PUSH AND PULL FACTORS IN HILL COUNTRY FARMING CHANGE: THE CASE OF AOTEAORA NEW ZEALAND

Angela McFetridge[1] & Dr. Katherine Dixon[2]

Abstract:

In Aotearoa/New Zealand, more than half of sheep and beef farming occurs in hill country. To understand how beef and sheep farmers balance the tension of farming amidst multiple challenges and balance resilience, we conducted 53 interviews with hill country farmers. In this work, we consider factors that pull change and those that push change in these farming environments. Farmers discussed challenges posed by market pull agents, such as carbon farming, and push agents who through government influenced change, create expectations of behaviour change from farmers for the benefit of positive environmental outcomes. Farmers considered bearing the financial and non-financial costs within change, and to create change. Farmers also expressed second order challenges about attracting the next generation of hill country farming, including farm succession and farm employees.

Key words: hill country, farming, sustainable agriculture, qualitative interviews, changing landscapes

Introduction

Hill country landscapes (Lynn et al., 2009) are important to Aotearoa/New Zealand for cultural, primary production, tourism and recreational reasons (Cottrell 2016; Kerr, 2016). These landscapes make up more than half of Aotearoa New Zealand's agricultural land, supporting the majority of the country's sheep and beef farms (Fransen et al., 2022). These dynamic hill country landscapes present significant opportunities for a world class model of sustainable

agriculture whereby carbon capture, waterway management and conservation of native biodiversity are part of a financially productive farm business model. Hill country farming is an important contributor to the Aotearoa/New Zealand economy through global lamb and beef exports (Moot & Davison, 2021), recently evidenced during the Covid-19 pandemic and the increased demand for red meat (New Zealand Ministry for Primary Industries, 2022b).

However, during the last two decades the resilience of the hill country farming industry, isolated rural communities, and farmers themselves has been tested by a suite of systemic changes. Through market pull, there has been competition for land-use from dairy and forestry industries, and currently, the Aotearoa/New Zealand Emissions Trading Scheme (ETS) has incentivised the conversion of farm land to "carbon forest" (Price Waterhouse Coopers, 2020). These market forces have pulled and influenced rapid increases in hill country land prices which in turn put pressure on family farm succession (Nuthall & Old, 2017). Moreover, the direct and indirect impacts of climate change and a suite of new government regulations have created an environment aiming to push change into farming practices and farmer behaviour (Crofoot, 2016; Harrison, 2016; Kerr, 2016; Scrimgeour, 2016).

Industry leaders initiated the Hill Country Futures Research Programme (HCF) to shape the future of hill country farming. Spanning five years, this multidisciplinary initiative prioritized resilient forages and farmers, crucial for safeguarding New Zealand's hill country farms and rural communities. Led by Beef + Lamb New Zealand (B+LNZ), the programme received funding and support from B+LNZ, The New Zealand Ministry for Business, Innovation & Employment (MBIE), PGG Wrightson Seeds, and RAGT NZ. The paper focuses on a social component of the HCF and presents empirical findings derived from qualitative interview data.

Methods

To ensure a geographic spread of representative interviewees across Aotearoa/New Zealand, local network-connectors were used to select hill country farmers for interview. We conducted 53 interviews with 85 farmers across the North and South-island (Figure 1).

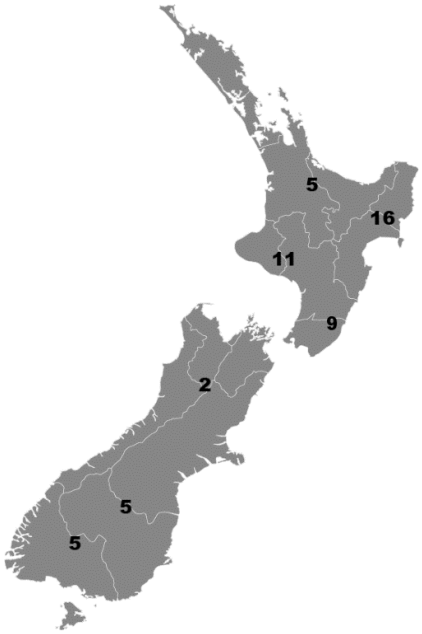

Figure 1. The areas where interviews were conducted across both islands of Aotearoa/New Zealand and number of interviews shown. Because of farms cross regional boundaries, the total number of interviews per region could not be confirmed and numbers shown are estimates of area.

Interviewees were between 18 to 79 (average 50) years old; 31% were women; and 7% self-identified as Māori (Table 1). Māori are Aotearoa/New Zealand's indigenous population.

Table 1. There were 53 interviews across both islands, attended by 85 farmers.

	Interviewees	Interviews
North island (N-INT000)	69	41
South island (S-INT000)	16	12
TOTAL	**85**	**53**

A semi-structured questionnaire to guided interviews and enable a conversational approach. The questions and prompts (in parentheses), relevant to the research presented here are:

- Tell us a bit about yourself and how you came to be on this farm?
- Describe your operation (size, land classes, stock types, management, staff etc).
- How do you see the future of hill country farming (in your region)? (Where are things heading?)

- What is your vision for hill country farming in 2030? (Best case and worst case?) (Drivers? Barriers/enablers?)

Interviews were conducted between July 2020 and March 2021. The average duration of the interviews was 90 minutes. Interviews took place at a location convenient to interviewees, such as their farm office or home. All interviews were recorded and transcribed, and interviewees were sent transcriptions for verification prior to analysis. This research was assessed and approved by the New Zealand Ethics Committee (NZEC19_47).

Analysis

Initial analysis was conducted by five researchers using the online software, Web Qualitative Data Analysis (WebQDA) (*About WebQDA*, 2022). We used an inductive research approach for qualitative data analysis, to allow for the authentic farmer voice and to identify thematic unity in the data.

The themes presented here relay the interviewees perspectives of changes to hill country farming in Aotearoa/New Zealand. Testimonies were analysed to identify topics under the two broad themes of 'hope/optimism for the future' and 'concerns for the future'.

Limitations of this research include an under-representation of Māori farmers in the sample. The findings presented here do not represent Te Ao Māori. Further research would seek greater participation by Māori, as both researchers and participants.

Findings and discussion

We identified that there were themes that could be organized into factors 2 key factors: market driven forces which are pulling change, and policy driven factors which pushing change through these landscapes. There were perspectives which supported change and concerns about the pace of change. Similarly, there were perspectives about the scale of change.

Farmers were asked to describe their farmland, producing descriptions of the hill country. For example,

> "We've got 7,500 acres in total […] divided into three different areas: about 1100 acres of that is paddocks; the remainder is steep […] rolling hill country [with]

> elevations between 600 and 950 metres for the hill country, and the pastures are between 300 and probably 500 metres." (S-INT020b).

Several farmers reflected on how farmers in the context of things have changed, are changing, or need to change. For instance, one farmer noted the impact of historic change in the landscape, explaining that their land is "hill country and it's highly erodible". "Probably looking back now you wouldn't have cleared what you've cleared, but we have, so now we have to remediate" (N-INT070b). Other changes to the land were the result of direct government push and market pull changes to farming practices:

> "We're going through a whole lot of environmental stuff at the moment with [what] we're retiring [and] fencing off waterways, utilising some of the rubbish areas for carbon, planting them out, which then in turn we'll develop them and change them over to a native base and then be able to collect the carbon up till then, which then in turn will fund the native base." (N-INT133).

Within both push and pull change, there were examples within each which revealed that one was not more favourable than the other. Each example highlighted that there are important contextual considerations.

Market push change.

Some changes were driven by a market push through governmental policies and regulations. Most farmers supported the principles, however, there was scepticism about policy details and practical implementation. For example, one farmer noted that the proposed regulations for planting and fencing around waterways to protect water quality was "a good idea", but also highlighted that diversity in the landscape required flexibility and should be "practical and [applied] in the right situations" (N-INT151). Another farmer said they "don't mind doing some planting" (S-INT060) but queried the absence of learning from historical second order problems, such as planting willow trees near waterways. Some farmers, acknowledge the requirement for change, though, through market push tactics, the change is slower: "we appreciate that we have an impact on the environment, and we do need to change…[but] we can't do it overnight – these are complex biological systems" (N-INT076). Farmers identified that changes within their farm gates raised consideration of second order impacts associated initial change. Other farmers embraced change as part of guardianship: "Successful farmers

have always been mindful of leaving the farm or leaving the land in a better state than what they found it. It's in your best interest to look after the place and improve it" (S-INT083).

Market pull change

Farmers were concerned about the ETS and its current revenue from carbon farming well more than sheep and beef farming profits. Through this association, farmers identified this threat to hill country farming and rural communities. Farmers referenced the rapid and large-scale transition of sheep and beef farming to carbon farming through exotic forestry, in many cases, *Pinus radiata*[1]. One farmer thought that planning to "save the world's climate by blanket planting farmland […] to store carbon is just bizarre. I think it's going to screw the country personally" (N-INT120). Another farmer feared the impact that forestry would have on the ability of future generations to be hill country farmers: "That's my fear for this future. My children will benefit from growing up here, but will their children, if they want that? Will that be an option for them, or will this farm have been converted into a [exotic] pine forest?" (N-INT163). One farmer objected to the pine trees, but not the idea of using forestry to store carbon, noting that "I wouldn't mind so much if some of it was planted in native trees, and reverted to native bush" (N-INT115). Similarly:

> "[The] worst-case scenario is that it's all in stinking bloody monoculture trees that end up being chopped down and dragged out with bulldozers, and put on a ship and sent to China, and made into pallets and used three times, and burnt. That's great for the world, isn't it?" (S-INT059), and:

> "It would be nice to keep it and keep the hill country as it is; I don't want to see it get all denuded […or] covered in plants that are not supposed to be there. To me, I think it's senseless that we're planting trees that don't belong in New Zealand, on the country like that. I'd love to see a climatic zone that if we put forestry in it grows in that area; it doesn't go in […other] areas; [and] it's not allowed in […some] areas." (S-INT020b)

Conversely, several farmers supported the concept of using fast-growing exotic species to reduce their carbon footprints if there were no farming disadvantages. For example, one farmer

[1] In Aotearoa/New Zealand, *Pinus radiata* is an exotic tree which is predominantly used for production forestry and carbon sequestration (NZFFA, 2024). In some parts of Aotearoa/New Zealand it is wilding conifers such as *Pinus radiata* are identified as a plant pest (Department of Conservation, 2024).

relayed that they could select the areas of their land that are low-yield, "plant them in pine trees, achieving what you need to do with your footprint and intensifying the good parts so as you're not losing any stock" (N-INT133). However, other farmers saw sense in the idea of using forestry on some areas of their land by:

> "planting a variety of exotic and native trees on marginal land [where] the amount of grazing you get off some of that stuff is pretty minimal anyway, so why not retire it and reduce that erosion; even if it's a bit of carbon farming. Like, why not jump on that bandwagon and get a bit of benefit out of it[?]" (N-INT151).

Farmer initiated change

Farmers recognised the cumulative impacts of anthropogenic change and how they might affect farming and people's way of life. Despite various agents initiating change from outside the farm gate, farmers were observant and showed care about environmental impacts inside their farm gates. For instance, one interviewee feared the impacts from nutrient runoff on their water supply: "I don't want to have a creek where I can't have a drink out of it. […] We like clean water, and we have that now. But I am pretty worried about that in the future." (S-INT014a). Another farmer feared the effects of changing climate on the frequency and extreme variations in seasons and the weather: "That's one thing with our weather, it is becoming more extreme. There's no question. It's hotter for longer, drier, wetter" (N-INT128).

Balancing second order impacts of change

Farmers' aspirational hopes for the future of land-use in hill country acknowledged the dependencies between farming practice and financial matters. For example:

> "I would love to see green farms, native bush, less weeds, [and] profitable farms as well, because as soon as you start making money, farmers can spend money to fence bush off, or can improve their rivers […] you can't borrow money to do that." (S-INT057)

One farmer explained that "one of our biggest things is having the capital to put into the work that's needed. We've got beautiful land, but it needs drainage. It all costs so much. We can never do what we want to do" (N-INT035a). As global ecological and climate change progresses, farmers said they felt under pressure to minimise their operation's impact, while rectifying previous generations' impact. Some farmers explained the costs of social expectation

as financial and psychological: “It feels like we’ve been out here farming for a hundred years and then all of a sudden, it’s on one generation to get things right. There’s a cost to that” (N-INT160). Also: “There’s a lot of pressure financially, environmentally, and their mental wellbeing is potentially quite poor at the moment” (S-INT083). In terms of future farm maintenance, one farmer commented: “[it] would be hard to do anything. Interest rates would be too high, so you wouldn’t be able to borrow any money” (S-INT014a).

The increase of land prices was significant for farmers. For some, the land costs influenced uncertainty for the future. For example: “I do think land values have gone too high […] a lot of people are probably borrowed up a bit too much. I wouldn’t be going and borrowing a lot of money now […] not knowing what I can do with that land” (S-INT020a). Some farmers explained that foreign land ownership and the perceived financial benefits of forestry in the ETS influences rising land prices: “Forestry and overseas investment […] for someone trying to have a crack at getting into farm ownership, those two things just make it pretty much impossible I think” (N-INT031b). The rising costs of land and operations were affecting farm succession, creating difficulties for some families who want to keep the farm in the family. For example: “I think what might happen is the traditional owner operator might not exist, which would be a real shame. It would become more corporate farming” (S-INT083). Additionally:

> “Family farms, we’ve somehow got to pay out siblings. The farm has gone up ridiculously in value over the years to unsustainable levels. You can’t buy a farm and pay it off with the profits of the farm […] You cannot pass the debt on like we’ve been passed on.” (N-INT146a);

> “We would like farm succession to be able to move on, so it’s not just going to be corporates who get to farm in the future, because of the unsustainable land prices and future. It’s got to be realistic that we can put another generation of family farmers back into the farms, because that’s where the passion is…” (N-INT146).

Having financial pathways for new farmers to get a foot in the industry amidst rising costs of land and operations was seen as important:

> “I don’t think there will be so many opportunities like we’ve had. I think for young people that don’t have the ‘in’ with their parents owning a farm, I think it’s just going to be more and more corporate, which is unfortunate.” (N-INT162).

The need to have a degree of economic security to afford succession has also been identified in other countries (for example, Pilgeram & Amos, 2014).

Conclusions

In this research, the farmers themselves provided many of the conclusions. Achieving farmers' hopes for the future of hill country farming hinged on the interfacing between markets, environmental outcomes, and communities. In recognising "financial pressure is what drives a lot of the poor farming practices" (N-INT146a), one farmer wanted a "fair system" that "rewards those who have already done good work and penalises the ones who just keep pushing the boundary" (N-INT146a). In this research, we have seen market pull factors create change at pace and scale. Implementing market pull concepts to farmers are paid the true costs of producing food would enable environmental stewardship of hill country. One farmer explained:

> "I would say price is the main thing with our products; if we can get a good price it makes the whole thing much easier […] there's not a lot we can do about the climate. Price is the main thing; price of product. Then we can be good guardians of the land." (S-INT077)

Appropriate financial mechanisms to support farmers in making the changes they need to make to ensure resilient farming into the future have the potential to not only enable sustainable environmental decisions but may also aid continued family ownership of hill country farms and the longevity of rural communities. One such mechanism could be "removing barriers that landowners face in accessing funding and information" for private investment in biodiversity that also enhances carbon sequestration and climate resilience (New Zealand Minister of Climate Change, 2022). .

Farmers emphasized the importance of profit in hill country farming; "if you want to keep hill country farming going […it] has to be profitable" (S-INT020a). Farm profits were linked to the successful future of hill country farming and rising land prices For example, one farmer said: "we've certainly got to keep putting money in, pumping it in, because that's going to be the answer for a lot of things" (S-INT057).

> "To me, […my vision] would be improving the farm to the point where you can earn enough money, and obviously the prices are alright, and all that. You're earning enough money to then put the money into fencing and planting trees and

> shelters. The dream to me is a beautiful farm set up… troughs; rivers fenced off; riparian planting; hedges everywhere." (S-INT100)

Financial stability in hill country farming was a prerequisite for environmental sustainability, some went further by suggesting that a lack of funds leads to damaging practices. One farmer explained that "they always say that […] you've got to be black to be green; […if] you're not as financially productive as you want to be, it is tough to sort of go down that track" (S-INT077). This suggests there could be second order impacts on rural social and economic health. The importance of financial enablers in sustainable farming is not unique to Aotearoa/New Zealand, with farmers in the northern hemisphere also identifying it (for example, see Yeo, 2019).

Overall, farmers focused on the human aspects of farming. Whether it was about their local communities and public institutions, the reputations of farming, the ability for family-run farms to persist into the future, or the ability to continue to farm in the context of environmental and land-use change, people were at the centre of their ideal futures. Farmer responses to change depended on whether they felt a locus of control over the change or whether change happened to them. Much of the visceral reaction from the farmers we interviewed came from change that happened to them. Pride currencies, however, emerged when farmers owned their own change, with a higher locus of control.

We recommend that policies relating to forestry incentivised by carbon credits are compatible with the definition of nature-based solutions for climate mitigation. We feel that farmers would endorse this recommendation. They value the benefits of habitat restoration which can extend beyond climate change mitigation through the visible pride currencies of increasing indigenous biodiversity. For example, noticing increasing numbers of native birds and recovering native vegetation. Restoring habitats around existing waterways can improve water quality for the farming family, livestock, and others downstream, and can also provide some protection against landslips (Department of Conservation, 2020). This in turn increases the resilience of hill country farming in Aotearoa/New Zealand across multiple capitals.

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