

MANAGING CLIMATE CHANGE
Farming in the high country

THE FARM

- Situated on the shore of Lake Benmore in the southern corner of the Mackenzie Basin.
- Owned by Jenny and Han Klisser and managed by Paddy and Barbara Boyd since 1981.
- Sheep, beef, deer and more recently grapes.
- Stock on the property includes: 10 000 predominantly Merino sheep; 1000 cattle including a Hereford and Angus stud; 6000 deer including 3000 breeding hinds and a velvet herd of 500 stags.
- Haldon Station also planted 1000 grape vines as a trial in 2006.
- The station is 14 400 hectares in total, all of which is farmed, and runs from 366 metres up to 1676 metres.
- The farm consists of the freehold Haldon block (6000 hectares) and the Kirkestine block (8000 hectares) which is currently under tenure review.

THE CLIMATE

- The annual average rainfall at the homestead is around 380mm and temperatures range from –23.8°C to higher than 40°C.
- The vast majority of the property tends to be north facing and, with a prevailing north-west wind, very high evapotranspiration rates are common.

Haldon Station – It's big, it's dry and it's very productive.

Haldon Station extends over 14 400 hectares from the flat, stony and arid Mackenzie Basin floor to a peak of around 1676 metres in the Kirkestine range. It has to contend with temperature extremes ranging from –23°C to the mid-40s, and an annual average rainfall at the homestead of approximately 380–400mm, with significant annual variation in both rainfall volume and timing.

In a climate that is highly variable from year to year, and with rainfall that tends to fall in a few large downpours, manager Paddy Boyd has looked to diversify and intensify his farming activity to ensure the business remains economically, environmentally and socially sustainable.

The farm is commercially diverse with six main income-generating components: 16.5–18 micron Merino wool, prime lambs, beef, bulls, velvet and venison. The diversification has been aimed at spreading the risk of the farm's exposure to both market volatility and the variable and challenging climate. "I don't ever want to be exposed to the risks of supplying only one volatile market," says Paddy.

"You only get out what you put in. You can't keep taking and expect to achieve the same results unless you put something back into the system." Paddy Boyd

BUILDING SUSTAINABILITY AND RESILIENCE INTO HALDON

Key to the viability of Haldon station has been an assessment of risks and opportunities associated with the farm, and adapting the farming and stocking policies accordingly. Haldon has historically been faced with a major rabbit challenge: one that after the introduction of rabbit calicivirus disease in 1997, is again becoming an issue. This, coupled with a variable and low rainfall and a predominantly north-facing aspect, makes the management of feed availability and quality a significant challenge. The response has been to establish a symbiotic relationship between deer farming, beef grazing and sheep, and to install a highly efficient and effective moveable centre pivot irrigation system.

IRRIGATION

In the 1960s, a 440-hectare border dyke irrigation system was installed using water from the generally reliable Stony Creek. In 2004, a centre pivot system was installed to irrigate an additional 90 hectares. This has not necessitated taking any additional water, as the pivot is fed by wipe-off water from the border dyke scheme, essentially reusing the same water.

The pivot is situated on the previously barren and unstocked Mackenzie Basin floor, which had a zero stock-carrying capacity. With the incorporation of the irrigation system, the same area is now finishing 1500–2000 deer per year and providing options for managing the nutritional requirements of the sheep and beef systems. "The irrigation system was a big call – it was expensive and designed only as a trial, but it has paid for itself well inside five years," says Paddy.

The intensification of the country that is able to be irrigated has also had positives outcomes on the condition of the hill and high country. In the past, during difficult and dry years, stock could put the vegetation on the fragile hill country under pressure. Now Haldon is able to spell the hill country and manage its ground cover, further improving the long-term sustainability of the property.

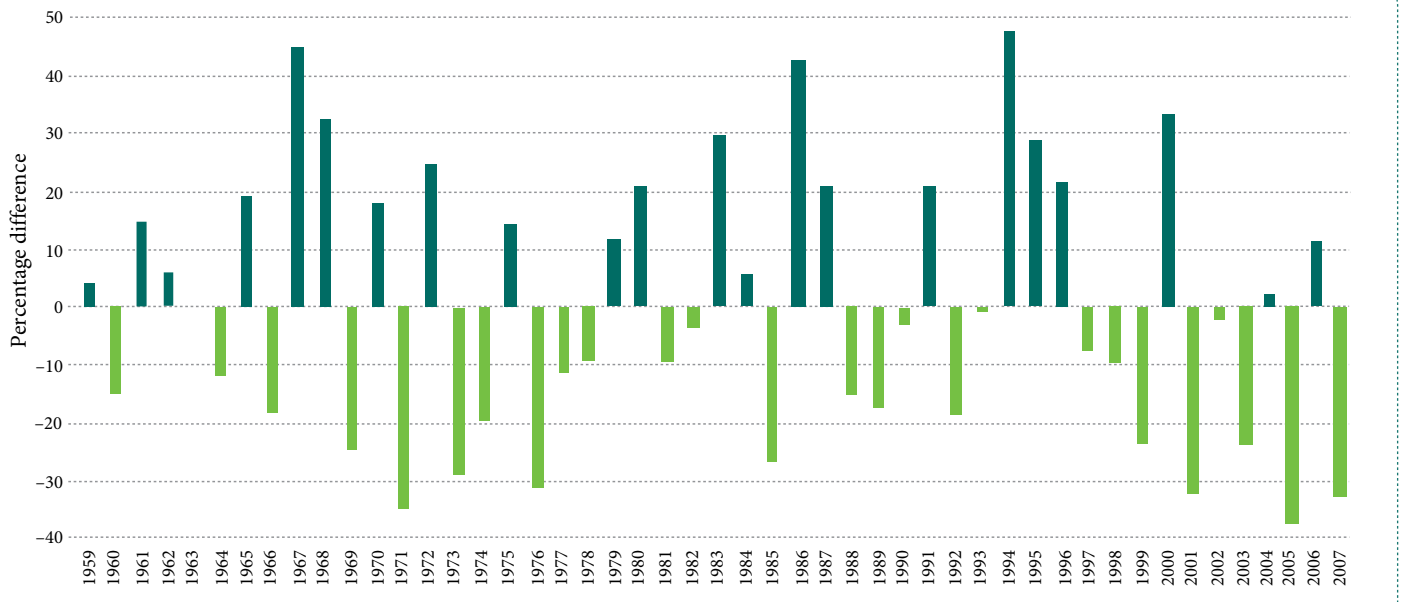
PEST CONTROL

Briar is a major plant pest for Haldon and it tends to form a thick and impenetrable cover through which sheep will not push. This is a particular problem in the fertile valley floors which tend to retain more moisture and feed through the dry summer. Paddy has found that deer will preferentially forage on the rose berries (hips) and foliage, rendering the seeds unviable and thus halting their spread.

Previously unstocked flats are now highly productive under the new centre pivot.

The graph below shows 50 years worth of rainfall data for Tekapo. While Tekapo tends to experience slightly higher rainfall than Haldon, the trends are the same, showing how highly variable the rainfall is.

FIGURE 1: PERCENTAGE DIFFERENCE TO THE 50-YEAR ANNUAL AVERAGE RAINFALL, TEKAPO



Source: www.niwa.govt.nz

They also open the canopy and "keep them well pruned" allowing sheep to graze and pass through. The continual grazing of deer stops any regeneration while the area at the base of the briar provides quality feed and an ideal lambing environment.

SUPPLEMENTARY FEED

Paddy is committed to finishing all his own stock and producing all required winter feed on the property. This is as a result of being "caught out" in 2007, when after two years of extremely low rainfall, only 187 round bales of winter feed were produced. Paddy was forced to purchase additional feed which proved to be a very expensive exercise.

To counter this, expansion of irrigation is proposed, as is the planting and harvesting of a range of supplementary feeds including the drought tolerant staple, rye corn. Persistence problems have limited the use of new cultivars of pasture and lucerne, with Paddy moving back to older, more traditional cultivars that seem to persist in the very dry and summer hot and winter cold of Haldon.

In comparison to the 187 round bales produced in 2007, Haldon set aside just over 5000 bales in 2008 due to an exceptional growing season and through the management and harvesting of feed produced under the irrigation system. With an annual supplementary feed requirement of around 2500 bales, this helped to build a little "fat in the system". Paddy explains: "We are aiming for self sufficiency and minimising risk, particularly in light of a changing climate."

Key points

1. **A very hot, dry climate has posed significant challenges for Haldon Station and has required a rethink of the entire farming system.**
2. **It has been vital to long-term sustainability in a changing climate and volatile markets to diversify and ensure the impact of a dry year or poor market prices are balanced by more positive returns for other farm produce.**
3. **Self sufficiency has been critical to reducing the risk of exposure to fluctuation in feed prices. This is seen as becoming increasingly important as the East Coast becomes dryer, potentially impacting on supplementary feed supply.**
4. **Integrated management of stock to achieve positive performance gains and environmental benefit is possible and has been highly successful at Haldon.**
5. **Irrigation and the ability to produce significant volumes of feed at critical times of the year has allowed Haldon to reduce its risk from a changing climate, and reduce the pressure on more vulnerable and fragile parts of the farm – particularly in very dry years.**

Briar grazed by deer (left) and ungrazed by deer (on right). All photos courtesy of Environment Canterbury.

FOR MORE INFORMATION

- Paddy and Barbara won the 2005 Ballance Farm Environment Awards, Canterbury Region Supreme and Environment Canterbury Water Efficiency Award. Read their awards story at **www.ecan.govt.nz**
- Review information on New Zealand's climate through the National Climate Database **www.cliflo.niwa.co.nz**
- Read about electricity generation on-farm including micro hydro-generation from the Energy Efficiency and Conservation Authority at **www.energywise.govt.nz**
- For more information on designing effective and efficient irrigation systems visit the MAF website **www.maf.govt.nz**

SUSTAINABILITY

Sustainability is a concept that is well understood at Haldon. Paddy is aware of his property's natural capital and manages it accordingly. The diversification of the property to ensure that the risk of market fluctuations is spread over six key agricultural markets, the incorporation of irrigation to both balance the risks of climatic variation and ease pressure on the hill country, and the production of sufficient feed to enable all stock to be finished on Haldon prior to sale, means that environmentally and economically Haldon is meeting the sustainability challenge well.

Social sustainability is also being met head on. Being an isolated property, attracting staff can be a challenge. Haldon employs four couples and provides a school for children of the families working on Haldon and surrounding properties. The school teacher is provided through the New Zealand correspondence schooling system.

Paddy says there are still plenty of opportunities to build the farm's performance, profitability, sustainability and resilience to the changing climate and market demands.

Some ideas include:

- extending the deer operation with an ongoing fencing program to introduce deer into new areas;
- irrigation of the currently unstocked "flats";
- a small to medium-scale water storage and reticulation system to provide certainty of supply and to increase irrigable area;
- the establishment of mini hydro-electric generation and gravity-fed centre pivots;
- eco tourism including trophy hunting.

"The biggest risk to sustainability will be staying viable and handling the extremes, be they climatic or market." Paddy Boyd

Production of supplementary feed is a major focus on Haldon. All photos courtesy of Environment Canterbury.

THIS IS ONE IN A SERIES OF CASE STUDIES CALLED ADAPTING TO A CHANGING CLIMATE

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