



MAKING EVERY DROP COUNT

Innovative, efficient irrigation



Neighbouring Canterbury dairy farmers Stu Neill and David Croft have helped clean up the once polluted Pahau River, while simultaneously increasing their irrigation area - all without using any more water.

The Amuri Basin farms, just outside Culverden, are irrigated by water from the Waiau River, which is delivered via a race by the farmer-owned Amuri Irrigation Company.

The scheme was constructed in the 1970s when border dyke irrigation was seen as cutting-edge.

David took over the farm from his father, a sheep farmer who bought the property in 1962. In the early '90s the property was converted to dairying. Since he was a boy, David has seen the district's once parched paddocks transformed into lush green pasture.

But as farming intensified, some shortcomings of border dyke irrigation were revealed. Nutrient run-off was blamed for polluting the Pahau River, a significant tributary of the Hurunui.

"There was an algal bloom in the Hurunui in 2001 and that's when ECan (Environment Canterbury) jumped in the jet boat and rode up the river collecting water samples and pointed out the Pahau River as being the most contaminated," says David.

High levels of E. coli bacteria and phosphorus (P) were found in the river.

"That dates back to the way the scheme was designed," says David. "It was designed to use the water once and then it was directed straight to the nearest creek. Through time, as dairying's moved in, with more intensive land use there was more contaminated water leaving the farms.

"That's when ECan called for a public meeting and said 'here's your chance, what do you want to do about it? Otherwise we'll come up with some regulations' and that's when the Pahau Enhancement Group was formed."

Including 16 farms, the group initially took measures like fencing waterways to keep stock out and replacing unreliable timers (used to trigger the dropping of gates to direct water from races to pasture).

However, for David and Stu, the most significant step was constructing large ponds to collect all their border dyke irrigation run-off, preventing it from entering waterways which drain into the Pahau.

The water is then reused in efficient spray irrigators. Stu uses K-line to cover 60ha of pasture that didn't previously get water, while David has a centre pivot that adds an extra 80ha to his irrigated land. "No waste water leaves the farm," says David.

^ David Croft's water storage pond.

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The measures taken by the enhancement group succeeded and since monthly testing of the Pahau River began in 2005, levels of P and E. coli have dropped significantly, with P concentrations now less than half what they were. In 2008 the enhancement group won an ECan resource management award for their efforts.

Making water go further

As well as solving the run-off problem and increasing the area under irrigation, the neighbours have found another way to grow more grass with their allocation.

Stu is rostered to get water on five days out of every 17 and David's allocation is seven days out of 17, but for the past five years, they've combined their ration.

"David and I put our days together and split them up a bit more, so instead of having five days in a row, I'll have three days and then a gap of five or six days and then the two days of water," says Stu.

"It takes me four days to get round the farm and irrigate it, so that extra day of water is of no use to me. But if I've got a gap in-between, I can go back and wet it again so it means we've got shorter return times.

"It's one of the things that makes the border dykes, despite their failings, work for David and I."

Taking all his water in one block would mean Stu had 12 days without water and that doesn't work in the heat of an Amuri Basin summer.

"We now have a gap of nine or 10 days, which is much better. In those high ET [evapo-transpiration] times we can go back to those paddocks faster, which is key if you're going to avoid water stress on the grass."

Managing border dyke

Border dyke irrigation is now somewhat frowned upon in much of Canterbury, because in many places too much water is lost through the porous soil profile.

However David says his farm has a clay base that stops leaching. And because border dyke works by gravity and doesn't require pumping – with the accompanying power cost – he argues it is cost-effective.

Irrigation New Zealand CEO Andrew Curtis agrees that although centre pivots are generally far more efficient, border dyke still has a place.



^ Culverden farmers Stu Neill (left) and David Croft have adapted their farm irrigation systems for greatest efficiency.

“They can be a very efficient way of watering. It’s about soil type, the length of the borders, the flow rate of the water that you’ve got going through the borders. Proper well-run borders are quite technical, it’s not just a case of open the gate and let it go,” says Andrew.

“There are some areas where they’re border dyking the wrong soils and there is a need to stop that and invest more in the pivot technology, because they’ll actually grow more grass and pay for the pivot that way – that’s been well proven.

“But if you’ve got deep soils that can hold on and allow you to water every 12 days or whatever your rotation length is, then if your borders are set up well and done well, there are no issues with it.”

And Andrew says the work done to clean up the Pahau River is a fine example of what can be done. “What those guys have done is actually great – they’re capturing their by-wash and stopping the phosphates from going into the river. More of that is part of the solution.”

For David and Stu, having both old-fashioned border dyke as well as spray irrigation is the perfect solution.

“The reason we went with the ponds, pivots and sprinklers was that it actually increased our border dyke reliability. We’ve got 80ha of border dyke water we’ve freed up that’s now covered by spray, so we’ve got that water that we can use to cover any shortfall on the remaining land,” says David.

Stu adds: “The roster is inflexible with border dyking – everyone takes a turn and you’ve got to wait until it’s your turn again, whereas with spray irrigation you can turn it on or off at will.

“I can run the spray irrigation continuously as long as I’ve got water in my ponds and because of the deal with Dave, I can fill my ponds whenever I want.”

Water strategies introduced

Irrigation throughout Canterbury is under close scrutiny at the moment as the zone committees set up under the Canterbury Water Management Strategy work on their Zone Implementation Programmes (ZIPs).

The first ZIP to be completed is for the Hurunui-Waiiau zone, where Stu Neill and David Croft live. It has 66 recommendations on how to implement the strategy and now planners are working on integrating them into the regional plan.

Amuri Irrigation Company chairman Norm Williamson has taken a keen interest in the ZIP and how irrigation in the area will be affected.

“It is a good thing, they’ve put a lot of work into it,” he says. “I won’t say everyone is absolutely satisfied, I think everyone has had to compromise along the way but it is probably a pretty good plan to form the basis of the Hurunui-Waiiau Regional Plan.”

The ZIP addresses environment, customary use, drinking water, stock water and irrigation, which it says must be efficient.

“The plan is more about an integrated approach as well – they don’t want one particular project to go ahead without showing how it’s going to integrate into the whole irrigation of the proposed 100,000 hectares in the region,” says Norm.

Some farmers, including Stu and David, fear their border dyke irrigation may come under pressure for its perceived inefficiency, compared with spray irrigation. However Norm says run properly, on the right country, border dyke works well.

“My personal opinion is, as long as there’s no border dyke run-off water coming out the end of the farm and into waterways, and they’re operating at the top efficiency achievable for border dykes, there’s no reason for the demise of the border dyke system. Much of the change from border dyke to spray to date has been on lighter land, where a clear economic advantage in pasture grown and product produced has been attainable by the change. Some well run border dyke systems on heavier soils would struggle to achieve the same cost recovery.”