

CASE STUDY 12



Diane and Chris Bolderston,
Evanston, RD3, Ashburton



**'Environmental issues
are a race without end
and we have just begun'**



Key facts

Farm size and type: The farm comprises two properties: a 189ha irrigated dairy farm, of which 169ha are effective, and a 175ha irrigated runoff, of which 141ha are effective.

Production focus: Milk production through a market-focused, environmental management system. Both properties have shelter trees. There is a woodlot on the runoff.

Soil type and topography: They are on a shallow, stony Lismore soil. The soil water holding capacity is 60mm to 65mm. The property is flat.

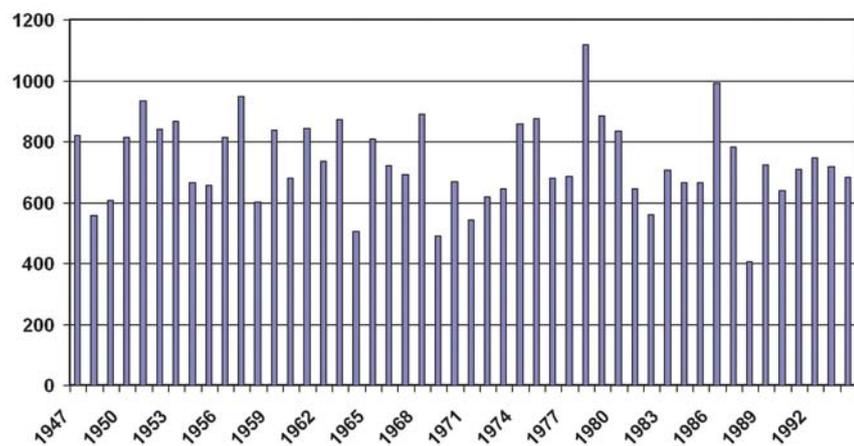
Climate: Average annual rainfall is about 735mm, ranging from 400 to 1100mm (based on Winchmore data). Temperature can range from -5°C frosts in winter to 30°C or more in summer.

Water: Irrigation water for the dairy farm is provided through the Rangitata Diversion Race (RDR). Entry to this scheme was built into the land price

when they bought the property in 1985. Their water allocation is 12 hours per 40ha per week. They have also dug wells down to 10m, with water levels fluctuating considerably between summer and winter. Their runoff also has a water allocation, which they can draw on if necessary for the dairy farm, and a deep well for a 400m pivot. The RDR scheme is now fully allocated but tradable water rights have recently been introduced. Sale of water rights can only be made to someone who doesn't have an existing right and is within the scheme boundaries.

Social: Early on Chris and Diane were both

Winchmore Annual Rainfall, 1947 to 1994



hands-on in the running of the farm, but this has now changed with a variable order sharemilker on the property. Their role now is more focused on strategic development and overall management of the farm business. They have two daughters at university and a son and daughter at boarding school. Succession is not an obsessive objective. They work on the philosophy of helping young dairy farmers get a start in the investment side of the industry, which they believe should be merit-based performance, ie, variable order.

Both are proactive community people and have worked hard in the face of a social bias against dairy farming families in Canterbury. Chris has been involved in various dairy company and industry committees and is a member of the local Dexcel RATs (Regional Action Team) Committee. He has also been a participant in a Healthy Soils Healthy Water project, part funded by the Sustainable Farming Fund, and pushed hard for Market Focused, a triple bottom line standard, to become the industry standard. Diane has been involved in school and sports committees, and is an active member of the Canterbury branch of the Farm Forestry Association. They won several awards in Canterbury's inaugural Ballance Farm Environment Awards.

Main climate features and challenges:

Hot, dry summers: Their irrigation season is from 10 September to 10 May, and during this time the biggest constraint is restrictions on allocation. They are limited by Environment Canterbury to applying 5mm of water per day. Evapotranspiration exceeds 5mm/day on a regular basis and with a shallow, stony soil (soil water holding capacity of 65mm) it can take only five days from saturation to wilting with ET rates up to 10mm/day in extreme times. With their irrigation allocation they can apply up to 3.5mm per day from the scheme, with the deficit made up from their wells or from the runoff allocation if necessary. The Canterbury nor'westers can be unpleasant for cows and people but they do provide recharge for the Rangitata, which is the source of scheme water.

Rainfall variations: While the long-term average rainfall data show even rainfall spread throughout, the reality is that it varies a lot through individual years.

Other climatic challenges are the climate of central government and the market climate. The increased level of regulation makes life very difficult. Employment laws, for example, have become very complex. 'The market climate is only going to get tougher' from environmental and consumer demand perspectives.

Chris and Diane's priority has been to plant perimeter shelter.



Historical development and influence of climate and weather extremes

Period

Production focus and major changes Climate and weather effects

19th century

The farm was originally part of Coldstream Estate, which was established in the 1850s and covered about 22,260ha. At this time the land was predominantly in tussock and native broom. Subdivision began in the 1880s and continued through to the early 20th century.

1890s through to 1980s

The principal farming focus in the district was dryland sheep farming, with cropping on the heavier soils. Border dyke irrigation, principally drawn from the RDR scheme, was developed in the late 1950s. The farm was being used as a runoff block for hoggets when the Bolderstons arrived in 1985.

1985 to present

Conversion to a dairy farm began in 1985, which was a year of intensive work. They redeveloped the irrigation system, principally by new bordering and new headraces in existing areas, the farm was regressed, a trough water system developed, wells dug, dairy shed built, fencing and lanes established. By 1987 they had more of a management focus. They took advantage of the Regional Council's NW shelter scheme at this time and began planting shelter trees. DDE was discovered in the soil, which became a major management challenge. Since 1990 they have had a period of expansion, leasing a farm next door and then subsequently purchasing part of it.

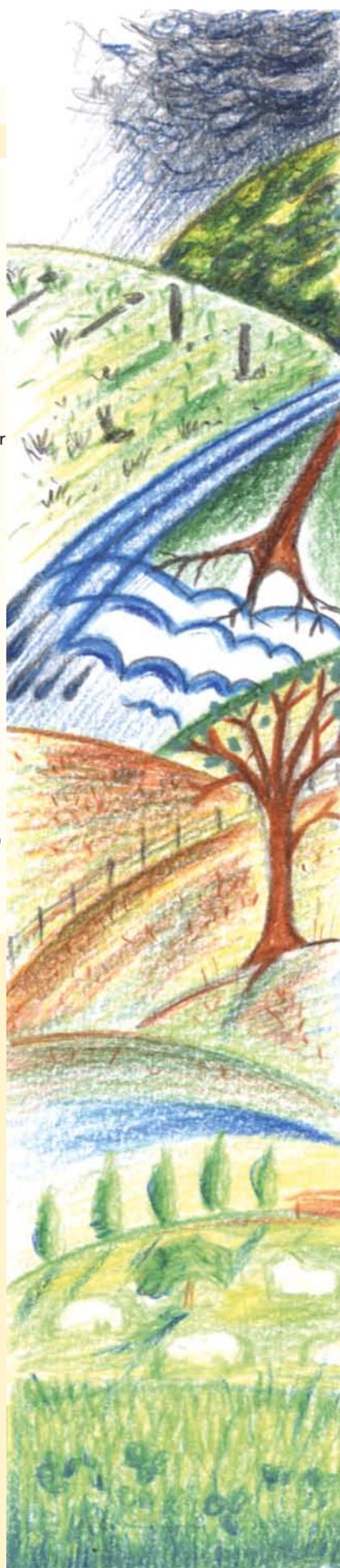
They took over the farm in the middle of a drought. This mainly had an emotional impact, coinciding with their shift from green/wet Taranaki and the challenge of establishing themselves on a farm with no shelter and a poorly developed irrigation system.

There was a flood in March 1986 with bridges washed out and surface flooding on the farm.

They were milking once a day the following spring to protect the cows from weight loss and stress as a result of a tough winter/spring.

There was drought again in 1988 and then snow in September 1991. The cows were calving at this time and while stock losses were low, it created stress on the animals.

Since this latter event nothing has felt as bad. They are much more secure now and better prepared to cope with the extremes of the Canterbury climate.



Adaptations to develop the resilience of the farm

A comprehensive strategy has been developed over nearly a 20-year period to provide as much buffering as possible against the extremes of climate. This has involved redevelopment of the irrigation system with a strong focus on more efficient use of available water. A programme of planting shelter trees was begun early and is ongoing. They now control their own runoff which gives greater flexibility and security and enables a bank of feed to be available at all times.

Their move to Canterbury in the mid 1980s was a pioneering one, but they didn't feel at risk. Chris and Diane both have the skills and acumen to innovate and succeed – their focus was on hard work, problem solving and analysis, along with a proactive approach to community. They have gained a better perspective with the experiences they've had. This has included dealing with issues such as DDE, high-level involvement with the dairy industry, as a company director and shareholder councillor and related industry committees such as the RATs groups and 'Market Focus'; and being proactive in promoting an environmentally sound system, for example through participation in the Ballance Farm Environment Awards. Their personal objective is to be ahead of the game rather than be forced into change through regulation.

Chris and Diane believe that they are doing everything they can now to minimise risk and will continue to innovate and adapt as they can. They believe in being prepared to look outside the square and embrace new ideas. Availability and use of water in the future will be a big issue. With climate change, much will depend on long-term changes to rainfall in the main divide and foothills as a result of more anticipated 'westerly' conditions. With regard to water their view is to 'look at what we have overcome to get to where we are and we will continue to do that'.

Forestry/trees: Their priority has been to plant perimeter shelter. There are three woodlots, with Eucalyptus nitens, macrocarpa and pine. Some Eucalyptus species were established as early shelter, but these are not suitable as long-term shelter species. The preferred shelter species now are poplars, double planted with Pittosporum tenuifolium. They're currently implementing a policy of planting three amenity trees per paddock, both for aesthetics and shelter and shade. The runoff has well-established trees. There is potential for

some more tree planting.

There has also been a focus on protection and environmental enhancement, with all springs, creeks and waterways fenced. Wetland areas are best left to nature after being planted and fenced.

Benefits: Shelter trees create a beneficial microclimate, particularly offering shelter and shade to help buffer the extremes of the Canterbury climate. They have aesthetic value, increase biodiversity (eg, more birds) and also add value to the land.

Information/support: The Regional Council helped early on with shelter plantings. They are recent members of Farm Forestry. They've tapped into local knowledge. 'Trees in the New Zealand Countryside' by John and Bunny Mortimer is a great help. Nurseries have become more helpful over time. There is no shortage of information or advice available from various sources but the failures of inappropriate plantings are the best teachers of all.

Constraints: Trees take time and money to establish and maintain, which is a long-term commitment. They take up space and poor species collection (eg, gums) can lead to problems with wind damage, use of valuable water and problems establishing secondary shelter.

Water: As the Mark Twain saying goes 'Whisky is for drinking, water is for fighting'. Water is everything. When their need is greatest the river flows (and available water) can be at their lowest. Nor'westers can be a blessing in disguise as they bring rain to the headwaters of the Rangitata and other rivers reaching back into the main divide. Eighty percent of their water cuts are due to low flows in the Ashburton River, which is used to supplement the RDR water. The Ashburton is sourced in the foothills, so doesn't catch nor'west rainfall under 'normal' conditions.

They have focused a lot on developing a more efficient irrigation system. The headraces were completely re-done when they bought the property and they have, more recently, developed wide borders. Their focus has been to make better use of the available water. A 25 percent bigger flow gives 30 percent faster coverage, ie an increase from 8 cusecs to 10 cusecs, which they are now on. The result of their efforts is a halving of the time it takes to irrigate the whole farm, from 28 days to 14 days. Along with the border dyke irrigation they also have K-line irrigation, and a travel-





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ling irrigator. A centre-pivot irrigator has recently been installed on the runoff. While they are more efficient in terms of water use from the scheme, there is less recharging of ground water which is happening throughout the scheme and is definitely affecting the shallow groundwater reserve.

Information/support: The NZ Irrigation Association, research organisations, the RMA, ECAN, RDR, irrigation companies, consultants, soil moisture monitoring.

Constraints: Low flows at peak demand from the scheme. The shallow wells are tidal. Enthusiastic neighbours above them have developed some large underground galleries to source enough ground water to run their irrigators, as have the Bolderstons.

Soil: They've focused a lot on improving the soil on the farm. Strategies have included sub-soiling and increasing soil organic matter and fertility, aimed at improving the soil moisture holding capacity of the soil. They've used chicken litter to help with this. When re-bordering they pay to retain all of their topsoil. Nutrient budgeting is used to match inputs and outputs.

Information/support: They've had support through involvement in a SFF project, their fertiliser company (Ravensdown), and from

consultants. Regular soil testing is carried out.

Constraints: The light, stony, soil that they started with.

Pasture management: The pastures have been regrassed to a better ryegrass variety, preferential Bronson, and white clover. They've tried growing Timothy but it suffers from overgrazing. The real focus with the pasture is to establish optimum growing conditions, which is linked to careful soil management and making the best use they can of available water. Establishment of shelter has helped to lower the evapotranspiration rate and reduce leaf damage.



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Information/support: Magazines, attending seminars and field days, participation in discussion group, experience, 30 years in dairying.

Constraints: Water restrictions. If they could actually receive their allocation of water from the scheme all of the time there would be little or no issue.

Stock management: They are running a crossbred herd and have a commercial stocking rate (their milking platform is 3.5 cows per hectare). They have strategies to minimise stress on their animals. They don't induce the cows, they stop mating early and carry over the best of the cows not in calf. There is no docking. Newborn calves are fed at least two litres of colostrum, with no antibiotic milk fed to replacements. Water sprinklers are used in the yard to keep the cows from overheating. The runoff provides more options. Shelter trees have made a big difference, both in winter and summer,



offering shelter and shade for the stock and pasture.

Waste management: Dead cows are composted with sawdust recycled out of calf sheds and the resultant compost is used around the trees. All water and cowshed waste is stored in a sealed tank and is reused as irrigation/fertiliser. Waste oil is stored and recycled. Pigs and chooks utilise household scraps. Baleage/silage wraps and covers are reused/recycled/stored for recycling.



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Meso connections

There is a community bias against dairy farming families in Canterbury. Diane and Chris never saw this as a constraint and have had a positive, proactive approach towards people – including

local community, immediate neighbours, the regional council, and others. Dairy farming has been a mixed blessing for Canterbury. While dairy farmers have been very successful, there has been a change in the social structure of communities as a result which probably has been seen for the worse. The latter is because of the transient nature of dairy farming staff, particularly share-milking families, and the general lack of input to community from this and corporate-type owners who live elsewhere. Diane and Chris are clearly exceptions to this.

Immediate neighbour issues that they are dealing with are both water-related. On the topside of the farm their neighbour has created large galleries to collect water directly above one of their wells. This has affected the water available for their use. They also have old stock races running through the farm which they are required to maintain for their neighbour on the seaward side of the property. Unfortunately, these races aren't so well maintained on the neighbour's property which results in ponding of water and negative impacts on trees in the vicinity.

The Landcare Trust is viewed very positively and they have a good relationship with Phil McGuigan at Environment Canterbury. Chris' approach with water on their newly acquired runoff was to not invest in capital works until the consent process with Environment Canterbury was fully completed. They are also enjoying a positive involvement with the Farm Forestry Association.

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