central Plains. The organisation also assisted members when Environment Canterbury undertook a review of groundwater consents in the Selwyn-Rakaia groundwater zone in the early 2000s.

In 1999 a joint Selwyn District Council-Christchurch City Council project to establish a steering committee to investigate the opportunities for the development of water resources for the Central Canterbury Plains called for expressions of interest. I put my name forward and became involved in what has grown to become the Central Plains Water Scheme (CPWL). Today CPWL irrigates approximately 44,000 hectares of the Central Plains with many irrigators switching from groundwater to the CPWL surface supply.

This fueled my interest in the reformation of the New Zealand Irrigation Association in the 1999–2000. Consultants and some farmers held several meetings in Ashburton that culminated in the relaunch of the Association in 2001, with Bob Engelbrecht as Chairman.

I joined the Board in 2003 when the organisation had perhaps 100 members and a very small budget. It wasn't until Terry Heiler agreed to take the role of part-time CEO in 2005 that the organisation gained some traction with the majority of the large irrigation schemes agreeing to pay annual memberships. Graeme Sutton had taken over as chairmanship with the aim of making the organisation more farmer/irrigator led.

A memorable step in this direction was a bus tour of irrigation schemes in Australia organised by Terry. The discussions and negotiations on this trip laid the foundation for the current structure of IrrigationNZ.

What is it that interests you about water management?
Irrigation and water management is very exciting and has transformed rural communities that were once prone to drought and struggling economically.

There has always been a challenge of using water more efficiently and IrrigationNZ played a big role in leading improvement in system design, installation, and management.

Prior to IrrigationNZ re-forming the irrigation sector was very fragmented. A scheme on one bank of the river might have a problem that a scheme on the opposite bank had under control. IrrigationNZ was pivotal in bringing irrigators and schemes together to share problems, ideas, and solutions; and it continues to do this today.

What has been the most important thing you have learnt about irrigation?
Irrigation is so much more than putting water on land, I like to think of it as water for communities. It goes beyond the farm and has major social and economic influence. The challenge today is to operate in a way that is socially and environmentally responsible yet enables farmers to be economically viable.

Where do you see the future of water management and irrigation going?
In the future I see the sector continuing to grow with more and more focus on technology – to not only improve water use efficiency but to further reduce the environmental footprint of irrigation. Unfortunately, irrigation has been linked to dairy farming when it is not just about that at all, irrigation is about choices for farmers. In future the choice may be away from irrigating dairy pasture to more lucrative agricultural or horticultural crops. Without irrigation there would not be this choice.

We cannot say today what the future of irrigated agriculture will be. By way of example, I was at Lincoln University when the Amuri Irrigation Scheme was being built in the late 1970s, early 80s. Land use was mainly sheep and some cropping, which was intensified under irrigation. Who would have predicted then that the Amuri Basin would be virtually wall to wall dairy farming 30 years later?

We cannot say with certainty what the future of agriculture will be, but we can say that irrigators will have many more options than if they farmed without water.

Ron Cocks Memorial Award 2020

The Ron Cocks Award recognises a person who has made a significant contribution to irrigation in New Zealand.

J.R. (Ron) Cocks was a Mid Canterbury farmer, a pioneer, visionary and a leader in farming affairs. His greatest legacy to New Zealand was his leadership in water issues. The Memorial Award acknowledges that legacy and encourages others to follow his leadership.

The recipients of the Ron Cocks Memorial Award from 2008 to 2016 were:

- Sid Hurst in 2008
- Allan Hubbard in 2010
- Brian Cameron in 2012
- Bob Engelbrecht and Grant McFadden in 2014
- Tony Banks and Robin Murphy in 2016
- Gavin Dann and Terry Heiler 2018

This year the Ron Cocks Memorial Award was awarded posthumously to Graeme Tulloch.

Graeme Tulloch.

Graeme Tulloch

Graeme Tulloch was a thought leader and made considerable contribution to irrigation in the Wairarapa. He successfully ran his own businesses and was a mentor for many. Graeme dedicated his working life to improving efficiencies in the agricultural sector until his passing in November 2019, age 83.

Graeme was a farmer in the Wairarapa and also ran a farm machinery business. Entrepreneurial, innovative and hard working, he forged a hugely successful career on and off the farm. Graeme's love for agriculture started at a young age when he was in the cow shed at the age of 10. Graeme loved physical work however, after recovering from illness when he was 18, he went into a 'softer' job and was on the road selling machinery. He was very successful at this and it led him to start his own machinery business with his father William known as Bill and brother David. Together they began an importing and manufacturing farm machinery business in the 1960s. At its height Tulloch Farm Machines had more than 50 dealerships stretching from Kaitaia to Invercargill. Now called Tulloch Imports Ltd, it is operated today by Graeme's son John. As a farming business, Graeme's TSM Farms Ltd was equally impressive. The business, formed in 2002 with two other families (Searle and Marfell) it included four farms – two dairy farms, a sheep and beef farm and an arable farm, all in the Wairarapa. These farms are still in the families today. Graeme and late wife Lillian-Estelle (known as Stella) had four children. Chris was the oldest daughter (Bell) followed by sons John and Steve (Tulloch) and youngest daughter Liz (Bosch). Graeme's son John said his dad was a hard worker and loved agriculture and it was always a goal of his to have his own land and the machinery business allowed him to achieve this. Even in his retirement he was still involved with the farming business and was always looking for ways to progress further farm developments John said. He said his father truly was an amazing man and although he struggled with dyslexia he turned what could've been a negative into a positive.

"He worked around the weaknesses of struggling to read and write and ultimately it made him stronger … things that should've been setbacks he turned to his advantage and that was one of the important things he taught me."

Graeme was widely recognised as one of the Wairarapa's most knowledgeable and innovative farmers. A long-term thinker and early adopter of new ideas he was always prepared to push the envelope to find solutions to securing reliable water for irrigation.

> "... things that should've been setbacks he turned to his advantage and that was one of the important things he taught me."

WATER FOR THE GREATER GOOD

Graeme was a leading figure in initiating discussions around establishing a more reliable source of water for the Wairarapa. What sparked Graeme's passion for water and water use was the 1997–98 drought and the impact it had on the Wairarapa farming community. He successfully helped lobby Government to fund a research project into the potential for water storage schemes in the Wairarapa, which started in the early 2000s. He was a founding member of the Wairarapa Irrigation Trust, formed in 2007 to build on previous investigative work. It commissioned preliminary studies that indicated strong potential for irrigated land that didn't have access to water. The trust continued to work and provide farmers and other groups with information on how irrigation could work for them. He continued to advocate for a region-wide water storage scheme and believed it was the "single biggest thing we can do to make this district grow."

While not directly involved with the

present Wairarapa community water storage project, his early leadership, vision and guidance had a major influence on the investigations progressing to the stage where the scheme now looks increasingly likely.

COMMUNITY STALWART

Graeme was extremely generous in his willingness to share with others his knowledge and experience with irrigation. He was a mentor in the agricultural sector and other sectors. He led by example, setting a benchmark in farming innovation from which many other farmers and businesses followed. He represented farmers and the wider community by serving on local Government including four terms as a Masterton District Council councillor and one term as a South Wairarapa District Councillor. He also had a long stint on the Wellington Harbour Board as well as numerous directorships. He was passionate about the value of water to unlock production and economic gain for all. He was clearly a dairy farmer however, he often said if he was starting out again he would be into some sort of horticulture. He saw the movement of water to the highest value land use as an inevitable and positive thing. He was very comfortable broadcasting these ideas to his peers, the agricultural community and local politicians. His quiet and controlled style cut through the noise.

Christine Tulloch (left) and John Tulloch receive the Ron Cocks award from IrrigationNZ chairwomen Keri Johnston on behalf of their late father Graeme Tulloch.

IrrigationNZ Innovation Award

IrrigationNZ in association with Ballance Agri-Nutrients appreciates the brainpower that goes into creating inventive irrigation tools and techniques, and we want them to be recognised.

After judging, three finalists were selected and meant to be honoured at our 2020 Conference however, because this event was cancelled due to COVID, these prizes were awarded at the recent IrrigationNZ AGM.

A $2,500 cash prize was awarded for 'the best innovation, discovery or achievement that makes a positive contribution, impact or benefit to irrigation in New Zealand'.

John Bright of Aqualinc receives the IrrigationNZ 'Innovation in Irrigation' award sponsored by Ballance and presented by Ballance Science Extension Officer Jessica Hollever.

1ST: AQUALINC – N-WISE IRRIGATION

A pilot desktop study led by Dr John Bright of Aqualinc has found that changing irrigation scheduling rules can significantly reduce nutrient losses.

Dr Bright has decades of experience when it comes to irrigation management and was approached by the Fertiliser Association of New Zealand to carry out this study.

"The study is prompted by the obvious environmental aspect that needs to be considered in day-to-day farming, particularly the need to reduce nitrogen (N) losses."

The study was carried out on 12 Canterbury dairy farms. The current practice was to irrigate when soil moisture drops below 50 percent available to the plant and to apply enough water to refill to a target level of 90 percent of the full point, often higher. The study systematically examined the effects on production, drainage and N loss to water of varying the irrigation trigger and target levels.

"We were particularly interested in the effects of reducing the soil moisture trigger level to significantly lower levels than current practice during spring and autumn, and of not refilling the soil profile as much as is usual practice."

The aim is to increase the soil's capacity to utilise rainfall to reduce the risk of drainage and N leaching. By allowing the soil to dry out more in spring and autumn and raising soil water content to no more than 80 percent of the full point, nitrogen loss to water was reduced by 27 percent, on average. The range across the case study farms was 4 percent to 58 percent.

Dr Bright said it was about being "smarter about things in spring and autumn … essentially it's as simple as varying irrigation triggers and targets month by month as set out in a table of values."

"We were particularly interested in the effects of reducing the soil moisture trigger level to significantly lower levels than current practice during spring and autumn, and of not refilling the soil profile as much as is usual practice."

RUNNER UP: MARLBOROUGH DISTRICT COUNCIL – E WATER

Water is Marlborough's most significant resource. The district relies on adequate supplies of freshwater for a range of sectors. Most water resources in Marlborough are at, or nearing, a state of full allocation. A review of Marlborough's resource management plans identified that the inability to allocate water beyond these limits would create a significant constraint to future growth. To facilitate this, the Council outlined an approach to Ministry for the Environment using the proposed water framework; this resulted in a partnership project that the parties believed "had potential wide reaching implications for water management in New Zealand." After a constructive design period eWater was developed.

Marlborough's rivers and aquifers provide water for more than 1,600 freshwater permits; the system was designed so that permit holders and registered individuals can find out more about water usage so we can all play a role in managing the region's water supply. Permit holders are required to provide to Council specific water metering data.

Data is used within the system to understand and manage the pressures and demands on Marlborough's water. Users can access the system data and check water records at a glance. By logging in they can see how much has been used to date and how much is left this month or this year, based on their individual consented allocation. This system can determine your irrigation status, whether you should be irrigating or when you can irrigate. The site also shows any restrictions on your permit including when you can take water, flow reductions and cut-offs. When Marlborough's water resources are fully allocated, the council cannot issue any more permits. However, many allocations are not being fully utilised. The provision of water-use information in real time will enable water users to identify unutilised water relative to water permit entitlements.

To help ensure our available water is being efficiently utilised, the Council is proposing to introduce an Enhanced Water Transfer scheme. This would allow water to be temporarily transferred between permit holders in the same freshwater management unit; the system has been designed to deliver this functionality digitally, making water management more efficient (subject to planning provision decisions). eWater was designed with users in mind and as a result will work on any mobile device or desktop allowing users instant access to information from the field or home, enabling informed and smarter decision-making for our precious water resources.

RUNNER UP: QTECH – WATER-INSIGHT

After over five years in the making, Water Insight (a brand of Qtech) can now offer a complete Irrigation Management System known as IMS. Launched in 2019, IMS is a state-of-the-art solution that integrates both monitoring and control into one platform. Unique and intelligent sprinkler controllers are placed at each fixed post or pod and can be managed remotely using the new cloud-based interface. A mesh radio network means that these devices can operate over large land areas and on terrain that would typically defeat traditional irrigation methods.

IMS includes real-time maps and a communication service that sends out alerts on problems, ensuring the farmer can respond quickly to any issues, streamline operations and reduce service costs. Sensors can also be integrated into IMS to provide farmers with more informed decision-making capability.

Moving forward, Water-Insight aimed to create tighter decision support which would allow for greater autonomous capability, develop additional sensor types and provide more advanced workflow/operational support.

Certificate in Irrigation Design

The training course is planned to help people acquire specific skills to design efficient and sustainable irrigation systems. The Level 5 certificate runs for 18 months. The course involves a range of work which encompasses irrigation design best practice. This year we had two students graduate the course following completion in 2019, Seamus Pomeroy-Lovatt and Matt Stace. The pair told us about what they learnt from the course.

What is your role – where are you based?

Seamus: I'm an irrigation and effluent system designer working for GV Electrical & Pumping (GVE) in the Wairarapa.

Matt: I am an irrigation design engineer based at WaterForce Marlborough/Nelson.

How did you first get involved with the irrigation industry?

S: I originally joined GVE in 2014 to assist with job management and update the company's policies and documentation. At the time, GVE was going through the process of getting its Dairy Effluent Design Accreditation so I became pretty heavily involved with that to try and lessen the workload on other staff. Following that, I began assisting our head designer Gordon Mouldey with discharge to land consents and subsequent effluent system designs and as part of the company-wide systems updates, we decided to look into IrriCad. I attended several days of IrriCad training in Christchurch and then spent the next few years completing irrigation and effluent designs under Gordon's supervision. By 2018 I was doing the majority of the design work and GVE management encouraged me to complete the NCID in order to both expand my skills and knowledge of irrigation design, and to provide some formal recognition of the work we were already doing.

M: I joined WaterForce through their graduate programme after completing a Bachelor of Science at the University of Otago.

What has your work primarily involved?

S: My main functions in the business are site investigation, irrigation and effluent system design and specification, district council liaison for consenting purposes, and pricing/project management.

M: My primary role in Marlborough is the design of drip irrigation systems for new and existing vineyards

Why did you do the design course – if it has helped you/been and advantage – how?

S: It's primarily given me and GVE a formal qualification that gives our clients confidence in my designs and advice, and it's given me the confidence to back my work.

M: The design course has been a significant advantage to give me a thorough overview of different system types that I don't often work with.

What do you enjoy most about working in the irrigation industry?

S: I'm personally interested in sustainability so I like being in position that gives me direct input into improving on-farm practices. I also enjoy the variety of the work I do and the people I get to work with. No two farms are the same and it's always good to see a farmer happy and getting results from a system I've designed.

M: Working alongside farmers with irrigation is unique where each day requires both practical and theoretical intelligence to solve real-world problems efficiently.

IrrigationNZ Achievements in 2019/2020

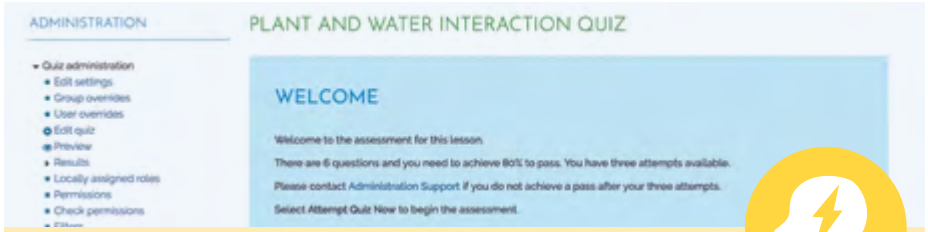
ADVOCACY

We had a strong focus this year on building and maintaining relationships with politicians across the spectrum. We met with Ministers David Parker, Damien O'Connor, Shane Jones, and James Shaw, as well as opposition spokespeople.

We released an **Election Manifesto**, setting out our priorities prior to the general election.

We represented our members on various government proposals, including submitting on the **exposure drafts** of **Essential Freshwater Regulations** and **Dam Safety Regulations**.

We are working as part of the **Food and Fibre Leaders Group**, which brings together the Chairs and Chief Executives of organisations across the primary sector to work on important policy developments collaboratively, such as climate change, greenhouse gases, and the government's response to COVID-19.



TRAINING

e-Learning

We concluded our **Smart Tools and Tips project**, with the resulting e-learning platform proving itself a valuable resource when in-person workshops weren't possible due to COVID-19.

PROJECTS

We are contributing to or leading several projects, including:

Fertigation

Researching the application of fertigation technology in pasture systems, and the resultant outputs.

Fish Screens

Developing updated guidelines applicable to native fish and promoting good practice for the industry.

Irrigation Insight (NIWA)

Supporting good decision-making through improved forecasting and comprehensive soil moisture data.

IRRIGATION NEW ZEALAND

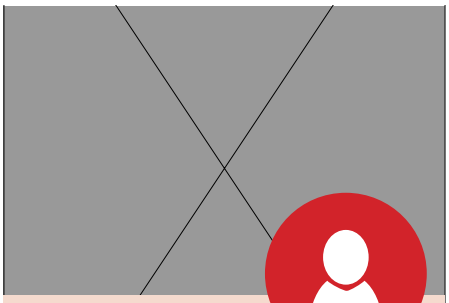
WATER | FOOD | FIBRE | LIFE

CONNECTIVITY

We spread the word about the importance of irrigation to our communities, with IrrigationNZ's large stand being a drawcard for many people at shows around the country.

PARTNERSHIPS

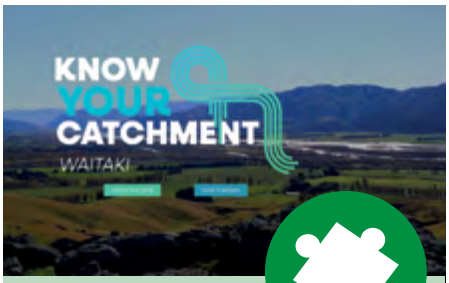
We hold workshops around the country with our **strategic partner FMG**, to reduce risk to irrigation equipment caused by wind damage. We also contribute to their **Irrigator Advice Guide**.



MEMBERSHIP

This year we have continued to

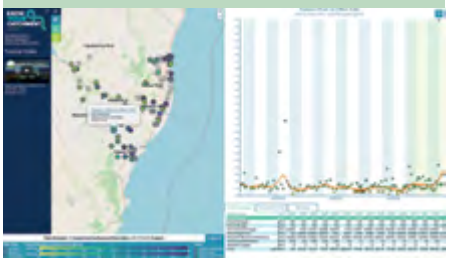
grow our membership



PROJECTS

Know Your Catchment

We launched the Know Your Catchment portal, developed through our **Building Trust project**, which provides farmers and the wider community with up-to-date water quality and river flow information, as well as telling the stories of farming in the catchment.



Flower power – grown with water

With a family history in growing flowers which goes back to the early 1900s it was somewhat inevitable that Michelle Kempthorne would end up in the business of growing flowers, a passion shared by her husband Ian.

Specialising in gerberas and roses, K&L Nurseries based in Springston, Canterbury produces over two million stems a year, and irrigation was a crucial part of that.

"We couldn't grow the flowers we do without irrigation; it is so important; flowers need nutrients to grow and water is that" Mr Kempthorne said.

"To get enough stems per square metre it all comes down to how much you feed them, and the climate in the glasshouses."

Mrs Kempthorne first started growing flowers in 2000 when she took on the business with her parents Paul and Lyn Loader, and although previously a diesel mechanic Mr Kempthorne came on full-time in 2006.

Mrs Kempthorne said the pair enjoyed working together.

"I like to focus on the growing side of things, watching the plants grow and change," whereas Mr Kempthorne said his mechanical skills came in handy when it came to "mechanical problem solving, fertilising and irrigation systems."

What started as one small glasshouse in 2000, Mr and Mrs Kempthorne, along with Mr Loader, have expanded the business over time and now have nearly 8,000 square metres of glasshouses for growing.

K&L Nurseries provided flowers for wholesale auction houses as well as distributing them to retail clients across New Zealand.

Even though the flowers grew under cover, growing all year round meant they had to be adaptable to the conditions.

"Too much light is not good and of course neither is too little … the flowers need around 10,000 joules of light per week," Mr Kempthorne said.

"The flowers are irrigated through a drip line system and if one of the drippers is blocked you soon know as it shows in the flowers … time periods of irrigation increases with more solar input, the amount of water the flowers need is really reflective of how much light they are getting."

Any runoff from irrigation or the greenhouses was pumped and irrigated on surrounding paddocks.

Propagation was an important step to the beginning of a flower's life and Mr and Mrs Kempthorne did it themselves. Mrs Kempthorne's father Paul introduced self-propagating gerbera plants which came from India and China as tissue culture, originally sourced from Holland, and roses were sourced from cuttings which they got themselves as well as from throughout New Zealand.

"It takes eight weeks before the gerberas are ready to go into the glasshouses and then

A sea of colour where gerberas grow inside the greenhouse at K&L nurseries.

"The flowers are irrigated through a drip line system and if one of the drippers is blocked you soon know as it shows in the flowers ... time periods of irrigation increases with more solar input, the amount of water the flowers need is really reflective of how much light they are getting."

another eight weeks before they have flowers, give or take, so it doesn't really take long in the scheme of things."

They used to use New Zealand pumice for as a medium for growing flowers but have since moved to coco (ground coconut husks). This is due to the area that would have been required to keep the pumice weed free, whereas the coco comes in dehydrated bales that are then hydrated and used. It was also lighter to lift plants in and out for replanting.

Although they grow a variety of flowers, Mr Kempthorne said the staples always stayed the same and they made sure they had plenty of reds and pinks for days like Valentine's and Mother's Day.

"Roses tend to be more work as they need more maintenance."

Mr Kempthorne said it took a lot of work to grow a stem and almost every stage was done by hand.

This ongoing work made for the requirement of many hands and they employed the equivalent of ten full-time staff, but the ongoing rises in wages costs made it an increasing expense.

"Prices for flowers haven't really changed over the past ten years but wages have continued to rise, we have to continue to have a profitable business."

Ian and Michelle Kempthorne of K&L Nurseries.

Mrs Kempthorne said they loved having staff and employing local people and getting to know them, although said they might have to investigate forms of automation in the future.

"We want to have people not machines."

While the pair said flower prices had not changed much over the past ten years – the price of roses had recently improved with less imports coming into the country following COVID-19.

Due to the reduction in air travel it has decreased the number of flower consignments (a single shipment, that may include different types of flowers, e.g. roses, chrysanthemums, etc) that are imported into New Zealand.

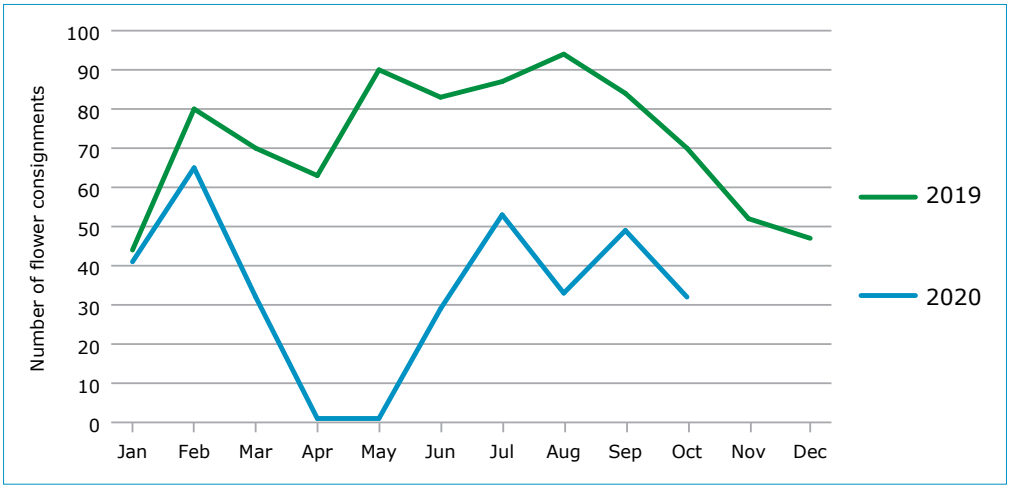
The graph and table below clearly show the impact that the COVID-19 response has had on flower imports. For example, April 2019 had 63 consignments whereas April 2020 had one.

The number of flowers imported to New Zealand have still not returned to pre-COVID-19 levels.

"Roses are harder to import, therefore this season has firmed up prices for New Zealand growers."

"In a mixed bunch of flowers, a buyer wouldn't know if the flowers were grown in New Zealand or imported."

One of the biggest challenges of growing was disease, said Mr Kempthorne.



	2019	2020
January	44	41
February	80	65
March	70	32
April	63	1
May	90	1
June	83	29
July	87	53
August	94	33
September	84	49
October	70	32
November	52	–
December	47	–
TOTAL	864	336

Number of flower consignments imported to New Zealand, 2019 and 2020. *(Source: Ministry of Primary Industries obtained under the Official Information Act 1982)*

Flowers ready to be packed and sent off around New Zealand.

"The climate inside a greenhouse is ideal for every disease, and we want to try and spray as least often as possible."

However, after many attempts the pair have had success with a predatory mite system which effectively works the same as spray but without the chemical.

"We try to keep our spraying to a minimum."

The predatory mite system works as a security system to stop plant-eating mites.

"We failed a few times before it worked, disease is a constant battle," Mrs Kempthorne said.

When asked what their biggest achievements of their business had been over the years the couple agreed that each stepping stone along the way had been rewarding but, installing renewable energy was a highlight.

Previously burning coal – which was used to heat the greenhouses – they installed a biomass boiler 'Polytechnik Boiler' in 2013 burning wood chip instead.

The biomass (organic matter used as a fuel) boiler heats pipes that run through the glasshouses with hot water, to keep the houses at a warm temperature for optimal flower growth.

Mr Kempthorne said installing the Polytechnik Boiler was a major re-fit.

With doubt over carbon and fossil fuel use they saw themselves being well placed to have a point of difference for their product, in the future of a continually changing and sensitive environment.

Michelle and Ian propagate their own flowers. Above are gerberas which come to New Zealand as tissue culture.

Ian holds the coco which is used as a medium for growing.

Irrigation Leader

Please join us for our Israel Water Education and Trade Tour June 27–July 7, 2021

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Millions of plants – here is where they start

With an increased spotlight on riparian, wetland, and tree planting in recent years, often little thought is given to how the plants are grown to the point of being ready for their forever home. However, irrigation is critical to getting it right.

Southern Woods nursery – located just out of Christchurch, Canterbury – was established in 1987 as a specialist producer of seedlings for fuelwood production and shelter belts. The 2000s saw a boom of native revegetation plantings and a corresponding shift in product mix. Since then it hasn't slowed with obligations for farmers to have riparian planting and wetland planting. This, as well as the One Billion Trees Programme where the New Zealand Government has set a goal to plant a billion trees by 2028, has seen the demand for these plants further increase.

Southern Woods Business Development Manager Rico Mannall said they had noticed people being more pro-active about planting their land.

"There are more people than ever before asking specifically for riparian planting purposes."

The nursery currently produces millions of trees per year of 500 species from varieties of shelter, forest, tree crops, native vegetation to fuelwood, hedging, and specimen trees.

The nursery is situated on the Canterbury Plains, which could be a very hot and dry climate at times, averaging 650–750mm rainfall annually. Mr Mannall said there would be no way they could grow the number of plants they do without sophisticated irrigation systems.

"Water is one of our most crucial resources, especially in the hotter summer months."

"We can grow plants more efficiently and effectively with the same footprint thanks to targeted water use."

Growing all these plants has relatively high labour inputs and Southern Woods currently has 40 staff.

Plant Centre Manager Chris Smith said people often ran into trouble when they did not research what works on their property before planting at a large scale.

"It's important to find out which species grow well in your area and experiment first, not only do the plants need watering here at the nursery, they also need adequate water when planted in the ground."

Mr Mannall said in a lot of ways the nursery was treated like a farm.

"We want all the plants to be fed, watered and healthy, the health of the plants is crucial in order for them to be successful here as well as when they leave the nursery to be planted elsewhere."

He said regulation had come to the fore-front in recent years and the appreciation for water as a precious and scarce resource meant the nursery had shifted to using more efficient irrigation practices.

"Previous irrigation systems took a blanket approach to broadcasting water across crops, however now we are much more specific with where our water is going."

Southern Woods Plant Centre Manager Chris Smith (left) and Business Development Manager Rico Mannall.

Drip irrigation for water use and plant growth efficiency. Without irrigation it would be impossible for Southern Woods to produce plants at a large scale.

Growing for the greater good

The feeling of doing something for the benefit of the environment is what Devin Westley loves about growing plants.

Devin Westley is the Production Manager at Southern Woods Nursery.

After dabbling in ecology and microbiology in the early days of his tertiary studies Mr Wesley then decided to study horticulture and horticultural management at Lincoln University. After this he went to Southern Woods as part of his work experience and since then, has never left.

His role sees him tackling a range of tasks and water management was a key one of them.

"It's a really important part of what I do."

Irrigation systems ranged from overhead micro sprinklers to more direct drip irrigation for individual plants and was run with a system called Galcon GSI, a 4G-based irrigation controller specifically for horticultural growing.

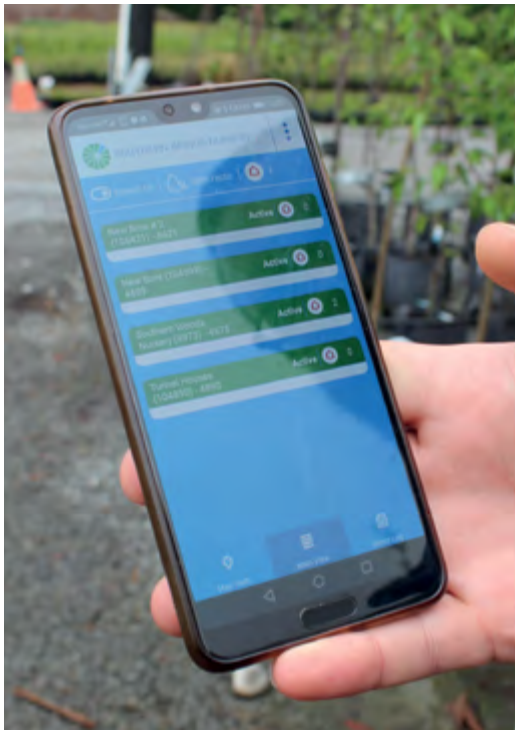
Water for irrigation was pumped from an onsite well and there were 80 irrigation zones across the nursery.

"Plants are at different growing stages, different pot sizes and different plants need different amounts of water which is why it is crucial we have different zones."

He said how much they irrigated was of course dependent on weather conditions and the time of year but generally in the winter they were irrigated twice a week, and summer up to twice a day.

During peak irrigation this meant they were watering for around 16 hours a day across different zones with capacity to have different zones going at different times using multiple pumps. He said the aim was to give the plants enough water that they were wet through but there was no water running off them to prevent nutrient leaching.

"Plants are at different growing stages, different pot sizes and different plants need different amounts of water which is why it is crucial we have different zones."



Irrigation turned on by the touch of a button on Mr Westley's phone.

Fertiliser was incorporated in the medium the plants were grown in and the size of the plant and how long the plant was going to be in the nursery determined the amount of fertiliser they got. This could be anywhere from a five month to a 14-month release, which could be topped up if required.

When it came to pest and disease control on plants Mr Westley said they did not over spray.

"We try not to put excess costs on the plants."

The prunus species (fruit trees) received a monthly copper spray and everything else got a blanket spray about twice a year, and the myrtle species were sprayed monthly as a precaution for myrtle rust.

For the first time this year they had used ladybugs which were natural predators for pests such as mealy bug and it was something they would likely continue in the future to reduce chemical use.

Bird control was also important, but this tended to be more of an issue for seedlings and so they were grown in tunnel houses to avoid damage.

The three main tasks of Mr Westley's job were monitoring irrigation, meeting production targets and making sure everything was working for his staff.

"I really enjoy the water management side of things and it has gotten more precise and technical in the time I have been working in this job and I'm sure it will continue to in the future."

Mr Westley said he appreciated both working inside and outside in his job and got the greatest satisfaction from seeing the plants he grew planted out in a large project.

"Visiting places where your plants have gone is great as it's such a tangible achievement, whether it's in a new subdivision or the side of a motorway, I know I've grown this stuff and it's going to be there for years to come."

During peak irrigation season irrigators were running for around 16 hours a day across different zones.

Passion to paddock: getting started with sub surface drip irrigation

In a challenging farming environment, it is important to look at ways you can improve your systems and a North Canterbury farmer is exploring how.

Gary Robinson has always been involved with farming and after exposure to sub-surface drip irrigation (SDI) he decided to investigate it more. This was just a year ago and now he and wife Penny have started their own SDI installation business.

"It really interested me and the more I researched it the more it made sense to do it … it's not a replacement to more traditional irrigation but an alternative," said Mr Robinson.

Earlier this year the pair went to the World Ag Expo in California. Mr Robinson said SDI was very common in the USA and they wanted to consider ways it could be better operated in New Zealand.

"SDI is commonly used in the States, they have far less access to water than us and manage to utilise it … so why can't we use it more to grow grass in New Zealand?"

He said it was a great opportunity to learn about how the method was used from people who were familiar with it and an eye-opener to different farming systems. From there, Robinson SDI was born, and they have teamed up with Carrfields to assist with the design process.

SDI can be installed to any crop or pasture-based system. Examination of the soil profile helps to determine the correct row and emitter spacing. This is to make sure the system is designed for best efficiency.

"It's great because soils can change massively in a small space and this system can adapt to that."

The tape (tubing) is installed with a drill (like a direct drill), and the tape is then guided into the soil with proximities determined by soil type.

This buried tape then slowly releases water to match crop water needs.

"SDI saves water and improves yields by eliminating surface water evaporation and reducing the incidence of weeds and disease. Water is applied directly to the root zone meaning the plant never reaches its stress point and always has the correct amount of

Gary Robinson, Robinson SDI, at his trial block in Oxford, Canterbury.

water available through capillary action feeding the plant up through the root as opposed to going down."

Mr Robinson currently has a trial block set up and plans to get some data off this reflective of the New Zealand environment. Of the two-hectare block, four millimetres of water a day is distributed at two millimetres an hour – therefore it is only running for two hours of the day, subject to change to soil moisture quantities.

"It can help with labour and cost savings; it will be good to get some data and facts about how it works here."

"There's no reason this system couldn't be used on a range of systems from productive dairy farms, cropping systems or even sports fields."

Mr Robinson said in future he hoped to see more farmers and growers using this system to be sustainable and make best use of our precious water resource.

"I believe in this system so much, it's not just a bucket in the paddock, rather feeding plants exactly what they need when they need it … for water use efficiency and better environmental outcomes, you've got to move with the times and it is up to our generation to find ways that we can better use and store our water, there's lots of different ways to do things and I see this as a future-proof option that will be viable for years to come."

Sub-surface drip irrigation installed.

Revealing groundwater's denitrification capacity

A new way to measure denitrification in groundwater has been proved and could make analysing growing waters denitrification capacity more accessible to regional councils and farmers.

Denitrification is a natural process that reduces the amount of nitrate entering water bodies. In some groundwater systems, micro-organisms turn nitrate into harmless nitrogen gas (known as 'benign denitrification'), significantly reducing nitrate concentrations.

Nitrate is primarily lost from land via leaching through soil into groundwater, and eventually enters streams, lakes and other freshwater bodies.

Over the past couple of years, Our Land and Water National Science Challenge research teams have developed a better understanding of the process and a better way to measure it.

Understanding more about denitrification is important because it helps us understand where land use can be better matched to land suitability. Areas with high groundwater denitrification capacities may be suitable for more intensive land use, while other areas with less capacity may be used less intensively.

The Our Land and Water research proved that the denitrification capacity of groundwater varies across regions. The main end product of groundwater denitrification (harmless nitrogen gas, or the greenhouse gas nitrous oxide) also varied, depending on the amount of oxygen in the groundwater.

Another research project proved a new way to measure denitrification in groundwater, which could make analysing groundwater's denitrification capacity more accessible for regional councils and farmers. The method compares the ratios of dissolved nitrogen, neon and argon gases in groundwater, to find 'excess' dissolved nitrogen gas (more than could originate from air) that can only be from denitrification.

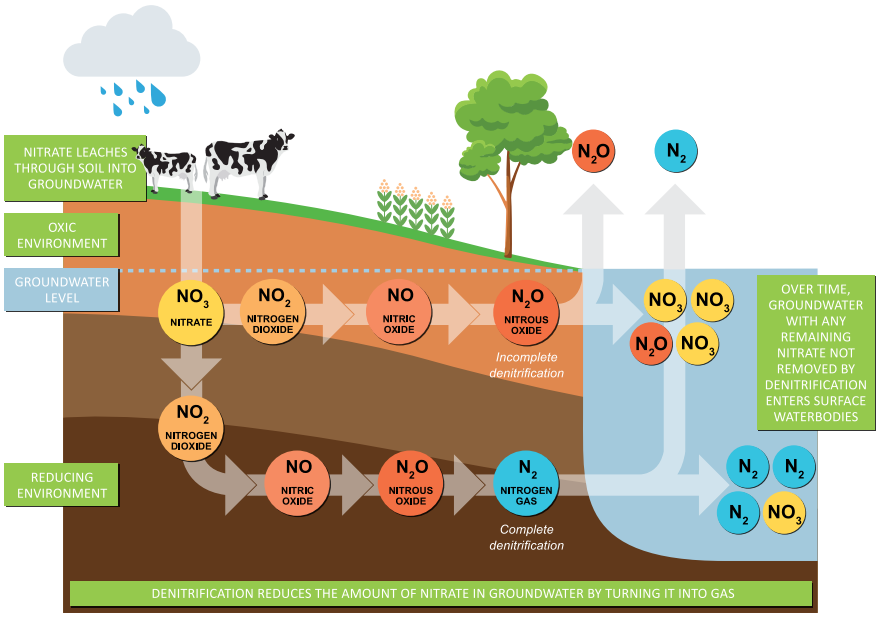
The new method for measuring excess nitrogen can be used to locate and characterise groundwater denitrification sites, so spatial variability of sites and rates can be mapped.

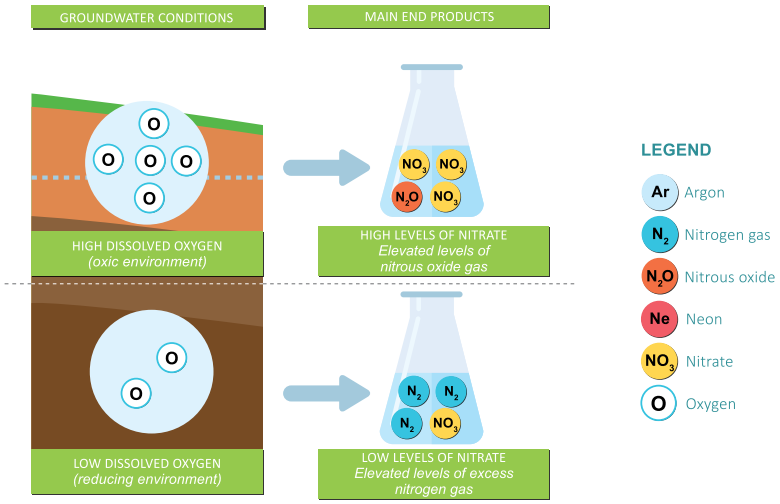
Our Land and Water is now establishing a team to produce a national map of denitrification potential in the subsurface environment. This team will analyse groundwaters in every region of New Zealand, to establish the relationship between low oxygen groundwaters and their denitrification capability.

A national map of groundwater denitrification potential could be used to reduce the amount of nitrate entering rivers and other surface freshwater bodies from groundwater systems.

A map would allow land stewards to identify whether their land's rate of nitrogen loss is impairing catchment water quality or largely being attenuated within the ground water. It will help identify and prioritise areas to target with nitrogen-leaching mitigation

The denitrification process





Source: ourlandandwater.nz

measures, and avoid unnecessary investment to reduce rootzone nitrogen losses in areas where naturally existing groundwater denitrification processes reduce nitrate concentrations.

NEXT STEPS

The excess nitrogen method to measure groundwater denitrification has been developed and tested with Horizons Regional Council, Environment Southland and Waikato Regional Council. The next step is to partner with other regional councils to test it in larger catchments.

Both the map and classification approach will inform allocation by the Ministry of the Environment and regional councils. Identifying the location and efficiency of groundwater denitrification sites can result in more effective nutrient loss regulations, more strategic nitrogen loss mitigation measures and improved land management.

If data from nutrient budgeting models such as OverseerFM, which determines nitrogen loss from the root zone, was coupled with spatially specific groundwater denitrification rates, then more accurate estimates of nitrogen loads to surface water could be determined.

CASE STUDY: RANGITIKEI AND TARARUA RIVER CATCHMENT MODELLING

Researchers looked at the likely results of strategically intensifying and de-intensifying land based on its denitrification capacity.

Modelling for the Rangitikei and Tararua river catchments indicates that relocating intensive dairy farming to areas with high subsurface denitrification capacity could reduce the amount of nitrate entering surface waterbodies from dairying by over 15 percent in the two catchments (supported by selective grazing and cut-and-carry on free-draining areas with low subsurface denitrification capacity).

Combining the subsurface denitrification capacity with purpose-built drainage management could reduce nitrate loads from dairying by over 25 percent in the catchments, according to the modelling.

The growth of sustainable finance

By Dean Spicer, ANZ, Head of Sustainable Finance, New Zealand.

Macro global trends in sustainable agriculture are growing in momentum and create an opportunity for New Zealand to take a leadership position in delivering the products that global consumers are demanding. The significance of sustainable practices in farming is only going to become more prominent in the future, and our ability to adapt to these trends will affect the demand and profitability of the sector.

A key aspect of climate change is the importance of water assets to support food production. New Zealand is blessed with natural resources that could provide a significant strategic advantage. How we manage our water resources is fast becoming a key to food security with a need to improve the quality of our waters. If New Zealand is to be seen as a premium brand on the global stage, we need to have a whole-nation view to sustainability.

The focus on capital providers to report on their climate related risks is expected to see a shift in capital, redirected to sustainable companies with clear strategies on managing their impacts on the environment and society. Sustainable finance is set to play an important role in transitioning economies to a low carbon basis and promoting social, financial and economic resilience for a future in line with environmental and societal objectives. For those companies that fail to transition, access to capital is likely to become more scarce and expensive. However those that adapt will be rewarded with greater access to capital and increasing demand for their products.

THE DEMAND CARROT AND THE REGULATORY STICK

The conscious consumer is driving significant changes in demand for products and services as consumers want to support producers who are 'doing good' as well as delivering quality products and services. 'Doing good' is often aligned to the sustainability of the product and the associated supply chain. In a research report released by Mindful Money and the Responsible Investment Association Australasia on 29 October, two thirds of those surveyed intend to switch to an ethical KiwiSaver or investment fund. This signals that the conscious consumer is now also a conscious investor.

The global shift in consumer demand and awareness of the importance of sustainability is matched by changes in regulations. The European Union agricultural ministers in October announced a policy change aiming to link farming financial support to the adoption of responsible practices beneficial to the climate and the environment. Another recent significant milestone is the EU Taxonomy passing into EU legislation. This is the establishment of an EU classification system for sustainable practices, and is an important step in freeing up finance for economic activities that can make a substantial contribution to climate change mitigation or adaptation. Market momentum is partly fuelled by these regulatory changes in Europe, which then feeds into other marketplaces.

Closer to home the New Zealand Government confirmed in September that it will be requiring climate-related financial risk reporting for listed corporates and major financial institutions, putting New Zealand on track to become the first country to commit to making this type of reporting mandatory.

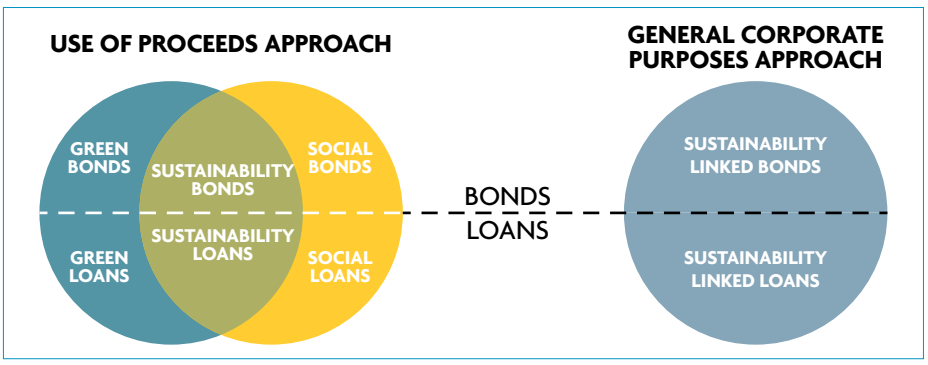
The Sustainable Finance Forum (SFF, formed as an initiative of The Aotearoa Circle) released its final report on a roadmap to a sustainable financial system in November. Its interim report highlighted the need for change, where the SFF noted that 'the global financial system is built on models, norms and rules that do not reflect the full cost of business or respond to changing societal expectations. Integrating environmental and social impacts would improve the accuracy of valuations, accounting and capital adequacy models and internalise social and environmental costs'.

These macro trends have seen a surge in growth and demand for sustainable finance products. There are a number of options for large-scale borrowers to consider. Some of the common sustainable finance products include 'use of proceeds' lending such as green loans and bonds, where the finance is attached to an underlying 'green' asset. Other options are general corporate-purpose products such as sustainability linked loans (SLLs) and bonds. With SLLs the interest rate on the loan has the potential to decrease over time if defined sustainability targets are met, in other words, a carrot–and-stick approach with success being rewarded by a cheaper funding rate, or failure requiring the borrower to pay more.

SUSTAINABLE FINANCE

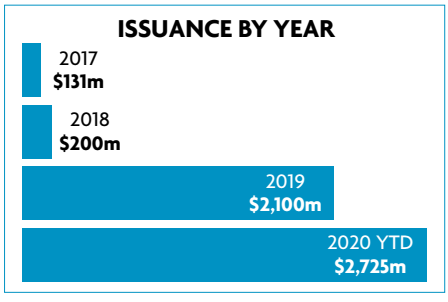
Environmental, social and governance (ESG) considerations are having an increasing impact in the debt capital markets globally – on what investors buy and how borrowers look to raise funds. Sustainable finance products encourage corporate prioritisation of green projects and assets, with many borrowers accelerating an internal push to integrate ESG principles into their business. This internal cultural shift arises as companies become more educated about the green agenda to protect both revenues and reputation.

In the New Zealand context, examples include Mercury NZ Ltd's financing of the Turitea wind farms and Auckland Council funding Electric Train development. To qualify, the assets need to be certified as meeting one of the evolving global sustainability frameworks, for example the Climate Bond Initiative (CBI) criteria or EU taxonomy. The definition of green assets under these criteria is continually being developed.



Companies that may not have assets that qualify as green may choose to consider a sustainability linked loan. As mentioned above, the financing is linked to predetermined ambitious sustainability targets the lender and the company agree to. If the company meets their targets they receive a funding discount, and should they experience a deterioration they may face an increase in the cost. The structure is intended to align the company's corporate purpose and sustainability strategy to their financing. Synlait Milk Ltd was the first New Zealand company to complete a sustainable linked loan from ANZ in 2019, with the goal of reducing emissions across a specified time period.

MARKET UPDATE



The New Zealand market for sustainable debt products has grown rapidly, with $2,725m in Sustainable bonds issued this year to date. This development is driven by investor demand and companies seeking to connect their sustainability strategy to their funding requirements.

ANZ has lead the development of the market in New Zealand and this year completed a number of market firsts including New Zealand's first Inflation Indexed Bond for Housing New Zealand (NZD300m, 15yr), New Zealand's largest Corporate Green Bond for Mercury NZ (NZD200m, 7yr), and New Zealand's first 30 year Green Bond for Auckland Council which was also the largest Green Bond issued to date in the New Zealand market (NZD500m, 30yr).

Both Australia and New Zealand require significant investments in green infrastructure and assets to transition to a low carbon economy in line with international commitments. A green-labelled corporate loan market in Australia and New Zealand has emerged in recent years and seen strong growth, with 14 labelled green loans since the first in 2018. Katharine Tapley, Head of Sustainable Finance at ANZ recently stated that "The market is rapidly moving towards greater awareness and product sophistication, and the new-found interest in green loans is a sign of just how far green financing has come".

ANZ has pledged to fund and facilitate at least AUD50 billion by 2025 towards sustainable solutions for customers. ANZ also announced new carbon initiatives in October 2020, confirming its commitment to help address climate risk, one of the world's most pressing sustainability challenges. Activity and targets such as these will boost credit supply for green loans, which along with strong stakeholder and institutional investor demand, could expand the market for green loans.

THE IMPLICATIONS FOR IRRIGATION PROJECTS

Qualifying categories for green loans are continuing to evolve, bringing irrigation assets in scope, subject to meeting certain criteria. For example, the installation or upgrade of high efficiency water irrigation system can qualify under the CBI Water Criteria, subject to meeting climate mitigation and adaption criteria.

The climate mitigation component of the CBI Water Criteria is intended to provide transparency over the degree of mitigation that will be delivered over the operational lifetime of the project or asset. Issuers must disclose and justify that their water assets or project do not increase greenhouse gas emissions compared to business-as-usual baseline.

The adaption component of the CBI Water Criteria applies if the asset has an expected or remaining operational lifespan of more than 20 years. In this case an assessment of potential climate risks is required. If these are found to be significant a corresponding adaption plan is required, setting out management responses noting how identified climate risks will be addressed.

LOOKING FORWARD

Looking ahead, the financing of sustainable business needs to be intrinsically linked to each company's purpose and its stated sustainability strategy. Investors view green or sustainable debt products the same way any consumer buying a sustainable product would. This means asking does a company have a clear pathway to a carbon neutral future and does it have a social licence to operate?

What is evident is that sustainable financing is here to stay, supported by macro global trends and regulatory requirements. It offers a new and flexible financing source for companies willing to incorporate sustainable principles into their businesses, including operators of irrigation assets. Irrigation operators looking for funding should examine closely whether sustainable finance is suitable for them.

Technology allows for sustainable and efficient farming

After growing up in the Waitaki and being involved with the land for a lifetime, one farmer knows how technology can enhance farming systems – right from the ground up.

Chris Dennison is an arable and dairy farmer whose property is based just north of Oamaru. Two-hundred-and-twenty hectares of the property is in dairy and the other 450 hectares is in arable. The arable portion of the farm grew wheat, barley, canola, rye grass and, for the first time this year, hemp.

The farm, named Drumena, has been in the Dennison family for over 100 years and Mr Dennison said it was amazing to see and compare what they used to do to what they did now.

Mr Dennison's grandad, Harry, came home from war in 1919 and purchased the farm.

"Things were done in a horse drawn cart back then."

Chris Dennison at his farm in the Waitaki.

Chris's Dad, Jim, driving a tractor with his Grandad Harry sowing bags on the header being towed behind in the 1950s.

> "It's like anything, technology has allowed us to farm so much smarter and more efficiently to feed a growing world ... we used to look at a paddock and think we were doing it perfectly however, now you realise how wrong you were doing it, but that's all part of learning."

Mr Dennison's face lights up when he talks about the latest technology innovation he had started to use – satellite imagery for looking at crops and the way they are growing across a paddock.

"I am able to receive satellite imagery of what is happening in my paddocks every five days."

The imagery helps to look for any anomalies that would otherwise be impossible to spot with the naked eye.

"It shows us where the grass or crops are deficient in nutrients and we can respond to this accurately. I can apply fertiliser where I need it within a two centimetre accuracy and we can be as consistent as possible."

Mr Dennison said being closed-minded to technology was no longer an option when it came to farming and growing in the environment we now live in.

"It can be challenging but doing the same thing all the time isn't possible anymore, especially with international competition, if you don't do it someone else will."

"It's like anything, technology has allowed us to farm so much smarter and more efficiently to feed a growing world … we used to look at a paddock and think we were doing it perfectly however, now you realise how wrong you were doing it, but that's all part of learning."

Beyond the farm gates Mr Dennison had other roles which included currently being on the Board of Farmlands the chair of Network Waitaki, the local lines company. He had previously been on the boards of Ravensdown and Tracmap, and had been the chair of the Lower Waitaki Irrigation Company for a number of years.

"I'm a bit of an accidental governor, I enjoy

the variety, you can be hands on with field work but the next day making a difference around a board table."

Although Mr Dennison was both an arable and dairy farmer, his true love lay in growing crops.

"There's nothing more satisfying than starting out with a bare canvas of soil and turning it into a high producing crop."

RELIABLE WATER HELPS RURAL COMMUNITIES TO PROSPER

The property has been irrigated since large-scale irrigation distribution was first introduced to the Waitaki area in the early 1970s.

Mr Dennison had witnessed what drought could do to the community before there was reliable access to irrigation, and recognised the importance of having dependable water for both the urban and rural communities of Oamaru and the Waitaki region.

"Irrigation offers solid prosperity for a community. In the past North Otago has suffered from drought. In a rural area during a drought the whole area suffers."

"Irrigation offers solid prosperity for a community. In the past North Otago has suffered from drought. In a rural area during a drought the whole area suffers."

This year was the first year Mr Dennison had introduced hemp to his arable farming system. Hemp is an increasingly popular fibre.

Mr Dennison said there were multiple licence requirements with growing hemp, and having irrigation was one of them.

"Irrigation can give me confidence that I can deliver – it is like liquid gold."

"You only get one harvest per year with crops, sometimes it's like going fishing – the excitement of harvesting a bumber crop gets your heart racing."

Mr Dennison said irrigation had a big role to play in enabling alternative land uses and growing hemp was an example of this.

"The ability to apply water when required means land can sustain a wider range of uses and we can target higher yields and get them. Without access to water growing crops would become a lot more high risk."

This story is part of the 'Know Your Catchment' dashboard. Putting a human face to water quality and telling the farmer's story.

The Building Trust project has been funded through MPI Sustainable Food and Fibre Futures Fund and managed by IrrigationNZ in partnership with Waitaki Irrigators Collective, Otago Regional Council, and Environment Canterbury and support from, FAR, Beef+Lamb NZ.

Find out more here: catchment.waitakiirrigators.co.nz

Growing in times of change

Peas about to get sprayed with fish protein at 'Phoenix Park' in Southbridge.

Every day is different and being able to react to that and adapt is crucial when it comes to arable farming says a Canterbury farmer.

Every day is different and being able to react to that and adapt is crucial when it comes to arable farming says a Canterbury farmer.

Matt McEvedy is an arable farmer in Southbridge, southwest of Christchurch on a 300 hectare fully irrigated property. It has been in the McEvedy family for over 120 years, making Matt fifth generation farmer on the property. He farmed 'Phoenix Park' in partnership with his parents Pat and Lynley, alongside wife Lizzie and one-year-old son Sebastian.

The farm's soils were home to a range of crops from wheat, spinach, grass seed and carrot seeds to processed peas and beans, and land was also leased to grow broccoli and potatoes.

Mr McEvedy said growing vegetable seeds had become a real focus over the past ten years and it would not have been possible without irrigation.

"My father installed irrigation on the property in the 1980s – it's great but it also brings its cost and challenges however, without it we wouldn't be able to farm what we do and it would be too risky to grow vegetable seeds."

"Irrigation allows us to do what we do and provide a range of quality crops to the market."

Phoenix Park was also home to lamb fattening and heifer grazing, however Mr McEvedy said arable farming was where his passions lie.

"Growing vegetable seeds is a real challenge, but it makes it a highlight. They're more rewarding but they're also riskier as they're very susceptible to weather and pollination issues."

> "Being young and inexperienced I could ask the stupid questions and feel comfortable about doing so ... having the access to the knowledge base and asking the questions to have someone come back to you with information is actually invaluable."

Mr McEvedy was building before he took over the reins of the farm in 2007.

"I'd grown up farming so had a good background in it, however lacked knowledge about what the arable industry was really about."

Since then he had involved himself in extension groups beyond the farm gate and said he would encourage anyone else to do so as it had had a pivotal influence on his career.

Although apprehensive at first, he took the opportunity to get involved, "there weren't many young cropping farmers in a similar situation that I knew of at the time."

"It was really good – I found likeminded people who were enthusiastic about the industry"

"Being young and inexperienced I could ask the stupid questions and feel comfortable about doing so … having the access to the knowledge base and asking the questions to have someone come back to you with information is actually invaluable."

During Mr McEvedy's farming career he said his three biggest challenges had been timeliness, choosing the right times to do things both in everyday work to choosing what to do ahead of time; making decisions to manage a diverse range of crops "they're all very different and you need to make sure you are recognising what is going on between them because it can be different from paddock to paddock; and legislative changes have made for getting your head around something different all the time.

Mr McEvedy said although these challenges made for hard work it was one of his favourite parts of being an arable farmer "you're a full-time problem solver, being constantly

"If we don't do trials and research we can't expect to improve. It's very easy to become siloed because you spend so much time focused on your own farm and your own business."

challenged every day with something different is testing and I'm sure many farmers will agree but finding solutions to these challenges is extremely satisfying – albeit difficult."

In future, he said he saw the arable industry getting faster, with constant changes specifically changes in direction of the market.

Albeit that the current environment could be overwhelming, Mr McEvedy said you had to make time to take opportunities such as doing trials and learning more.

"If we don't do trials and research we can't expect to improve. It's very easy to become siloed because you spend so much time focused on your own farm and your own business."

Keeping it green

They say you're not a green keeper until you've killed a green – but luckily that isn't the case for the Queenstown Golf Course superintendent.

Ian Douglas oversees keeping the greens "on par" at the Queenstown Golf Course, situated on the peninsula of Lake Wakatipu.

However, Mr Douglas's love for golf course maintenance extends much further than Queenstown, having worked on golf courses around New Zealand for over 40 years.

His greenkeeping career started in the 1980s. After a stint in the Air Force and looking for a job – a labourer position came up at the Taupo golf course, "being from a family of keen golfers I thought I'd give it a go … I soon worked out I actually really liked it."

He then went on to do his apprenticeship, "it took three and a half years, but that was back in the 1980s."

Since then he has worked at many courses throughout the country from Gisborne to Palmerston North before making the move to Queenstown to work at Millbrook Resort where he stayed for nine years, before going to The Hills golf course in Arrowtown until 2013. He then moved to the Queenstown Golf Course where he has been since. He said the Queenstown Golf Course had been a great place for him to bring together his knowledge that he has learnt over the years.

The Queenstown Golf Course was built in the mid 1970s and is on Crown land. It is approximately 40 hectares, with 15 hectares irrigated. Situated on a rock base Mr Douglas said it could get very dry very quick, making irrigation an extremely important part of golf course maintenance.

Water for irrigation was drawn from Lake Wakatipu and distributed via pop-up sprinklers.

Mr Douglas said the course could draw one million litres a night during their irrigation season, between 1 October and 31 March.

"We irrigate at night between 12–6am, starting earlier when necessary – during dry periods we will use around 800,000 litres a night and 100–200,000 litres during the day."

Of the irrigation season Mr Douglas said they were irrigating about 70 percent of the nights with varying amounts.

"A lot like irrigation on farms irrigation is great, but once you start the season it's a big job to run it, you almost need someone else just to manage the irrigation."

Ian Douglas – Queenstown Golf Course Superintendent.

Mr Douglas said the target for the greens was 17–18 percent soil moisture, and the rest was mostly done by eye.

He said during his time working as a greenkeeper he had seen a change in weather patterns, and although a bit apprehensive about climate change, he recognised irrigation had become more important as the weather goes from one extreme to the other.

"The springs and autumns are continuing to get longer or shorter and drier, and irrigation allows us to adapt to this."

"In 2017 we had two and a half months with no rain – things would've been a lot different without irrigation."

> "Everyone expects a lot of a golf course these days, it needs to look right and provide suitable conditions, it would be very hard to achieve that without irrigation."

"Everyone expects a lot of a golf course these days, it needs to look right and provide suitable conditions, it would be very hard to achieve that without irrigation."

A career highlight for Mr Douglas was preparing and maintaining The Hills golf course for two New Zealand Open events.

The proximity of Lake Wakatipu as an abundant water source was utilised by the golf course and was a crucial element to keeping it at its best.

"Not only were there good golfers but also managing people like setup crews and TV was more of challenge than getting the course ready."

Working throughout the country had built Mr Douglas's appreciation for the difference between locations around New Zealand.

"When I worked in Taupo it was geothermal therefore when water came out of the ground it was 35–40 degrees. We had to run it across a cooling tower before it was used for irrigation, the water had a lot of minerals in it which used to build up in the pipes … it made for a big job cleaning them out."

Queenstown, being a major tourist destination, Mr Douglas said the golf course's income went to zero overnight earlier in the year thanks to COVID. However, he said it was great to now see plenty of Kiwis visiting and things were improving.

Mr Douglas's interest in irrigation expanded beyond just the golf course and he was also the part of a board of directors for Arrow Irrigation Company.

When asked if he played golf himself Mr Douglas said he enjoyed hitting the ball around occasionally but tended to spend his spare time away from the course.

"I live and breathe it so it's good to take opportunities to get away."

Mr Douglas said he had enjoyed his career as a greenkeeper and has never stopped learning.

"It's a challenge, every day is different you're always battling the climate, but it's really satisfying when it all comes together."

Irrigation at the Queenstown Golf Course on a warm morning.

A closer look at irrigation and decision making

By Pamela Booth, Manaaki Whenua – Landcare Research.

Pamela Booth is an Associate Economist with Manaaki Whenua – Landcare Research based in Wellington. She is interested in freshwater use and farmer decision making and has expertise in survey design and analysis.

The Survey of Rural Decision Makers (SRDM) has been conducted every second year since 2013. It samples from farmers, growers, and foresters nationwide.

The questionnaire is developed in partnership with government ministries, industry groups, regional councils, and other stakeholders. In each wave of the survey, the questionnaire is revised to reflect contemporary issues in the primary sector. Questions related to water irrigation were added in 2017. Approximately 4,500 responses were received in 2017 and nearly 3,800 responses in 2019, split evenly between commercial production and lifestyle farmers across all 16 regions of New Zealand.

WATER IRRIGATION ACROSS THE COUNTRY

Among commercial respondents, 19 percent had water irrigation. However, the proportion of respondents with irrigation varies by sector and region. Unsurprisingly, irrigation is common in horticulture, viticulture, and arable farming: 90 percent of wine grape growers and 85 percent of vegetable and flower growers have irrigation (Fig. 1). Irrigation is also common in regions with large horticulture, viticulture, and arable farming, e.g. 64 percent of respondents in Marlborough irrigate. Interestingly, irrigation is relatively uncommon across the North Island (Fig. 3).

Travelling and manual moving irrigation, such as K-Line or rotorainers, are the most common systems, but 19 percent of respondents have drip irrigation, seven percent have surface systems (e.g. contour) and two percent have subsurface irrigation (Fig. 2). Respondents also use several methods to determine when and how much to irrigate including 40 percent who irrigate when the plants look like they need water, 31 percent who use soil moisture sensors, and two percent who use weather forecasts.

Those in horticulture, viticulture and arable farming predominately use ground water for irrigation while those in livestock predominately use surface water. Approximately 85 percent of respondents in Auckland and Hawke's Bay primarily used ground water while 80–85 percent of respondents in Gisborne, Taranaki, and Otago primarily rely on surface water for their irrigation systems. Twenty-five percent of respondents who irrigate also rely on water from their on-farm and/or on-scheme storage.

TRADE-OFFS AND LONG-TERM DECISIONS

The 2019 SRDM included questions about changes in priorities for on-farm decision making. 60 percent of respondents reported that improving water quality was at least a moderate priority in the last five years. That proportion increases to 67 percent of respondents who expect to make improving water quality at least a moderate priority in the next five years. While 58 percent of respondents report a moderate or major focus on

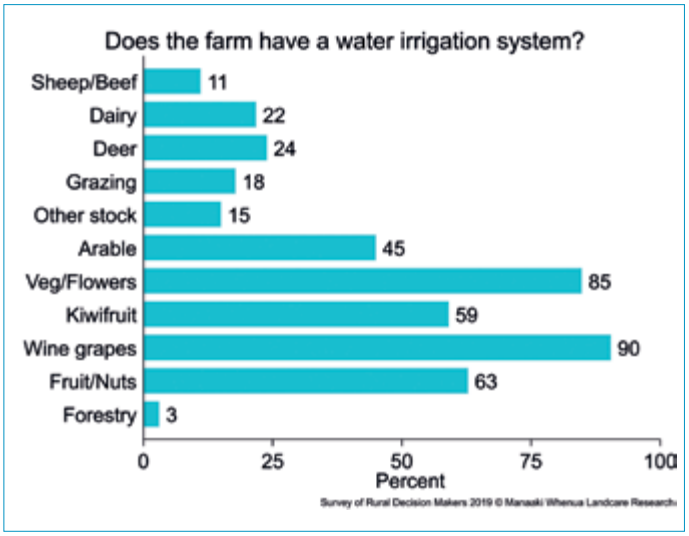


Figure 1. *(Source: Manaaki Whenua Landcare Research)*

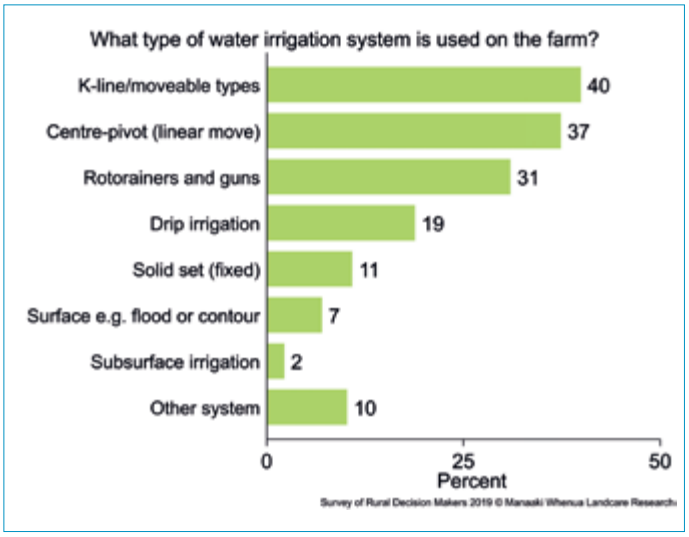


Figure 2. *(Source: Manaaki Whenua Landcare Research)*

using water more efficiently in the last five years, 65 percent expect to put a moderate or major focus on using water more efficiently in the next five years. This increase could be attributed to challenges such as drought. For example, approximately 70 percent of respondents are concerned about the frequency and/or intensity of drought increasing by 2050.

Investing in irrigation is not usually considered a quick decision because of complex trade-offs and uncertainty around return-on-investment. The 2017 SRDM compared benefits of irrigation actually realised with expectations of potential benefits of irrigation (Fig. 4). Among respondents who irrigate, 88 percent said installing irrigation improved their farm performance. At least five percent of respondents also said the best decision they made on-farm within the last few years was to increase water storage, improve drainage and/or invest in

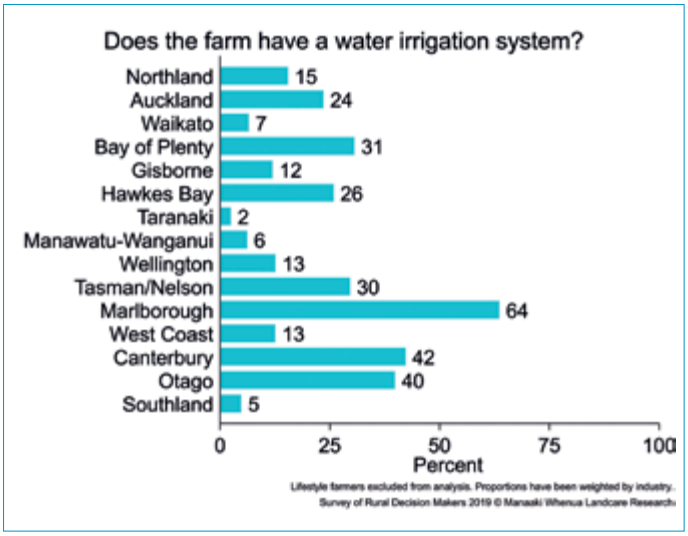


Figure 3. *(Source: Manaaki Whenua Landcare Research)*

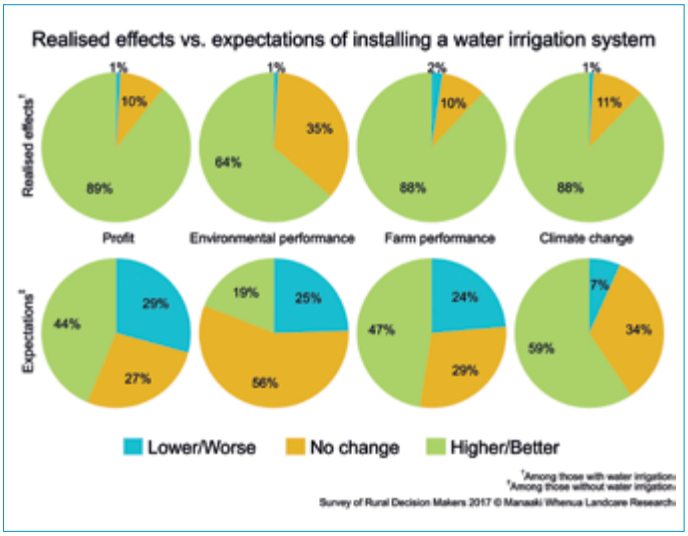


Figure 4. *(Source: Manaaki Whenua Landcare Research)*

irrigation. However, only 47 percent of respondents who do not irrigate thought that installing irrigation would improve their farm performance. Despite these reservations, many respondents are thinking about changing their irrigation and water storage in the short- to medium-term. Among respondents who expect to make increasing their resilience to climate change at least a moderate priority, 15 percent intend to increase their water storage capacity and 10 percent intend to invest in irrigation over the next five years.

SOURCES OF INFORMATION AND ADVICE

Of the 42 percent of respondents who sought or received information or advice on water quality or use within the past five years, 56 percent received that information or advice from their local or regional council. However, respondents seek information or advice from multiple sources. For example, of the 39 percent of respondents who seek information or advice farming magazines, 65 percent also seek information or advice from councils, 35 percent also seek information or advice from industry levy organisations, and 35 percent also seek information or advice from peers or peer support groups.

FURTHER INFORMATION

Each iteration of the SRDM is a snapshot of what it means to be a farmer, grower, or forester in our dynamic primary sector. The results presented here are also just a snapshot of topics and questions in the surveys. If you would like more information about the SRDM, summary results are available on Manaaki Whenua's website: www.landcareresearch.co.nz/discover-our-research/environment/sustainable-society-and-policy/survey-of-rural-decision-makers/

You can also contact Pamela Booth (BoothP@LandcareResearch.co.nz) with any questions, comments, and suggestions. The 2021 SRDM is currently in development and we appreciate feedback especially from those who take the survey.

Seasonal climate outlook December 2020–February 2021

OUTLOOK SUMMARY

Consistent with moderate La Niña conditions, December 2020 – February 2021 air pressure is forecast to be higher than normal over and to the southeast of the South Island and lower than normal to the northwest of New Zealand. This is expected to be associated with northeasterly air flow anomalies. Although patterns of higher than normal pressure and drier conditions are expected to start summer, moist, sub-tropical disturbances are expected to reach the country occasionally, particularly the North Island and northern South Island. These systems can cause areas of heavy rainfall and flooding. Marine heatwave conditions formed near the northern North Island and northern Tasman Sea during November. Unusually warm seas in other coastal regions may develop into a marine heatwave over summer. Air temperatures are very likely to be above average in all regions of the country with elevated humidity levels from time to time, particularly in the North Island. (A marine heatwave is defined as periods of extremely warm sea surface temperatures that persist for a prolonged period of time and can extend up to thousands of kilometres.) Rainfall is about equally likely to be near normal or below normal in the east and west of the South Island and about equally likely to be near normal or above normal in all remaining regions of the country. Extended dry spells may be interspersed with the expected unsettled periods. For the tropical cyclone season (November 2020–April 2021), NIWA's Southwest Pacific Tropical Cyclone Outlook indicates that the risk for New Zealand is elevated. On average, one ex-tropical cyclone passes near the country each year. Significant rainfall, damaging winds, and coastal inundation can occur during these events. Soil moisture levels are about equally likely to be near normal or below normal in the west of both islands and the east of the South Island and most likely to be near normal in the north of both islands. There is no strong guidance for the east of the North Island. River flows are about equally likely to be near normal or below normal in the west and east of the South Island, about equally likely to be near normal or above normal in the north of the North Island, and most likely to be near normal in the remaining regions of the country.

REGIONAL PREDICTIONS FOR DECEMBER 2020 TO FEBRUARY 2021

Northland, Auckland, Waikato, Bay of Plenty

- Temperatures are very likely to be above average (80% chance).
- Rainfall totals are about equally likely to be above normal (40% chance) or near normal (35% chance).
- Episodes of heavy rainfall are possible through the season, which could increase the chance for flooding events.
- Soil moisture levels are most likely to be near normal (45% chance) while river flows are about equally likely to be near normal (40% chance) or above normal (35% chance).

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

- Temperatures are very likely to be above average (75% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or above normal (35% chance).
- Soil moisture levels are about equally likely to be near normal (40% chance) or below normal (35% chance) while river flows are most likely to be near normal (45% chance).

Takaka River. *(Photo: Dave Allen, courtesy of NIWA)*

Gisborne, Hawke's Bay, Wairarapa

- Temperatures are very likely to be above average (75% chance).
- Rainfall totals are about equally likely to be above normal (40% chance) or near normal (35% chance).
- Episodes of heavy rainfall are possible through the season, which could increase the chance for flooding events.
- Soil moisture levels are most likely to be near their climatological value while river flows are most likely to be near normal.

Tasman, Nelson, Marlborough, Buller

- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or above normal (35% 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 very likely to be above average (75% chance).
- Rainfall totals are about equally likely to be below normal (40% chance) or near normal (35% chance).
- Soil moisture levels and river flows are about equally likely to be below normal (40% chance) or near normal (35% chance).

Coastal Canterbury, east Otago

- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or below normal (35% chance).
- The lower part of this region, including South Canterbury and east Otago, has a higher chance of experiencing below normal rainfall than areas north of Christchurch.
- Soil moisture levels and river flows are equally likely to be below normal (40% chance) or near normal (40% chance).

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

In the absence of any forecast guidance there would be an equal likelihood (33% chance) of the outcome being in any one of the three categories. Forecast information from local and global guidance models is used to indicate the deviation from equal chance expected for the coming three-month period.

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

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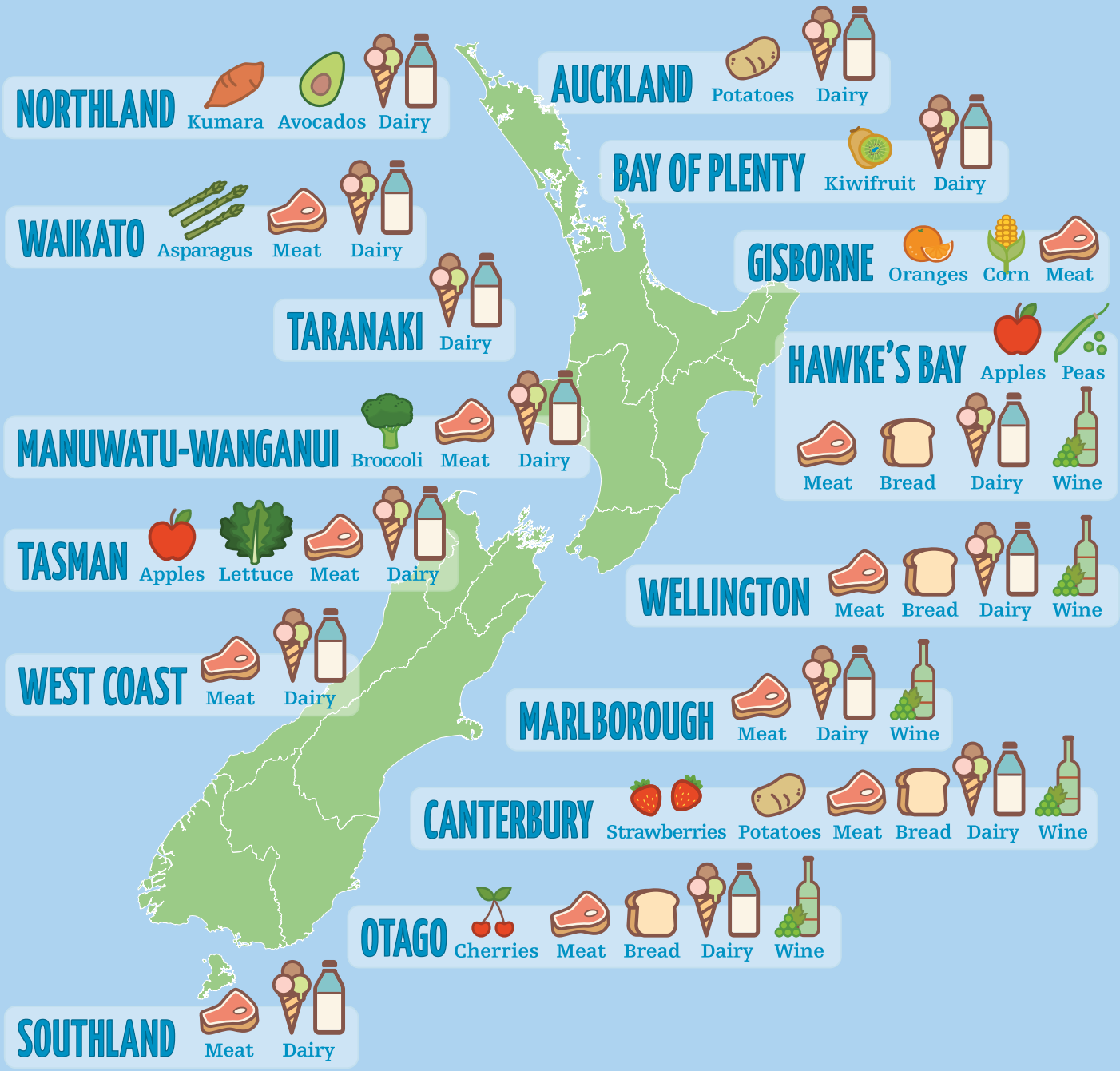

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IrrigationNZ Logo: Time for a refresh

You may have noticed our new logo on our website and publications. With 2020 has come a lot of change so we thought it was time we updated our logo.

At IrrigationNZ our focus is on so much more than just irrigation. Irrigation encompasses many aspects of water management as our logo outlines 'water, food, fibre, life'.

Using our logo from our Conference (which unfortunately didn't go ahead) which had the theme of 'Water for Life' this illustration made for a good fit, representing the complexities, challenges and anticipation for the future of freshwater in New Zealand and the world.

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