



ELECTION 2017

Growing the Benefits from Sustainable Irrigation



SMART

IRRIGATION
NEW ZEALAND

GROWING THE BENEFITS FROM SUSTAINABLE IRRIGATION

Current situation



Irrigation is an important contributor to New Zealand's agricultural success and future.

Currently around 820,000 hectares in New Zealand are irrigated. Pastoral-based agriculture (also known as livestock farming or grazing) makes up 75% of this land (dairy 50%, sheep and beef 25%). The balance is predominantly vegetable and arable crops alongside fruit and wine growing.

Our irrigated land contributes an estimated \$2.5 billion a year in increased value at the farm gate – over and above equivalent dryland farms. This value more than doubles as the increased production is processed through the economy for export and domestic consumption.

There is significant potential to increase both the total irrigated area and the economic value accruing from irrigation. However, this potential also places obligations on irrigators to continue to improve water use efficiency, as well as strive towards the high standards of environmental performance that New Zealanders now expect.

Where we were, where we are, and where we're heading...

	2011–2012 ⁱ	2016–2017 ⁱⁱ	2021–2022 ⁱⁱⁱ
 Farm Gate	\$2.2bn (\$3,000/ha)	\$2.5bn (\$3,000/ha)	\$3.5bn (\$3,500/ha)
 Contribution to GDP	\$4.8bn (\$6,700/ha)	\$5.5bn (\$6,700/ha)	\$8.8bn (\$7,700/ha)
 % of GDP	2.4% (\$203 billion)	2.4% (\$227 billion)	3.1% (\$250 billion)

i. Value of Irrigation in New Zealand, NZIER 2014 based on 720,000 ha irrigated. ii. IrrigationNZ current estimate based on 820,000 ha irrigated. iii. IrrigationNZ vision based on 1 million ha irrigated with improved reliability of supply and increased irrigation efficiency.

Realising our vision



Realising Irrigation New Zealand's vision by 2021 will require:

-  A stable legislative and regulatory framework.
-  High standards of technical investigation and design of new irrigation opportunities.
-  Access to development capital to support the uptake risk period for new scheme developments.
-  The continuing development, and refinement, of methodologies to support the delivery of good management practice through Farm Environment Plans.
-  A continuing focus on building capability and capacity through industry training.
-  The development of new generation SMART technologies, supported by readily available rural bandwidth.

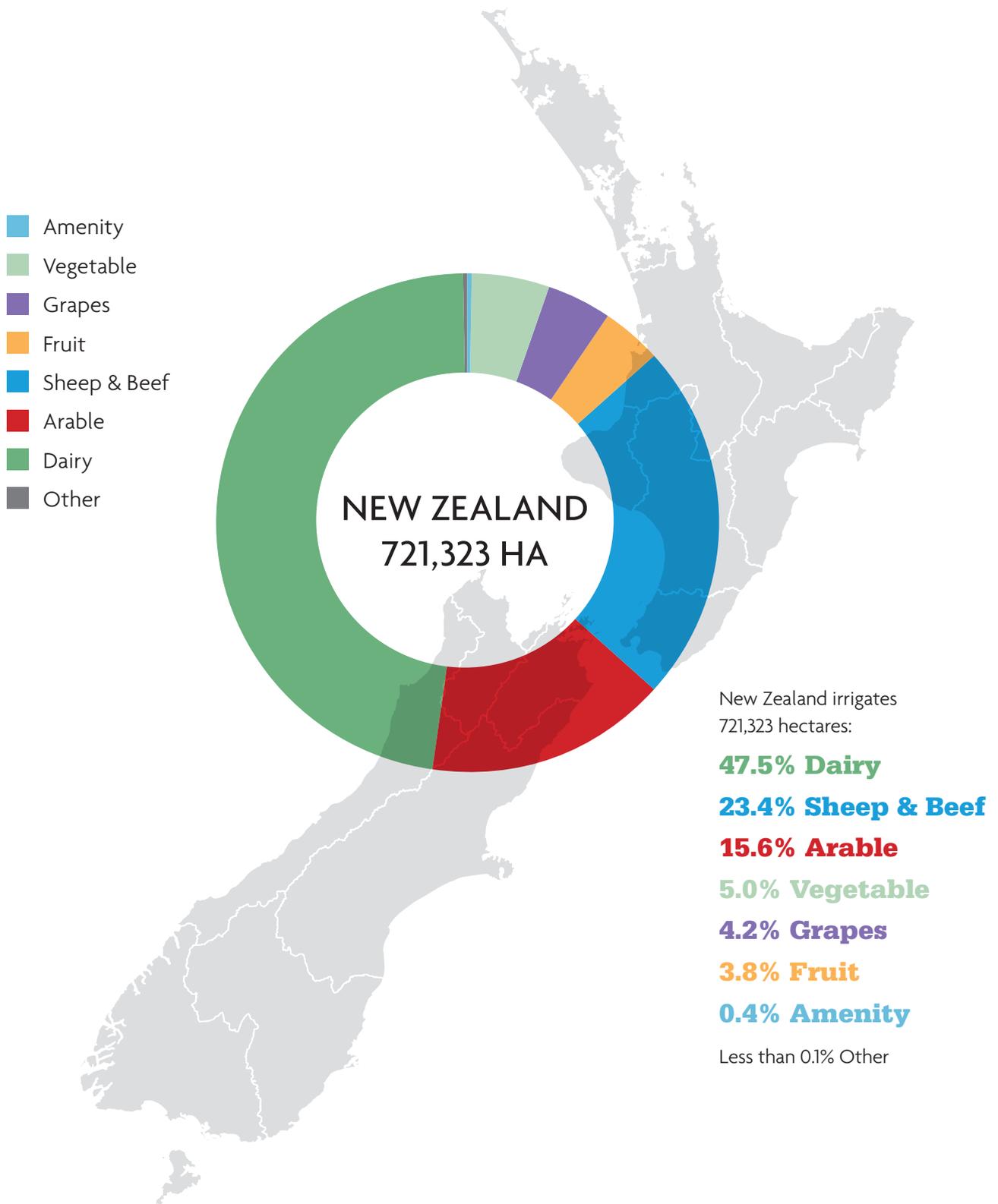
+50 FTEs

An average of 50 additional full-time jobs are created per 1,000 irrigated hectares

+500 FTEs

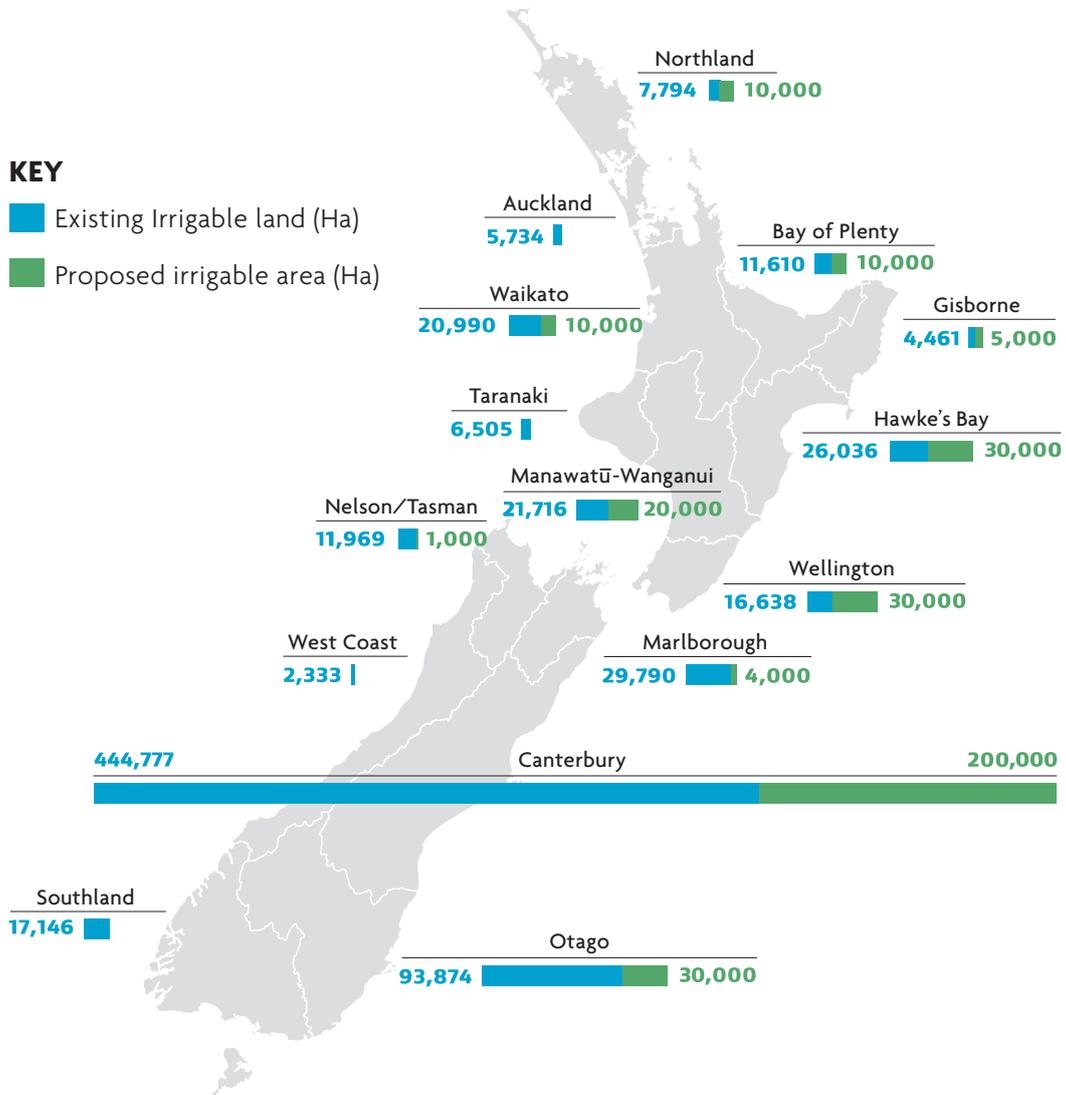
For high value industries such as horticulture, up to 500 additional full-time jobs are created per 1,000 irrigated hectares

Irrigated land use in NZ



Source: Statistics New Zealand, Ministry for Primary Industries.

Less water, more crop through sustainable irrigation



New Zealand's Existing Irrigated Area and Future Potential

Source: Statistics New Zealand, Ministry for Primary Industries. Updated with IrrigationNZ knowledge

WATERSHED AGREEMENT MAY END IRRIGATION BANS IN THE FUTURE

A watershed agreement devised last year has been re-enacted this summer in a key horticultural area to ensure fruit crops get the water they need during dry periods. Hawke's Bay fruit growers have negotiated to preserve access to water during critical growing periods, while still preserving the sustainability of the resource. The agreement, between Twyford landowners in Hastings and the Hawke's Bay Regional Council, sees landowners in the catchment sign over existing individual water rights to become part of a group stewardship model under a global consent. A global consent allows a group representing landowners to decide when and where their collective water is used – with resulting efficiency gains. The agreement provides certainty and reliability of water, even during severe drought, yet still ensures environmental considerations are paramount.

Where we have come from



To realise our potential, we need to build on our achievements. Since 2011, New Zealand's total irrigated area has increased by 80,000 hectares. This has occurred alongside a rapid and ongoing conversion of existing infrastructure to more modern efficient methods. These methods have delivered real improvements in water use efficiency and how we manage leaching of nutrients below the root zone.

Change has resulted from:

1. New scheme developments which are designed, constructed and implemented within the RMA framework for the sustainable use and management of land and water. Limits established in regional plans are then translated into individual resource consent conditions and performance standards.
2. The capital upgrade of existing irrigation schemes from open races to piped and pressurised distribution systems that reduce distribution losses and improve water use efficiency.
3. The capital upgrade of on-farm infrastructure from border dyke flood systems and older inefficient spray systems to modern efficient spray systems which use substantially less water for the same, or an improved effect.

Work completed since 2011 has required a total capital investment of \$1.7 billion, made up of an estimated \$1 billion in irrigation system upgrades and \$0.7 billion in scheme infrastructure.



Central Plains Water Scheme

Photo: Central Plains Water Ltd & Fulton Hogan

How we are meeting environmental obligations



GROWING OUR COMMITMENT TO IMPROVED ENVIRONMENTAL MANAGEMENT

Since 2011:

- \$0.6 billion has been invested by existing irrigators in upgrading to modern efficient irrigation systems
- \$18 million has been invested in installing precision irrigation technologies
- \$15 million has been invested in installing irrigation decision making technologies
- \$10 million has been invested in audited Farm Environment Plans
- Over 1,500 irrigators have attended irrigation training courses.

We are committed to continuous improvement:

1. All new irrigation scheme developments have individual consent conditions that require a very high standard of irrigation system design and water use efficiency, alongside Farm Environment Plans, as a condition of water supply.
2. All existing and new irrigation schemes have audit programmes in place, or are being established, to support the continual improvement of Farm Environment Plan management performance.
3. All existing and new irrigation schemes have developed, and are implementing, nutrient management accounting and monitoring systems to reflect their individual resource consent conditions.
4. IrrigationNZ co-ordinates an extensive industry training programme that is delivered by both IrrigationNZ and other providers. The continuing innovation, and application, of precision technologies has also provided a significant impetus towards the IrrigationNZ goal of SMART Irrigation (Sustainably Managed, Accountable, Responsible and Trusted Irrigation).

It is well-documented that precision agriculture technologies produce strong commercial results alongside high levels of environmental performance – many of these businesses have been recognised through programmes including the Ballance Farm Environment Awards. Continuing development of new sensor technologies networked through cloud-based applications will accentuate the roll out of SMART Irrigation. The expansion of the rural broadband network capacity is also key to this.

IRRIGATION SCHEMES DRIVING ENVIRONMENTAL IMPROVEMENT

Supporting 250 Barrhill irrigation scheme shareholders in Mid Canterbury with their efforts to improve on-farm environmental practices keeps Eva Harris busy. The Environmental Manager for the Acton, Greenstreet, Barrhill Chertsey and Valetta Irrigation schemes is responsible for ensuring Farm Environment Plans are produced and audited.

“We know implementing good practice will improve water quality, but we will need to be patient to see these results. It may take many years before we can see the benefits of these on-farm improvements on water quality. In the meantime, we can track how we are progressing with achieving GMPs and continually support our shareholders with making improvements.”

Economic benefits – wider than you think



Responsibly managed irrigation projects are good for both the economy and the social cohesiveness of our communities.

As well as contributing around \$3 billion to the national economy, the benefits multiply for surrounding areas; for every \$1 an irrigator earns, another \$2 to \$3 is spent in their community.

Irrigated agriculture 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 resilient without irrigation infrastructure. Future towns which may benefit from forthcoming irrigation projects include Motueka, Amberley, Waimate and Napier.

Irrigation isn't just about dairy – it supports a range of land uses, particularly horticulture. Winegrowers and fruit and vegetable producers from Central Otago to Northland are dependent on irrigation for consistent production.

Having a reliable source of water is especially important for our farmers and growers. Irrigation, supported by water storage, allows growers and farmers to ride out global market conditions and climatic stresses like droughts. Irrigation also allows diversity of land use as a wider range of stock, crops, vegetables and fruit can be grown and farmed with reliable water.

VIBRANT COMMUNITY EMERGES FROM IRRIGATION GROWTH

Growing the irrigation network in South Canterbury has translated into a more economically-viable and diverse region. The \$32 million Waihao Downs Irrigation Scheme opened in April 2016 centred around Waimate. With this scheme, the Morven Glenavy Ikawai Irrigation Company now delivers water to around 26,000 hectares of land in the district. Irrigation development has increased labour requirements attracting new families to the area. Rural school rolls have grown, particularly in Morven and Glenavy. Immigrant workers bring diversity to the southern community creating opportunities to learn about other cultures.

The Morven Glenavy Ikawai Irrigation Company is also proud of its environmental record. Water quality testing commenced before required to proactively protect the resource. Irrigators have also worked with local anglers to support salmon spawning by providing feed for a spelt project.

Former chairman and recently awarded Officer of New Zealand Order of Merit, Robin Murphy, says “irrigation is just part of the community. We like to think as a company that we are good neighbours.”



Environment – our challenge and our opportunity



New Zealand currently abstracts around 2% of our water resource (if we include hydropower this rises to about 5%). And irrigation accounts for approximately 60% of this. By international standards our abstraction rate is extremely low. Globally we're considered a water-rich country because of our extensive rivers, lakes and groundwater systems and ample rainfall. Worldwide rainfall (precipitation) averages 800mm per year. But New Zealand experiences 2.5 times that amount with average rainfall of 2000mm per year. However we don't always have water where we need it.

Irrigation projects have environmental as well as economic and social benefits. Irrigation helps build resilience to drought and improves soil quality over time. Water quality issues can be addressed through water storage as it provides the ability to maintain regular flows and augment streams that are struggling. On top of this, water storage allows groundwater users to move away from deep bores. We're already seeing this transition occur in Selwyn District prompted by Central Plains Water and this could be a key feature of the proposed Ruataniwha scheme.

Irrigators are addressing environmental concerns head-on. The majority of irrigators are meeting new environmental requirements by moving to Good Management Practice and many schemes are proactively coming up with community solutions to local issues.

THE ROLE OF IRRIGATION NEW ZEALAND

Since 2011, IrrigationNZ has invested more than \$1.6 million in developing knowledge resources and tools supported by industry training. Irrigation technical standards and industry training materials have been also developed and are available to all irrigators.

This investment has positioned the irrigation industry well to deliver the water use efficiency and nutrient management standards required under the National Policy Statement for Freshwater Management (NPS).



Oxford farmer, Scott Evans, with Paul Reese

Photo: Environment Canterbury

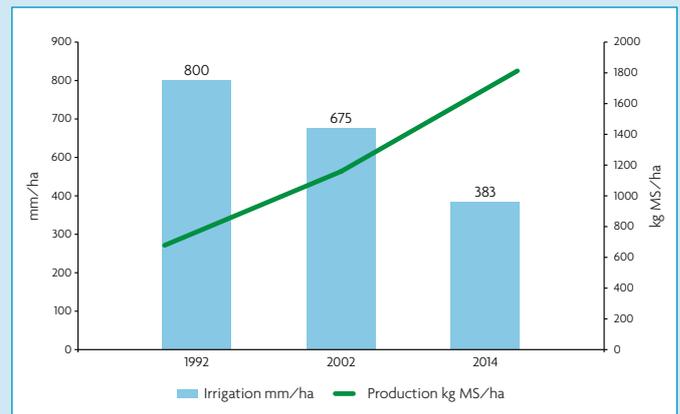
Farm Environment Plans seek to address and mitigate the environmental impacts of farming. In Canterbury – our largest irrigation region – nearly 3000 Farm Environment Plans have been initiated by farmers as of December 2016. Just over half of these are being managed and overseen by irrigation schemes.



MID CANTERBURY IRRIGATORS LEAD THE WAY

Sustainable irrigation practice and investment in technology is no better demonstrated than by Mid Canterbury irrigators Mark and Devon Slee. The couple are among New Zealand's top performing farmers. As well as being early adopters of SMART Irrigation technology, the Slee's are committed to reducing their environmental footprint. Moving away from border dyke irrigation to modern centre pivots has allowed intensification of land with no increase in water allocation. The couple have reduced their water consumption by more than 50% over the past decade while doubling milk production. Key to this is soil moisture monitoring analysis which allows them to only water the paddocks that need it. Existing shelter belts have been kept where possible, and in areas where trees needed to be removed to accommodate irrigation, greater numbers of low-growing native species have been introduced.

Fourteen full-time staff are employed on the farm, a big jump from the two they began with in 1990. The Slee's place equal emphasis on environmental management, animal welfare, compliance and the community in which they farm, which led to their Supreme Win of the 2014 New Zealand Ballance Farm Environment Award.



Change in water use and production since 1992 on the Slee farm.

FARMERS WORK TOGETHER SAVE GREEN STREET CREEK

During the 2015 drought, the 20-strong Green Street irrigator user group worked with a neighbouring lifestyle block owner to keep water in their creek to protect wildlife. Despite having no water themselves (being on 100% ban), the irrigators negotiated with Environment Canterbury to release some of their consented take for environmental purposes. Without their intervention, Spring Creek would have run dry, fish and invertebrate life would have been decimated and the creek's habitat might have taken years to recover.



Community – we're all connected

Whether you live in the city or in the country, your life is touched by irrigation. When you buy New Zealand wine, fruit and vegetables, their accessibility and price point is partly related to available water. In many cases, irrigation is the reason that product made its way onto the supermarket shelves that week.

Irrigation schemes contribute to the community in many ways. They may have a dual role of providing town drinking water supply like Opuha Water in Timaru, or supply stock water for their farmers as well as lifestyle block owners and non-irrigators. Having an irrigation scheme in your backyard means access to water for firefighting purposes and several schemes have modified infrastructure to enable faster connections when a rural fire threatens.

Outside of the obvious water supply benefits, irrigation schemes are very aware of their community's needs and, where practical and safe, allow recreational use of water storage assets.



Community benefits from irrigation infrastructure include:

-  **Provision of secure domestic water supplies for local towns and rural reticulation schemes.**
-  **Increased proportion of the population in full-time employment in comparison to the district and New Zealand averages.**
-  **Increased household and personal income in comparison to the district average.**
-  **Stable or increasing primary school rolls.**
-  **Higher proportion of community infrastructure properties (e.g. parks, halls, churches) per household.**
-  **Significantly higher building consent numbers.**



IRRIGATORS LAUNCH POND AND WATER CRAFT FOR COMMUNITY USE

Irrigators in North Otago developed an irrigation storage pond for recreational use in 2014 providing a selection of water craft for low-cost community use. Shareholders of the Lower Waitaki Irrigation Community provide locals with year-round access to the private pond for sailing, boating, paddleboarding and kayaking. Only a few minutes out of Oamaru, the project has cost shareholders more than \$150,000 with funds sourced from local irrigators as well as community trusts. Lake Opuha, pictured above, is another example of a water storage asset being used for recreation. Year-round Opuha provides South Canterbury residents with camping, fishing and boating opportunities.

The future

Increasingly, irrigation practice is moving towards precision techniques which employ cutting-edge technology to ensure targeted and sustainable application of water. Variable Rate Irrigation (VRI) increases water use efficiency and improves production by applying optimum application depths of water at both the right time and the right place. Watering meters and soil moisture monitoring allow accurate scheduling of crop and pasture needs taking out the variable of human error. And GPS technology and remote monitoring enables farmers to control water at the push of a button regardless of whether they're on-farm or not. The future applications using technology are endless.

Join us on the SMART Irrigation journey as we work together to better manage our land and water resources.

PRECISION IRRIGATION PROTECTS ENVIRONMENT

Variable rate irrigation, known as VRI, allows farmers to apply exactly the right amount of water in the right place. The technology controls valves mounted on a pivot or lateral irrigator – pulsing them on or off depending on the depth of water that is needed in that part of the paddock.

Lindsay NZ's Client Relationship Manager, Sarah Elliot, says Precision VRI enables farmers to control the depth of water applied to a crop or pasture producing better results. "Water can be withheld from heavier soils or areas that tend to get wet and boggy to avoid over-watering. You can avoid environmentally sensitive areas like wetlands, streams or trees and unproductive areas. Precision VRI allows you to put a buffer around these areas."

While being careful with water saves money, Sarah says it's also the environmental benefits that convince farmers to move to Precision VRI. "Once a farmer has EM-mapped and classified his soils, they can apply irrigation according to the spatial variation in water holding capacities. This ensures there's no leaching of irrigation water through the soils taking nutrients with it. Therefore, making sure all of the nutrients are being used by the plant."

The latest advancements in precision irrigation technologies is remote system control by the farmer. Sarah says being able to remotely manage and monitor the inputs being made on-farm has a lot of advantages. "Farmers have the ability to switch their plans from anywhere using a smart phone or tablet. They can see what's happening and record it to share the data with the farm consultant or regulator to prove how much water they're putting on where. Combined with technology such as soil moisture monitoring you can really maximise irrigation efficiencies." As well as having significance for the regulator, Sarah says this technology will also help assure the public that water management is appropriate.

With farmers grappling with a wave of technology, LindsayNZ has made it a priority to streamline and simplify their Precision VRI system. "Since we released our system in 2008, the amount of regulatory change and new technologies farmers need to keep up with has increased significantly so we have made sure our products are as easy to use as possible."

Lindsay NZ (formerly Precision Irrigation) is a former IrrigationNZ Innovation Award winner for its Precision VRI technology. Set up by two Massey University graduates, the company was taken over by global irrigation technology specialist Lindsay Corporation in 2011 but founding partners Stu Bradbury and George Ricketts still work at the company. Sarah Elliot says one of the keys to the company's success is its farmer engagement. "Most of our team are from farming backgrounds and one of the key components of the way we work is to involve farmers right from the innovation through the development stages. That helps us figure out what the challenges are and how we can help them solve it."

SMART

IRRIGATION
NEW ZEALAND