Greenhouse Gas Emission Reduction Case Study
Anewa
Wairoa sheep, beef and forestry

Overview

Anewa is an Ahuwhenua Trust, returned to its owners in 1989. The land is vested in 6 trustees who make all decisions on behalf of the over 5,000 beneficiaries. They have appointed Hilton Collier as their Supervisor and he has delegated authority from the trustees. Anewa is a hill country property inland and northwest of Wairoa. The farm consists of 1,942 hectares in total, of which 960ha are in pasture, 18 hectares in a pine forest, with the remainder (964 ha) in native bush. Approximately 27% of the property is steep to very steep hill country.

The property runs sheep and beef, essentially a breeding operation which until recently has been selling the majority of animals store.

Table 1 shows the capital stock numbers and overall stocking rate for the farm in recent years and the planned future state (as the farm undertakes development).

Table 1: Anewa stock numbers and rate since 2019 including planned future state.

	Area in Pasture (ha)	Breeding Ewes	Breeding Cows	SU/ha
2019	960	3,886	294	9.0
2020	960	4,150	378	9.4
2021	960	4,354	375	10.3
2022	960	2,800	250	9.8
2023	960	2,800	250	7.6
Future	1,100	3,210	286	7.5

Total biological greenhouse gas emissions across the whole farm have decreased by 16% since 2019, and 26% since the peak in 2021.

What changes have been made?

As can be seen in Table 1, stock numbers peaked in 2021. Since then, the owners have adopted a policy of reduced capital stock, improved productivity, and endeavouring to sell animals prime rather than store. Future plans also include developing further semi-developed land into pasture. While this will increase stock numbers, overall stocking rate per hectare will be held at present levels. They also intend to improve areas of poor pasture species into more productive species.

At the end of 2021, the trustees retired an area of 320 hectares of regenerating native bush, planting up some areas within this. 246 hectares of this area has been entered into the Emissions Trading Scheme (ETS) to earn carbon credits. Prior to this, the trustees had protected reserves of 595 hectares and formally protected 295 hectares as a Māori Reservation.

NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre

AGFIRST

Greenhouse Gas Emission Reduction Case Study
Anewa
Wairoa sheep, beef and forestry

In addition to the stock changes, the team at Anewa have also been undertaking a significant amount of fencing including fencing waterways and additional sub-division fencing. This supports improvements in animal productivity and has also meant that inputs (such as fertiliser) are used more effectively.

Why were the changes made?

The farm was not performing (financially) to the level it should have been. As well as profitability the trustees wanted to reduce their environmental impacts and enhance the land (and waterways) - they wanted to make sure they were sequestering more GHG than they were creating although at that stage they were simply focussed on the ETS eligible sequestration.

Two trustees lead a work programme to better preserve and enhance ngahere (native vegetation). They are also exploring the opportunity this might create for Rongoā (Māori medicine). Another trustee has lead the work on optimised land use and was agnostic about what that use could be.

These ideas, combined with a team willing to explore and analyse options, and increasing awareness of a need to change for financial and environmental sustainability drove the changes.

GHG modelling method

The farm was modelled in Farmax for the 6 years being analysed.

What have been the impacts of the changes?

Table 2: Gross biological greenhouse gas emissions (Tonnes)

	CH4 TCO_2e/ha	N2O TCO_2e/ha	Total T CO_2e/ha	Total T CO_2e
2019	2.54	0.57	3.11	2,986
2020	2.66	0.60	3.26	3,130
2021	2.91	0.65	3.56	3,418
2022	2.75	0.62	3.37	3,235
2023	2.14	0.48	2.62	2,515
Future	2.11	0.47	2.58	2,838

Figure 1: Gross biological greenhouse gas emissions (Tonnes CO_2e)

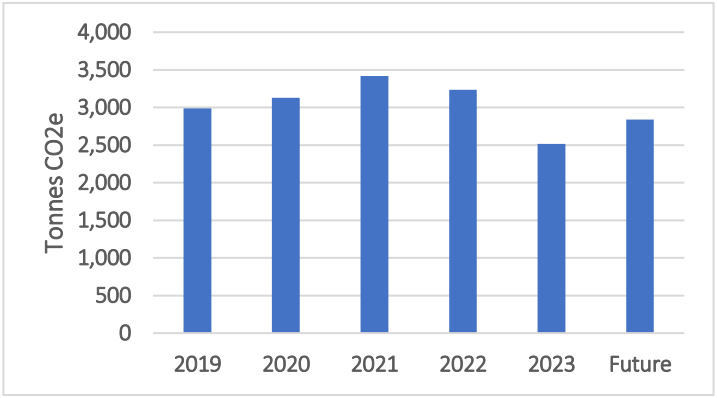


Table 2 and Figure 1 show an increase in total gross GHG emissions as stock numbers increased from 2019 through to 2021, and a decrease since. The "Future" scenario involving a greater area of pasture and more stock, while having a similar per hectare GHG emission level, has greater total emissions.

Which is where the regenerating native bush area comes into play, whereby carbon credits from this area can be used to offset the farm emissions. This is shown below, where it is assumed the forest is at

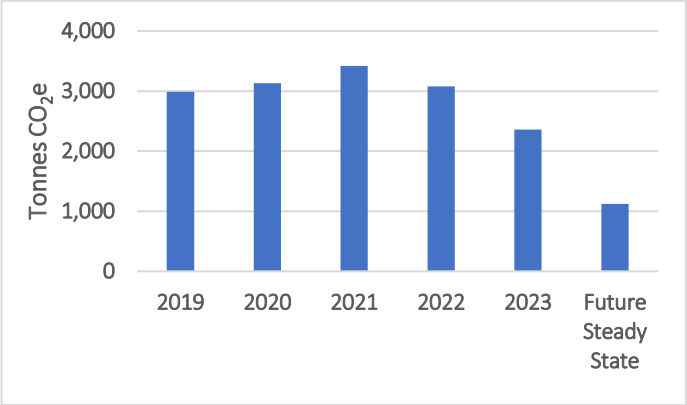
NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre

AGFIRST

Greenhouse Gas Emission Reduction Case Study
Anewa
Wairoa sheep, beef and forestry

a steady state in relation to sequestering carbon credits.

Figure 2: Net GHG Emissions (T CO2e)



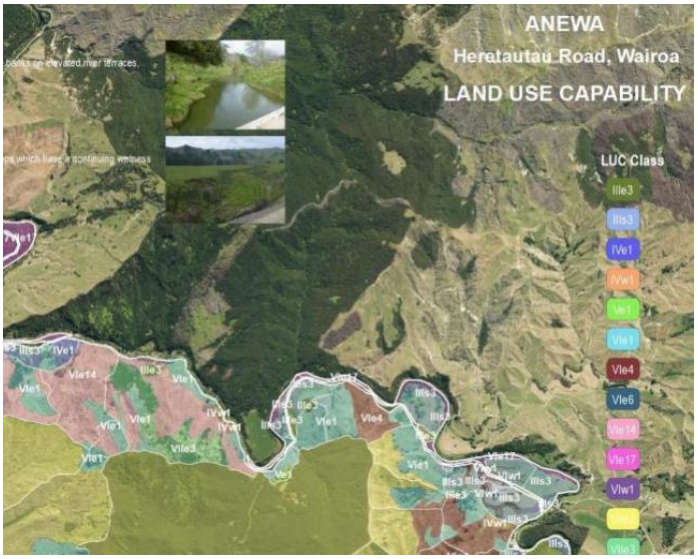
By using these credits, the farm can readily develop the extra land into production, while still reducing total net GHG emissions. The farm has other areas of regenerating native bush which would be eligible for ETS registration, thereby generating further credits, and reducing net emissions even further. Note the above figure illustrates the issue on a simple “tonnes” basis – under the proposed He Waka Eke Noa pricing mechanism, the offsetting would be done on a monetary basis.

The changes have also led to improved financial performance, with more gains likely as the changes are bedded into the system.

What process did they go through to make the changes?

Once the trustees agreed that change was needed, the supervisor analysed the numbers and identified the reduction in capital stock numbers that was needed. Excess stock were then sold.

A detailed farm plan (with farm-scale soil and Land Use Capability mapping) was utilised to help identify the best land for retirement, and to identify areas that could perform better from a livestock perspective.



Funding was also obtained (through One Billion Trees) to help retire the native areas and Jobs for Nature to support the riparian retirement fencing project.

What challenges were faced in making the changes and how were they overcome?

There is a significant amount of misinformation and confused messaging out there. This meant that it was difficult to create a value proposition for the trustees and the farm team to understand the need for change. Having the support of key trustees to make changes really helped drive the change.

Another key challenge was in identifying and then articulating how you can achieve the right landuse from an operational perspective. The farm still has to be workable. For example, there was 15ha of good flats in the middle of a challenging part of the farm that was best suited to retirement from pastoral use. It was hard to let go when flat land is hard to come by in this environment.

By demonstrating the cost and complexity of fencing that area and accessing it to get the most from it, it

Greenhouse Gas Emission Reduction Case Study
Anewa
Wairoa sheep, beef and forestry

became clear that it didn't make sense to try and keep it in the production system.

If they were doing it again, they would probably look for more areas to plant in exotics to increase sequestration opportunities as long as this did not compromise water quality. They would also provide greater support to the farm team and engage them more in the process.

What other changes are planned?

Perhaps considered controversial, the changes being made will also allow for land to be brought back into production from regenerating scrub. The intent is to bring 60-80ha per year back into production ultimately ending up with around 1,100ha effective. However, a strong focus of this development will be to ensure the farm is sustainable and that the development does not compromise the land and water resource. The need for development needs to be balanced with emissions, other pressures such as managing water quality and financial returns.

The team at Anewa will also continue to work on improvements in productivity and per animal production. Utilising data to provide insights into management of animals throughout the calendar year will be a key part of this.

The lack of policy certainty around emissions pricing and recognition of sequestration is constraining how far they are willing to go with changes.

What advice do they have for other farmers?

There is a need to recognise that hill country farms are a diverse landscape and not treat them as a homogeneous sheep and beef farm. Take the time to identify different areas of land – the poorer performing areas, through to the best performing areas. Shifting the focus to profit/ha helps to identify where areas might be costing the business and could be taken out of pastoral production and used for sequestration. This also can lead to improved performance on the better areas and simplify management.

NEW ZEALAND
AGRICULTURAL GREENHOUSE GAS
Research Centre

AGFIRST