IrrigationNZ news
WINTER 2017

The co-operative management of water

The value of irrigation schemes to New Zealand communities

IRRIGATION NEW ZEALAND

TESTING IRRIGATION EFFICIENCY

NGAI TAHU: BUILDING FARMS, GROWING COMMUNITIES

WETLANDS: NATURE'S BEST KEPT SECRET

PGG Wrightson Water

The complete service for all your water and irrigation needs

IRRIGATION DESIGN ACCREDITED

Visit your local PGG Wrightson Water branch today:

Auckland	*3 Arthur Brown Place, Mt Wellington*	***Ashburton***	*447 West Street*
Hastings	*1203 Omahu Road*	***Timaru***	*7 Eversley Street*
Rangiora	*1 Southern Cross Road*	***Cromwell***	*16 Pinot Noir Drive*
Christchurch	*411 Blenheim Road*		

Freephone 0800 864 774 www.pggwrightson.co.nz *Helping grow the country*

CONTENTS

REGULARS

FEATURES

RUBICON™

Monitoring and control solutions you can rely on.

Whether you want to remotely manage a storage pond, a pump station or a thousand property offtakes, we have a solution for you. And with our software you can start simple and build to a complete scheme management solution by adding water ordering, demand management, delivery automation and water use accounting modules.

Contact us today to find out why New Zealand's major irrigation schemes rely on Rubicon Water.

18 Kermode Street Ashburton **email** enquiry@rubiconwater.com **ph** 0207 644 2288 **www.rubiconwater.com**

IrrigationNZ: out & about

ADVOCACY

We've been knocking down doors in Wellington – meeting with Ministers, politicians, opposition MPs and their advisors. Advocating on the regulatory environment, taxing water and continued access to development capital for schemes.

IRRIGATION APPRENTICESHIP

We got the 'green light' from NZQA to proceed. We're now working on building the course structure and content. In 2018, people wanting to work in the irrigation sector will have a new trade qualification to consider.

SMART TOOLS AND TIPS FOR IRRIGATORS

The SMART Tools and Tips for Irrigators Project attracted $534,000 from MPI's Sustainable Farming Fund. We'll use it to help farmers and growers make a significant improvement in irrigation efficiency.

SOUTH ISLAND AGRICULTURAL FIELD DAYS

The team was onsite for the South Island's biggest agricultural event – hosting 'field walks', distributing resources, promoting training and attracting new members.

SHOWCASING AGTECH AT LINCOLN UNIVERSITY

Steve attended Showcasing Agtech at Lincoln University in May. Featuring emerging technologies in the primary sector – including new methods, big data, robotics, software and irrigation tech.

SUMMER STUDENT IRRIGATION EFFICIENCY PILOT PROGRAMME

The Summer Student Irrigation Efficiency Pilot Programme – in partnership with ECan – was a huge success. We now have a number of other regions wanting to join the project next year.

UPCOMING EVENTS

28 June 2017: Applying Digital Innovation to Irrigation

Interactive workshop in partnership with Microsoft. Looking at the challenges and impacts of technology, and how digital innovations happening elsewhere could be applied to irrigation and water management in New Zealand.

GREAT IRRIGATION CHALLENGE

The Great Irrigation Challenge was held in Ashburton in May and was booked out! A great event for farmers, industry and schemes, featuring international experts, new technology and resources.

NEED TRAINING?

Check out page 48 for details on IrrigationNZ's upcoming irrigator training courses for farmers and growers, industry and schemes.

Activism vs collaborative action

There are two characters from my childhood that have grown to become great, iconic New Zealanders – Fred Dagg and Wal Footrot. The men behind these characters, John Clarke and Murray Ball, understood rural New Zealand and the people who lived there. They created lovable, flawed characters that we could all relate to – back then, all New Zealanders were a little bit country.

Now, there's a chasm between urban and rural, a growing divide that both Fred and Wal would struggle to bridge. Instead of cartoons on the antics of Dog, and the Pongo and Footrot communities, the media today serves up an almost-daily dose of farmer bashing.

No longer do you need science, facts, data or history to understand why New Zealand's fresh water resources are under pressure. You just need an opinion, a keyboard and/or a very loud voice.

Take former TV presenter, Nadine Higgins. She wrote in the Sunday paper about how unfair it was that she can't take her dog for a swim in any of the Hawke's Bay rivers because a dog died in one of them recently. She went on to suggest it was because of farmers. (Alternative facts suggest that it was actually because of a blue-green algal bloom unrelated to farming, but let's not let science get in the way of a good opinion.)

It's not just a national shame, said Higgins (about the dog dying and water quality), but a "National" shame. You see what she did there – shifted the blame from farmers to politicians. "National", she shouted, have created a freshwater CRISIS because they let in too many cows. I'm not one to be nit-picky but history doesn't agree with you, Nadine. The biggest increase in dairy cow numbers was under the last Labour Government's stewardship, when cow numbers went from 3.2 million in 1998 to 4.3 million in 2008. The numbers peaked at just over 5 million and are now tracking back down again.

Not content with knowing very little about water quality or cow numbers, Higgins went on to say that the Land and Water Forum (LAWF) – set up to advise government on freshwater management – is "bleeding members who say their advice is being ignored". She is correct in that three of its members have resigned because no one was getting alarmed enough about their alarmist, activist agendas. Calling the departure of three from a forum of almost 70 a blood-bath might be overstating it a bit. The Forum still retains a number of very knowledgeable, capable members and organisations, including IrrigationNZ, making a tangible and positive contribution to the development of good policy.

Mrs Higgins' baseless blaming has become, sadly, the norm in the ongoing debate over water quality and management. During our recent visit to Wellington, the Greens' Catherine Delahunty talked about her 'distrust of the collaborative process' in relation to resource management, stating that it had been hijacked by people with an agenda and was now the realm of a 'privileged few'. She too was referencing the LAWF, but also the Canterbury Water Management Strategy and the Zone Committees which are centred around the principles of collaboration.

To hear a 'green' advocate dismissing a style of governance that is central to their own ethos struck me as almost oxymoronic. And as I sat there trying to reason with her and defend collective governance, I had a light bulb moment. I realised why we have such a problem with having a rational debate and finding, if not solutions, at least common ground: it's because we've stopped listening to each other.

In the mad rush to get our opinion across or defend our position, we've created a bias filter. We no longer listen to people or organisations with whom we disagree.

People aren't leaving the LAWF or splintering away from Zone Committees because they're being ignored, they're doing it because they refuse to listen to, or accept, other people's or groups' opinions and positions.

"In the mad rush to get our opinion across or defend our position, we've created a bias filter. We no longer listen to people or organisations with whom we disagree."

How can this be healthy? Do we teach our kids to throw a tantrum when they don't get their own way? Or do we teach them to be tolerant; to be quiet when others are talking and to accept the opinions of others, even though they might be quite different to theirs?

Recently I was driving with one of the iwi reps on a Zone Committee and they spoke of their frustration at the 'hijacking' of the meetings by certain factions. It was really disheartening to listen to – here we have a group of people dedicated to, and passionate about, managing their catchment, people who have accepted the call to action – but who are being increasingly thwarted by activism.

I welcome the recent call to action from Federated Farmers President, Dr William Rolleston. He has challenged the primary sector to get together and present a 'united front' to address the anti-farming rhetoric. Instead of attacking critics, the primary sector should instead tell their stories about how they care for water and land, their animals and their communities. Scientists then need to back them up – revealing the issues that need addressing and how the industry is responding to them.

Human beings like being connected in a positive way – that's why so many of us get involved in zone committees, regulatory processes, as representatives on councils, user and care groups. We are not 'the privileged few' as Catherine Delahunty called us, we are the listening posts for our communities.

Nicky Hyslop
Chairwoman
IrrigationNZ

Reporting back

There's been an awful lot of report writing going on around the country over the past couple of months. First there was the OECD Report, which told us very little of what we didn't already know; next, the report by the Prime Minister's Chief Scientist, Sir Peter Gluckman, who boldly stated that 'New Zealand's fresh waters were under stress because of what we did in and around them' and most recently 'Our freshwater 2017' which said the exact same thing using slightly different words: 'all human activities are placing pressure on our fresh water environments'.

As soon as these reports are released there is a flurry of media releases from various groups picking out the bits that suit their agendas. Like the Greens who immediately blamed agricultural intensification for 'wreaking havoc on our waterways.'

What Catherine Delahunty conveniently forgot to read in Sir Peter's report was that he actually said 'while some water bodies were in a good state, others have been significantly compromised by agricultural intensification, urban expansion and industrial pollution, hydroelectric development, or the effects of drought.'

That's five complexities Catherine, not just one scapegoat.

Within an hour of the release of 'Our freshwater 2017', social media was teeming with anti-farming sentiments and calls for moratoriums on dairy cows – despite one of the reports key findings being that E. coli and nitrate-nitrogen concentrations were highest in urban catchments.

I find it really interesting that the burden for environmental stewardship is so avidly applied only to the rural sector. For all those people demanding moratoriums on cows to 'give us time to look at how we can change the farming model' or making nonsense statements about crammed cows poisoning habitats for fish and other animals', I have one question for you: What about Auckland?

Auckland isn't sustainable. It has too many people crammed into too small, too pricey houses. They burp and fart their way along congested motorways in cars that use oil which green people protest about because it's bad for the environment. Those same people pollute habitats for fish and other animals because the Council can't afford to separate their storm water from their wastewater and it all pours out into the harbours. Imagine the outrage if I called for a moratorium on Aucklanders to give us time to look at how we could change the urban model!

There's no denying we all have our own agendas and we're always going to seek out the bits in these reports that suit or support those agendas. I do it myself!

One thing I liked about Sir Peter's report was his attempt to explain the complexities around managing water, as well as the multiple trade-offs and decisions that were needed. Yes, trade-offs – these are things people do when they really, really want something but it's either too difficult, too expensive or really impractical to achieve. 'I want a river that I can swim in whenever I want to' will involve a trade-off between how much you're willing to pay in increased rates, how much you want your power bill to go up by, whether you can be bothered getting up on a Sunday morning and joining the local stream care group to plant trees or clean up rubbish and whether you want an economically and socially thriving regional town.

Sir Peter put it a little more succinctly: "We all want [the water system] to be clean but then we all want to be able to have hydroelectric power, we want to have economic growth around farming and so forth. There's all sorts of contradictions in here." He concluded that how far waterways could be improved would be a function of time, effort and resource.

And if you ask me – leadership. Particularly in the regulatory environment.

In our recent meetings with politicians in Wellington one of the key issues we raised was the impact the continually changing regulatory environment was having on the primary sector. Whilst there's a huge amount of work going on to create and support collaborative governance of freshwater at a regional and catchment level, what's still missing is that over-arching national direction and leadership. A stable legislative and regulatory framework is what underpins good management practices on the ground.

Who knows, maybe someone out there is writing a report about it right now – "How fiddling with the RMA for the past 20 years has made it largely incoherent."

Andrew Curtis
Chief Executive
IrrigationNZ

Serious science in the Mackenzie Country

Richard and Annabelle Subtil run a merino and beef farm in the Waitaki Valley. They're at the bottom end of the Mackenzie Country – which means they're at the pointy-end of a long-running battle between farming and conservation.

The Mackenzie Country – barren, brown, endless. A State Highway divides it, several district and regional councils regulate it and most New Zealanders have an opinion about it. Omarama Station is its gateway – 12,000 hectares of farmland, home to Richard and Annabelle Subtil and their 19,000 merino sheep and 1,000 beef cattle. The Subtil's are award-winning stewards of the land; Annabelle's family connection to this place goes back 100 years and when they've finished farming here, they've every intention of handing it on to their kids – or someone else's – in a better state than when they started.

"This is an intergenerational property, it's our home, it's our business and we care deeply about what happens here. We also recognise that other people feel passionately about this area, too. And because of that, we don't farm in some sort of splendid isolation, we try to be open and upfront about what we do, the impacts we have and the efforts we go to, to mitigate them."

A few years back, the Subtil's were instrumental in establishing a sub-catchment water user group, which works collaboratively to improve farm practises and environmental outcomes. It's a great example of people coming together at a local level to change outcomes on a national scale.

"We've got all the property owners along the Omarama Stream doing voluntary water testing. We all share our results, there's no hiding from ourselves or our neighbours. If we spot a problem, we fix it together. It's more productive than finger-pointing and the result has been a significant improvement in trust and understanding."

The group has accumulated some "serious science" over the past couple of years, which proves they're making a positive difference. "The data we've been gathering shows that it's possible, farming on these light soils, to grow with very few nutrients dropping out the bottom, so to speak" says Richard.

The station's flat lands, prior to irrigation, supported ¼ of a stock unit per hectare, per annum. After pivot irrigators were installed in 2010, the flats can now run 22–23 stock units per hectare per annum. "That's close to 100-fold increase in productivity, which has not led to a huge outflow of nutrients into the groundwater. Everything that is being applied

Table 1. Lysimeter Data (September 2016 to May 2017)

	Delivered irrigation	Effective irrigation (the amount of applied irrigation retained/stored in the soil)	Irrigation effiency (%)	Irrigation # (number of irrigation events)	Delivered rain (measure of the rainfall that fell on the site)	Effective rainfall (a measure of the amount of rainfall which was retained/ stored in soil profile)	Rain efficiency (%)	Number of rain events
Lys1	229mm	226mm	99%	58	374mm	358mm	96%	79
Lys2	229mm	228mm	100%	58	374mm	374mm	100%	79
Lys3	229mm	224mm	98%	58	374mm	350mm	94%	79

is being used" said Richard.

Lysimeters are set up on the property to provide data on the efficiency and effectiveness of their water use. Data from September 2016 to May 2017 showed that irrigation was, on average, 99% efficient.

Hydroservices Technician, Jane Robb, analysed the data set and found that for Lysimeter 1, 229mm of irrigation was applied over 58 events and of that, under 3mm of drainage was recorded. For Lysimeter 3, 229mm of irrigation was applied, 224mm of which was retained and stored in the profile.

"These statistics are very good and it's been a pleasure to analyse a site with so little drainage" was Jane's conclusion.

"Science and technology are the future for farming, particularly here in the Basin. We're now able to make decisions based on real science rather than assumptions and we can see what's having an effect and where we're making a difference" says Richard.

There's no doubt that technology will accelerate the change in farming practises required for a better future, but there are also more 'traditional' tools that Richard thinks should be used to greater effect.

"I am endlessly on about the carrot and stick approach. We've got around 5% of farmers who are letting the whole side down because they're not investing in best practise, they're not engaged and they're not listening. And we're not tough enough on them. We need to get to a stage where best practise is the norm; go above it you get rewarded, fall below it and you get the book thrown at you. Farmers are businesspeople, they understand this approach."

"I understand that many people view farming in the Basin as a threat and the only way forward for them is to stop all development. But that won't save the Basin – it'd be overrun with rabbits and wilding pines in no time – they're our biggest threats to biodiversity, not farming"

The consenting framework in New Zealand also has a lot to answer for, says Richard. "It's a 'one size fits all' approach and it doesn't work. We operate under Environment Canterbury here and the rules are applied as if the whole ECan area is one and the same. It's not. We need a more mature approach to consenting and compliance, one that recognises catchment and sub-catchment differences and allows us to develop and implement processes that fit the environment and deliver better outcomes."

Subtil recognises that his focus on the positives and potential isn't an approach embraced by everyone. "I understand that many people view farming in the Basin as a threat and the only way forward for them is to stop all development. But that won't save the Basin – it'd be overrun with rabbits and wilding pines in no time – they're our biggest threats to biodiversity, not farming."

It's not a case of farming vs conservation, says Richard, but farming with conservation. "Many farmers in the Basin have developed their land to increase biodiversity values; they use science and data to improve the water environment and they work collectively and proactively to manage their impacts. The Basin isn't being lost; it's being improved and cared for by people who have a vested interest in its sustainable future."

The grass really is greener – an American view of New Zealand

Earlier this year, IrrigationNZ hosted a group of irrigators from the American Mid-West. They met with a number of scheme managers, farmers, growers and industry reps and this is what they had to say about the way we water in New Zealand.

KRIS POLLY, TOUR LEADER:
The farms and irrigation facilities we visited were well maintained and cared for. There is a bedrock of resourcefulness and practicality in New Zealand thinking that can be seen in nearly everything New Zealanders build or do.

Work is done with only the number of people that is absolutely necessary. Whereas an irrigation district in the United States may have 75–100 employees, New Zealand schemes of similar service acreage would have 3–5 employees, with the vast amount of work done by outside contractors to reduce costs.

Pivots are the primary form of irrigation and we learnt that many innovations in pivot technology were developed or tested in New Zealand before going to the United States and other global markets.

DAVE BLODGET, AQUATICS MARKET MANAGER, ALLIGARE:
From the beginning, you could tell that Andrew Curtis, CEO for IrrigationNZ, was in touch with water and the politics going on there. He introduced us to key people who were addressing the concerns of the environmentalists in a proactive way. I was impressed that water users worked in conjunction with their neighbours to solve problems and collect data to demonstrate that they were on top of perceived water quality issues.

The irrigation systems in New Zealand in most cases were more advanced than what we see in the United States.

GARY ESSLINGER, MANAGER ELEPHANT BUTTE IRRIGATION DISTRICT:
I was fascinated and impressed by the different irrigation schemes that we visited and the significant technological advancements they had developed.

Farmers in New Zealand are faced with similar environmental, water quality and conservation pressures as farmers in the western United States. From personal account, presentations by our guides and scheme managers and the current newspaper articles, it was obvious to me that there is an attack on New Zealand farmers' livelihood and their farming practices. Every irrigation scheme we visited showed us that only through continued innovation, real-time metering, and monitoring of water quality and quantity, irrigation efficiency improvements and continued on-farm conservation practices, they are going to be able to defend their viability.

JOEL IRVING, INTERNATIONAL WATER SCREENS:
New Zealand is similar to North America in that it is working to improve water storage and distribution, and to extend coverage to more irrigated acres. Those efforts exceeded my expectations – the schemes were more advanced than I expected. With surprisingly large projects, such as Central Plains Water and the proposed storage ponds of the Rangitata Diversion Race, New Zealand shows an impressive future of water projects that will support its water needs.

JASON MCSHANE, KENNEWICK IRRIGATION DISTRICT:
I was most impressed by New Zealand irrigation managers' practical approach to solutions. The mentality is 'if we have a problem, we have to solve it. Let's get together and do it.' I was also impressed by the sense of community. I enjoyed meeting farmers, who according to all the environmental groups are pillaging the land, but in fact, they are excellent stewards of the land. They are concerned about things that are beyond the bottom line and beyond property boundaries.

JOHN CROTTY, WRITER FOR IRRIGATION LEADER MAGAZINE:
We met a lot of good, thoughtful people – true stewards of the land and water. The water managers we spoke with share a can-do attitude with respect to system upgrades and thinking big about their projects. Everyone we talked to shared a vision for long-term, sustainable water supplies that would serve agricultural, municipal and environmental needs.

"As we ate our final dinner together as a group, we were grateful for the bounties these [irrigation] projects brought us: fresh fruits, good wine, and a strong connection to the land and people of New Zealand."

Planting of a new wetland at Owl Farm in Cambridge, designed and built by Opus International Consultants.

Wetlands: nature's best kept secret to slow nitrate loss

By Roger MacGibbon from Opus International Consultants.

Farmers across the country are increasingly being called to account for their environmental footprint, and the main focus on intensive livestock farms is to minimise nitrate loss. Building wetlands alongside pastures offers farmers a unique tool to extract the nitrate from water and remove it completely from the farm system.

Opus International Consultants has been working with farmers across the country to help them reduce their nitrate losses through man-made wetlands.

These wetlands can – when they are the right shape, size and plant composition – remove as much as 70 percent of the nitrate entering them.

Opus International Consultants' wetland expert, Roger MacGibbon, says that farmers tend to focus on improving fertiliser, livestock and pasture management practice to reduce nitrate losses but wetlands offer a powerful potential tool for livestock farmers.

"The process of denitrification is completely natural as micro-organisms known as denitrifying bacteria 'consume' the nitrate molecules and convert them into nitrogen and oxygen gas. Our role is to create the right conditions for these bacteria to flourish," he says.

Nutrient treatment wetlands can be constructed in most locations where springs, seeps, streams or drainage waters flow for most of the year. But not all wetlands are created equal. Some types of wetland – especially those with predominantly open, deep water pools (e.g. duck ponds) and tree-covered kahikatea wetlands – may remove little or no nitrate. Design aspects such as water depth, wetland width-to-length ratio, water residence time, plant species and plant spacing are all critical for optimising nitrate extraction efficiency.

Roger highlights the need to seek experienced advice when planning and building a new wetland.

"If you get the design and management right, wetlands will substantially reduce farm nitrate losses; but get it wrong and they can be little more than an expensive hole in the ground," he says.

Roger leads the Opus nutrient management team that has designed and built several successful nutrient wetlands on farms, especially in intensive dairy-farming regions such as the Waikato, Horizons and Canterbury.

"Wetlands are one of a suite of nutrient management tools that can be used on farm to manage nitrogen and faecal micro-organisms such as E. coli. Most properties that have locations where water collects or drains to, including sub-surface drainage, can install a wetland," says Roger.

Selection of the right plant species is also critical to the successful establishment of a treatment wetland.

"Poor selection of plants is one of the major reasons for the failure of some wetlands. We prefer to both design the wetland and supervise earthworks and plant establishment to ensure farmers get a functional performing treatment wetland that can reduce nitrate losses for years to come," says Roger.

"If you get the design and management right, wetlands will substantially reduce farm nitrate losses; but get it wrong and they can be little more than an expensive hole in the ground."

Developing constructed wetlands is just one of the water management services Opus provides to the agrisector. Other integrated services include irrigation, and riparian and effluent management.

"Our farming specialists understand the whole farming system as well as the demands on a farmer's time and resources, which allows us to develop targeted solutions that enhance productive capacity and reduce the environmental footprint. Working with the people within the agrisector is very rewarding for us, especially when we see farming communities engaged in enhancing the natural environment."

Contact Roger MacGibbon at Opus for more information: 027 496 1365 or roger.macgibbon@opus.co.nz www.opus.co.nz

Our week in Wellington

By Andrew Curtis, CEO, IrrigationNZ.

They say a week is a long time in politics. For Board Chair, Nicky Hyslop, Deputy Chair, Hugh Ritchie, and myself, our week meeting politicians in Wellington was time well spent. We managed to get an audience with all of the major parties' primary industry spokespeople, as well as Ministers Smith, Joyce and Guy.

We went armed with a range of resources, discussion papers, messages and questions – guided by extensive feedback from our members on the issues they face, the opportunities ahead and what we need government to do with, and for, our sector. Our key talking points were:

- The need for a stable regulatory environment, particularly with regard to the NPS – essentially 'stop tinkering; give us time to embed the legislation and then review it once you have some real data'.
- Taxing water
- Continued access to development capital for schemes
- The need for a national framework to support the implementation of GMP and FEPs
- Better messaging around the environmental investment made by the primary sector – and recognition of these efforts.

Come September, some of these views will influence our immediate future, so here's a precis of what might lie ahead…

THE FUTURE FOR IRRIGATION:

Nick Smith (National): My two messages would be 1. More irrigation doesn't mean, quid pro quo, poorer water quality; and 2. Irrigation projects basically cannot happen without some level of public support.

David Parker (Labour): I'm not opposed to irrigation, I'm opposed to some of the land uses it supports. I see land use moving to a higher value than dairy over time.

Richard Prosser (NZ First): We support agriculture and we support irrigation – done right. Unfortunately, a lot of people are driven by the Green agenda and they've got it wrong – we don't have a shortage of water in this country, we have a shortage of storage.

CROWN INVESTMENT IN IRRIGATION:

David Seymour (ACT): I have concerns about Crown investment in irrigation, I'm not a fan of it and I don't think you can just say 'it benefits everybody.'

Eugenie Sage (Green Party): We would wind up CIIL and stop government subsidies for new irrigations schemes

WATER QUALITY:

Nick Smith: There's a high level of political agitation around water; the level of passion New Zealanders have for water is now evident in the polls. Our most polluted rivers are in urban catchments, but by length and scale they are small compared to the deterioration in rural waterways.

Steven Joyce (National): There's a real head of steam built up around water; public pressure for improving water quality is evident. It is becoming accepted narrative that dairy farming is to blame, irrigation is sucking our rivers dry and the nutrient load is enabled because irrigation supports intensification. The strong message I'm getting from you [INZ] is 'help tell our side of the story'.

Nathan Guy (National): All these dire warnings around water management yet you never hear anyone saying 'apologies, we got it very wrong' [referring to Havelock North and Selwyn River].

David Parker: We've got serious and worsening issues around water quality in this country. The problem is we've had leadership in the sector which hasn't always been smart.

David Seymour: Water has become the issue du jour; I think water has been caught in the crossfire of a separate debate which has more to do with New Zealanders feeling like they are having something taken away from them than it has to do with water quality. I'm not buying into the crazy xenophobic stuff around foreign ownership.

TAXING OR CHARGING FOR WATER:

Nick Smith: There are no free lunches in life. Whenever you impose costs, you impose impacts. If you put a tax on domestic water, it affects New Zealanders; if you impose it on exports, it impacts on our competitiveness. Our position is that we're comfortable with a charge on water but only for the management of the resource. That means paying for the monitoring, enforcement, allocation and science – basically a reasonable cost for managing water.

Damian O'Connor (Labour): Any talk of a charge or tax has to be reasonable.

David Seymour: On balance I think it would be better if we had a market for trading water. That would mean establishing the limit for allocation and then Councils will work within those limits until they start having to say 'no' to people. Users would then develop a system where they could buy other people's allocation.

Clayton Mitchell (NZ First): Water is a commons property, it belongs to everyone. We are totally opposed to charging for water on a volume basis. However, when water is exported as water, we think there should be a royalty on it. 25% of that royalty would then go back to the region where the water was extracted.

Catherine Delahunty (Green Party): The Greens would introduce a tiered pricing regime for water. Water charging isn't a silver bullet but it is one of the mechanism we can use.

THE CURRENT REGULATORY ENVIRONMENT:

Nick Smith: It might suit you to say 'no more change' but the public is braying for more regulations. For example, there's an increasing level of heat around water conservation orders. I have some sympathy with this approach – just as we have reserves on land and at sea, we probably should have the same on some of our rivers; where we have fresh water environments that we simply leave alone.

Damian O'Connor: By changing the goal posts, Nick Smith has made it more difficult for New Zealand farmers.

David Parker: There's better planning for water in Canterbury than there used to be, but the public won't put up with the transition period [between taking action to fix issues and evidence that its working].

David Seymour: The standard of regulatory reporting in New Zealand is abominable. The RMA is a classic example – 18 amends over 26 years; we're trying to fix something that was badly written in the first place. We need to change the culture of regulation so we end up with regulations that are only there to address market failures.

Steven Joyce: There's a clear message from you to make sure the new version of the NPS doesn't stuff things up and then lay off more changes for a while – or only make informed changes.

Catherine Delahunty: I don't have confidence in FEPs and audits. The audits are not undertaken by people with ecological or environmental backgrounds. There's no rigour around them.

QUOTE OF THE DAY:

Ron Marks (NZ First): City folk cannot just sit there poking the borax at rural New Zealand, ignoring the pollution they are imposing as they sit, one person, in their car on congested motorways, pumping wastewater directly into their harbours. I have two words for them – 'Shut up!'

THEY SAID WHAT?!?

Catherine Delahunty, Green Party: I have a distrust of the collaborative process [in the context of freshwater management]. There are too many people on Zone Committees with a vested interest. We should be listening to communities, not just the privileged people inside the room.

THE LAST WORD...

Nick Smith on swimmability: Rivers aren't that different to roads, where you have State Highways and local roads… which ones do you want the government to focus on? In terms of swimmability, urban vs rural rivers, streams and catchments, what we're saying is: here's the national plan, we are more than happy for regional councils to set specific targets and identify certain waterways that they want to prioritise in terms of water quality.

"No one ever regretted putting in irrigation. Banks don't lend on it and cockies don't go out and write six-figure cheques for nothing. There's no doubting its value. What we need to do though is ensure we maintain environmental and amenity values; that habitats and culture are respected."

– Richard Prosser, NZ First

Same Iconic Brands
Same Iconic Products

Now supplied throughout New Zealand by

43SOUTH

pumps · motors · filtration · aquatics

PENTAIR onga Southern Cross

onga

Onga's Farmmaster range of pumps has evolved with the needs of New Zealand and Australian farmers and landowners since Onga's beginnings back in 1967. Available in either shallow and deep well configurations. Your local dealer can tailor the pumps to suit your requirements delivering the efficiency you demand.

Southern Cross

Southern Cross is the longest established and most recognised brand in the New Zealand and Australian pumping industry with their ISO end suction range being the most recognised pump of their portfolio. Available in close or long coupled units they are suitable for applications ranging from building services, fire applications, water treatment or irrigations.

43SOUTH pumps · motors · filtration · aquatics | SAME PRODUCTS. SAME PEOPLE. BETTER SERVICE.

Phone 03 349 1350 | Email marty@43south.co.nz
www.43south.co.nz

Building farms, growing communities

Toitū te Marae o Tāne, Toitū te Marae o Tangaroa, Toitū te Iwi
When land and water are sustained, the people will prosper

Ngāi Tahu Farming is the 'new face' of corporate farming in Canterbury. They're not just building a whole heap of new farms, they're creating new communities and better futures.

Dairy Manager, Shane Kelly, is in charge of the transformation of Te Whenua Hou, a former forestry block northwest of Christchurch, which is being developed into 6,700 hectares of new farmland. When it's complete, there will be 20 farms operating under gravity-flow pivot irrigation, sourcing water from the Waimakariri Irrigation Scheme.

What makes Te Whenua Hou unique is that it was concept-designed from day one – a master plan covers the whole forest and the layout of the completed and future farms. The design of each farm, including its water and infrastructure needs, was determined by an independent designer; Ngāi Tahu then went to market knowing they were getting exactly – and only – what they needed for success.

"Right from the start, we've been able to make good decisions based on good information. From concept to design, installation and use of technology, and investment in capital infrastructure – all of the processes and systems on our farms have been well-researched and well thought-out so that they can deliver on our core values."

Those core values include kaitiakitanga (stewardship), tahungatanga (expertise), tikanga (appropriate action) and rangatiratanga (leadership). The focus is on the future and the means to get there is by upskilling the next generation.

"We are committed to our rangatahi. We have a training programme, Whenua Kura, which is training around 30 young people every year, in dairy, sheep, beef and apiary. When they come out, some come to work for us here in Canterbury, others take their skills back to their own iwi. Wherever they end up, they end up influencing, and contributing to, their community. It's great for iwi and it's great for the agricultural sector."

It's been pretty good for North Canterbury rugby, too. "We've had quite a few young people relocating here and they're now playing rugby for Ohoka and Oxford. Not only does it help them engage with the community, outside of Ngāi Tahu and farming, it helps us break down those perceptions of Ngāi Tahu as a corporate farmer or only looking after our own. We're seen as a valued part of the community here, we look out for each other and we're a good neighbour."

Being neighbourly is helped by their investment in technology. "Our shareholders hold very high expectations around what happens on our land and as a result, we've made a significant investment in research, modelling, data and technology. We have monitoring wells throughout the forest, we undertake soil mapping and moisture monitoring, we implement GMP. We have literally gone through every paddock and found opportunities to save water, improve soil fertility and knock our nitrogen rates down.

And then we've taken all this information and shared it with our neighbours. It's not just about Ngāi Tahu, it's for everyone."

The Ngāi Tahu approach to stewardship is a "complex combination" of looking down at what's happening on-farm now, and looking ahead at what will be needed in future. The daily view is made up of information gathered from soil moisture strips under every pivot, mini weather stations which tie into the Metservice's five-day forecast and fertiliser application tracked by GPS.

"Our shareholders hold very high expectations around what happens on our land and as a result, we've made a significant investment in research, modelling, data and technology." – *Shane Kelly*

"Managers get all of this updated every day at 8.30am. There's still a degree of interpretation required, but it gives them a comprehensive picture to base their decisions on."

Technology is also very much in Ngāi Tahu Farming's long term view of the world.

"On the world stage, New Zealand is leading the way in the adoption and utilisation of technology. Roll forward ten years and this stuff will be the norm, it will be second nature to us. For Ngāi Tahu, we know it will be the next generation that makes this place [Te Whenua Hou] work; we're giving them the tools and technology now to make that happen."

Irrigation schemes remaining true to the cooperative principles

By Georgina Hamilton, Tavendale and Partners.

The cooperative entity is quintessentially Kiwi and part of the Number 8 Wire approach to problem solving that New Zealand is so well-known for.

At its heart, it's about pulling together the thinking and resources of like-minded people in pursuit of a common goal. There are plenty of examples around the country where the cooperative model has worked to deliver the desired outcomes – be that commercial or not-for-profit.

New Zealand irrigation schemes are no exception. Traditionally founded on a not-for-profit model, such schemes have typically been operated by the collective capability of members and run on a cost-recovery basis and the smell of an oily rag. Over the years, schemes have necessarily become more sophisticated as they've adapted and evolved to meet the ever growing demands around compliance and environmental regulation.

The traditional scheme governance model is not as structured as that of other organisations operating in the corporate environment. There is a spectrum of types and forms of schemes, due in part to the varied statutory bases on which they have originally been established. Individual needs therefore vary from scheme to scheme; there's no 'one size fits all' solution.

The need for schemes to be even better resourced going forward is clear; whether that's by way of consultants and other expert advisors, or by employing specialist staff in-house.

While a necessary means to an end, bridging the capability gap in this way doesn't always sit comfortably with the traditional cooperative governance model, or the culture of the cooperative.

Expectations of these schemes is increasingly more like a corporate. More often than not, the cooperative's greatest challenge is making the shift from reactive decision-making to proactive management practices that increase the demands on members' time and energy.

Then throw the nutrient management challenges in the mix. Schemes are taking on an almost regulatory role – managing scheme-wide nutrient allocations – and the requirement for additional expertise magnifies even more. The upshot is that schemes are mobilising in this space – getting expert input to ensure compliance. Farmer members of schemes are becoming much better educated on their obligations under the nutrient management planning regimes as a result – arguably more so than many other farmers.

This requirement to up-the-anti isn't necessarily compatible with the ethos of operating on a cost-recovery basis central to the cooperative model. It can, however, drive inventiveness and ingenuity around capital and income generation. Water charges as a key income source will come under even more pressure to offset growing operational costs.

Third party investment is another evolving approach for raising scheme capital. The Barrhill Chertsey Irrigation Ltd and Electricity Ashburton joint venture is just one example of this type of "hybrid" arrangement on the ground. And no doubt, Government's recent announcement of a $90 million fund for scheme development will result in other forward-thinking solutions.

Despite the financial upsides, these types of solutions also bring their own challenges and tensions. Maximising returns from investments, on the one hand, while minimising costs for investors, is a tricky juggle for scheme boards.

> "Farmer members of schemes are becoming much better educated on their obligations under the nutrient management planning regimes as a result – arguably more so than many other farmers."

Understanding the culture and environment of individual schemes is critical for those who have the opportunity to partner with, and work alongside, members. The dynamic nature of schemes, the range of individuals that contribute to them, and the novelty of the issues they face, demands robust and well thought-through strategies that will protect the scheme and its cooperative intent, not just now but in the future.

Collectively managing our fresh water challenges

By Justine Gilliland, Ministry for Primary Industries.

Managing one of our most valuable natural resources to benefit the environment and provide economic benefits to communities is no easy feat. But it can be done, and it is being done. Collectively, it can be done through improving and building new water management infrastructure. At an individual farm level, continual management improvements, combined with land use change, also contribute.

Caring for our land and our waterways is in the best interest of everyone, particularly farmers, as the future of their livelihoods and their communities is at stake if they don't. However, recent reports tell us we need to be much better at it.

The 'Our Fresh Water 2017' report released in April confirmed that our fresh water challenges vary significantly across the country and that the problems have arisen due to agricultural and urban development over many decades. This is not just an irrigation problem – dryland farming systems that occupy much of New Zealand also provide challenges to water quality.

Improving water quality and quantity management systems at farm level, and building efficient infrastructure to support this, takes time and money. I believe that we are making progress by taking a long-term approach to improving our environment. This approach involves facilitating the development of modern water management infrastructure that provides reliable water for both economic and environmental uses.

A reliable source of water, managed responsibly, gives farmers and communities more certainty, a wider range of land use options and the potential to improve river flows. This is particularly important during dry times or where over-allocation of groundwater has occurred. By collecting water when it is plentiful due to rainfall events or snow melt, we can better manage the trillions of litres of fresh water we have available in New Zealand. We can store it, recharge our aquifers with it, divert it and manage flows to ensure supply for farms, which need water to grow their grass, crops, vines, seeds, fruits and vegetables. All of this can be achieved while providing rivers with sustained flows, including when nature doesn't provide them.

Through the Ministry for Primary Industries' Irrigation Acceleration Fund (IAF) we have supported early investigations into many irrigation schemes, or water management, that have the potential to improve water quality and to deliver reliable water to communities.

Central Plains Water Stage 1 was one of the first IAF-supported schemes to be built, with further assistance by way of loan investment from Crown Irrigation Investments Ltd. In its first year of operation, the scheme used 19 million cubic metres less of groundwater. Now that Stage 2 of construction has begun, groundwater takes will continue to reduce. The whole scheme must operate within a nutrient loss limit and is expected to further reduce these losses over time via continued improvement in farm practice.

Another example is the Hinds/Hekeao Managed Aquifer Recharge project, where alpine water from the Rangitata River via the Valetta irrigation scheme is filtered back into the ground. The goal of this is to improve aquifer levels and address high nitrate concentrations. This project is in its first year, but already has shown improvements in both water quantity and in water quality, with decreasing concentrations of nitrates in nearby bores.

These are not miracle cures. Continual improvement and adaptive management will be required, catchment by catchment. There will need to be constant engagement between farmers, schemes and their communities. Farmers are already stepping up to the plate, and I congratulate them for that. Just as the issues developed over time, so too will the tangible results we look forward to seeing in our communities. But together we have started down a better road, and are developing the tools and the signals required to manage this vital resource for the benefit of us all.

The co-operative management of water in New Zealand

New Zealand is the world's #1 ranked co-operative economy. Our biggest and best known cooperatives are all primary sector-based – Fonterra, FMG, Silver Fern Farms, Alliance Group and Farmlands. Here, we take a look at the cooperative contribution irrigation schemes make to our economy, environment and social wellbeing.

Irrigation schemes are the epitome of cooperation – they are owned and controlled by their members; they distribute benefits back to members; they sustain growth in uncertain or changing environments and they put environmental and social impacts at the heart of their business. Their cooperative nature is part of the reason Government invests in irrigation schemes.

At the recent opening of Stage 2 of Canterbury Plains Water, Prime Minister, Hon. Bill English, stated that the government invests in irrigation "because we have a wider view of the benefits. We understand the connections – the value of the water here moves its way into our towns and cities."

Kerikeri Irrigation Company (KICL)

The scheme:
The infrastructure was built by the Ministry of Works and started delivering water in the early 1980s. In 1990, local horticulturalists and farmers formed the cooperative Kerikeri Irrigation Co Ltd and purchased the assets off the government.

It has approximately 350 shareholder members who are supplied with water from two storage reservoirs. The scheme supports:

- horticultural land (approximately 2,300 hectares)
- agricultural land (approximately 350 hectares)
- lifestyle blocks
- commercial users
- raw bulk water for town supply.

Water is gravity supplied through a piped system to about 90% of the southern area, and with the assistance of water turbines, to about 75% of the northern area. The balance of the areas rely on pumping. The design flow is 3,000 cubic metres per year per hectare.

Its history:
In the mid 1970s, Kerikeri orchardist, Roger Davies, had had a gutsful of the prolonged drought and he decided to do something about it. He bought a bottle of scotch and headed south to Wellington where he met a bloke who liked to drink and think big. Legend has it that Davies returned with an irrigation scheme.

Whether or not the story is entirely true, there's no disputing that irrigation has changed the fortunes of the Far North.

The environment:
Horticulture has been a feature of Kerikeri's economy and environment since the 1920s when the first citrus orchards were established.

The moisture-holding capacity of the volcanic soils in the district is low and the summer droughts can be long so that even with an annual rainfall of 1,800mm, supplementary irrigation is necessary for consistently high quality fruit. Streams in the area are small and their drought flows are very low so that harvesting of the winter run-off is necessary.

The main reservoirs are sited high in the

catchments to minimise diversion and spillway costs, to enable a largely gravity-fed irrigation supply and to lessen the impact on the local environment.

One of the scheme's major advantages is the way it harvests the water in the high rainfall times and stores this in its reservoirs for distribution during drier periods. This has reduced the pressure on the local rivers and streams for the taking of water for irrigation purposes and helping to protect their natural flows.

Before the irrigation scheme was built, there was so much pressure on the local streams and rivers that in times of drought, neighbours continually argued over who had the right to take water.

The economics:

"We wouldn't be growing up here without KICL" says Dave Kelly, kiwifruit orchardist and Director of HortNZ and the Kerikeri Irrigation Company.

Irrigation is now the foundation of the sector, the town and the region. Kelly reckons that there's "about $1 million per working day percolating around the tills in Kerikeri businesses" because of irrigation.

His estimate is backed up by data in the *2016 KICL Economic, Social and Environmental Impact Report*, which shows KICL contributes more than $100 million per annum to the region's GDP and employs more than 1,300 FTEs. The report also found that Kerikeri has higher household incomes (when compared with the wider district and region), it has a higher proportion of the population in full-time employment and a higher proportion of workers in professional service occupations.

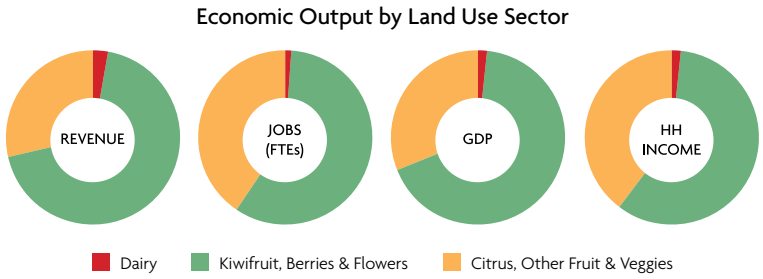
The report also looked at KICL's environmental impact and found that the scheme had improved total flows and drought flows in a majority of the catchment's streams and rivers.

While there is no firm data to prove it, Kelly believes that because the scheme harvests water in medium-to-high flows via weirs, it has also played a significant role in flood mitigation.

"The economics speak for themselves, but what's even more important is that KICL has a relationship with its community. Irrigation isn't a contentious issue here because its value is recognised and understood. It has established and supported an industry that is a key element for employment and growth in the Far North. Horticulture here isn't just about hiring a bunch of backpackers and giving them some secateurs, it's about creating opportunities, upskilling, embracing technology, growing productivity and adding value."

"Before the irrigation scheme was built, there was so much pressure on the local streams and rivers that in times of drought, neighbours continually argued over who had the right to take water."

	DISTRICT				REGION (excluding Far North district)			TOTAL
	Direct	Flow-on	Processing	*District sub-total*	Flow-on	Processing	*Region sub-total*	
REVENUE ($m)	$110	$120	–$0.9	$229	$7	$4	$11	$240
JOBS (FTEs)	922	342	–3	1,261	51	5	56	1,317
GDP ($m)	$59.9	$40.8	–$0.3	$100.4	$5	$0.8	$5.8	$106.2
HH INCOME ($m)	$34.6	$19.4	–$0.2	$53.8	$2.9	$0.4	$3.3	$57.1



Kerikeri caption economic data.

And in some cases, getting people back on the right track. The sector is now working with Department of Corrections, providing meaningful work pathways for prisoners on work-release programmes. The 'unexpected outcomes' from KICL have transformed the town and Kelly believes KICL is a model for other towns and regions.

"Communities need diversity and KICL has delivered it. I look at the flow-on benefits from the scheme – the tech side of the business is huge, then there's opportunities for high-value jobs, like orchard management and science-based roles. Then you've got H&S, construction, all the service and support industries. The whole value of our community has been lifted on the back of horticulture and irrigation."

Twyford Irrigation Group (TIG)

The Twyford Irrigation Group is a company that manages the global consent to take water; individual consent holders still own their water consent. The global company covers 1,500 hectares in total. The consent holders in the group have groundwater bores and a surface water take from the Raupare and other streams, and is working to avoid all surface takes. The streams are spring-fed with water from the Ngaruroro River and the aquifer.

A global approach to managing drought:

January 7, 2017 was the day they 'officially' called drought in Hawke's Bay. The region hadn't seen any decent rainfall since mid-October and the catchment's spring-fed streams had dropped significantly more than anyone had seen in the past.

It could – and should – have spelt disaster for local growers. But thanks to the efforts of the Twyford Irrigation Group (TIG), who had previously signed over their existing individual water rights to become part of a group stewardship model under a global consent, all was not lost.

"It was a critical time for finishing off key root crops, apples and stone fruit. All of them would have been severely affected and some would have been written-off if we didn't have the global consent" said TIG member, Jerf Van Beek.

Drought conditions in the semi-confined area where the global consent applies, saw the Raupare Stream drop below its 300 litres per second minimum flow. The global consent allows the TIG to use water to augment the stream. During the peak of the drought, they were putting approximately 150 litres per second back into the stream.

"At one point when pumps were hard to come by, we let our irrigators know that we were struggling to maintain the stream's minimum flow. Because of this awareness, irrigators changed their behaviour and within days, the stream started showing signs of recovery."

Augmentation continued for almost 40 days, before rain came to the catchment in mid-February. Not only was the waterway spared, severe damage to crops was avoided and water quality was improved. This was because the augmented water was colder and had higher dissolved oxygen, which helps in-stream values.

TIG have developed their own WaterSense web tool, which collates the individual water-take telemetry data from Hawke's Bay Regional Council's Water Information Service. It shows the total water used by the group's global consent each day, including the total volume augmented. During the height of the drought, it showed total use per 28 days peaked at 59.8% of the allocated water. The total for the 12 month period was 45%.

"We know, and we can prove, that we can manage our irrigation both according to the needs of our environment and the needs of our crops. Our growers and irrigators know how important it is to protect the integrity of the global consent."

Hawke's Bay Regional Council is now looking at the Twyford model as an option for other lowland spring-fed streams in the region and there has also been interest from other parts of New Zealand as to how the TIG global consent model could work for other catchments.

FAST FACTS ABOUT TIG'S GLOBAL CONSENT:

- Is the first of its kind in New Zealand
- Was negotiated by Twyford landowners in Hastings and the Hawke's Bay Regional Council
- Sees landowners in the catchment agree to "give to gain" by signing over their existing individual water rights to become part of a 'group stewardship model' (aka a collective)
- Allows the TIG to decide when and where their collective water is used – with resulting efficiency gains
- Provides certainty and reliability of water, even during severe drought, yet still ensures environmental considerations are paramount.

Central Plains Water Limited (CPWL)

The scheme:

Central Plains Water Limited was formed in 2003. Stage One was completed in 2015 and delivers water to 23,000ha via an open channel headrace from the Rakaia River into pressurised pipelines. It supplies shareholders via 110 turnouts located at property boundaries. The Scheme wide application rate is maximum daily water allocation per shareholder is 5.18mm/ha.

Stage 2 will begin operating in September 2018 (to 20,000 hectares) and the Sheffield Section (Sheffield Water Scheme) will be operational in September–October 2017 (taking water from the Waimakariri and Kowai Rivers to 4,300 hectares).

Storage in Lake Coleridge provides reliability for Stage 1 and 2 shareholders, providing water when the Rakaia River is flowing at environmental limits.

The transformation of the Plains:

At the opening of CPWL Stage Two in April, Minister for Primary Industries, Hon. Nathan Guy, said the scheme has been "a game changer for Canterbury; it has delivered an estimated $370 million in economic growth for the region."

What it has delivered for the environment is even better. In a community fretting about the impact of dairying and irrigation on lowland rivers and aquifers, CPWL has been giving water back. Its inaugural Annual Sustainability Report showed that shareholders replaced 75% of their total groundwater allocation typically used with Scheme water from the Rakaia River (during high flow periods) and Lake Coleridge (stored water). The result: 100% reliability of water supplied to shareholders without adversely impacting the natural character of the river or its ecology; and 60 million cubic metres of groundwater stayed 'in the system'.

"Reducing groundwater takes benefits the environment because it increases flow to lowland streams. Using external water to irrigate previously dryland also increases recharge to groundwater and increases lowland stream flows" says Ian McIndoe from Aqualinc.

Switching off groundwater abstraction is just one element of the scheme's environmental benefits. Nutrient management is the next 'cab off the rank' to help improve water quality in the catchment.

"Our farmers prepared their Farm Environment Plans prior to CPWL supplying water in September 2015 and have now completed the first audit of their plans. We now have a data set that we can analyse to determine how well our farmers are doing, and turn it into tools to enable our shareholders to do better" said CPWL Environmental Manager, Susan Goodfellow. "We can see what it is people are doing well, what's innovative and having a real impact in reducing nitrogen leaching and improving irrigation efficiency, among a range of other things. That then enables others to follow their lead, so instead of wondering where or what they need to further improve, they can leap-frog straight into advancing their management practises based on other people's proven successes."

Goodfellow says the success of the scheme's contribution to improving water quality and quantity, particularly for the Selwyn River and Te Waihora Lake Ellesmere, comes down to farmers' attitudes.

"We've been successful in our first full season of operation because of our farmers. These guys should be celebrated – they've embraced the changes they've been asked to make; they've stepped up and asked: 'what do we need to do to get to the next level?' They've gone beyond compliance; they're engaged and they're committed to making this catchment better for their community."

So, what lies ahead for CPWL?

- Construction of Stage 2: will provide an additional 20,000 hectares of land under irrigation. Approximately 50% of this is existing irrigation using groundwater, which will switch to the Scheme resulting in more water to the aquifers. This second stage of the Scheme will also provide opportunity to improve the water quality in the Selwyn River via near-river recharge.
- Biodiversity enhancement in the Selwyn-Waihora Catchment: Te Ara Kakariki Greenway Trust is the inaugural recipient of CPWL's Environmental Management Fund. They will carry out planting and biodiversity projects at nine sites within the Selwyn Waihora Zone.
- Targeted Stream Augmentation: having a ~350km underground pipe network in place affords multiple opportunities for the community in addition to irrigation. Environment Canterbury is investigating using CPWL infrastructure to augment the Selwyn River to assist in improving flows in lowland streams.
- The Sheffield Water Scheme will provide future proofing for the Selwyn District Council's (SDC) Community Drinking Water Supply by piping raw river water through scheme infrastructure to 2 existing SDC water treatment stations. The distribution pipes also enable supply of SDC's stock water to some farmers allowing several stock water races to be closed.

Barrhill Chertsey Irrigation (BCI)

The scheme:

The Barrhill Chertsey Irrigation scheme (BCI) is a 50:50 joint venture between farmer-owned BCI Limited and Electricity Ashburton Ltd.

BCI takes water from the Rakaia and Rangitata Rivers and delivers it to shareholders at a standard rate of 3.9mm/day and an upper limit of 5.2mm/day. The total consented take is 17 cumecs. The distribution of the water is managed between BCI and Acton Farmers Irrigation Co-operative Limited (AFIC).

At present, BCI irrigates 20,000 hectares and AFIC 5,000 hectares. BCI has the capacity to irrigate a further 15,000 hectares. The water from the scheme is also used as a source of renewable electricity generation for the area.

Land use is primarily arable, dairy, and dairy support.

Their vision:

BCI and AFIC have a commitment to the community. Their vision is to provide positive economic, environmental and social solutions in response to the challenge of sustainably managing their community's water resource through employing a combination of outstanding technology, people and governance.

BCI – agent of change:

Eva Harris is BCI's Environmental Manager. She's also completing her Kellogg Rural Leadership programme, looking at the role collectives play in influencing and supporting behaviour change.

And there are some significant changes coming our way.

"If you take the nutrient-capping requirements in the NPS, they will result in changes to farming systems on a scale that haven't been seen since subsidies were removed in the 1980s. They represent a fundamental change to the way farmers farm, and how they think about their business."

Eva understands the psychology of change and she's able to use that knowledge to influence and support the behaviour change needed to meet the scheme's consent conditions and its broader goal of achieving GMP by 2020.

"At the core of it, people don't like change that they're not in control of. The advantage of a cooperative is that we are a community; we hold each other to account. Without this structure, some farmers would struggle with what they perceive as the burden of compliance."

BCI operates on an ethos of continuous improvement and their audited self-management programme is key to reinforcing this concept.

"Our approach starts with socialising the idea of GMP – what it is, what it looks like, and how it relates to their property. The next step is the audit process, which is followed up with a series of workshops to explain in more detail the practice of GMP and how to achieve it. Audit results then feed into the cycle, enabling peer and practical learning – you can share what you're doing well, you can learn from others what works for them and then you can weave these discoveries back into your FEP."

For BCI, auditing is as much about checking systems and processes as it is about engaging and educating shareholders about GMP.

"FEPs are a regulatory process, they are not voluntary. Because they are imposed, they can disempower people – they either don't feel like it matters or applies to them, or they do it because they have to, in which case they tend not to be engaged in the cycle of improvement.

The audit process helps people adjust their expectations and improve their acceptance of the change. They feel they have some ownership over it and a better understanding of why they're doing it this way."

Success for Eva means her BCI share-holders see her as a resource, not a threat.

"The reality is when you're operating as part of a collective, you don't have a choice whether to comply or not. You have to participate. The beauty of a collective is that we have the resources and skills to help and support you to implement and integrate these changes into your business. To get the environmental benefits we all want, everyone has to contribute."

BCI is a key part of their shareholder's

Rakaia River intake, downstream from Highbank.

businesses. The relationship between the scheme and its shareholders is one of trust – the shareholders rely on them to look after a critical aspect of their business – environmental compliance and adhering to the conditions of the collective consent. In return, shareholders must collectively contribute to some stringent consent conditions and long-term environmental goals.

"Our environmental programme and the granting of our consent is our licence to operate. We've made a point of trying to be leaders; we have high expectations of our own performance and that of our shareholders. The one thing we all share is that we must maintain public confidence in our processes, recognising we are utilising public resources and we have a social responsibility to use them wisely."

"Farmers aren't environmental vandals, they're not the bad guys here. They're just people doing business using the best tools and information available to them at the time.

It took a long time for the damage [to water quality] to occur; everyone contributed to that damage. Now, instead of blaming each other, if everyone did a little bit, collectively it would make a significant improvement."

BCI: A FARMER'S PERSPECTIVE:

Will Grayling runs an 800 hectare dairy farm north east of Ashburton. He's a BCI shareholder and joined their Board in 2016.

How has BCI helped you meet environmental standards on your farm?

The first thing they did was put a deadline on completing the Farm Environment Plan [FEP] – 'if you don't get them in by this date, you don't get any water'. That was a pretty good incentive.

The big benefit for us is the FEP template. It's easy to work with, everything's included all in the one document, they helped us fill it out and we have confidence it proves our processes to ECan. The template brings all the individual measurements and processes that we were already doing, like nutrient budgets and monitoring, together into one document, which means you get a better picture of what's going on on the farm.

What has been the value of this process to your business?

The first thing we did as part of our FEP was soil moisture monitoring. It cost us over $10,000 to put the monitors in but the benefits have been huge. We get real-time information which has made a huge difference to our irrigation, particularly on the shoulders of the season.

The other big benefit has come from bucket testing. That's allowed us to see the influence water pressure has on our irrigation – there were times our pressure was so low we were struggling to get water around and when we did, it wasn't very efficient. Keeping the pressure up means enormous efficiency gains for us.

How does the wider community benefit from schemes like BCI?

Having a secure water supply has helped our community grow. When these schemes first started, their role was just to provide water. Now that's changed – as a collective, we have a responsibility to look after the water for our community. Individual farmers don't have the resources to undertake research or get involved in finding solutions – that's the value of a scheme, we can use our strength as a collective to manage water for the benefit of all users.

Waitaki Irrigators Collective (WIC)

About the Waitaki Irrigators Collective:

The Waitaki Irrigators Collective Limited (WIC) is a company made up of shareholders comprising six irrigation schemes and a society of individual irrigators that take water from Lake Waitaki, the Lower Waitaki River, its tributaries or connected groundwater. These schemes and individuals use irrigation water for agriculture, horticulture, dairying and viticulture across 80,000 hectares in South Canterbury and North Otago. Schemes also provide water to other industries, town supplies and sports clubs.

Initiative to engage more people with farming:

The WIC has recently launched a new social media campaign aimed at getting more people engaged with, and learning about, farming in New Zealand.

Called "Ask a Farmer," the initiative invites members of the public to ask farmers questions about anything to do with farming life.

Policy Manager for the WIC, Elizabeth Soal, said that there seems to be a widening gap between the rural and urban communities in New Zealand, and social media has great potential to help bridge that gap. "Our population is becoming increasingly urbanised, and that means that fewer young people get to experience life on a farm, or have a good understanding about where their food comes from" said Ms Soal.

"For some people, it might be that the only exposure they have to farming is what they see through their car window as they drive down the state highway. We want to change that, and bring farming life to them through digital social media channels" said Ms Soal. "How many people have driven down State Highway One behind a strange-looking piece of farming equipment and wondered "what on earth does that thing do?" Or driven past a field and wondered what the crop is growing in it? We want to answer those sorts of questions" she said.

WIC is well placed to answer all kinds of questions about farming, as its farmer members have a diverse range of land uses, including horticulture, viticulture, dairying, sheep and beef farming, cropping, and deer farming. "Irrigation water is also used for sports fields, fire-fighting, supplying town and domestic water, and recreation areas" said Ms Soal. "We want to let the urban community know about all of this, and hopefully bring a bit of humour to it, as well" she said.

The launch video can be found on the WIC Facebook page, and questions can be left in the comments section of the page or by following WIC on Twitter using the hash-tag #askafarmer.

Lower Waitaki South Bank, part of the Waitaki Irrigators Collective. Photo: Caswell Images

Ripponvale Irrigation Limited

A very cherry future

Irrigation began in the Ripponvale area in 1956. The Ripponvale Irrigation Co. was formed after the scheme was purchased from the Ministry of Works in 1989.

The scheme now provides water for a vastly different community. Gone are the barren, rabbit-ravaged hillsides, replaced with a world-famous fruit bowl of cherries, stone fruit and grapes.

"Gone too, is the old technology" says Nikki Jenkins, Secretary for Ripponvale Irrigation. "Parts of the scheme used to consist of a network of aluminium pipes on top of the ground, which had to be shifted every 4-5 hours. You just couldn't even imagine operating like that today."

Ripponvale irrigates 411 hectares of a total land area of 815 hectares, including 27 minimum supply agreements covering 56.14 hectares, a further 323 hectares supplied under 24 'per hectare' agreements and 7 agreements for pipe supplies totalling 26.5 hectares. The scheme started out with 29 shareholders; now there are 55 – growing diverse crops including cherries, apricots, nectarines, plums, pears, apples, herbs, olives, berries, grape vines and walnuts. There are also some farms and lifestyle blocks on the scheme, as well as the Cromwell Racecourse.

Irrigation and orchards grew at the same time, "pretty much at the same rate" says Nikki. About 30 years ago, the larger, more intensive orchards came on stream; five years later, the larger, more intensive vineyards became a feature of the Central Otago landscape.

"Central Otago has always had an abundance of water, believe it or not" says Nikki. "It's just that it wasn't always in the right places. Orchards have also always been a part of the landscape, just not of the size or scale they are now. Intensification on this scale, and the fact that most of the new orchards were on flat land, meant growers and irrigation service companies had to work together as new technology became available."

The change from flood irrigation over gently-sloping land to using water delivered under pressure via sprinklers not only gets you further along flat land, it uses around 30–40% less water. Frost-protection has also made significant efficiency gains over the years.

"Overhead sprinklers used to be the 'weapon of choice' for frost fighting – a method which required 4.5 million litres per hour per 100 hectares. Many trees, particularly cherry trees, hate being wet for so long, so a lot of growers have now switched to using windmills for frost fighting – which means a zero requirement for water, therefore massive savings over the long term."

Cherries grown on the Ripponvale Irrigation scheme earn an estimated $35 million annually. This represents approximately half of New Zealand's total $71 million export earnings for cherries, a figure which is expected to grow given China's growing love for New Zealand cherries.

"It might just look like we're running a few open channels, but this scheme is absolutely vital to our community. Horticulture and viticulture, supported by irrigation, is the lifeblood of our region."

CROWN IRRIGATION INVESTMENTS LIMITED

Crown Irrigation Investments Limited (CIIL) provides funding to, and invests in, irrigation schemes that have the potential to generate long-term economic benefits for New Zealand. CIIL provides grant funding to support scheme development and make targeted investments into schemes, alongside other partners for scheme construction.

By assisting schemes to reach construction, CIIL helps harness the opportunity that irrigation provides to improve productivity in the primary sector, create jobs, increase export earnings and, ultimately, accelerate New Zealand's economic development.

CIIL provides support to the larger and more complex regional-scale irrigation schemes in New Zealand.

Support is also available to assist smaller community-scale schemes. The Ministry for Primary Industries' (MPI's) Irrigation Acceleration Fund (IAF) offers grant funding to support community schemes through the development process, and funding for strategic water management studies.

For more information: www.mpi.govt.nz

"The Government invests in irrigation because it delivers tangible economic, environmental and social benefits. Those benefits, however, are not well understood by most New Zealanders."

– Minister for Primary Industries, Hon. Nathan Guy.

Ripponvale has a very cherry future thanks to irrigation.







LayneBowler

VERTICAL TURBINE PUMPS

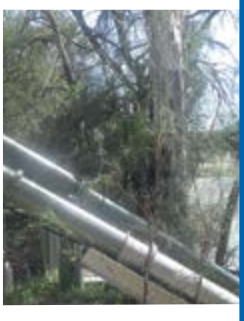
TASTE THE ENGINEERING









- Flows to 2,300 L/Sec
- Heads to 350 m
- Power to 1000+ kW
- Temperatures to 150°C
- Bowls Diameter up to 45 inch

Design Advantages

- Exceptional engineering quality
- Highly efficient hydraulic design
- Heavy duty component castings
- Cast discharge heads
- In-built thrust bearing with anti-rotation arrangement
- Standard IEC electric motors
- Superior quality column assemblies
- Materials of construction options
- Shaft sealing options
- Engine drive options

Applications

- Irrigation
- Water Supply
- Process water
- Geothermal
- Cooling towers
- Fire protection
- Marine
- Water treatment
- De-watering

Layne Bowler vertical turbine pumps have a proven record under the most demanding and toughest of conditions.

Brown Brothers Engineers Ltd

Exclusive New Zealand Distributor

Christchurch (03) 365 0279
Auckland (09) 525 8282
www.brownbros.co.nz

DELIVERING PUMPING SOLUTIONS® since 1908

The value of irrigation

By Greg Petersen, Associate Director and Registered Valuer at Colliers International Rural & Agribusiness.

When valuing rural land, the biggest influence is the quality of the underlying physical resources – the location, soils and irrigation water availability.

Improvements such as buildings and fencing have a finite economic life and can be changed to suit with time and capital, however the underlying physical characteristics of the land are essentially fixed.

Where land benefits from irrigation water, it may be sourced from consented groundwater, surface water take or from an irrigation scheme. Not all water resources are the same, so it is important that the volume, reliability, cost and infrastructure are all considered when assessing the value of irrigation to the land. Valuation of rural land requires a careful consideration to ensure that the property receives the right amount of irrigation water when the farm needs it, at a reasonable cost and that the infrastructure is in place to ensure the most efficient use of the water.

VOLUME

The volume of irrigation water that a property receives determines the potential land area which can be irrigated. As valuers, we determine whether the volume of water is sufficient for the irrigated area of the property and whether further irrigation development is possible.

If a property has insufficient irrigation water we cannot place full value on the irrigated land area or the infrastructure in place to utilise this water.

Key questions to ask:

- Do the weekly, monthly or annual volumes place limitations on the actual abstraction rate per second?
- Do nutrient loss rules and consent conditions limit the taking of water?
- What are the irrigation requirements of the soils?
- What is the annual rainfall and the seasonal distribution of rainfall?

RELIABILITY

It is important to consider whether the water is available when it is needed.

Water storage can ensure that water is available to continue irrigation in the height of summer when consented or scheme water may be less reliable. Some groundwater takes have a high degree of reliability, whereas some surface water takes are subject to the maintenance of minimum flow rates, which are often at their lowest when irrigation is most needed.

> "In order to accurately value an irrigated rural property, one needs to carefully analyse the total volume, reliability, cost and suitability of irrigation infrastructure in relation to the intended use of the land and future operations."

Important factors here:

- Is water storage required?
- What is the long-term reliability of water source?
- What is the duration of the consented water take?
- What is the likelihood of the consent being renewed?

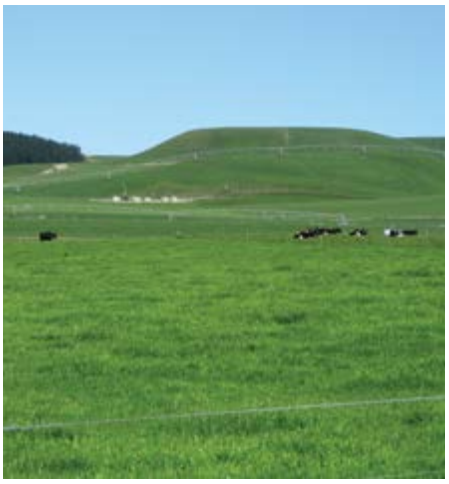
COST

In periods of strong value growth, the relative cost of irrigation is not always fully factored in. In a rational market, those properties with access to lower cost irrigation should be valued at a higher rate compared to otherwise similar properties but with more expensive water sources.

The cost of irrigation water, whether it be scheme annual costs or electricity, is a significant farm working expense and impacts on profitability and subsequent value.

Questions to consider:

- What is the annual cost of irrigation water? Is it provided at pressure?
- What is the depth of groundwater?
- What pumping costs are likely to be incurred?
- What are the storage costs?
- Will the annual cost of water decrease once the debt funding portion of the shares is repaid?



IRRIGATION INFRASTRUCTURE

The on-farm infrastructure enabling irrigation ensures that water is used in the most efficient way. Some farms may be facing significant infrastructure costs to upgrade to centre pivot and fixed grid irrigation to ensure nutrient loss targets and reductions are met.

The market value of a farm therefore needs to incorporate all future capital expenditure requirements:

- Is the infrastructure sufficient for the area to be irrigated?
- What is the irrigation return?
- What is the age of infrastructure? Does it require significant maintenance?
- What is the evenness of application?
- Does the property have soil monitoring?
- What are the labour requirements of the infrastructure?
- Future capital expenditure requirements for pumps and pipes?
- Will nutrient loss regulations require an overhaul of the irrigation system employed on farm?

How the water is sourced, stored and applied to the land and how much of it is available, is essential to the value of the rural land. It has significant impact on both sides of the equation – it increases the productivity of the land, but also adds to the operational costs of the farm and the future capital expenditure required.

Contact Glynn Nuthall at Cla-Val Pacific Co. • 03 964 4860 • gnuthall@cla-val.com

www.cla-val.com

Testing irrigation efficiency – what's really going on on-farm

IrrigationNZ spent last summer gathering data on farms around Canterbury to get a better, more accurate understanding of irrigation efficiency. The results, say IrrigationNZ Project Manager, Steve Breneger, will provide a benchmark for progress.

"We were on-farm for four months looking at how farmers were operating equipment, applying water, scheduling maintenance, monitoring soil moisture and run off – literally going through their farms with a fine-tooth comb. The data backs up what we already knew – that most farmers are operating within limits and are genuinely focussed on finding efficiencies."

IrrigationNZ, in partnership with Environment Canterbury (ECan), employed post-graduate Environmental Science students to undertake the four-month data collection. Their brief was to develop a clear snapshot of what was happening at farm level for a single zone (Ashburton).

"What we discovered during the programme was that most of the systems tested were within tolerance levels and over half of the respondents were undertaking some form of scheduling. On farms that weren't meeting efficiency targets, the students then looked at potential causal factors.

"The value we gained was that not only did we have actual data from bucket testing, we also had insight from the students, they were able to add context and experience to gain a broader picture of what was really happening on the farm. Where they discovered some discrepancy between what the farmer thought they were applying against what they were actually applying, they were able to look at operational and maintenance factors as possible contributors."

Enda Hawes was one of the farmers involved in the programme. He farms 360 hectares at Maronan, SW of Ashburton. He discovered his system wasn't as efficient as he thought – "when the students first did the bucket test in January, it was only delivering 8.5mms. I should have been putting on 12."

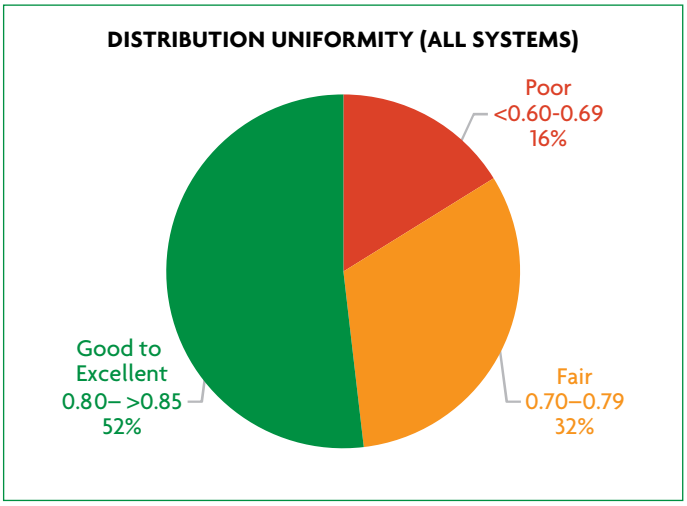
When the system was re-tested two months later, Enda thought he was applying 14.2mms, in fact it was 12.2. "Clearly, we weren't being as efficient as we thought. These results prompted us to have a look at what was going on and we discovered the system was losing pressure and was inconsistent at the far end of the pivot. We made a few adjustments and now we're delivering greater efficiency all round. This process was great for proving the value of bucket testing."

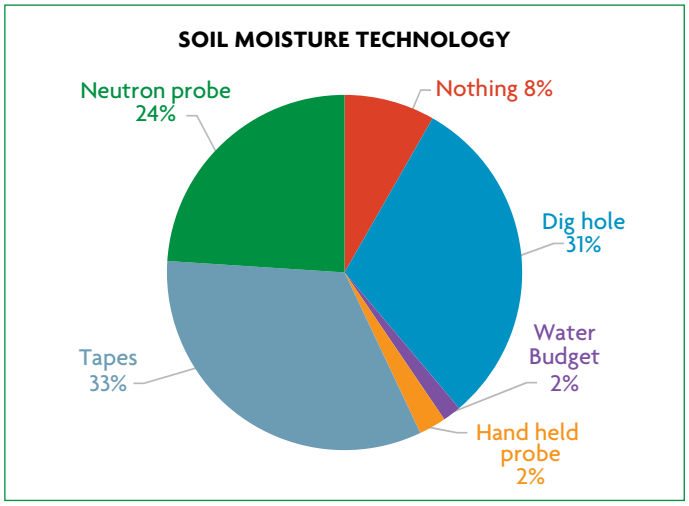
During the programme, students tested 244 systems on 131 farms. Primary land use included dairy, sheep and beef, deer and arable. Systems tested included centre pivots, laterals, travelling irrigators, hard hose guns and spray-line systems.

Distribution Uniformity (DU) is the key indicator for irrigation efficiency. Of the systems tested, 52% achieved good to excellent DU; 32% achieved fair DU and 16% achieved poor DU. Upon further investigation, possible factors contributing to poor DU were identified as being worn componentry, sediments in water supply and incorrect hardware being used.

In terms of Application Depth, which is a critical performance factor, of the systems tested, 37% achieved within +/- 10% of the desired application depth; 31% achieved +/- 25% and 32% achieved >+/- 25%. Contributing factors to poor results were identified as incorrect set up and commissioning during installation (including componentry), poor understanding of the system's constraints, poor maintenance and technology failures.

"The programme really highlighted the importance of understanding your system and ensuring it is regularly maintained. In one case, we had a farmer whose DU and application depth showed poor results after





The following organisations supported the Summer Student Irrigation Efficiency Pilot Programme 2016-17:

KEY FINDINGS FROM THE PROJECT

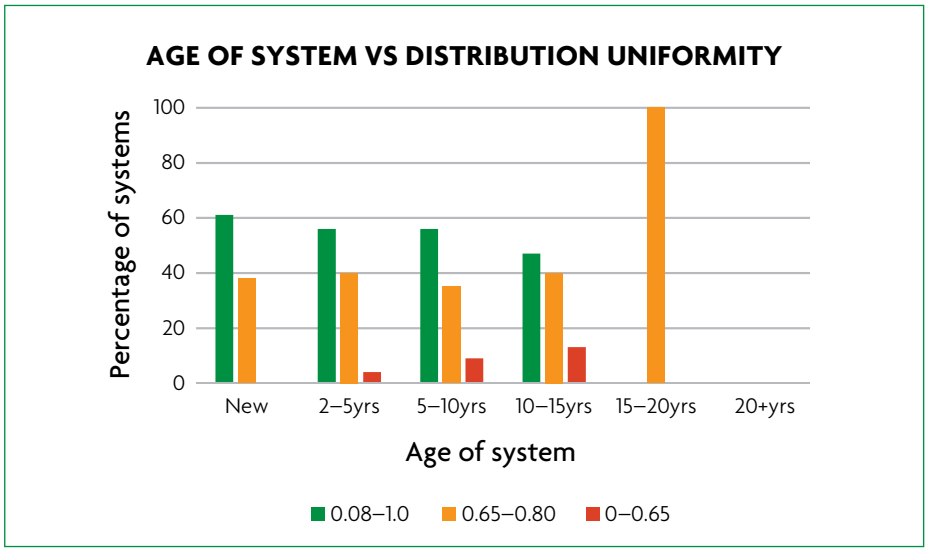
- Bucket tests were useful across all irrigation systems of all ages to identify inconsistencies in uniformity and application depth.
- Many of the common causes of low uniformity – blocked nozzles, pressures not being as designed – are easily fixed. Why not add them to your winter maintenance checks?
- Ensure the guys fitting your gear know about Council regulations. The best way to ensure this is to use an IrrigationNZ accredited company!
- Centre pivot performance deteriorates over time; with many performing quite poorly beyond ten years of age. This highlights the need for good maintenance programmes.

the initial bucket testing. He discovered the operating pressure wasn't high enough so he went out and replaced the regulators on his pivot and he got the service company to check the programmable set up and correct any errors. After re-testing, he'd turned his 'poor' result around – achieving 99% of the target depth and overall DU of .85, which is considered excellent."

Next summer, IrrigationNZ and ECan will extend the Irrigation Efficiency programme, employing more students to gather data from an increased number of zones.

Ultimately, says Breneger, this programme will tell a compelling story of change.

"We now have a benchmark to work from – we can clearly see where we started. Over time, we'll be able to create a comprehensive, zone-specific snapshot of on-farm behaviour, which we can all use to effect positive behaviour change and support better environmental outcomes."



IN BRIEF

MAJOR SOFTWARE UPGRADE FOR IRRICAD

Lincoln Agritech Limited have just announced a major software upgrade for IRRICAD – the leading irrigation design software program. Previously customers experienced IRRICAD as a standalone program, but now, due to customer feedback, IRRICAD is available as a plug-in for industry standard CAD platforms AutoCAD and BricsCAD, under the brand IRRICAD Link. Users will experience all the current powerful IRRICAD irrigation design features, plus new fully customisable menus and improved graphical performance.

Visit irricadlink.irricad.com

MORE MONEY FOR IRRIGATION IN LATEST BUDGET

Last month's announcement of an additional $90 million funding for irrigation is great news for New Zealand communities, says IrrigationNZ CEO, Andrew Curtis.

"Sustainable irrigated agriculture is New Zealand's future. It underpins many of the provincial economies on the east coast of New Zealand. Regional towns like Hastings, Blenheim, Ashburton, Timaru, Cromwell and Alexandra would be far less vibrant and less resilient without irrigation infrastructure" said Curtis.

The Government's announcement of new funding for scheme grants and investment capital for development will increase the value derived from irrigated agriculture, support land-use diversification and contribute to increased efficiency gains and environmental outcomes.

"Water storage and distribution infrastructure is key for New Zealand's rural sector to ride out climatic stresses, like drought and climate change, and is instrumental in providing win-win solutions for freshwater quality. Reliable irrigation also enables diversity of land use as a wider range of stock, crops, vegetables and fruit can be grown and farmed with reliable water."

Braided rivers – how irrigators are helping save the birds

You'd think endangered black-billed gulls, grazing dairy cows and travelling irrigators would make for uneasy bedfellows. But late last year, a colony of almost 800 black-billed gulls set up home on Tim Delaney's Waikuku Beach Farm and they really enjoyed their rent-free digs!

"The fact that these black-billed gulls chose to establish themselves in the middle of an actively managed dairy farm is interesting. Although they can often be seen feeding in irrigated paddocks, and have been known to nest on farmland, this is the first record of a colony on improved pasture regularly grazed by cows. Not only that, but a centre pivot spraying water regularly passed over them and it didn't seem to bother them at all" said BRaid manager, Sonny Whitelaw.

Unlike their larger black-backed gull 'cousins' who tend to favour marine coastal environments, black-billed gulls are 'inland specialists' – preferring to live and breed in the shallow water interface between land and the channels of braided rivers. Irrigated farms can sometimes present the same 'water-land' interfaces that the birds need for breeding and feeding. The birds won't nest in grassed paddocks, but what can happen is that they will establish a colony when a paddock has been ploughed or cultivated in spring – and by the time the grass has grown back, the've made themselves at home.

If farmers do encounter the birds in their paddocks, they're encouraged to contact BRaid or their regional council.

"Fundamentally, we're looking to develop relationships with farmers who may be seeing birds trying to nest in their paddocks, beside storage ponds and dams, or grubbing for worms and bugs after ground cultivation during or after ploughing. It doesn't take much to help the birds – often it's just a matter of setting up a hot wire around them to keep farm animals from trampling the nests and just keeping an eye on them."

At the Delaney's place, the cost to the farmer was the loss of a very small part of a paddock; the gain was that nearly all of the chicks survived. "Success on this scale is virtually unheard of elsewhere, where they are more likely to be washed away by floods, driven over or harassed by 4x4s using the rivers, or eaten by predators" said Sonny.

Once the birds fledged earlier this year, the only evidence they left at the Delaney's was eaten-down grass in 'their' corner of the paddock and a slightly worn path around the colony margin where the cows stood to stare at their new neighbours.

"The beauty of the farm environment is that it can be both a nesting location and a food source for the birds. There are obviously aspects of modern farming which can work in well with indigenous conservation – all it takes is better recognition of the compatible factors, and then working together to make the most of them."

ABOUT BRAID:

BRaid (Braided River Aid) works to protect, enhance and restore braided river ecosystems through co-operation and partnerships. BRaid can provide environmental accreditation for farmers who work with them to monitor and protect black-billed gulls – getting involved can help you meet some of the biodiversity requirements in your farm management plans.

To find out more about the accreditation programme and how irrigators can participate and benefit: www.braid.org.nz

BRaid presenting Waikuku Beach Farm with a Bronze Award.

The birds in 'their' corner of the paddock.

Progress in the dairy sector

by Antony Willemse, Bauer Sales and Marketing Manager, New Zealand.

The topic of dairy waste impacting waterways has been seared into the consciousness of most people, thanks to sensationalist advertising campaigns, which are high on emotion but low on data or research.

As Kiwis, we're passionate about the image of our country and we feel very strongly about our environment matching our "clean green" image. Looking from the outside in, the focus on dairy is only one aspect of what we perceive as being widespread pollution of our land and waterways. Whether it has been correctly identified as the key component of this deterioration is really superfluous to the argument put forward. Our concern should be for all pollution, not dairy alone.

When people see or perceive the environment deteriorating, they tend to become emotionally charged because of course, they – or their children or grandchildren – will ultimately suffer the consequences of that deterioration. A very simplistic view – and one that seems to have been adopted in New Zealand – would be to finger a single villain (dairy) whilst ignoring the bigger picture. The truth however, is that there are many contributing factors to environmental degradation.

If people are prepared to criticise, they should also be able to offer solutions that consist of more than shutting down an industry. As Kiwis, we pride ourselves on finding innovative solutions, so why aren't we working to find solutions, rather than critiquing from a distance?

Most dairy farmers are equally as passionate about the environment as other New Zealanders, apart from a few stalwart renegades who resist change. There's no doubt that the incredible growth in the dairy sector has created challenges. But equally, many farmers are proactively making improvements to reduce the environmental impact of farming. As well as working with new dairy regulations, farmers are also trialling numerous different measures to mitigate risks from run-off and leaching to the water table. Industry suppliers are supporting their efforts with new technologies.

The introduction of indoor housing is one possible alternative to the pasture-fed model. Quite apart from an increase in production, other advantages of indoor housing include 100% nutrient capture, reduction in compressed topsoil, 100% control of nutrient to land, 70–90% water-use reduction and the ability to crop the land as opposed to pasturing, which gives greater control over run-off and leaching to the water table.

Industry suppliers have also specifically developed new products, which suit a wide variety of on-farm effluent systems, and also around the land application of treated wastes. Mechanical solids separation provides farmers with numerous advantages – a reduction in greenhouse gas and noxious odours, solids which are ready to be stored and a liquid fraction ready for irrigation, a constant standard of treatment, a favourable nutrient split between solids and liquid fractions and the ability to treat dairy waste from all farming models, from 1–20% solids.

For land transfer of waste, the introduction of VRI systems offer water savings and a unique way to transfer effluent to land according to soil moisture levels and types. By controlling application at each individual nozzle, it's possible to reduce effluent applications over sensitive areas, no effluent areas, and no spray areas across the farm.

With separating effluent prior to application, the liquid fraction (less solids) has a far quicker infiltration rate. This allows microbial breakdown in the soil to occur faster, which in turn facilitates efficient uptake in plantings. The intent of the new code is to allow quick soil infiltration, at a quantity which gets to the root zone, and no further, so that bacterial action and plant uptake utilise the full application on a daily basis. This prevents the run-off that often occurs with heavier applications of raw effluent, but also the leeching beyond the root zone.

Irrigating Cambodia

A Canterbury irrigation expert is helping two Cambodian villages install a reliable water supply for their school, church and a vital local business, which all currently depend on seasonal monsoon rain.

WaterForce director, Paul Donaldson, has organised a new Glockemann water ram to be installed this month at O Tateung School and Samlout Church in West Cambodia, about 10km from the Thai border. It will allow them to access drinking water from a nearby stream, instead of collecting rainwater off the school's roof.

Donaldson, who is based at WaterForce's Hornby branch, is also helping set up a new misting system for a mushroom growing facility in Prey Preal village in central Cambodia, to help boost production and provide employment for locals.

"A big challenge is providing some form of employment for the village teenage girls. The alternative is the lure of the big city and the high risk of being caught into prostitution, or even worse, child trafficking," he explains.

"The mushroom growing environment has suffered due to a lack of constant water and high temperatures. So I'm working on a small automatic mist system that will constantly maintain a humid environment for the mushroom spores to be active.

"The system will involve a small solar power booster pump, pressurising water via the misters which will be suspended from a pipeline above the mushroom beds. The pump will be pumping from an existing header tank which will have to be filled daily via a petrol pump from the existing pond."

Donaldson was spurred into action after a trip to Cambodia in January this year where he described poverty in the rural areas as "extreme".

"The day is spent preparing food and water for the next day and there is strong reliance on the monsoon rains between August and November to replenish ponds for water. I will never take a flush toilet for granted again!"

Donaldson travelled with his close friend, Rob Blakely, an environmental engineer who frequently volunteers in Cambodia to help local farmers better understand agronomy issues such as soil fertility and crop diversity.

Around 300 children will benefit from the new water system at O Tateung School where water will be pumped uphill via a 32mm pipeline from a nearby stream.

"I believe we are all given talents, and if we can use those talents to help our 'neighbour' that is very rewarding," he says. "If you have hot and cold water, electricity, quality shelter, daily food and reliable transport, you are in the top 15% of wealth in the world. I believe 'giving' is a fundamental life principal."

Donaldson believes all New Zealanders should be encouraged to visit a third world country to get a better perspective on life.

If you'd like to know more or you want to support Paul's Cambodian campaign, give him a call on 027 567 8777.

Paul Donaldson (far right) at O Tateung School.

The river near O Tateung School.

Children from the Samlout area.

BAUER
FOR A GREEN WORLD

MOBILE IRRIGATION MANAGEMENT SYSTEM

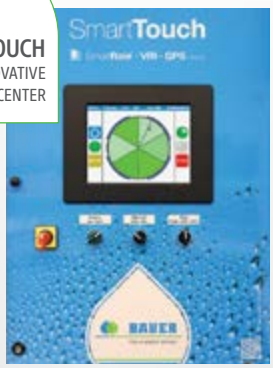
MONITORING AND CONTROL of Rainstar, Pivot and pumps with GPS supported App!

SEPARATOR Press screw separator for solid-liquid separation

SmartRain®

- Monitoring of Pivot and Rainstar operations
- Optimize your irrigation management
- Automatic Error messages
- Irrigation control via mobile devices
- Team management
- Automatic reports

SMARTTOUCH
THE INNOVATIVE CONTROL CENTER



BAUERVRI VARIABLE RATE IRRIGATION

- Complete Pivot and Corner irrigation solution from one central source: Scalable, Accurate, Easy-to-use, Mixed fleets
- Integrated in SmartRain
- Remote Control with SmartRain App for mobile devices

Please contact:

Antony Willemse, Sales & Marketing Manager New Zealand
Bauer GmbH (Austria), 16 Rochester Crescent, Rolleston 7614
Cell 021808993, a.willemse@bauer-at.com

BAUER QUALITY AND INNOVATION SINCE 1930

www.bauer-at.com

Who owns what and when?

By Scott Harvey, Canterbury Area Manager, FMG.

At February's Industry Forum in Ashburton, I was asked to talk about irrigator ownership, specifically when it changes hands and how this impacts on insurance.

The question was: "At what point does the ownership and liability of an asset, such as an irrigator, transfer from the irrigation installation company to the farm owner?"

From an insurance perspective, the question is asking who owns and who pays for an irrigator to be repaired or replaced if it is stolen or damaged at any stage during delivery, installation, or commissioning?

The answer I gave was that the ownership and liability depends on what contract exists between the irrigation firm and the purchaser. This contract should be in writing and will take into account whether the irrigator has been paid in full, paid in part, or is being leased. The contract will stipulate what insurance cover the irrigator firm has – what they cover, what they're prepared to cover – and what they don't cover. The contract should also outline when ownership transfers to the farmer.

Importantly, if you don't have a written contract, FMG recommends that you do formalise any arrangement in writing. If you haven't seen a contract, ensure that one exists and you are aware of the obligations within it. A written contract will ensure that there is no confusion about each party's rights and responsibilities later down the track.

My advice is that prior to any work commencing, all parties agree when insurance cover ends for the irrigation installation company and starts for the farm owner. It could be at a particular point in time, such as at commissioning or practical completion. In some cases, risk transfers to the owner once the irrigator is on the property.

At whatever point in time it is, this must be clearly stated and agreed to by all parties (again, preferably in writing). Both parties need to be very clear about:

- what insurance is required
- whose responsibility it is to have it
- at what point this may change.

It also pays to talk to your insurer about what cover they can provide and when. For example, not all contractual obligations and exclusions in existing contracts can be insured against.

Another element to confirm with your irrigation installation company is the commissioning report. Ensure your installer commissions your equipment and provides you with full documentation, including:

- the system specifications
- results of testing and commissioning
- how to operate and maintain the system safely and effectively.

IRRIGATOR ADVICE

- Set up a regular service and maintenance plan for your irrigators.
- Ensure the irrigator track and paddocks are clear of obstacles, debris or overgrown trees before start up.
- Create a parking space in-line with regional prevailing winds to park your irrigator when a storm warning is given.
- Additionally, if your irrigator has a corner arm, take extra precautions to tie these down. In many circumstances, they cannot be moved out of or downwind, therefore anchoring it as much as possible is critical.
- Walking the irrigator track could save you thousands of dollars by ensuring nothing is blocking the path of the irrigator.

Paving the way for change in Central Otago

Deemed water permits dating back to the 1860s goldrush era are unique to Central Otago, traditionally viewed as renewable forever and subject to no limitations.

But like many other irrigators throughout New Zealand, those who hold such permits now face a time of significant change if they want to keep taking water.

By 1 October 2021, deemed permits must be replaced with modern water permits, subject to equally modern environmental conditions, like residual flows, which have never applied in the past.

More than 400 deemed permits will be affected. At best, many landowners will end up with less water for irrigation. At worst, some could end up with none. But one thing is certain, says a local specialist: few if any farms and orchards will come through the transition unchanged.

Resource management planner, Kate Scott, founded Landpro in Cromwell in 2007. Today the firm works across a broad range of land-related disciplines, from aerial mapping and surveying to geotechnical and environmental consultancy.

Her advice for holders of deemed permits? Start preparing water renewal applications as soon as possible, because even a non-notified consent can take up to 18 months to process. In some cases the process may take longer where background information is not available and needs to be collected.

Resource use remains core business, and right now, Landpro's water team is flat out supporting Central Otago irrigators as they prepare for life after deemed permits.

In most cases, Landpro handles the whole process, from preparing consent applications and co-ordinating ecological evaluations, to assessing residual flows and consulting with affected parties.

One particular aspect of the deemed permit system makes such exhaustive preparation essential, Kate says – the region's water resource is over-allocated, so those wanting to keep irrigating in the future cannot assume they will automatically be granted as much water as they have now.

> "I'm really confident that there is a balance out there, there is a way you can facilitate both community water values and productive land use."

Because of the over-allocation, when it comes to renewing water rights, the Otago Regional Council requires evidence that water use has actually occurred in the past.

"So it's really important that farmers and orchardists who want to renew their deemed permits have the ability to demonstrate how much water they've been using. Efficiency of water use will be a consideration for future use."

Underlying these questions is a larger fundamental challenge for many landowners: will their existing businesses remain viable in the future with less water?

"It's not just a matter of change to the water use process in isolation. In many cases, it's far broader than that, with lasting implications for farm succession planning, investment in farm infrastructure and even the existing farm system itself."

The good news? "I'm really confident that there is a balance out there, there is a way you can facilitate both community water values and productive land use. In situations where we have helped manage the dialogue between the different parties involved, there have been win:wins, both for community values and farmers who can actually keep farming. But no-one who wants to renew a deemed permit can afford to wait any longer if they haven't already started preparing their application."

Ballance
Farm Environment Awards®
Promoting Sustainable Profitable Farming

'Nothing is left to chance'

If you were to ask most people what the two key ingredients for success on a dairy farm would be, they'd more than likely say cows and grass. For award-winning farm manager, Paul Clement, his two success factors are people and water.

"You could have the best cows, land and technology but that doesn't count for much without a top team."

Clement manages Delaborin Dairies, part of Theland Purata Farm Group and Canterbury winner of the 2017 Waterforce Integrated Management Award. According to the award judges, 'the farm is immaculate and nothing is left to chance with fool-proof systems in place. There is recognition that water is a valuable resource and the farm is fortunate to be able to use it; monitoring and measuring systems ensure the best use of this resource'.

Centre pivots cover 343 hectares of the 370 hectares property, and in the larger dryland corners there are solid set sprinklers covering 13 hectares. The irrigators are linked to cloud-based technology which enables remote operation via a smartphone.

"There are four Aquaflex soil moisture monitors installed on the farm and I also regularly manually check the moisture of the soils. This information, combined with extensive weather measuring – rainfall and evapotranspiration and forecasting – allows for optimum irrigation scheduling" says Paul.

As well as taking care of the water resources, Paul also looks after his people. Health and safety is an intrinsic part of his farm's culture, with Award judges commenting: 'Paul has not only embraced the systems in place at Purata, he lives and breathes them, leading by example. His focus on people is one of the standout features of his approach to farming'.

Paul Donaldson, Joint Director of WaterForce, says Delaborin's ten pivots are only the start of the journey towards effective water management. "Monitoring data, to enable correct decision making, is the real key, and something that Paul Clement and his team at Daleborin do very well. Data gathered from the soil moisture monitors and weather stations, and then the ability to easily change irrigation programs via SCADAFarm telemetry, has enabled the team to optimise their water use and minimise wastage.

"For us at Waterforce, it's great to work with like-minded clients. We strive for a similar culture, where our team is valued and they feel like they're a part of the client's success story."

Paul Clements.

JUDGES' COMMENTS

- Recognition that water is a valuable resource and should be used responsibly
- Irrigation decisions made on soil moisture monitoring in conjunction with weather data
- Automated irrigation systems
- Smartphone technology allows irrigators to be operated and monitored from anywhere in the world.
- Openness to use the awards programme as a way of gaining valuable feedback on his farm operation and using that information to make improvements.

Maximising the value of soil water – findings from a potato bed trial

Research being conducted in the MBIE Programme "Maximising the Value of Irrigation" has provided some interesting results about the effect of different types of management on potato yields in irrigated soils.

KEY POINTS

- Trials investigated water storage capacity of flat versus raised potato beds and the affects of mulching on potato crop yield.
- Soil cultivation and bed architecture influenced the proportion of plant available water storage.
- Mulches were beneficial in increasing yields, reducing evaporation and may improve the filling of storage pores.
- Soil water properties were dynamic in the cultivated zone and changed significantly over a growing season as soil consolidated. This has implications for determining irrigation requirements (amounts and rates) over the season.
- Quantifying the amount of soil water storage is important to precisely manage irrigation and maximise production.

Photo 1: Potato trial field at Lincoln.

Potatoes are easily water stressed and can quickly lose production as a consequence. Potato rooting systems are relatively small compared to other crops, limiting their ability to extract water from deeper soil layers. Hence, irrigation has become a requisite for attaining potential yields. Scheduling irrigation for shallow root crops is also relatively challenging because these crops deplete the small available soil water store quickly. Complicating this, irrigation application rates are often greater than the capability of the soil to absorb water, resulting in runoff or excess drainage through the largest soil pores into deeper soil layers. When this occurs, the smaller storage pores are bypassed, resulting in incomplete wetting of the soil, i.e. a proportion of the irrigation water applied is ineffective for crop production.

So to maximise production, increase water use efficiency and minimise water and nutrient losses, we need to improve our understanding of how water behaves in soil. This is one of the focuses of the Ministry of Business, Innovation and Employment (MBIE) research programme Maximising the Value of Irrigation led by Landcare Research, Plant & Food Research and FAR.

In a potato ('Bondi') field trial at Lincoln planted October 2015 (Photo 1) we investigated the following questions:

i. Do flat beds have better water storage than traditional ridged beds?
ii. Does mulching the surface (in our case with wheat straw) affect the total yield by reducing evaporation?
iii. How easily does the soil wet up?
iv. Do the hydrological properties change over time?

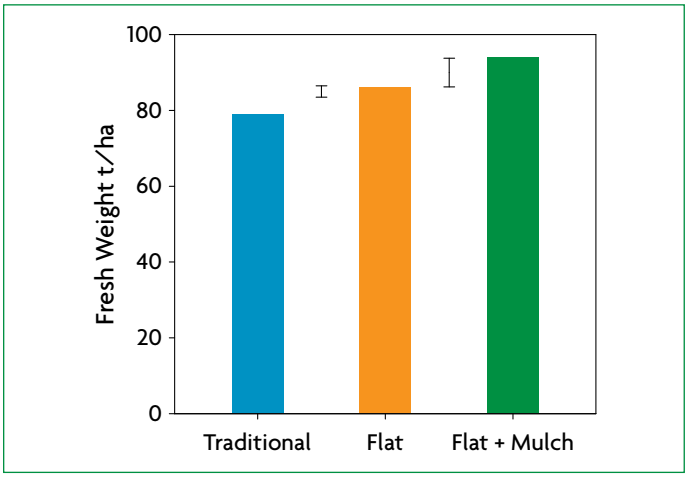


Figure 1. Marketable fresh yield for potatoes grown in traditional beds, flat beds and flat beds with a straw mulch. Error bars are the least significant difference for comparing the traditional and flat beds (small error bar) and comparing flat beds with a mulched flat beds (p= 5%).

Results indicate that the flat beds were better at storing and supplying water compared to the traditional beds. Furthermore, yields were greatest from plots that were mulched to reduce evaporation losses (Figure 1).

In addition to reducing evaporation losses from wet soil surfaces, mulching was likely to have had the added benefit of reducing flow through the large soil pores (macropores) by retarding the rate at which

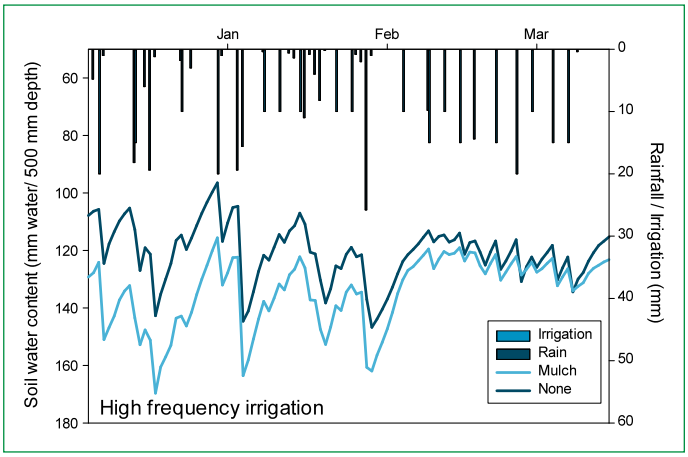


Figure 2. Soil water content in flat beds with (light blue line) and without mulch (dark blue line).

water infiltrated the soil (Photo 2). Overall, the mulch maintained much higher water content than the topsoil of the non-mulched plots (Figure 2), in particular during early crop growth when the canopy was developing. This higher water content appears to explain the increased yield.

Soil water storage and drainage properties differed between the two types of beds. Results suggest that soil in the flat beds was able to store 7% more water available for plant growth than the traditional beds (Figure 3).

This is likely to have contributed to the higher yields from the flat beds. Greater macroporosity in the traditional beds indicates that they will drain more rapidly. Greater consolidation of the flat beds (data not shown) may also improve root-soil contact, improving water and nutrient uptake.

SOIL WATER STORAGE AND INFILTRATION RATES REDUCED OVER TIME

We measured soil water properties early in the trial when the potatoes were establishing and prior to harvest. Some key soil water-holding properties were affected. For example, the readily available water fraction declined by one-third in both types of beds. These results suggest that more frequent and lower volume applications of irrigation could be more efficient as the season progresses.

Photo 2: Measuring soil infiltration rates on flat beds.

ACKNOWLEDGEMENTS

Work was completed as part of the Maximising the Value of Irrigation programme with principal funding from the Ministry of Business, Innovation and Employment (MBIE) and co-funding from the Foundation for Arable Research, Horticulture New Zealand, Environment Canterbury, Hawke's Bay Regional Council and Irrigation New Zealand. The programme is led by Landcare Research, Plant & Food Research and the Foundation for Arable Research.

For more information – Steve Thomas, Plant & Food Research, steve.thomas@plantandfood.co.nz

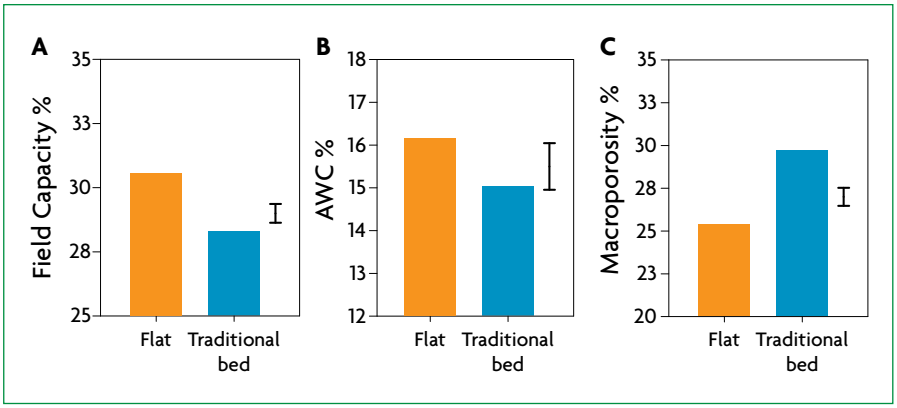


Figure 3. Selected soil water characteristics of flat beds compared to traditional beds: a) field capacity, b) available water content (AWC), and c) macroporosity. Error bars are the least significant difference (p= 5%).

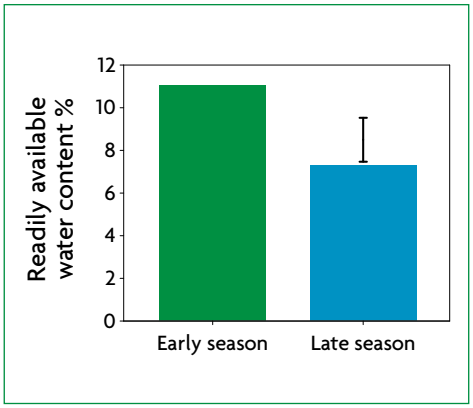


Figure 4. Changes in the readily available water fraction of sol between early and late season. Error bar is the least significant difference (p= 5%).

Great Irrigation Challenge 2017

It was a smorgasbord of irrigation information at the 2017 Great Irrigation Challenge, held in Ashburton in May.

We had over 200 people turn up to hear from local government and industry practitioners, farmers and growers and international experts. There were 15 workshops run over two days, covering a diverse range of topics and issues from OVERSEER and N-check, fertigation, precision irrigation, risk management and insurance, to Farm Environment Plans and audits.

Feedback from attendees was really positive and we're now working on delivering an even greater Irrigation Challenge in 2019!

Thanks to our sponsors, presenters and exhibitors for making this such a valuable learning event for our sector.

FEEDBACK

"Fantastic discussion amongst participants and sharing ideas"
"Found massive benefit in discussion with industry experts and asset owner"
"Very good. Great stuff. It opened my eyes to a lot about efficiency"

PRINCIPAL SPONSOR Irricon resource solutions

Australian irrigation specialist, Rob Welke, demonstrating pumping techniques.

Great Irrigation Challenge Winner 2017 was awarded to Rangitata Dairies Ltd.

Standing in the gap – health and safety from the heart

Most people go to health and safety presentations because the boss says they have to or they've drawn the 'short straw' and have been picked as their workplace's H&S rep. But at the Great Irrigation Challenge, there was a H&S presentation with a difference.

In a room full of hardy rural New Zealand men and women, there was hardly a dry eye. It was raw, it was real and it has made many think about H&S in a whole new way.

"This was probably the most powerful presentation I have been to" said IrrigationNZ CEO, Andrew Curtis. "We were drawn into a beautiful family, we became part of their story and then it was all ripped away."

Wiremu (Lee) and Marsella Edmonds always said to their children that one day, the world was going to know who they were. What they didn't realise was that the way the world would remember their son, Robert Ruri-Epapara, was after he was killed in a forestry accident almost two years ago.

His death was the catalyst for a chain of events which has seen the couple quit their day jobs, and launch a campaign to try to stop more deaths occurring in New Zealand workplaces.

"The rural sector doesn't have a great H&S record. As irrigators, we're part of it. We need to take on board these messages and look at our culture and behaviour out in the field."

"They have turned their personal tragedy and pain into a story of hope for others. They have put the 'human factor' back into H&S. I know lots of businesses and workers treat H&S as bureaucracy, as extra paperwork or box-ticking. When you hear Wiremu and Marsella talk about H&S, it's all about family, about caring for your mates and always looking for opportunities to stand in the gap – to do the right thing."

Wiremu and Marsella have travelled the world with their story, inspiring thousands of people to rethink H&S at work. This was not a job either of them ever imagined themselves doing.

"We never expected, never wanted, never thought we would be doing what we are doing now" said Wiremu.

The couple is committed to helping businesses and workers understand the consequence of taking risks or shortcuts, how to identify poor safety culture and to encourage individual leadership by speaking up to dangerous or risk-taking behaviours – stamping out the "nark" mentality that causes workers to turn a blind eye.

"The rural sector doesn't have a great H&S record. As irrigators, we're part of it. We need to take on board these messages and look at our culture and behaviour out in the field. I suspect very few people in our industry really take shot of just how risky and tricky the environment we work in can be. This presentation gave us a diffident view of the world – it really highlighted the need for leadership in our sector to recognise the risks we face and then start to think and act for change" said Andrew.

The 'Standing in the Gap' presentation at the Great Irrigation Challenge was sponsored by Fletcher Construction Company Ltd.

Sustainable Dairying: Water Accord – three years on...

IrrigationNZ is a supporting partner for DairyNZ's Sustainable Dairying: Water Accord.

Launched in 2013, the Sustainable Dairying: Water Accord is a set of national good management practice benchmarks aimed at lifting the environmental performance of New Zealand dairy farms.

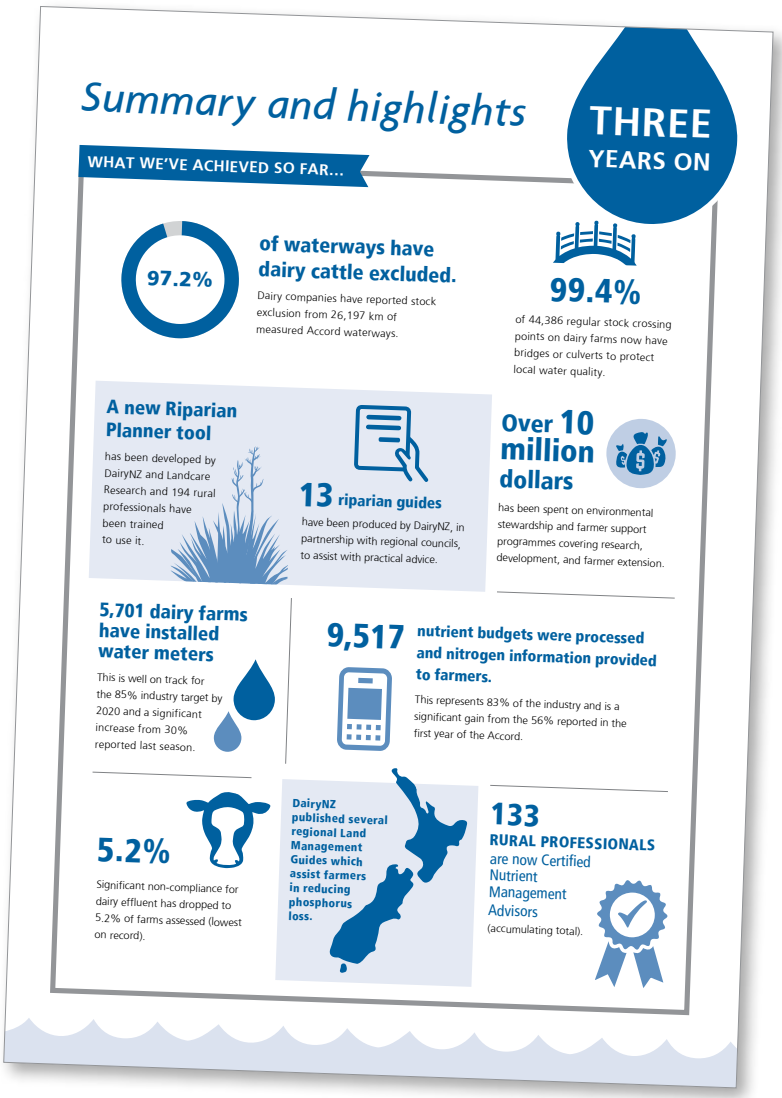
Last month, DairyNZ released its annual progress report, detailing the Water Accord's achievements for the dairy season June 2015–July 2016.

"We're committed to supporting DairyNZ and working with farmers on the ground to meet the Accord's targets" said IrrigationNZ CEO, Andrew Curtis. "The latest progress report details significant progress towards a range of environmental targets, particularly around water metering and nutrient budgeting. This report is tangible proof of the engagement and investment being made in GMP by farmers and by the industry as a whole."

As part of its commitment to the Accord, IrrigationNZ runs a series of targeted training for dairy farmers focussed on efficiency and effective use of water. We also run a Farm Dairy Effluent Design accreditation programme in partnership with DairyNZ, which further supports dairy farmers to meet regulatory and consent requirements and performance and efficiency targets.

"We know that farmers are all about efficiency because that's what drives their production and profitability. By working with them to increase their knowledge, and working with industry to establish efficient, sustainable infrastructure, we are all collectively contributing to the targets outlined in the Accord."

Check out the full report: www.dairynz.co.nz



What we can learn from Havelock North

Post the release of the first report from the Havelock North inquiry, there are some findings that groundwater irrigators need to be aware of. These could result in additional requirements around the security of well-heads and the consent and consent renewal process. IrrigationNZ will be involved in these conversations to ensure any new requirements are practical and achievable for irrigators.

The inquiry report found that "the regional council's knowledge of contamination risks around the site fell below the required standards". Amongst other things, this included "through its resource consent processes and its management of the many uncapped or disused bores in the vicinity".

The resource consent finding could result in much more information needing to be supplied by new water take applicants, and for water take renewals, to show how they are managing any contamination risks to nearby drinking water supplies – the question is to what degree?

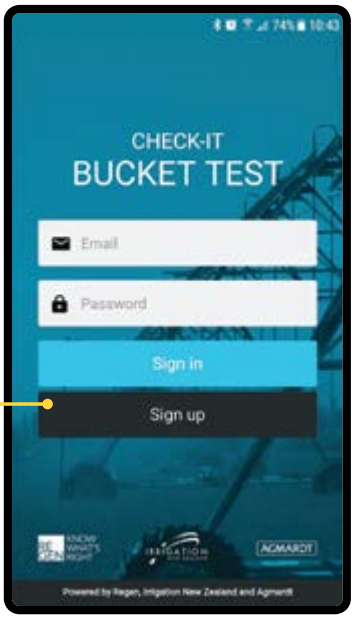
The findings around bores will almost certainly result in tighter controls around well protection – requiring sealing around the casing with bentonite or concrete and ensuring the well-head itself is sealed. It also raises the question around backflow prevention requirements. IrrigationNZ's code of practice for design and for installation covers check valve requirements for bore pumps and headworks. In addition, IrrigationNZ has also developed guidance around backflow requirements for fertigation. We will be using these as the basis for any future discussions.

IrrigationNZ launches step-by-step guide for bucket testing

Everyone working in the rural sector knows that efficiency increases production and profitability. That's why IrrigationNZ has developed the 'Check It – Bucket test' app. National Projects manager, Steve Breneger, has developed a step-by-step guide to walk users through what the app is and how it will make your farm more successful.

WHERE CAN I GET IT?

The Check It – Bucket test app is available for download free of charge from the App Store or Google Play. It currently works with linear and pivot systems; spray lines and travellers will be included in future updates.

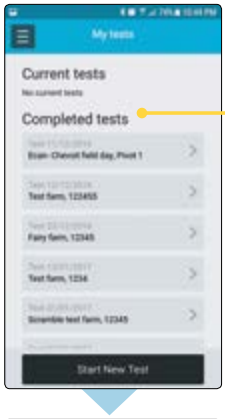


SIGN UP

Set up your user account by pressing the "Sign Up" button and follow the instructions. Once your account is set up you can simply re-enter your details and press the "Sign In" button.

Note: the email address you use for your account will be the email that the app sends your test reports to.

Before you purchase buckets or go in to the field... FOLLOW THESE STEPS FIRST!



MY TESTS SCREEN

Once signed in, the app opens to your test page screen. Here, you will be able to see all your completed tests and any tests yet to be completed. The user can exit the app and that test will appear in the **'Current Test'** list.

To begin a new test, press the **'Start New Test'** button.

START NEW TEST

Enter the farm name and an identifying name for the irrigator that is to be tested. Press the **'Next'** button to continue.

STEP 1

Select the irrigation system type – Centre Pivot or Linear.

More system types will appear in future updates of the app.

STEP 2

Enter the irrigator details. This information must be gathered before starting the test.

Target depth should be set for 75% minimum application depth. For example, if my irrigator is 5mm minimum, set the dial to 6.25mm. This will ensure that there is sufficient water collected.

STEP 3

The app contains a series of scrolling information screens that will prompt you on things you should take, things you should avoid, and how to carry out specific parts of the test.

More information can be viewed by pressing the light bulb icon in the top right corner.

STEP 4

The app calculates the amount of buckets required and the spacings of the bucket based on the information entered. Different length irrigators will require different number of buckets.

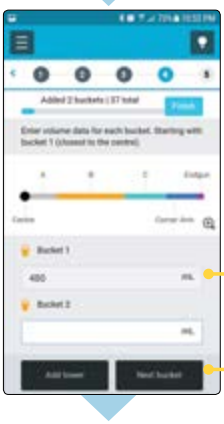
A quick way to layout your buckets is to place your first bucket at the furthest end of the last standard span. This maybe at the end of an overhang or inside the wheel track before a corner arm. You can then step out your buckets in either direction.

Complete these steps when you are in the field

STEP 5

Once the machine has been started, record the stable operating pressure at the centre point. Then walk back out along the machine to measure the wetted width and the speed at the last standard tower.

This must be done whilst the irrigator is passing over the buckets.



STEP 6

Once the machine has passed over all the buckets you can switch off the machine and start measuring and recording the volumes. This must be done from the centre point out.

Add buckets by pressing the **'Next Bucket'** button.

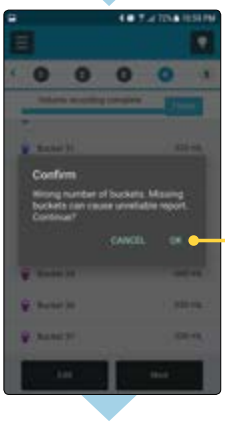
STEP 7

The **'Add Tower'** button allows the user to spatially identify the location of buckets after the test has been completed and as a reference on the final report.

STEP 8

Once all the bucket volumes have been entered, pressing the **'Next'** button allows you to review and edit the data you have entered.

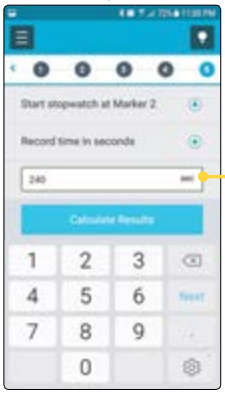
Once you are satisfied with the entered data press the **'Finish'** button in the top right.



STEP 9

When you press the **'Finish'** button you will be asked to confirm you wish to proceed.

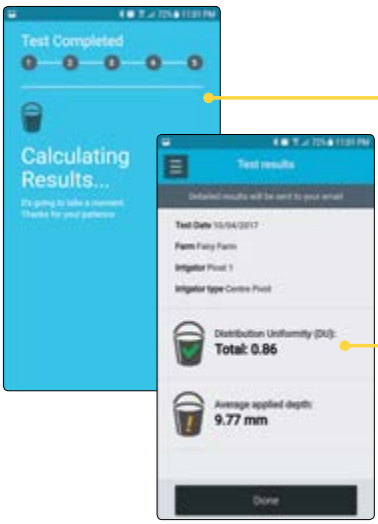
Once **'OK'** has been pressed, you can no longer edit your bucket data.



STEP 10

Enter the irrigator speed in seconds and press **'Calculate Results'**.

Results



To calculate the result the device must be connected to the internet, either a mobile network or a wireless network.

The in-app results lets you know instantly your two key peformance measures:

- Distribution Uniformity
- Measured Application Depth

A detailed report is sent to your email address.

The app generates a printable PDF report that can be used to assist you and your service provider in identifying performance issues.

The report can also be used in your Farm Environment Plan reporting.

Would you like a tax with your water?

By Andrew Curtis, CEO, IrrigationNZ.

If there's one thing every election has in common it's tax. Usually one party promising to lower them; the others threatening to raise them. This year however, tax is being talked about in the context of water.

I've spent time with politicians over the past couple of months and their 'take on water' varies from taxing water at 10c per cubic metre, introducing a tiered pricing regime, imposing royalties on water exports or retaining the status quo. Depending on who you talk to, no one owns the water or everyone owns the water.

I think the water tax debate has been a knee-jerk reaction to a whole lot of wider issues around water. It has allowed some to push their anti-dairying agenda and others to be xenophobic. So, let's look at a water tax from a common-sense perspective.

Because we all benefit from the use of water, then a water tax would need to be applied to everyone who uses it. You can't just tax the people and/or uses of water that you don't like – i.e. foreigners bottling it and selling it offshore or farmers because you think they're getting it for free (they're not).

Let's just say, for argument's sake, that Labour and the Greens do what they say they're going to and impose a 10c per cubic metre tax on water. In New Zealand, we allocate around 11 billion cubic metres of water for consumptive uses annually and on average, due to climatic variation, utilise 60% of this. A 10c per cubic metre tax on consumptive water use would therefore remove around $660 million from our economy. In a regional context, $422 million would disappear from Canterbury; the Hawke's Bay would lose an estimated $22 million and the 'hit' for a town like Oamaru would be close to $51 million.

These figures are scary enough on their own but when you consider that none of them include the water we use for hydro power generation, then the reality of a water tax becomes a whole lot more frightening for your average family. When you call for a tax to be applied to a resource that is fundamental to energy and food production, the end result is that you are going to pay a whole lot more for your electricity and your groceries.

I think most New Zealanders, when they're calling for a tax on the 'commercial' use of water, don't understand the wider implications. Perhaps they think a water tax wouldn't apply to them or maybe they're blissfully unaware of the fact that almost everything we grow and eat and export in this country relies on water. New Zealanders would soon realise that the true cost of a tax on commercial use would be paid by domestic consumers. That extra few dollars for low income families promised in last month's budget? Tax water and all of it – plus some more – would disappear on higher food, energy and travel costs.

If you 'ring fence' the tax to only be applied to one sector (e.g. bottled water exporters), then how long before it 'creeps' into other sectors and users? And why just bottled water… what about the businesses that use water to produce other beverages we like to consume – and export – like beer and wine?

The argument that the proceeds from a water tax would be reinvested back into waterways is a weak one. Taxing water isn't an effective way to incentivise water use efficiency or clean up our rivers. Farmers and growers are already at the forefront of efficiency – New Zealand leads the world in technological advancements in irrigation and sustainable farm practices, which are also now being driven through national and regional regulations. If you were to add another tax onto farmers' and growers' incomes, then you would reduce their capacity (and

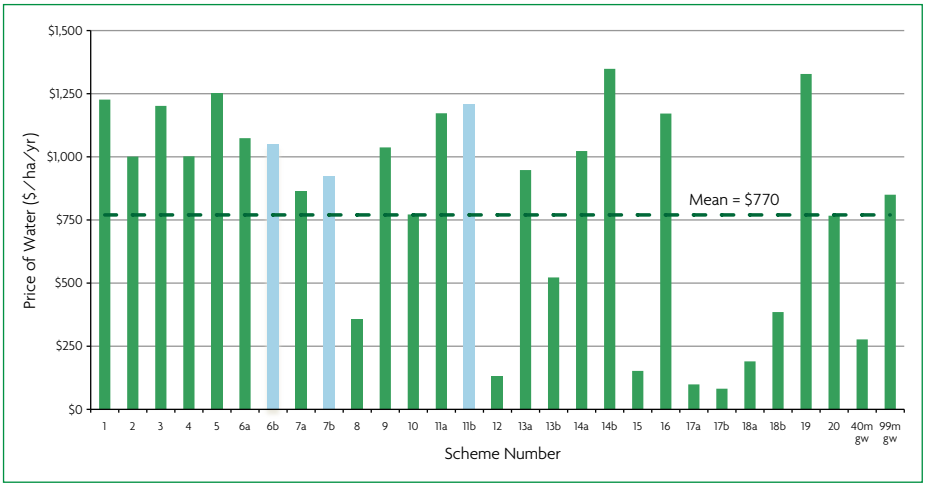


Figure 1. Cost of water $/ha/year.

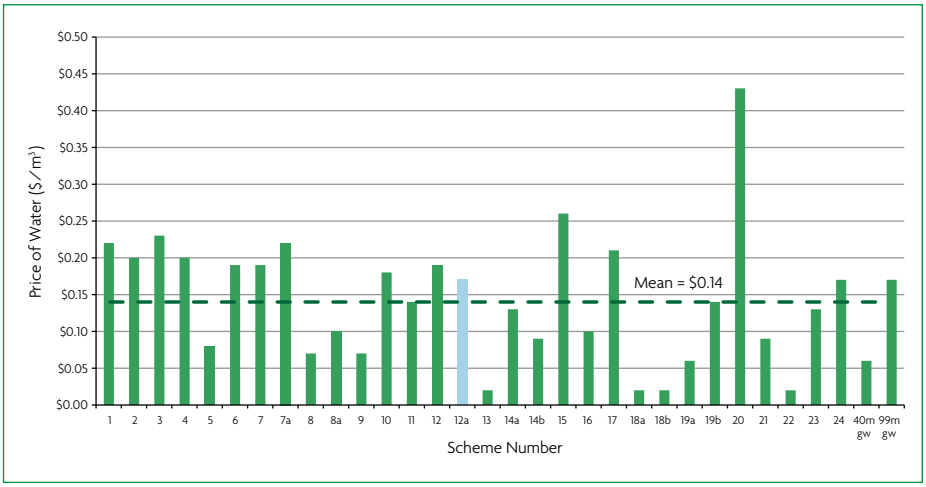


Figure 2. Cost of water $/m³.

"The argument for a water tax on commercial use doesn't take into account the value that commercial users, particularly farmers and growers, add to the water they use. Not only do they use it grow a bounty of produce for domestic and international markets, it also supports jobs, trades, support services and amenities. Irrigation is a productive use of water that creates prosperous communities."

appetite) to make discretionary investment in environmental management.

Water is complex, which makes managing it difficult and taxing it nigh on impossible. No other country in the world has successfully implemented a water tax and I think we'd be foolish to attempt it here. Our competitive edge on the international stage would be lost – no other country taxes food production! Exports would suffer – and the effect of that would impact big businesses, small businesses and communities. Ultimately, those that can least afford it will bear the greatest cost.

What we should be doing to protect our fresh water resources, and manage them for current and future generations, is exactly what we're already doing – continuously improving how we use the resource more efficiently and effectively; protecting it through regulation that underpins good practice; increasing its reliability and security so we're not adversely impacted by climatic events; and being innovative and clever with it so it grows prosperous resilient communities.

All of this can – and will – be achieved without taxing it.

WHAT DO IRRIGATORS PAY?

Despite what you read in the media, farmers and growers DO pay for water.

- They've invested over $1.7 billion in modernisation of irrigation infrastructure over the past five years.
- They pay for water permits and resource consents.
- They undertake and pay Councils for annual monitoring and reporting.
- They pay the capital and operating costs for infrastructure to take, supply and use water.
- They operate within strict environmental limits with an on-going obligation to continually improve their environmental performance. Compliance costs money!
- They pay more rates – irrigation equals higher production, therefore higher land and capital values – which equals higher rates. For example, in the Selwyn District, a 100 hectare irrigated cropping property pays upwards of $2,000 per annum over and above the equivalent dryland property; a 100 hectare irrigated sheep and beef property pays between 5 and 10 times more business tax than the equivalent dryland property.

WHAT ABOUT SCHEMES?

IrrigationNZ undertakes a biennial Irrigation Scheme Cost Survey. In 2016, the average cost of water supplied by irrigation schemes was calculated at $780/ha/year and $0.14/m^3.

"The argument for a water tax on commercial use doesn't take into account the value that commercial users, particularly farmers and growers, add to the water they use. Not only do they use it grow a bounty of produce for domestic and international markets, it also supports jobs, trades, support services and amenities. Irrigation is a productive use of water that creates prosperous communities."

Irrigation events and training

INFLUENCING THE FUTURE

Next month, IrrigationNZ Project Manager, Steve Breneger, will swap his outdoor classroom for the hallowed lecture theatres of Lincoln University. Breneger has been invited to present a series of irrigation-focussed papers to undergraduates in the University's agricultural and environmental degree courses.

"Sustainable irrigated agriculture is New Zealand's future. It's critical then, that we ensure young people coming into the sector have a good understanding of irrigation, its benefits and challenges and the role technology will play in its future" said Breneger.

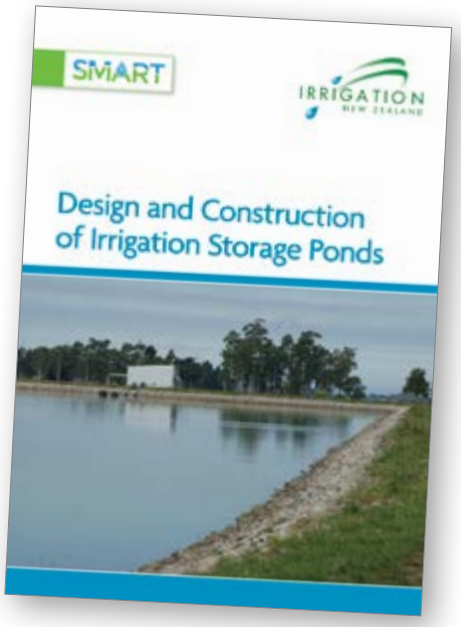
Breneger sees a close synergy between irrigation and the University's vision, which is to enable students to understand and address the global challenges of how to feed the world, protect the future and live well.

"Irrigation contributes to all three. It has the potential to secure New Zealand's future, particularly when you consider the likely impacts of climate change on the primary sector. We want this course to give students a 'taste' of irrigation so that they'll see it as a solution, as a positive feature of our future landscape."

The third-year students will study three core topics – water allocation, system types and design methodologies. They'll be challenged to consider impacts like seasonal demand and climate change and the benefits and barriers in terms of current and future technology. For the design module, their mission will be to balance the needs of irrigators, the limitations of the system and the potential impacts on the environment.

"Part of the teaching will be designed to bust some of the myths that persist in our sector, particularly around environmental management. By the very nature of their business, farmers and growers aren't sitting around doing nothing to mitigate their impacts on land and waterways.

This course will help students understand that irrigation, as an industry, is built on critical thinking. We need them to continue that discipline because someday, they're going to be the growers or the designers or the regulators. Whatever role they have in future, hopefully this teaching will positively influence their understanding of the value of irrigation and its vital role in growing New Zealand communities."



DESIGN AND CONSTRUCTION OF IRRIGATION STORAGE PONDS

(aka – how to build a dam)

IrrigationNZ has just launched its latest training resource: *Design and Construction of Irrigation Storage Ponds*. The guide takes you through a step-by-step process of constructing a freshwater storage facility for irrigation – from feasibility and design, through to construction and compliance.

This booklet is part of a series of knowledge resources developed for industry and irrigators. It's free for members and available on our website: www.irrigationnz.co.nz/practical-resources or by phoning Eleonore on 03 341 2225.

UPCOMING EVENTS

20 June	IOD Governance Essentials Training, Ranfurly
8–9 August	Irrigation Fundamentals Training, Hastings
26 September	Irrigation Operator and Manager Training, Cromwell
27 September	Irrigation Operator and Manager Training, Omakau
28 September	Irrigation Operator and Manager Training, Ranfurly

For more info visit our website at www.irrigationnz.co.nz/events-training or call Kate on 03 974 1425

"While the public understandably might hope for rapid restoration of water quality across all rivers and lakes in New Zealand, this is unrealistic and scientifically impossible. In some cases, we are dealing with contamination that occurred decades ago, and the legacy effects may take a similar time to flush from the system. Moreover, there are no silver bullets in water restoration – multiple actions are needed, requiring partnerships between central and local authorities, iwi, citizens and businesses including farmers."

– Sir Peter Gluckman, Prime Minister's Chief Science Advisor (excerpt from 'New Zealand's fresh waters: Values, state, trends and human impacts' report, released April 2017.)

IrrigationNZ news

Editor: **Nikki Hawkey**
Phone 03 341 2225
Mobile 021 759 257
Email nhawkey@irrigationnz.co.nz

Business Manager & Advertising:
Chris Coughlan
Phone 03 341 2225
Mobile 027 671 7705
Email ccoughlan@irrigationnz.co.nz

Administration & Subscriptions:
Eleonore Dumaine
Phone 03 341 2225
Email admin@irrigationnz.co.nz

Irrigation New Zealand
Lincoln Research Centre
Corner Springs Road & Gerald Street
PO Box 69119, Lincoln 7640

Design: Rosie Fenton

Printing: Caxton Press

Distribution: New Zealand Post

Cover Photo: Aerial view of Central Plains Water Ltd (courtesey CPWL)

IrrigationNZ News is published by Irrigation New Zealand Inc four times a year in March, June, September and December. The circulation of 9000 includes all INZ members. The opinions expressed in IrrigationNZ News do not necessarily reflect the views of Irrigation New Zealand Inc. The information contained in this publication is general in nature with every effort being made to ensure its complete accuracy. No responsibility can be accepted for any errors or copyright breach that may occur beyond the control of the editor or INZ. Permission must be sought from the Editor prior to reproduction of any material contained in this publication.

ISSN 2230-5181

IRRIGATION NEW ZEALAND

www.irrigationnz.co.nz

PUTTING THE FUTURE OF IRRIGATION IN YOUR HANDS TODAY

SCADAfarm is an irrigation management tool that combines on farm variables to let you make accurate decisions specific to your irrigation needs.

Features include:

- Real time weather forecasts and irrigation history, giving you the entire picture to make informed decisions
- On-farm weather stations giving accurate forecasts that lead to improved resource use and minimisation of losses
- Remote monitoring and control that keeps you informed so you can manage your irrigation from almost anywhere

Benefits include:

- Save money by reducing water and fertiliser usage while spending less time on irrigation management and more time on your business
- Future proof your farm by leading in sustainable practice

For more information visit scadafarm.com or contact your local WaterForce branch.

SCADAfarm

scadafarm.com

Developed and exclusively available from WaterForce

Talk to us about all your winter servicing and maintenance requirements

Carrfields Irrigation

North Canterbury

6 Mt Cass Road, Waipara | 03 314 6899

Mid Canterbury

162 Dobson St, Ashburton | 03 307 6690

Central Otago

40 Russell St, Alexandra | 03 440 2007

New Waipara branch now open

IRTEC

IRRIGATION DESIGN ACCREDITED

www.carrfields.co.nz/Irrigation