Greenhouse Gas Emission Reduction Case Study
Kinross
Manawatū Sheep, Beef and Deer Farm

Overview

This sheep, beef and deer farm, owned by Tony and Lynda Gray, is situated in the upper reaches of the Pohangina Valley, in the Manawatu. It consists of 411.8 hectares total, of which 265 hectares is effective. The farm runs a mix of sheep (38%), beef (22%) and deer (30%). All are breeding flocks/herds, with the sheep and cattle progeny generally finished on-farm, and weaner/hinds/stags sold at weaning. The farm achieves high levels of reproductive performance, with the 2022/23 season showing 161% lambing, 90% calving, and 96% fawning.

Over the last few years stock numbers have changed slightly, with sheep and deer numbers reducing, while cattle have increased. All stock numbers have been reduced in 2023 compared with 2022. In addition to this, the farm has a total of 19 hectares planted in ETS forestry; 6 ha in douglas fir, 4 ha in poplars (planted for erosion control), and 6 ha of regenerating native forest. Of the remaining non-pastoral area, 125 hectares is in QEII covenant.

At the same time, efforts have been made to reduce CO_2 emissions from energy use, across electricity and fuel usage on-farm. This will be improved further when a solar-powered pump is installed to drive the stock water reticulation system.

Overall, total GHG emissions have been reduced by 2% across the farm from 2020 levels, rising to 2.4% reduction when offsetting from forestry is incorporated. The reduction in stock numbers from 2022 to 2023, results in a 3.4 % reduction in total CO_2e emissions, or 4.2% net when forestry offsetting is included.

Table 1: Kinross Partnership Physical Parameters

	2020	2021	2022	2023
Effective Area (ha)	265	265	265	265
Breeding Ewes	978	904	939	900
Breeding Cows	38	45	46	48
Breeding Hinds	289	274	290	260
Total Sheep	1,267	1,216	1,189	1,154
Total Cattle	114	127	127	125
Total Deer	402	402	418	372

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What changes have been made?

The key farm system change has been the concentration on improving farm efficiency, particularly reproductive performance. While this has had a relatively small impact in reducing GHG emissions, it greatly aided farm profitability. In the last year stock numbers have been reduced, which has had a greater impact in reducing GHG emissions.

Trees have also been planted in the landscape over the 20-years of tenure.

Why were the changes made?

There were different drivers for the different approaches used. Trees have been an important part of farming Kinross to protect the land. The farm sustained severe damage in the 2004 floods just as Tony and Lynda took ownership. They did not want to see damage like this again and so embarked on a significant planting programme.

A general philosophy of supporting the environment while remaining profitable has guided their farming career. This also encouraged a focus on appropriate stocking rates and driving individual animal performance while not over-using the land.

Land management decisions have been guided by their Sustainable Land Use Initiative (SLUI) Whole Farm Plan, funded by Horizons Regional Council.

Tony and Lynda completed the first of over 500 plans to-date.

GHG modelling method

The farm was modelled in OverseerFM for the 4 years being analysed.

What have been the impacts of the changes?

Figure 1 shows the total emissions from Kinross since 2020. Total emissions initially increased over the past few years and have since reduced with the reduction in capital stock numbers and other efficiency gains made on the farm.

Figure 1: Total GHG Emissions

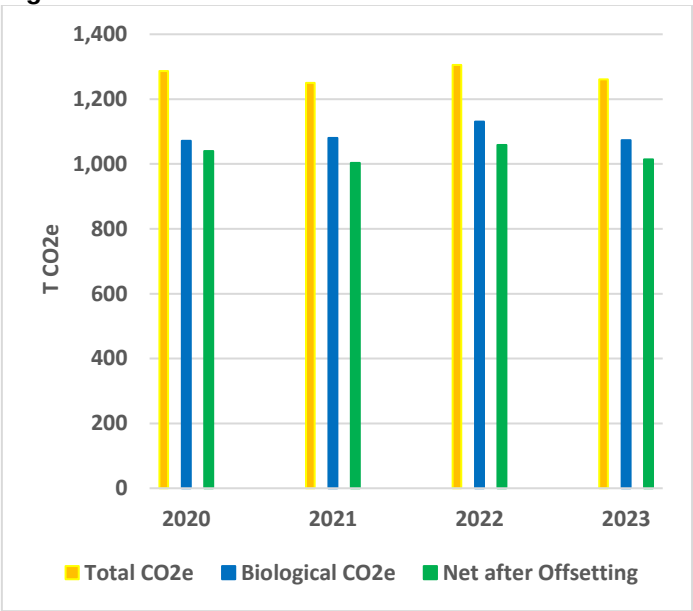

Table 2: Total GHG emissions by gas

	2020	2021	2022	2023	2023 vs 2020*	2023 vs 2022*
Methane (Total T CO_2e)	876	901	943	886	1%	-6%
Methane (Tonnes CH_4)	35	36	38	35	1%	-6%
Nitrous oxide (Total T CO_2e)	195	179	187	188	-4%	0%
Total Tonnes CO_2e**	1,286	1,250	1,305	1,261	-2%	-3%
Total Tonnes CO_2e/Eff ha	4.9	4.7	4.9	4.8	-2%	-3%

* % change **Includes CO_2 emissions

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For Tony and Lynda the changes have been an intrinsic part of the way they farm. Overall, they have worked hard to grow a business they are proud of that supports healthy, high performing animals, and a healthy environment. As their knowledge has increased, they have implemented different things to achieve positive outcomes.

As well as lowering emissions, the changes have improved water quality results (which are measured as part of the Pohangina Catchment Care Group) and have improved the stability of their hills.

Financial performance has been strong, setting Tony and Lynda up for retirement in the next few years. The strong financial performance has also meant they can have support half an extra labour unit on the farm.

What changes were made on Kinross that reduced emissions?

2023 compared to 2022

- Decreased pasture intake by 7.7% - decreased methane emissions.
- Decreased total stock units by 6.4% from 3,539 to 3,311 – decreased methane emissions.
- Decreased total sheep RSU by 9.8% - decreased methane emissions.

2023 compared to 2020

- Decreased N fertiliser by 36% - decreased nitrous oxide emissions.
- Decreased swede and kale crop areas by 3ha total – decreased nitrous oxide and methane emissions.
- Decreased imported fodder supplements by 38.2% and imported other supplements by 77.8% - decreased nitrous oxide emissions.

What process did they go through to make the changes?

The changes have been made incrementally and are still a work in progress. Building on good analysis, expertise, and tools such as their SLUI Plan has enabled the system to be adapted to meet their objectives and make the most of market opportunities when they arose. A lot of the work has been done by Tony and Lynda, so this has meant it has taken a bit longer than it should have in some cases but has been very rewarding. Where they've used contractors, this has been beneficial to get the job done!

Finances and time were the key limiting factor, but good planning, good communication and a solid history of financial performance enabled access to capital when required.

What other changes are planned?

A system change which will be implemented from 2024 onwards is to finish cattle earlier. Currently they are finishing Wagyu x Angus cattle at 24-30

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months of age at carcass weights of 360-400kg. The change is to finish them at a carcass weight around 300kg, at 18-20 months through a breed change. This change will reduce biological greenhouse gas emissions within the beef enterprise by 48% and for the whole farm by 1%.

There is more poplar planting to do for erosion control. These plantings will also be entered into the ETS. Following Cyclone Gabrielle there is also a lot of repair work to happen.

What do they want their legacy for Kinross to be?

With Tony and Lynda nearing retirement they have been thinking about their legacy.

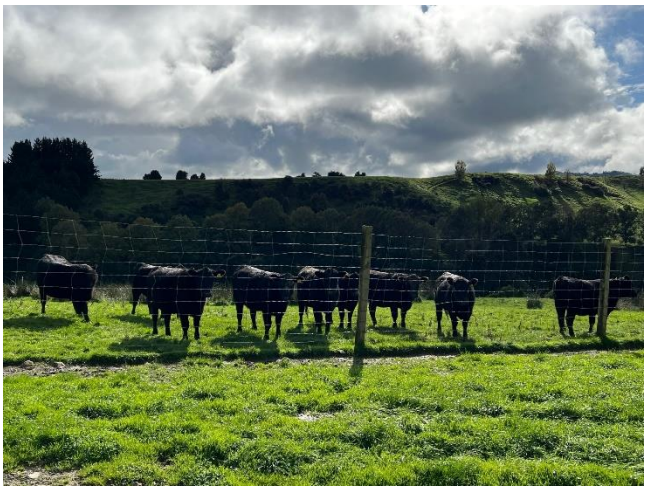
They hope that whoever is farming their land in future will value the work they have done to protect regenerating natives, see that they looked after the land and that the farm can still maintain a healthy and productive system.

What are you doing to adapt to climate change?

- Ensuring that pastures are not over-grazed and that the farm is not over-stocked.
- Allowing buffer for dry years (in particular).
- Using data and information to make decisions early – for example, a few years ago, NIWA was predicting El Nino, so they planted more green-feed crops than usual and fortunately that got them through.
- Using shade, shelter and water to ensure stock are healthy and to maintain good utilisation and quality of feed.
- Retiring areas of land to native so that inputs are not wasted.

What advice do they have for other farmers?

- Looking after the environment can be daunting and a lot of farmers put it into the ‘too-hard basket’. It is important to break down the challenge into small pieces. You don’t need to do it all at once, start small, get it working then work on the next little bit.
- It is important to enjoy what you do.
- Attitude is everything – seeing how things could work and how a challenge could be turned into an opportunity makes a big difference to doing something about it.
- Use good people, good information and stay informed. There are lots of people and tools that can help you make good decisions.



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