Final Report for the Stapledon Memorial Travel Trust Fellowship

A perspective on ‘regenerative’ livestock farming in New Zealand

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Client Ref: Stapledon Memorial Trust
Period of travel: 18 Jun 23 – 9 Jul 23
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Background

I am an ecologist looking to understand how the relationships between the social/ecological and economic values of land can best be optimised. I spent some time in my formative years in New Zealand working on organic and low input farms (late 80's/ early '90's) and during COVID dialled into some online webinars with New Zealand farmers looking at sowing and managing multi-species swards for livestock farming. This is a practice which is very much part of my UK research and becoming more mainstream in the UK, in livestock, mixed and arable systems. I am interested both in the ecological/production aspects of such practices but also very aware that social factors heavily influence both these and other agroecological farming practices. I was interested to understand more about New Zealand livestock production from a systems perspective encompassing the farmers, their 'advisors' (in the broadest sense) and the academic systems which provide research to support them. The Stapledon fellowship enabled me to spend 3 weeks in New Zealand following on from presenting at an EcoSummit conference in Australia. New Zealand.

Project Aims

My aims were to learn

- How is grassland managed in NZ?
- How are grassland management practices tied into wider system level thinking about food in NZ?
- How does grassland research work in NZ? What extension services are present in NZ and how do they link to research?

Methods

In my 3 weeks in NZ, I visited the two major agricultural universities – Massey University in Palmerston North in the North Island and the University of Canterbury at Lincoln in the South Island. I also visited Dairy NZ and Manaaki Whenua (LandCare) NZ in Lincoln and AgResearch in Palmerston North. I met up with and interviewed an independent advisor on regenerative approaches who was instrumental in making my fellowship successful as far as assisting with visits (John King https://www.succession.co.nz/) in Lincoln. I visited the University farms at both sites, I also visited 9 farms across the North and South Islands and joined two Exchange meetings of Quorum Sense (https://www.quorumsense.org.nz/) one in the North Island and one in the South Island. The 9 farms belonged to farmers that either John King had been involved with in some way, through various webinars and regenerative groups (8 farmers) or that had been recommended through an organic dairy farmer contact in the UK who would also broadly label himself as 'regenerative'(one farmer). They spanned a range of different areas of New Zealand (though mostly located in the South Island). In total, I made notes and conducted qualitative and semi-structured interviews with

20 individuals, having carried out an ethics review with the UKCEH ethics committee prior to departure. The individuals interviewed included 10 farmers, 9 whose farms I visited plus one neighbour, 4 members of Quorum Sense, all of whom farmed (2 full-time commercially and another 2 on small holdings), academics at Massey, Lincoln and Manaaki Whenua (3) and an ex-academic (ecologist) from Lincoln, a member of the national farming press (as recommended by John King), and John King himself..

As well as gathering some basic information about the farmer (age, gender, employment, education, length of tenure/ownership) in order to gauge their potential impact on innovations in farming practice, I then guided and prompted a semi-structured discussion along the following themes: farm work, farming methods, changes in ways of farming, motivations for change (push and pull factors), ways of learning for the farmer, benefits/difficulties of any changes made, produce and markets, thoughts on contemporary agriculture. I explored with farmers the agroecological farming practices which I have been working on in the UK such as (mob') grazing and herbal leys, as well as forms of organisation and learning/peer-learning.
From researchers, I gathered some basic information about what their area of research was, where they have been working and on what research areas. I particularly focused on;

a) Interdisciplinary approaches to research on farming
b) Farm management approaches
c) Farmer- peer learning
d) Farmer/researcher learning
e) Changes in farming/drivers of change and the role of research in farming futures

I have permission from participants to publish the findings from these interviews, should I find time to formally analyse and present them.

Findings

Unfortunately, I have insufficient time to properly analyse the interviews that I conducted and have been looking for options such as employing a student or colleague to do this with me. However, for the purposes of this report I am providing an overview (rather than an in-depth analysis) of my findings in the following areas:

Overarching impressions of New Zealand farmland in the light of historic visits (15 and 30 years previously)

As a result of a fiscal crisis in 1984, the NZ government removed all agricultural subsidies. In a case study for the Convention on Biodiversity[1] it was reported that adjustment in the agriculture sector took seven years, with the government supporting the farming sector through the transition with loan restructuring and social welfare payments. It was reported

[1] https://www.cbd.int/doc/case-studies/inc/cs-inc-newzealand-technical-en.pdf (accessed 20/12/2024)

that the support of farmers' organizations and consumer groups contributed greatly to reform success. I first visited NZ in 1989/90 which roughly coincided with the end of this adjustment period. My first visit was not solely farm focused and not as a researcher, but I worked on both conventional livestock and fruit farms as well as visiting some pioneer organic farms. On my recent visit, as on that initial visit, I noted large numbers and greater densities of stock on NZ farms than in the UK (see front page photo). The most marked changes I observed in both islands were considerable increases in the extents of vineyards (with very little apparent non-crop associated soil cover) and increases in the extents of irrigators on grassland in the Canterbury Plains, South Island (see picture below).

Also particularly notable were the extents of tall (>6m) managed shelterbelts of non-native coniferous tree species. Price (1993) describes the increasing prevalence of these shelterbelts in areas of NZ that are windy and exposed with shallow soils. They have

effectively replaced the gorse hedges which were originally planted by British settlers but proved inadequate to protect against the winds and problematic in terms of the ability of gorse to spread rapidly into fields. Originally 'hedges' were planted in NZ for both practical and aesthetic reasons, the latter being to recreate the British landscape. However, these shelterbelts are very much more utilitarian than UK hedges and as they are constituted of non-native species may provide limited benefit for native biodiversity.

Shelterbelts on the right, walls of solid non-native conifers

From a social landscape perspective, I can see a much greater attempt to integrate Māori culture, values and beliefs into modern NZ than was apparent on previous visits. Manaaki Whenua is working with landowners and communities to care for land, including agricultural land.

Key factors influencing New Zealand Farming

The sections above introduce several of the factors that have or have had a profound influence on New Zealand agriculture from the colonisation by the British in the mid-1800's to environmental conditions (shallow soils and windy conditions, particularly on the Canterbury plains) and agriculture's importance to the NZ economy.

Export market

The key feature that impacts on agriculture is New Zealand's distance to everywhere else and its small population. Agricultural exports are NZ's mainstay and currently include a large market for powdered milk products in China; the need to produce efficiently is key to maintaining the country's economy.

Non-native vegetation

Farming in New Zealand is entirely reliant on non-native flora and fauna. Whilst there is evidence of land clearance by the Māori people, their diets were largely reliant on wild fauna and flora and on imported root vegetables which initially came from Polynesia before imports came from Europe. New Zealand has no indigenous grazing mammals and its grass species are not suitable for agricultural production. Hence agricultural grasslands in NZ have been created from non-native (now naturalised and bred for production in local conditions) seed sources including European and African species. NZ farming is very

'young' compared to European farming which has occupied European landscapes for thousands of years.

Subsidies and scale

New Zealand farming is not underpinned by any subsidies as it is in Europe and other parts of the world like the US. This includes subsidies for the production of environmental goods which the UK is shifting towards whilst moving away from subsidised production. Last year the government decided not to implement a 'belch tax' to limit agricultural emissions from livestock farming. There is little apparent support for agroecological approaches.

Most farmers appear to farm at scale. NZ stats[2] reveal a reduction (15%) in the land area used for agriculture since 2002 and a 33% reduction in the number of farms indicating a consolidation of farmland under each farmers' management, particularly in the Canterbury area. There were 47,250 farms farming 13.2 million hectares (ha) of land in NZ in 2022. In the UK[3] in 2023, 209,000 farm holdings farmed 17 million ha of land.

Commonalities with UK farming

As well as utilising a very similar set of grassland species for feed, livestock farmers in New Zealand also focus on producing the same livestock, i.e. cattle and sheep, and producing the same products for export (dairy and meat). Most farmers in New Zealand are conventional with below 1% registered as organic (compared to ~3% in the UK). Whilst nitrogen fixing species (such as lucernes and clovers) and deep rooting herbs like chicory have, and are, being explored both in practice and in research, grasslands are more traditionally (like their UK counterparts), dominated by ryegrass and associated fertiliser management. Increasingly New Zealand farmers and agri-businesses are claiming the regenerative approach as their own – largely as a result of livestock being primarily grass (rather than grain) fed (see Fonterra's NZMP[4] website). In doing so, they are benefitting from loose definitions around the term 'regenerative' including a lack of attention to the impacts of fertiliser production and use on GHG emissions and on wider environmental pollution and the disbenefits of irrigating grassland.

As in the UK (with the Pasture Fed Livestock Association and Nature Friendly Farming), there are groups of farmers and individual farmers who are keen to farm in ways that are better for the environment and in the long term for their land and their profitability. Quorum Sense held two meetings in the weeks that I was in NZ. These are summarised in brief below (see Regenerative Farming in NZ).

Current issues for NZ farming

[2] https://www.stats.govt.nz/indicators/farm-numbers-and-farm-size-data-to-2022/ (accessed 20/12/2024)

[3] https://www.gov.uk/government/publications/farming-evidence-pack-a-high-level-overview-of-the-uk-agricultural-industry/farming-evidence-key-statistics-accessible-version#:~:text=The%20UK%20agriculture%20industry%20is,than%2020%20hectares%20in%20size. (accessed 20/12/2024)

[4] https://www.nzmp.com/global/en/sustainability/regenerative-agriculture.html?trk=test (accessed 20/12/2024)

Many of the issues currently facing NZ farming stem from factors listed above. NZ markets itself as a low carbon pastoral farming producer, but there are clear concerns with such a green marketing approach. The following are a limited set of key observations from my interviews and travels.

- The economic pressures to produce efficiently and at scale are significant. This has led to intensive management and serious pollution issues, particularly of water bodies in several areas. Irrigation of shallow gravel soils for dairy production in the Canterbury plains is a management system that appears totally unsuited to the area, resulting in significant environmental impacts (Foote et al. 2015). DairyNZ is tackling this issue, alongside the dairy industry through its work on Dairy Tomorrow[5], but increases in land going into dairy create a large ongoing challenge. Impacts of ruminants on global GHG emissions are also a key consideration in NZ, as elsewhere. The lack of system complexity, or potential for system complexity (in terms of plant, invertebrate and soil species associated with grassland farming) means that NZ systems have been primarily focused on ryegrass varieties that respond well to fertiliser, contributing to GHG in both its production and its use. Changes in the dairy industry from 100% pasture fed to around 20% of production now including supplementary winter feeding (associated with off-paddock structures) which has led to cattle waste going onto fields in the form of slurry[6] create the potential for greater impacts on GHG compared to the situation (without slurry) 20 years ago.
- Farms are often large with high stock numbers relative to UK farms) and are managed by few staff (often one farmer or a 2-person partnership) to maximise efficiency. This means that farmers may be quite isolated from one another.
- From an ecological perspective, unlike in the UK and Europe, there is a distinct separation between farmed land and native bush. This leaves little room for exchange between species occupying farmland and those not. To date there has been only a very small amount of work to create patches of native habitat within farmed landscapes either to provide habitat and connection for native species or more often to utilise the potential ecosystem services that those species may bring to an agricultural landscape (such as regulating water levels). Where marginal farmland has been withdrawn from farming it has often been forested with non-native pines (which have recently been subject to storm events and contributed to significant soil erosion from upland areas). Increasing attention to Māori cultural values of 'land care' may result in a shift towards more agroecological approaches.
- At a very practical level, there is no Capital Gains tax on land in NZ, this often results in highly intensive management to inflate the (productive) value of land prior to selling and this high value makes it very difficult for new entrants to farming to gain land.

[5] https://www.dairynz.co.nz/media/jp1dzgml/sustainable-dairying-annual-report-protecting-our-environment-2022-v141.pdf

[6] https://www.mpi.govt.nz/dmsdocument/46240-Refining-New-Zealands-GHG-Inventory-Methodology-Manure-Management

Sacrificial paddock – fenced winter crop adjacent

Regenerative farming in NZ

The term 'regenerative' farming is a contested one, with many individuals, businesses and policy initiatives adopting it for different ends. At the very least it represents a shift away from intensive farm management approaches towards more agroecological approaches which seek to improve farmland for both current and future production. In my fellowship I was seeking to discover more about such approaches in NZ. John King is an independent agricultural advisor who has worked with various government organisations in Australia and New Zealand to facilitate farmer groups around regen approaches, as well as working with individual farmers. John has pulled together a book representing farmers stories of trial and error[7]. After I contacted him, he helped me to reach and interview a number of farmers employing such practices across NZ.

Reading John's collected farmer stories and meeting up with individual farmers on their land it became clear that, as in the UK, farmers in NZ are finding themselves under pressure from compliance, in debt and are often no longer enjoying their roles. Some farmers (as in the UK) are choosing to take different pathways to production which they believe (and in some cases are already discovering) will lead them towards better margins on their production, as well as enhancing their lives and improving the land which they farm. I spoke to dairy, arable, sheep and beef farmers, all with very different farms and individual circumstances. Some had chosen to change farming approaches after visiting neighbouring farms, others had watched videos or met up with individuals championing regenerative approaches (including Australian Dr Christine Jones, American Gabe Brown or John King himself) or attended regenerative farmer gatherings (and field visits) run by Quorum Sense (see Methods). Some farmers had adopted system level approaches (e.g., organic farming) and others had taken up specific practices (e.g., no till, species rich leys, lucerne, paddock grazing). Most changes were relatively recent (last 5 years) but

[7] https://www.quorumsense.org.nz/network-notices/available-now-cucuriosity-farmers-discovering-what-works-book-by-john-king

some were much longer established. Examples of practices are shown below. Notable were the sizes of mob grazing flocks, the mob in Southland was around 4000 sheep, but the farmer told me of mobs of around 12,000 sheep on some farms.

Cattle grazing a herbal ley in the South Island (on marginal land at altitude)

IMG_0411.MOV

Mob grazing on the Canterbury plains

Mob grazing (4000 sheep) in Southland, South Island

I hope to be able to carry out an in-depth analysis of the interviews but my over-riding impression was that the common pattern across all farmers, regardless of which practices they employed, was a change in mindset leading to a step away from business-as-usual towards more independent (but supported) thinking about what they wanted from their businesses. From an ecological perspective, many of the farms were ostensibly little different to the wider farming landscape, although somewhat more diverse in pasture species. It was winter during my stay and therefore not an ideal time to assess ecological diversity. From a social perspective these farmers were enjoying discovering what works on their farms and learning together with others. These farmers are seeking a good work/life balance but the economic imperative to produce remains a strong one.

The research which I saw in Lincoln and Massey, is attempting to evidence novel pastures and pasture management (regenerative approaches) through detailed experimental studies on university farms.

Researcher involvement with Quorum Sense is helping farmers to think about measuring impacts of their changes but I found little evidence of formal research on regenerative farms themselves (rather than at experimental sites). An exception to this was Gwen Grelet at Manaaki Whenua who is looking at the environmental, social and cultural outcomes of regenerative approaches.

Quorum Sense has provided a forum for knowledge extension among farmers wanting to step away from more conventional practice. It provides opportunites for farmers to visit other farms and to hear about wider aspects of the farming system. The meetings I attended included presentations from farmers, university researchers (Lincoln and Massey) and health experts, focusing on farmer wellbeing. Lunch was provided at meetings to encourage farmers to attend and to mix with others, many farmers I spoke to reflected the importance of being with and learning from other farmers.

What we can learn from NZ and vice versa

My hypothesis (if I had specified one) for this visit would have been that the UK would have something to learn about farming regeneratively from NZ farmers. Instead, I found that the UK is currently following a very positive path towards change in livestock farming and NZ, due to its location, its land and its history faces a much tougher road towards achieving regenerative farming. The prevailing production agenda percolates through policy and research and whilst change may be coming through governments ensuring that Māori values are more prominent in political agendas and, for example, government departments (like DairyNZ) tackling production impacts on water quality, there are some tough hurdles to overcome. Unlike UK or European farmers there is no support for farming to deliver public goods and this impacts on their delivery from NZ systems when compared to those in the UK.

On a more positive note, as in the UK, farmers, farmer organisations and individual advisers and researchers working with them are bringing change, acknowledging the need for systems approaches which consider the environmental, economic and social aspects of farming and food.

References

Price, L. W. (1993). Hedges and Shelterbelts on the Canterbury Plains, New Zealand: Transformation of an Antipodean Landscape. *Annals of the Association of American Geographers*, *83*(1), 119–140. http://www.jstor.org/stable/2569418

Foote, K.J., Joy, M.K. & Death, R.G. New Zealand Dairy Farming: Milking Our Environment for All Its Worth. *Environmental Management* **56**, 709–720 (2015). https://doi.org/10.1007/s00267-015-0517-x

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