



ADAPTING TO A CHANGING CLIMATE: CASE STUDY 14

HIGH COUNTRY FARMING

Erratic seasons test mettle at Middlehurst Station

THE FARM

- Middlehurst Station stretches from the upper Awatere Valley to the top of the Inland Kaikoura Range.
- The homestead is 114 kilometres from Blenheim.
- Middlehurst is 16 723 hectares (10 723 hectares effective, the balance mountainous) at an altitude of 600–2400 metres above sea level.
- 4920 hectares has been oversown and is regularly topdressed, 5770 hectares is in native pasture, 21 hectares is in lucerne and there are 12 hectares of winter crop.
- The farm runs around 4500 merino ewes, 4000 hoggets and 500 Angus cattle.
- Calving occurs in September, lambing in October.



Middlehurst front country in May 2009, at the end of a dry autumn.

Winter conditions extend well into autumn and spring at Marlborough high country property, Middlehurst Station. Summer months can be searingly hot, yet frosts can strike at any time of year.

Building on Middlehurst Station's strengths has helped Willie and Sue Macdonald cope with the erratic high country climate and an extremely narrow window for pasture growth. The purchase of additional properties with complementary climates has further increased the resilience of their farming operation by providing flexible feed options and the ability to finish stock. These approaches also help the business adapt to climate change.

CLIMATE CHANGE AWARENESS ESSENTIAL

"None of us are around long enough to gauge the reality of climate change, but there is good science on it," says Willie Macdonald. "Ten years is nothing in the history of the planet but it is quarter of our farming career. If we're not aware of the possibilities of a changing climate or don't have the ability to react, we might discover one day that we've spent 20 years farming in the wrong direction."

A CLIMATE OF EXTREMES

Being so far inland, Middlehurst experiences an almost continental climate with temperatures anecdotally ranging from -10°C to more than 40°C . Rainfall fluctuates from 360mm to 1030mm (averaging 588mm over the last 10 years) with an extremely erratic seasonal pattern. Frosts are frequent from April until November and can occur at any time of year. Snowfall too is unpredictable.

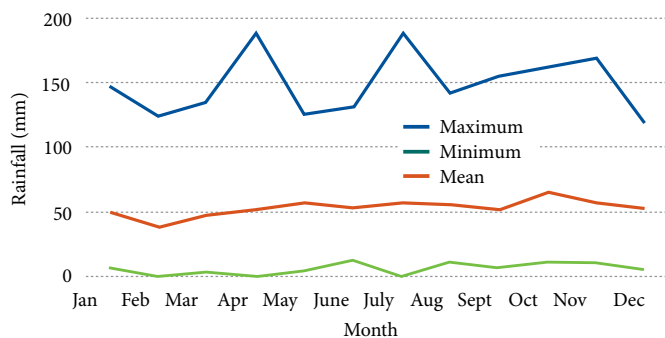
Pasture growth gets off to a slow start, usually towards the end of October, then takes off from around mid-November to mid-January when it again begins to slow. Most years, conditions are not ideal for growth until late spring/early summer and February is the driest month.

DEVELOPMENT BUILDS ON PROPERTY'S STRENGTHS

Middlehurst's strengths are naturally fertile soils, its large-scale and excellent stock health. Limiting factors are low levels of natural sulphur, erratic rainfall and a reliable growth period of only three months.

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MIDDLEHURST STATION RAINFALL DATA, 1959–2008



Source NIWA.

Since purchasing the property in 1998, the Macdonalds have undertaken an intensive development programme, using the station's strengths as a base on which to apply good science and genetics.

SUBDIVISION, SEED AND FERTILISER

The first step towards developing Middlehurst was selling the 1800 head wether flock and shutting the gate on country that had been continuously set-stocked for 90 years. The wethers were replaced with ewes which spend only two winter months on this unimproved backcountry.

The sunniest, early country suitable for lambing underwent a programme of subdivision, seed and fertiliser. Attention then shifted to south-facing country which would provide grazing in the feed-short summer months. Around 30 kilometres of fencing has broken 660–1500 hectare blocks down to 200–400 hectares.

The invasive flatweed hieracium had colonised soils bared off by sheep, rabbits or erosion, with up to 95 percent coverage. Taking advantage of frost lift, infested areas were oversown in mid-to-late August with 3kg/hectare of Tahora white clover, 2–3kg of Leura sub clover, 0.5kg of Montgomery red clover, and 2kg of Tekapo cocksfoot with 100kg of Sulphur Super 30 (30 percent sulphur).

Caucasian clover was sown separately on some sites at 3kg/hectare using a Ventura seeder fitted to the aircraft for even distribution.



A strong constitution with the ability to thrive in extreme high country weather, is a stand-out feature of Middlehurst merinos.

Because of its ability to run stolons underground when water's in short supply, this species is resilient to drought but is slow to establish.

On a 1250 hectare area which had previously been seeded, 1kg/ha of clover seed was applied, mostly for the inoculum it provided.

The gate was shut on newly developed blocks from spring through to summer for two years, to encourage re-seeding. From year two, the topdressing programme entered a three-year cycle of 100kg/hectare of Maxi Sulphur Super (47 percent sulphur) applied over 6000 hectares with 2000 hectares treated each year.

An exponential rise in fertiliser prices has put the 200 tonne/year maintenance fertiliser programme under threat. Prices would need to fall to \$300/tonne on the ground before maintenance would be resumed without question. The cost could be reversion to hieracium, especially if the climate becomes hotter and drier.

WORK WITH NATURE

"We work with, rather than against, nature," says Willie. "We've got no desire to be bamboozled by feed budgets, or find ourselves growing feed all summer to feed out in the winter."

"It's impossible to farm by the diary," says Sue. "While it's necessary to err on the side of caution, we are running a business so can't be overly conservative."

Rather than "harvesting the pasture curve" at the height of the summer growth period, the Macdonalds conserve a proportion as "standing hay" to get stock through the long nil-growth winter period.

Each year the 21 hectares of lucerne provides about 400 bales of baleage used as a feed buffer for whatever class of stock has the greatest need. The lucerne is also directly grazed by ram hoggets from January until May.

Twelve hectares of winter crops will be converted to permanent lucerne in spring but given the fickle climate, instant success is not guaranteed. Rape, turnips, kale and swedes have all been sown, "but are all a bit of a gamble," says Sue.

"We don't need a lot of rain but we do need it at the right time, especially in spring," she says. "But dry springs seem to be the pattern of the moment. It's getting harder to establish pasture. Half the year's rainfall in August is of little use, if by November the property is a dustbowl."

Autumns too can be tricky. Rains in November 2008 caused red clover to strike, then in late February the young plants were promptly burned off by frost.

EWES WINTERED BELOW SNOW COUNTRY

The Macdonalds have become "snow-wise", predicting likely snowfall patterns but also ready to react to the unexpected.

"Snow is always erratic with no rules," says Sue. "Recently we seem to be getting bigger, less predictable dumps."



Ewes are mustered out to the back country, once the mountains' winter snow-cap is in place.

The Macdonalds use their highest, least intensive country for wintering stock. Ewes are mustered to these blocks once the mountains' winter snow-cap is in place, the snowline acting as a natural barrier. Typically, they head out on around 5–10 July and return in early September for scanning then shearing two weeks later. Inevitably they come back in better condition than they left, their winter diet supplemented with nutritious briar berries.

Climate change projections of reduced snowfalls for the South Island high country and a rising snowline could be advantageous to the Macdonalds. Higher temperatures and an earlier spring melt are likely.

LAND INVESTMENTS INCREASE FLEXIBILITY

Rather than overloading Middlehurst's delicate system, the Macdonalds have bought additional land within easy travelling distance which complements the high country and provides flexibility. Investing in other land rather than in ongoing development at Middlehurst also spreads risk.

CHEVIOT INCREASES OPTIONS

A 550 hectare finishing block at Cheviot in North Canterbury enables the Macdonalds to retain control of stock further down the supply chain thus strengthening their marketing position.

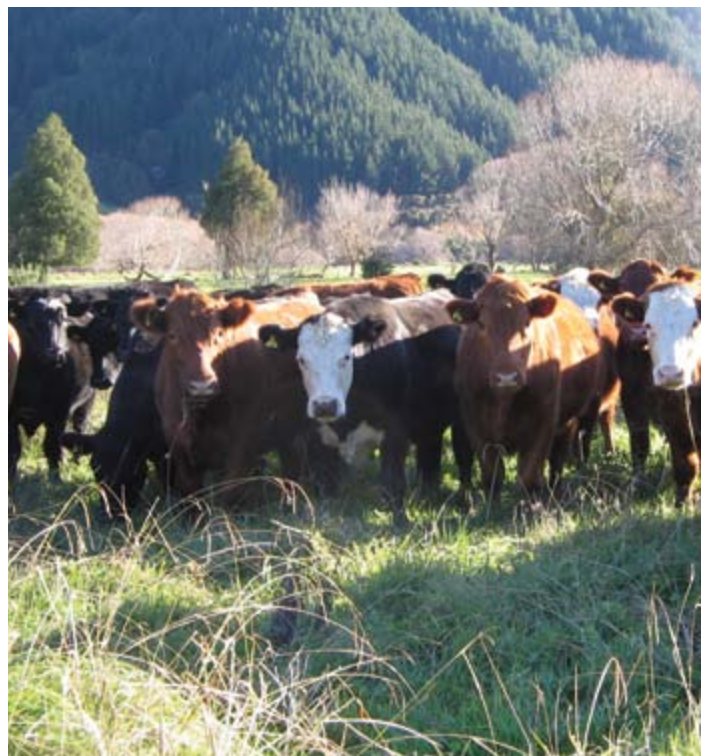
The pasture growth peak begins early on the Cheviot property, in August, and tails off from mid-November/early December just as growth begins at Middlehurst.

After shearing in late September, 3000 surplus hoggets are sent to Cheviot where spring is well underway, with most finished on a winter lamb contract by November. A month after arrival they are drafted into three weight ranges for ease of management then killed as they reach a 20kg carcass weight.

Seven hundred cast-for-age ewes also go to Cheviot, where they are mated with a Poll Dorset ram. They are either sold with lambs at foot if feed is short, or run for a couple of seasons to produce two crops of lambs.

Key points

- 1 Willie and Sue Macdonald accept the scientific evidence of climate change.**
- 2 Awareness of the possibilities of climate change and an ability to adapt reduces risk for their business.**
- 3 Development is based around building on the property's strengths of fertile soils, its large-scale and excellent stock health.**
- 4 The high country is a fragile environment and requires land management to be prioritised ahead of stock.**
- 5 Farming in an erratic climate requires the ability to adapt management practices.**
- 6 Additional land has been purchased to complement the high country, increase flexibility, maximise market opportunities and insure the business against climate change.**



Purchase of a high rainfall block near Havelock, at the head of Pelorus Sound, has drought-proofed the Macdonalds' cattle finishing operation.

FOR MORE INFORMATION

- Watch a *Rural Delivery* feature on Middlehurst Station at www.tvnzondemand.co.nz
- Visit www.beeflambnz.com for information on the industry.

Access to the Cheviot property means the Macdonalds can now wean calves at Middlehurst anytime between mid-April and mid-June, depending on the season. After weaning, 200 heifer calves head to Cheviot where the best 100 are mated as yearlings and the remainder are killed. Of the yearlings that go to the bull, three-quarters return to Middlehurst to calve and the truck is back-loaded with that year's crop of calves.



The striking results of oversowing and topdressing, in spring, 2006.

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

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BEEF FOCUS SHIFTS TO HAVELOCK

A 150-hectare former dairy block at Havelock, has drought-proofed the Macdonald's cattle operation. Pasture grows abundantly from September/October–May, with a reliable 1500–2200mm rainfall.

Rising two-year-old (R2) steers are finished here. Last autumn which was extremely dry at Middlehurst the Havelock property enabled the Macdonalds to hold onto 100 R3 steers which otherwise would have been sold as stores.

IMPROVED GENETICS SECURES CONTRACTS

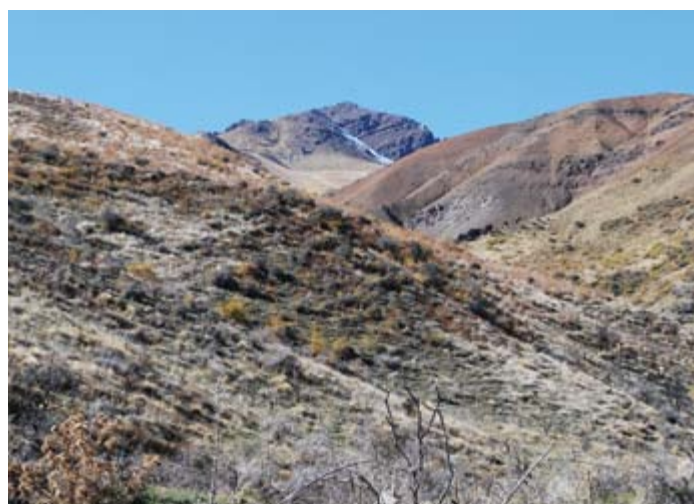
After generations of being bred to thrive in the local conditions, the Middlehurst sheep purchased with the property were of good size, constitution and fertility; vital in this challenging environment. However, their wool was too strong to meet the modern market and lacked style.

Using Australian genetics, the Macdonalds have developed ewes that cut 6.5–6.8kg/head of 19 micron wool (17.5 microns for hoggets); a considerable improvement on the 5.4kg/head of 23 micron wool at takeover. The payback has been access to lucrative contracts and the establishment of a non-registered stud flock selling rams both in New Zealand and overseas.

As dual purpose animals, the Middlehurst merinos grow large and genetically lean meat lambs, finished to an average 20kg carcass at Cheviot on time to catch early market premiums.

RABBITS RISK BARING FRAGILE SOILS

Retaining pasture cover is essential for soil conservation, which requires keeping a lid on rabbit numbers. Drought and over-grazing could further expose soils and tip the balance on this vulnerable property. Aerial poisoning over the last two winters and employing a part-time rabbitier has been essential to maintaining progress that's been made.



Middlehurst front country in May 2009, at the end of a dry autumn.