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Are Biodiversity Credits an Opportunity for Sheep and Beef Farmers?

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Executive Summary

Biodiversity measurement for sheep and beef farmers in New Zealand must be affordable, relatable, and have relative ease of entry to market. This research explores the potential of biodiversity credits to incentivise sustainable practices in the agricultural sector.

There is a need for robust, farm-scale data to demonstrate how biodiversity delivers measurable ecosystem services and financial outcomes. It emphasises that accurate biodiversity measurement requires comprehensive monitoring of ecological indicators, often requiring specialised expertise and investment, which lead to high administrative costs.

However, to encourage farmer engagement, a key challenge is simplifying the measurement process while ensuring credibility and avoiding greenwashing. International comparisons show that overseas markets have developed various approaches to biodiversity crediting, with mixed results. Literature suggests that processor and government incentives can play a significant role, to recognise the effort of prior projects of landowners and encourage the uptake of new biodiversity development.

The New Zealand agricultural sector has historically prioritised production over protection, often driven by financial factors. New Zealand has a unique opportunity to commercialise its biodiversity, given that a lot of established residual biodiverse land is marginal for traditional pastoral farming. The existing carbon market and Emissions Trading Scheme (ETS) is considered more mature than the emerging biodiversity credit market and learnings can be taken and applied, including better carbon sequestration data for native vegetation to encourage farmers to choose native species over exotic monocultures.

Farmer surveys reveal a strong interest in biodiversity credits system, with 83% surveyed seeing value and opportunity. Landowners are motivated by freshwater and ecological improvements and perceive regulations as a major challenge. Many farmers have planted natives, often self-funding these projects, showing a true altruistic stewardship ethic. Volatile livestock markets, unclear financial incentives, and operational costs are key concerns and a combination of carbon and biodiversity credits is seen as alternative sustainable income source.

The report identifies several recommendations to promote the adoption of biodiversity credits on farm

- Updating of Ministry for Primary Industries (MPI) carbon sequestration tables to reflect the true value of native sequestration, making native establishment more cost effective to establish
- Processors through their membership of NZFAI to establish low-entry-level uncertified biodiversity credits, and simplifying measurement for farmers, utilising the NZFAP accreditation system working with existing tools such as the Biodiversity Assessment Tool, helping farmers start the journey of recognising and measuring the value that biodiversity has on farm from both and economic and environmental standpoint.
- The government needs to set the rules and ensure the market runs efficiently, creating surety and stability of the market, setting a minimum dollar value for 'farm biodiversity' credits.
- Farmers need to adopt a forward-looking approach to land use, and with existing recommendations, native tree planting can be recognised and rewarded as a better choice over exotic monocultures.

Addressing these challenges will enable New Zealand to enhance and expand our existing biodiversity, promote farm resilience, access premium markets, and reward farmers as stewards of the land.

Introduction

New Zealand's sheep and beef farmers face increasing pressures to balance agricultural productivity with environmental sustainability. Too many times, farmers are associated with environmental degradation at the expense of profit. We know this isn't the case, and through my own travels, interactions and experiences, farmers are particularly mindful of the environment in which they work every day. But farmers also have a reputation for being modest and just getting on with the job, with a substantial amount of environmental management going in on farm already, often without any fanfare or fuss. It is only in the last decade, with the establishment of catchment groups and support from industry bodies and regional councils, has some of this good work been recognised and celebrated.

Farmers learn best from other farmers, and the approach of catchment groups has led to a large amount of education throughout communities, often bringing neighbours together, and providing communication and collaboration within neighbourhoods to help identify issues and provide solutions to others, that traditionally, individual farmers have faced on their own.

It can be safely assumed that over the last decade, millions of dollars have been spent throughout the country on environmental restoration work, often from farming business profits. But it continues to be unrewarded, although recognition has improved. Unfortunately, recognition (as it currently stands) create return on investment that goes into these projects. New Zealand farmers are some of the most environmentally friendly farmers in the world sowhat is stopping New Zealand farmers getting a financial reward for some of that sacrifice that has been made? This research paper sets out to explore the potential opportunities that biodiversity initiatives, particularly biodiversity credits, may offer to farmers. The report aims to understand how biodiversity is defined, how biodiversity credits can be measured and valued economically (and environmentally) for landowners, and how these credits might incentivize a shift towards even more sustainable practices, preservation of biodiversity on farm., and an additional income stream.

New Zealand has been slow off the mark in the biodiversity credits markets, it was only in 2025 that the government has launched a pilot programme to test out the market's capabilities.

Land use change has also been a hot topic over the last few years, with afforestation of whole farms going into pinus radiata, chasing the carbon credit market. These conversions, although physically not yet realised, will

cause dramatic consequences to rural communities, often gutting schools of children, as shepherds, farm managers, shearers and other support roles move to where livestock is farmed. If biodiversity was properly recognised and rewarded, we might find that farmers and investors are less likely to follow down the path of blanket carbon farming using exoxtic species.

But biodiversity is notoriously hard to measure. Unlike carbon credits that can instigate a relatively straight forward equation, biodiversity is made up of many intertwined processes and outcomes, many that potentially can't be quantified efficiently and effectively.

How can we measure biodiversity relatively simply to get farmer engagement? What do farmers think about biodiversity credits, do they see an opportunity? What about rural professionals who specialise in sustainability, what are their thoughts, and what solutions might they bring?

This report aims at answering some of these questions, to provide a greater understanding on what biodiversity credits are, the international landscape, consumer wants and needs, and to get an idea of what farmers are doing, and some of the competition native vegetation and biodiversity has on farm compared to some of the current 'cash cows' such as carbon credits.

Objectives

This report sets out to assesses biodiversity credits from a farmer's viewpoint, examining biodiversity potential to provide financial benefits for both past achievements and future investment in native vegetation over exotic monoculture crops. It also looks at whether biodiversity credits can be a sustainable, financially viable alternative to carbon-credit-based exotic plantations.

To ensure a balanced perspective, the report also includes commentary from rural professionals and sustainability experts on biodiversity credits and discuss a potential system implementation, identifying necessary steps for credible reporting and consumer transparency, and barriers that exist or might exist to make it not just efficient, but more importantly effective.

Limitations

Limitations of this report include the relative novelty of biodiversity credit trading in New Zealand, which results in a lack of transparent market information and established central platform and pricing tools. The complexity of measuring biodiversity outcomes, potential integrity issues, also restrict the analysis somewhat.

The report is bound by the availability of current literature and market data, meaning some findings and information may be subject to change as the sector evolves.

Literature Review

What is Biodiversity?

Biodiversity, or biological diversity in its long form, is best defined by the New Zealand Biodiversity Strategy (2020) as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems'

Definition of a Biodiversity Credit

A biodiversity credit is 'a certificate that represents a measured and evidence-based unit of positive biodiversity outcome that is durable and additional to what would have otherwise occurred'. (Biodiversity Credit Alliance, 2024)

International History and Approaches to Nature Markets

In the 1992 Earth Summit in Rio- the Convention of Biological Diversity (CBD) was agreed. This summit predated the first COP in Berlin in 1995 and could be considered the first collective step in acknowledging biodiversity and the impact the growing global population was having on its (lack of) development, and its protection.

Since then, the Kunming Montreal Global Biodiversity Framework (GBF) was agreed upon at COP 15 in December 2022 and has brought together a more global focus, with 196 countries signing up. The GBF has established four goals by 2050, including

1. Protect and restore
2. Prosper with nature
3. Share benefits fairly
4. Invest and collaborate,
   (Convention on Biological Diversity, 2024.)

These goals are predicated by COP 23 targets by 2030.(Convention of Biological Diversity, 2024)

By agreeing to the GBF, countries have agreed to setting national standards to address biodiversity loss and protection. The international community has started seeking innovative solutions to stop biodiversity loss and biodiversity credits systems have emerged as a tool to help promote conservation and restoration. New Zealand's own Te Mana o te Taiao Biodiversity Strategy tied in with this framework(MfE, 2023).

The Convention on Biological Diversity (CBD) has encouraged market-based mechanisms for private investment in biodiversity, with ongoing discussions about global standards for credit quality, additionality, and guarding against both social and environmental unintended consequences.

Different countries have adapted different frameworks, and two different approaches have emerged, offsetting and voluntary

Offsetting

United States of America

The USA was a signatory to COP 15 or the GBF, however it does have its own conservation banking system, which works like an offset programme. Landowners buy important natural areas and put a legal agreement in place to protect them in perpetuity (not unlike the QE2 Trust in New Zealand). Developers who need to make up for the environmental impact of their projects can buy credits from the 'land banks' to balance out what they're doing on another site. It's not a perfect system, but the money raised helps look after and improve the land in these banks.

The credits stand for real conservation work that has been done, and they are approved by the right agency. The idea is to make sure the credits only come from genuine, extra, and lasting conservation efforts.

Australia

The Australian Government is currently updating their Environmental Protection and Biodiversity Act as part of implementing the Nature Positive Plan, that was introduced in December 2022 that has also been adapted to fit in with the GBFs goals and targets.

In 2023 the Nature Repair Market Bill was introduced, showing transparency between investment and outcomes, through a certification programme, that would encourage positive biodiversity outcomes

Developers creating adverse biodiversity effect must purchase credits that matches their impact, supporting conservation elsewhere. Like other countries, credits are created by landholders who manage land to improve or maintain biodiversity values.

Australia's Biodiversity Offsets Scheme was pioneer in biodiversity offset markets, particularly at a state level (e.g. New South Wales's Biodiversity Offsets Scheme).

New South Wales Biodiversity Offsets Scheme

This scheme requires developers to offset impacts on biodiversity by purchasing credits created by landholders who conserve and improve biodiversity values. The system uses a detailed metric called the Biodiversity Assessment Method (BAM) a 176-page document that assesses both losses and gains.

The Biodiversity Conservation Trust oversees the transaction of biodiversity credits and supply agreements, working alongside the Department of Climate Change, Energy.

Voluntary Biodiversity Markets

United Kingdom

In response to the GBF, the United Kingdom has adapted a UK Biodiversity Framework and published a National Biodiversity Strategy and Action Plan (NBSAP), titled "Blueprint for Halting and Reversing Biodiversity Loss"

England's compulsory BNG (Biodiversity Net Gain)rules requires most new developments to deliver at least 10% net gain in biodiversity. A combination of offset and compliance, developers can buy off-site biodiversity units if they cannot achieve net gain on-site. Privately owned biodiversity credits banks (eg the Environment Bank Limited) transact these credits with a level of integrity and transparency with inhouse auditors.

Wallacea Trust (UK) (Outcomes Based)

The Wallacea Trust's method for measuring biodiversity work mirrors the way the Consumer Price Index (CPI) is measured globally. Wallacea Trust uses a system where data is collected and analysed in a structured way. For the CPI, its picking a basket of everyday items to check price changes, while for biodiversity, it's choosing certain habitats and species to keep an eye on. Both use set routines—e.g. regular surveys or standard ways to gather information so assessors collect consistent and accurate results over time. Their numbers are analysed to show clear measures and scores of biodiversity, simplifying analysis to spot changes and trends, whether it's in prices (in the CPIs case) or in biodiversity. These statistics make sense of all the data, help compare results over time, and guide decisions. The concept is that the system depends on reliable, repeatable ways to measure what matters in their fields.

The Wallacea Trust measures biodiversity by looking for a 1% improvement of biodiversity per hectare. They figure this out by checking the average

percentage change in different biodiversity indicators that match the project's conservation goals.

Latin America

Countries like Columbia has piloted voluntary biodiversity credits, focusing on restoration and conservation (namely avoid, minimise, restore, offset) in areas with high ecological value. These projects try to link with corporate social responsibility and international sustainability standards. These projects aim to target priority ecosystems and involve local communities in generating credits and therefore income

Table 3 gives a tabular view on international approaches to biodiversity schemes

Table 1 Biodiversity Credits and related Schemes(Pollination Report, 2023)

	EKOS – Sustainable Development Units (New Zealand)	Nature Repair Market Bill (Australia)	Biodiversity Net Gain (United Kingdom)	Wallacea Trust (United Kingdom, global)	ClimateTrade (Spain) and Terrasos (Colombia)	Greencollar (Australia)
Go live	July 2022	Still under development (subject to legislation and development statutory rules	November 2023	2021	2022	2022
Regulated	No	Yes	Yes	No	No	No, but may be regulated by the Nature Repair Market legislation
Purpose	Nature-positive scheme	Nature positive scheme (provides for environmental offsets that deliver a net gain)	Largely an offset scheme with nature-positive elements	Nature-positive scheme	Nature-positive scheme	Nature-positive scheme
Approach	• Primarily activities based • Activities over 1 year	• Projects based • subject to various permanence periods based on prescribed methods (minimum periods of 25 or 100 years) • Regulated methodologies for different contexts	• Ecosystem qualities • Sellers can stack 'credits' (eg, with nutrient credits) • Revenue from government credits used for habitat projects • Regulated metric	• Outcome based	• Activity based • Credits issued based on International Union for Conservation of Nature threat category	• Outcome based
Accountability	• Uses third-party auditors • Credit retirement protocols	• Independent auditing by an accredited greenhouse and energy auditor (based on the Bill)	• Local planning authorities responsible for monitoring delivery (can charge fees) and are encouraged to develop local Biodiversity Net Gain policies • Government will cover new cost pressures on local planning authorities	• Independent verification, approval of metrics, credit issuance and retirement by third-party organisation (eg, Plan Vivo) • Five yearly audits • Credit retirement protocols	• Uses third-party auditors • Credit retirement protocols	• Verified using 'Accounting for Nature' standard
Registration	• Uses specified registry	• National registry	• National registry	• Certified provider maintains a publicly available register	• Uses specified registry	• Publicly available register

New Zealand's perspective

New Zealand recently announced support for a biodiversity credits market to be implemented by announcing a pilot programme (Beehive.govt.nz, 2025.)

These pilot programmes range from single region, multi-regional and national levels and pull expertise from processors, iwi, quality assurance agencies, and government (Figure 1)

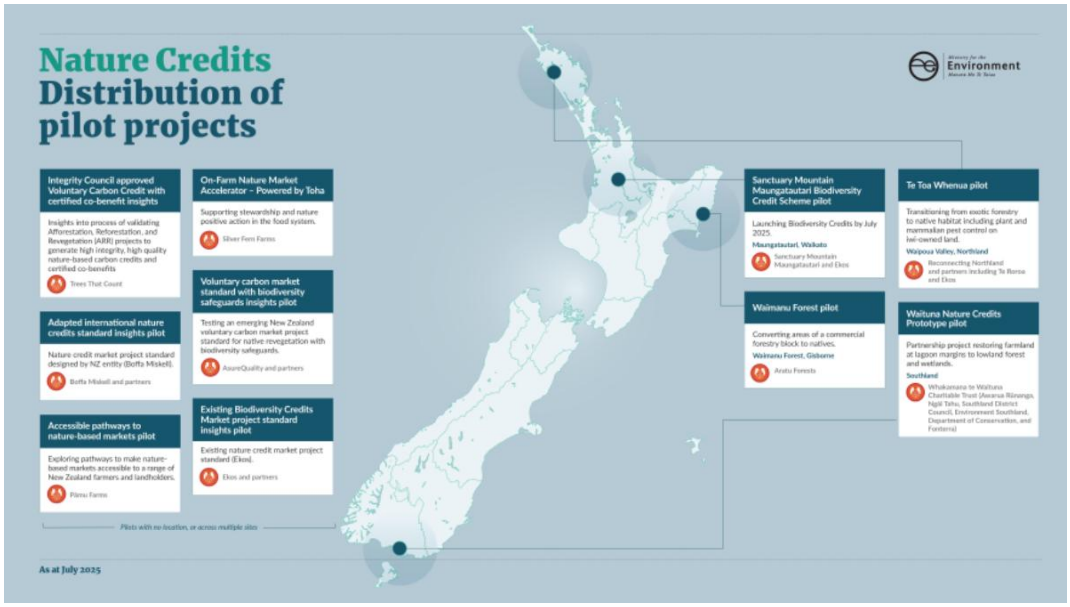

Figure 1 Distribution of pilot projects (Ministry for the Environment, 2025)

In New Zealand government's part in setting up a biodiversity credits scheme, some fundamental decisions need to be addressed. Walker et al (2025) highlighted two options: the government as administrator, setting the rules, ensuring the market runs efficiently. Alternatively, the government acts as an enabler, stepping back but providing enough support to let the market flourish without intervention. If the government puts its support behind the voluntary biodiversity market, this will increase stability and offer a level of credibility.(Walker et al., 2025)

The question remains - should the government be getting directly involved, or is this project better led by processors. Is this an opportunity for processing companies to recognise and reward the positive efforts that farmers are making on the ground, seizing the chance to turn good practice into tangible value. Or alternatively is it that without the government's input, the biodiversity credit market can't reach the level of trust and consistency it needs to become successful. *Figure 2* shows the current role of government and the structure that could support a voluntary carbon market.

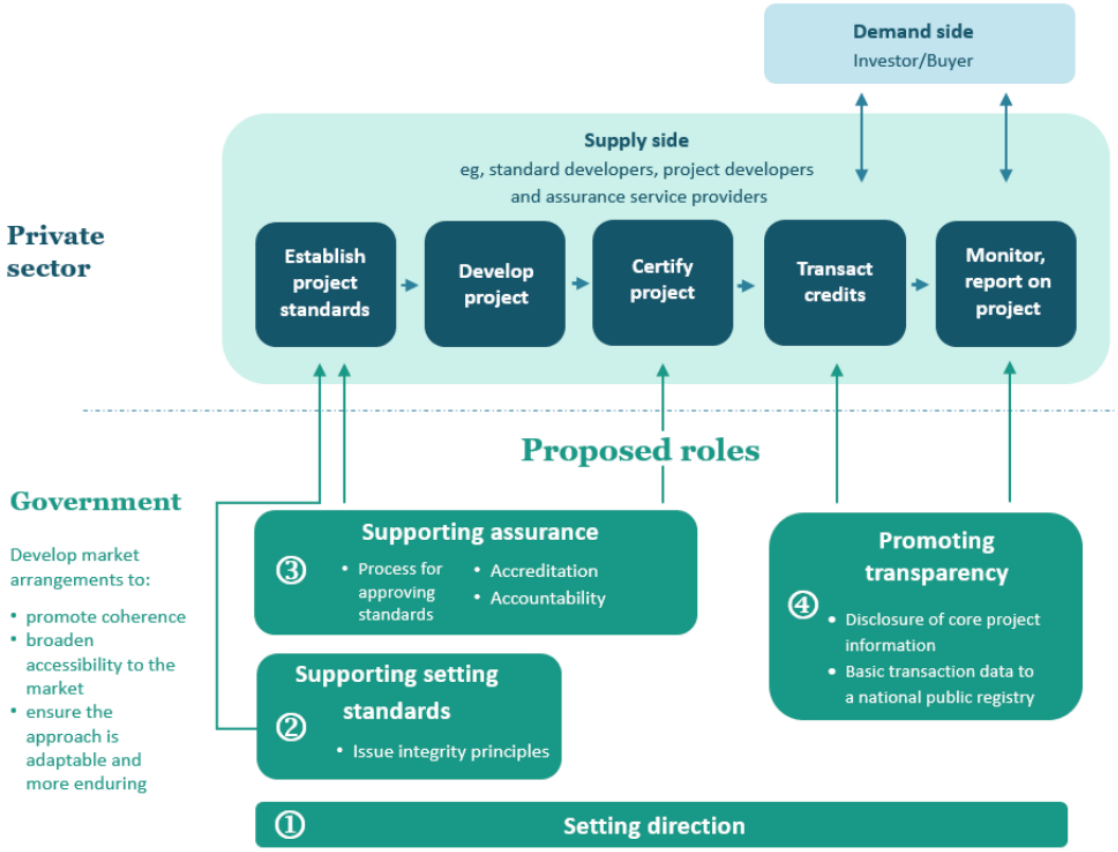

Figure 2 Government and private sector roles in setting up a biodiversity credits market (Best, 2024)

New Zealand Programmes

Ekos and Maungatautari Mountain Sanctuary

Sanctuary Mountain Maungatautari is an example of a well-managed, outcomes-based project that provides certain assessment, but has complex measurement metrics. 3363 ha of predator fenced native bush, the sanctuary offers biodiversity credits as administered by Ekos Biocredita programme. These biodiversity credits are used to offset the cost of maintenance and constant improvement of the unique environs.(Sanctuary Mountain, 2025), and the sanctuary is also utilised as a kiwi breeding ground and nursery. This is a fantastic bit of work that was established in 1912 and has taken over 100 years to develop.

Toha and Silver Fern Farms

Currently in its pilot phase with Silver Fern Farms, Toha offers a more farmer-focused credit system that blends actions and outcomes. The pilot uses Mahi (actions) tokens—digital credits representing hours worked, linked to New Zealand's living wage of around $26 per hour—and Toha tokens, which grant rights to data (The Toha Network, 2024).

Biodiversity in New Zealand's Sheep and Beef Sector

The relationship between agriculture and biodiversity started off as being mutually exclusive. New Zealand pastoral land has been developed at the expense of native biodiversity for over 100 years. Traditional agriculture has been a practice of high external cost and damage to the natural environment.(Fountain & Wratten, 2013) From New Zealand's population explosion in the 1880s, high demand was placed on the natural resources, and between 1890-1900, over one quarter of the indigenous forest was cleared for pastoral farming (Rhodes, 2001). Even up to the 1970s, there were financial incentives to clear indigenous forest to make way for livestock. Under the Land Development Encouragement scheme, loans were written off if the land was kept tree-free for five years, and the Livestock Incentive Scheme was introduced to encourage more stock on farms.(Nightingale, 1992). This all had a detrimental effect on the native biodiversity around the country, coupled with the use of fertilisers in establishing pasture, and chemicals for weed control.

Biodiversity is steadily being recognised for its vital importance as part of the overall system that exists within a sheep and beef farming system. Often referred to as 'ineffective' native vegetation, it is increasingly being recognised as an important part of the farming system, with the additional attributes such as protecting water quality, stimulating bird life, pollination and seed spread. Pest control, although challenging is undertaken at varying degrees of success throughout the country, usually through a regional or a national project. Recently more focus and investment has been put on catchment groups to understand and identify the importance of significant, biodiverse areas within their working environment.

Native vegetation under farm management

Nearly forty percent (39.7% or 10.6 million ha) of New Zealand's total land area is used for sheep and beef farming and supports one-quarter (24.5% or 2.8 million ha) of the total remaining woody native vegetation (Norton & Pannell 2018).

Data is limited to show how much of this remaining native woody vegetation has been excluded from stock grazing. It can be assumed all 180,000ha of QE2 land is fenced and covenanted land (QEII National Trust, 2018). This still places 2.62 million ha of native vegetation still under fluid management of beef sheep and farmers, and their farming system, style, beliefs and goals.

As farming practices have become more efficient, the pressure on the intertwined biodiversity continues to increase, but recognition of importance of biodiversity has also become more prevalent, e.g. National Policy Statements such as the Freshwater Policy – have provided awareness and helped accelerate protection of waterways, predominately on LUC 1-4 land. With riparian planting undertaken,this has helped increase the national stock of native vegetation. (See Figure 3)

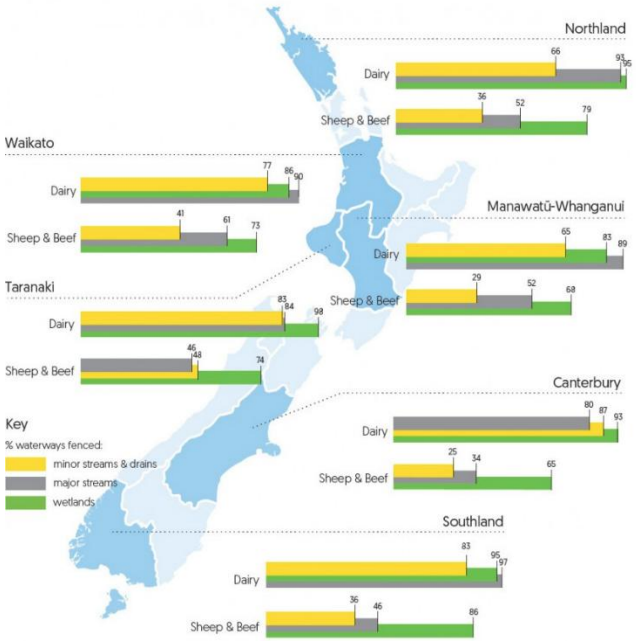

Figure 3 Extent of Waterways fenced in 6 Regions(Manaaki Whenua, 2021)

So if sheep and beef farming supports the greatest proportion of remaining woody native vegetation outside of public conservation land, the way in which private land generally (Hanley et al. 2012), and sheep and beef land use specifically, is managed has major implications for biodiversity conservation nationally. Farmers, as land managers, have a critical role to play (Thompson et al. 2015).

Over the 9125 commercial dry stock farms in New Zealand, (Beef + Lamb New Zealand, 2025) it could be assumed that at least half of this woody native vegetation is based in the North Island. This data shows a large opportunity for sheep and beef farmers to capitalise on this historically ineffective land, to showcase some of New Zealand's natural and unique flora and fauna, but also demonstrate, through active management and data collection, that as well as being some of the more carbon efficient farmers in the world, farmers are also actively protecting and enhancing biodiversity on the footprint that their business inhabits.

Farmers attitude and understanding towards biodiversity.

Biodiversity awareness has became more mainstream for farmers with the introduction of the National Policy Statement for Indigenous Forest. Drafted in 2022, the statement was introduced to protect Significant Natural Areas (SNA's) on private land. This was met with protest, with the argument that farmers were losing control of what to do on their land, by giving central government an overarching reach into what happens on farm (Driver, G, July 2021)

It is observed that many farmers are perceived as resistant to compliance-based management initiatives, particularly those introduced by central government. This resistance can sometimes result in outcomes that are not aligned with the interests of either party involved. While there is limited literature to support this, conversations with sheep and beef farmers suggests that the topic of compliance often creates robust conversation, these conversations don't often have positive connotations.

However, it is argued that domestic consumers see compliance as a greater way of creating transparency, and that compliance driven reporting is essential to provide assurances to consumers (Castka et al., 2023).

For farmers to discover an opportunity in biodiversity credits, farmers need to understand the value that biodiversity can bring on farm, and the motivation needs to move more from a compliance perspective to an environmental gain that can potentially translate to an economic benefit. There needs to be a greater recognition that areas of biodiversity can work as an advantage to farmers to improve the resilience of their farms (Norton et al., 2020), farmers tend not to participate in programmes that require high inputs but deliver a low return (Kay,2025).

Pest Control

Exclusion of grazing animals (farmed and feral) is identified as the single most effective thing that farmers can do to sustain and enhance the remnants of native woody vegetation on their properties (D. Norton & Pannell, 2018).

Which promotes the question, if exclusion fencing for farmed stock is undertake–can feral animal control be a measurement factor for biodiversity protection and enhancement, and how could this be easily quantified?

Pests also have a devastating effect on newly established native vegetation when it is at its most vulnerable. Can excluding native vegetation from farmed stock and a robust pest management plan be considered a realistic baseline for farmers to aim for? Initiatives such as Predator 2050, regional

government plans are maintaining feral pest control, but with the onset of blanket forestry plantations, pest populations will become more challenging to manage without biological or genetic viral control, for example how myxomatosis or RHVD has been used for rabbit population control. Possum and rat control in New Zealand is reliant heavily on toxin control such as 1080, cyanide and brodifacoum, whereas deer, goat and pig population control is more reliant on hunting activities and culling.

Indigenous forestry sequestration of carbon is currently undervalued

Further investigation into carbon sequestration puts native establishment as a much more effective carbon sequestrator than previously thought, and the carbon sequestration tables for native forest are based on established indigenous forest, compared to retired pasture being converted into new native. (*NIWA*, 2025)

It is understood that new native plantations have carbon sequestering ability well above what is reported in the Carbon look up tables (Kimberley & Bergen, 2022).

A key issue is whether accurate carbon measurements from native plants could motivate farmers to select natives over exotic tree species, with better data leading to higher expected carbon income and therefore biodiversity gains.

If carbon sequestration in indigenous forests is measured more accurately, it could increase carbon credits and provide additional funds to support native vegetation rather than monoculture exotics plantations, Measuring on a per farm basis, despite higher associated costs, may allow for more accurate adjustments reflecting actual carbon sequestration benefits (Tuahine, 2018).

The comparison between Tanes Tree Trust research data and MPI carbon tables is shown in tables 2 and 3 below.

Location	Age (years)	Stocking (stems/ha)	Height (m)	RCD* (cm)	CO_2* (t/ha)	MAI+ (t/ha/yr)
Canterbury	24	3086	8.8	19.7	596	24.8
Nelson	13	3265	6.5	16.7	337	25.9
Waikato	12	4444	6.6	16.5	457	38.1

Table 2 Carbon Sequestration estimates and other stand characteristics of mixed species native shrub and other small tree plantings.(Kimberley et al., 2014)

Carbon stock per hectare for Douglas fir, exotic softwoods, exotic hardwoods, and indigenous forest

(expressed as tonnes of carbon dioxide per hectare)

Age (years)	Douglas fir	Exotic softwoods	Exotic hardwoods	Indigenous forest
9	131	137	282	109
10	135	139	310	107
11	143	144	337	108
12	155	151	364	111

Table 3 Carbon Stock Look Up tables(Climate Change (Forestry) Regulations 2022 New Zealand Legislation, 2025.)

It remains unclear if the increased costs of measurement will outweigh the additional carbon sequestration, or at what point this becomes cost-effective.

Carbon and Biodiversity

Associating carbon credits to biodiversity has three possible main approaches; stacked, stapled, and bundled (Waterford et al., 2022)

Stacking using different types of environmental carbon and biodiversity credits from the same area, provided benefits of the biodiversity credit with the carbon credit are not double counted

Stapling involves separate credits for carbon and biodiversity from the same project, but each one is sold on its own, which lets landowners tap into different markets.

Bundling, uses carbon and biodiversity benefits rolled into a single credit, and sold as one package.

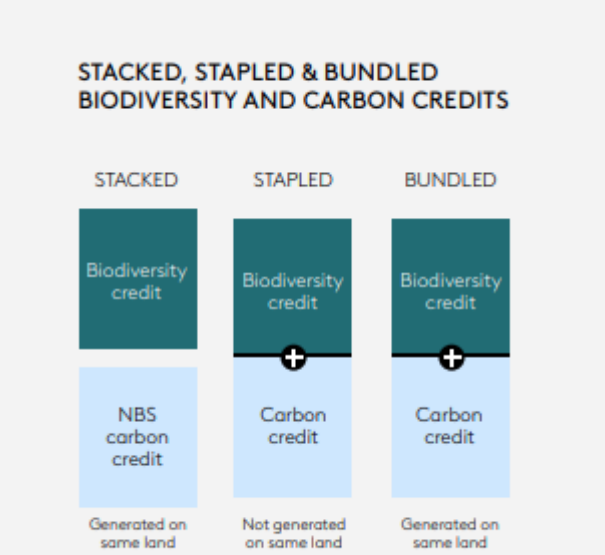

Figure 4 Stacked, stapled and bundled credits (Waterford et al., 2022)

Figure 4 gives a visual representation of stacking stapling and bundling biodiversity and carbon credits.

Recent studies show that these approaches can help landowners create more income, incentivising native planting, and continue to lead to better results for the environment. Challenges are still present, such as measurement parameters, that credits are genuinely making a difference and having

strong rules and markets in place. Even so, commentators see stacking, stapling, and bundling as good ways to make conservation financially sustainable, especially when consumers and policymakers are looking for environmental solutions that tick multiple boxes.(Waterford et al., 2022)

Competition for unproductive pastoral land

In recent years, 261,000ha of marginal pastoral land have been planted with *Pinus Radiata* (Orme, 2024). To encourage farmers to establish native vegetation instead of pines on low-yield areas better suited for retirement, attractive incentives are needed. Beef and Lamb benchmarking data (Appendix 3) compares sheep and beef profitability across different Waikato land types as an example, highlighting the competition between forestry and farming, especially given native vegetation's current lower carbon sequestration value when compared to exotic tree species.

Biodiversity measurement

Measuring biodiversity is challenging, because of the complex and expansive attributes that biodiversity encapsulates. Recent literature outlines several key themes regarding the development, implementation, and challenges of these schemes.

For example, Maseyk (2017) states that 'there is a need for more robust, farm-scale data on the extent to which biodiversity delivers measurable ecosystem services, particularly in relation to productivity and financial outcomes' (Maseyk et al., 2017).

Studies highlight the importance of robust auditing and certification processes to ensure credibility and avoid risks of greenwashing, and several unintended consequences. Manaaki Whenua have done extensive research on this, identifying eight difficult problems (Walker et al., 2025)

This poses the question that whether a robust (think expensive and time consuming) auditing processes might discourage sheep and beef farmers from participating, and at what level do farmers become discouraged based on the administrative barriers that might hinder participation.

Current examples of NZ biodiversity measurement being commoditised have been highlighted earlier, including the Ekos/ Maungatautari Mountain Sanctuary partnership and Toha piloting digital tokens with Silver Fern Farms. Maungatautari have employed the services of Ekos to measure, distribute and bank biodiversity credits, to cover the cost of management of a

particular area for a 12-month period. This currently sits at $12/ 100m^2, (Ekos, 2025). Silver Fern Farms are currently trailing work (Wallace, 2025) with Toha to generate digital tokens to acknowledge work both done, and upcoming, with the Mahi token 'tethered' to the current living wage (Toha,2025)

Again, to establish farmer interest, the steps to recognising biodiversity on land must be obtainable, both administratively and cost effectively, or alternative planting options such as *Pinus Radiata* look more attractive, both financially and administratively

The potential dollar value of a biodiversity credit still remains unclear, as a lack of a centralised index exists between the different classes of biodiversity credit, with the literature noting a lack of transparent market information and established pricing mechanisms. This uncertainty is increased by the relative novelty of a biodiversity credit trading in New Zealand compared to more established Emission Trading Scheme and the carbon market. How do you compare Sanctuary Mountains 100m^2 area, to Toha/Mahis hours' worth of work, and how can this be systemised or indexed against each other and relate this to a farming context in a relatable way.

Actions measurement versus outcomes measurement

Outcome-oriented biodiversity credits are based on the actual, measurable improvements in biodiversity (e.g., increased species counts, improved habitat quality, enhanced ecosystem services). This aligns with more robust and verifiable system and can be expensive.

Action-oriented approaches alternatively focus on the specific activities undertaken to improve biodiversity (e.g., planting trees, removing invasive species, fencing off areas). This is potentially cheaper to administer (Figure 5).

Figure 5 Addressing the challenges of measuring Biodiversity(Landcare Research, n.d.)

NZ Biodiversity Assessment Prototype tool

Landcare Research Biodiversity Assessment Tool is based on a high trust, actions-based model of farmers entering their own approaches to biodiversity rich areas and farming practices to manage and protect these areas (Landcare Research, 2015.)

International comparisons show that overseas markets have developed various approaches to biodiversity crediting, often with mixed results. Literature suggests that processor and government incentives can play a significant role in encouraging uptake, (Waterford et al., 2022), though again concerns remain about the administrative complexity and costs associated with establishing and managing these credits.

There is of course the ongoing debate about whether consumers and markets can absorb the additional costs associated with biodiversity credits. Overall, the literature underscores a market demand for biodiversity credits in theory but identifies a gap in practical information and established value frameworks, signalling a need for further research and policy development in this area. This is not within scope of this report.

Distinguishing between standards of biodiversity credit

Certified

Certified biodiversity credits are those that have been formally recognised and by a third-party organisation or a government-approved standard proving that the ecological outcomes claimed are verified, consistent, and transparent. This certification process usually involves high levels of assessment, ongoing monitoring, and ongoing reporting. This helps build trust among buyers, investors, and government. This certification level involves significant costs, and certified credits are typically favoured in regulated or large-scale markets. Ekos and Toha are good examples of certified credits.

Non-Certified

Non-Certified biodiversity credits lack formal validation and usually rely on self-assessment or less formal processes, making it more difficult to guarantee the credibility, comparability, and integrity of the environmental benefits. Noncertified credits are seen as suitable for informal or early-stage initiatives without established standards, such as when using the Landcare Biodiversity Assessment tool or NZFAP assessments using a farm management tool such as FarmIQ or MyEnviro

Future consumers' needs and wants.

Currently 65% of consumers make purchasing decisions to live a more sustainable life (Schneider, 2023).There is increased demand from consumers that the products they buy and consume have a responsible environmental footprint.

In what way can New Zealand leverage this opportunity? New Zealand red meat is worth $9.9b annually (MIA, 2024) and based on consumer demand, farmers and their processors need to be future focussed to make sure customer demands are being met. Despite a strong focus on carbon emissions in recent years, regulations may become stricter, and customers can easily change their buying habits. Trade agreements, while usually stable, are also subject to change over time. For example, the European Union Deforestation Regulation (EUDR) shows how New Zealand's international consumers possess significant regulatory influence.

Is there a way that processors can extract value from consumers by providing environmental data with product? Some processors are involved with pilot programmes for biodiversity credits and are well established as a zero-carbon organisation, such as Silver Fern Farms and the Toha network. Others are capitalising on the commodity driven consumer demand, with less concern around emissions profile and more on product to fill retailers' shelves.

At this stage in NZ, the biodiversity markets are voluntary, whereas carbon emissions have legal backing for select industries, with the looming threat of carbon emission reporting being allocated to all industries, depending on the government of the day and coalition partners involved

Farmer incentivisation to retire land to native vegetation

Combining the themes of farmers attitude and understanding towards biodiversity, and future consumers wants and needs, brings together an understanding that change in attitude is 1) unavoidable, but 2) creates an opportunity.

But what is the attitude of New Zealand dry stock farmers? Research suggests that farmers are intrinsically bound to be stewards of the land. 92% of farmers want to make their farms more environmentally sustainable (MPI, 2019) and that farmers understand the benefits, although not necessarily economic, of protecting their farming businesses to be more resilient.

Cost is perceived to be is an overriding factor in establishing native vegetation, especially with no real financial return evident at this stage – long term vision is needed to consider the opportunities that might arise in the future, especially in relation to consumer demands.

Intended Consequences - Opportunities Provided by Biodiversity Credits

Even if a biodiversity market doesn't produce direct economic benefits to the farming business in way of capital income it is important to acknowledge that the consequences of any effort towards maintaining and enhancing biodiversity on farm creates a more nature positive farming environment, that can only have positive implications. Other indirect economic benefits include reduction of erosion in erosion prone areas, stock shade and shelter, and improved water quality(D. Norton, 2021). This helps generate a more resilient farm that could potentially reduce cost at a later date, i.e. less susceptibility to flooding or slips.

Potential Issues

As highlighted earlier, Landcare Research have produced a policy brief that identifies eight problems in a biodiversity credit market that need awareness, with one of the more adverse effects of a biodiversity market is to accelerate harm to biodiversity, albeit the intention as for the opposite (Walker et al., 2025). These problems include, not attracting private investment, greenwashing by organisations, biodiversity not measured accurately, unintended outcome potential, lack of on the ground data, capacity for a voluntary market in NZ is poor, and administrative costs are high. (Walker et al., 2025).There is potential conflict between credibility of credits and cost of measuring, administration and management that they may ultimately create a cost, not a financial benefit.

NZFAP and its uptake in the sheep and beef sector

New Zealand's Farm Assurance Program (NZFAP) is run by NZ Farm Assurance Incorporated, which in turn is owned by processors that represent 95% of the food and fibre production. NZFAP, the 'Stage 1' of accreditation has now been adopted by over 8000 dry stock farmers throughout New Zealand.(NZFAI, 2025). Using statistics from Beef and Lamb NZ of 9125 commercial dry stock farms, it could safely assume that most sheep and beef farmers are NZFAP accredited. However, there is discrepancy between these statistics and the survey results, which will be discussed further on in this report.

Establishing metrics and the use of AI

Artificial Intelligence is becoming increasingly important in biodiversity monitoring. Tools like remote sensing, camera traps, and eDNA water sampling automate sample collection and analysis, while advances such as eco-acoustics (Figure 6) and other AI technologies are rapidly improving how we capture and monitor biodiversity.(*Harnessing the Power of Sound and AI to Track Global Biodiversity Framework (GBF) Targets – Rainforest Connection*, 2023)

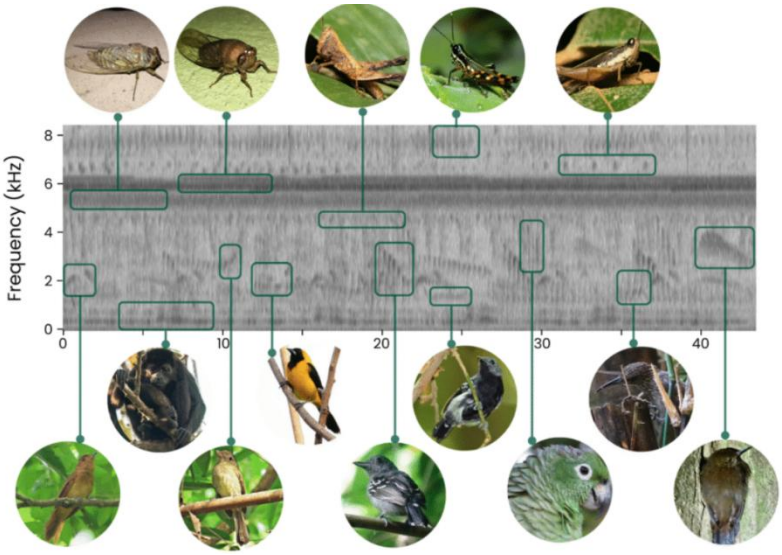

Figure 6 Ecoacoustic example for identification of biodiversity Rainforest connection ,2023)

This is a large area of research and beyond the scope of this report. However, it is important to recognise the impact that artificial intelligence will have on the monitoring and management of biodiversity and provide credibility and objectivity that might be present in human monitoring and assessment.

Knowledge Gaps and Research Needs/Questions raised

While the benefits of biodiversity are increasingly recognised within New Zealand's sheep and beef farming sectors, several knowledge gaps exist

There are ongoing challenges around understanding the socio-economic factors that influence the uptake of biodiversity-enhancing practices, such as costs, incentives, and the effectiveness of knowledge sharing among farmers.

The lack of long-term monitoring data also makes it difficult to assess how biodiversity 'levels' respond to changes and attitudes in farm management, what the market wants, and government of the day policies. Also quantifying the benefits of biodiversity from a New Zealand farming perspective, implementing effective management strategies, and fully integrating social and cultural perspectives remain further research that needs to be completed.

The mainstream adoption of biodiversity markets, like the carbon market and the ETS could be restricting farmer attitudes towards native vegetation versus plantation species such as Pinus Radiata, the perceived opportunities in biodiversity, differences in approaches based on land use capability, consumer preferences, the premium consumers are willing to pay, and the practical challenges of measuring biodiversity.

Why has New Zealand been so slow to adopt a biodiversity credit market compared to other countries? Has the country rested on its laurels as the most carbon efficient producers and overlooked the biodiversity crisis? This is the focus for the rest of this report….

Research Methods

To address the some of the gaps identified in the literature review, this report took two research methods. 1) a qualitative approach based around semi-structured interviews with rural professionals who had sustainability expertise, and 2) a survey across three catchment groups in the Waikato, establishing an understanding of farmers appetite, knowledge and focus on biodiversity and the opportunities that might present themselves,

The semi structured interviews provided important insights into the practical challenges and opportunities with the potential emerging biodiversity markets.

The data collected through these interviews and surveys was analysed using thematic analysis. This method involves systematically identifying, organising, and interpreting recurring patterns or themes within the data.

Thematic analysis enabled the ability to identify common viewpoints, challenges, and perceptions shared by both survey respondents and interviewees, and this helped identify any issues and opportunities that might not be obvious from quantitative surveys or literature reviewed. These interviews were also informative for additional information, which often enhanced the literature review.

By focusing on the themes that came through from the semi structed interviews, this approach ensured that the findings were genuine, lived experiences and practical concerns relevant to the biodiversity opportunity.

In addition to interview data, other data sources including Beef and Lamb economic surveys, MPI carbon return tables, and farmer surveys on land use change were used to gather information into opportunities identified by farmers. As farmers are usually engaged in day-to-day farmwork, their awareness sometimes is different to that of the rural professional network. This mixed-methods approach allowed for comparison between practical experiences and strategic ideas related to biodiversity credit adoption.

Results

Farmer Survey Results

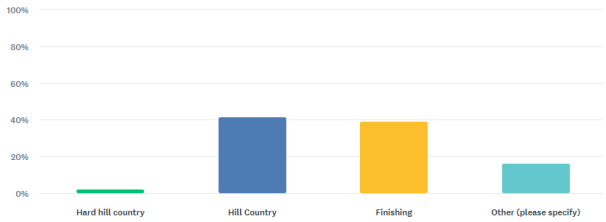

Figure 7 Survey results on farm type

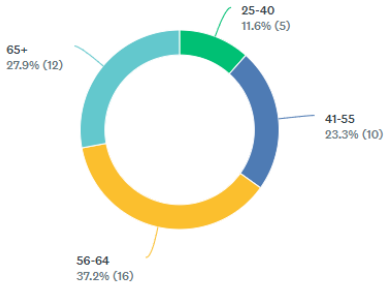

Figure 8 Survey results on the age group demographic of decision maker

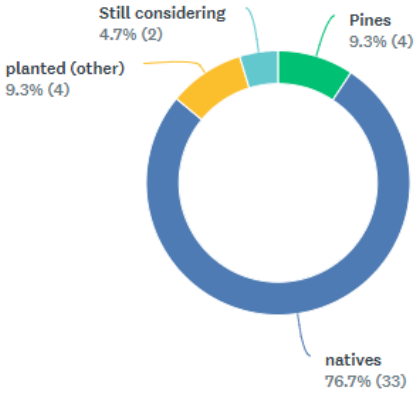

Figure 9 Planting activity over last 5 years

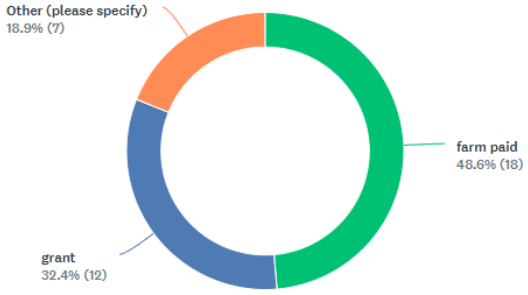

Figure 10 Financing for planting

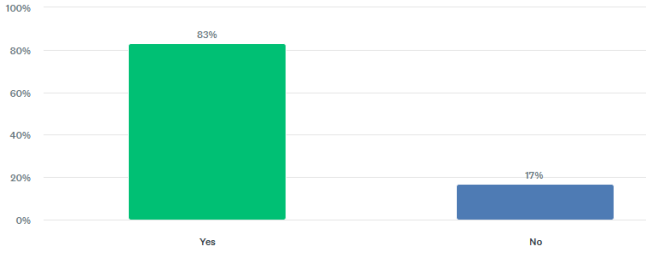

Figure 11 biodiversity opportunity on farm

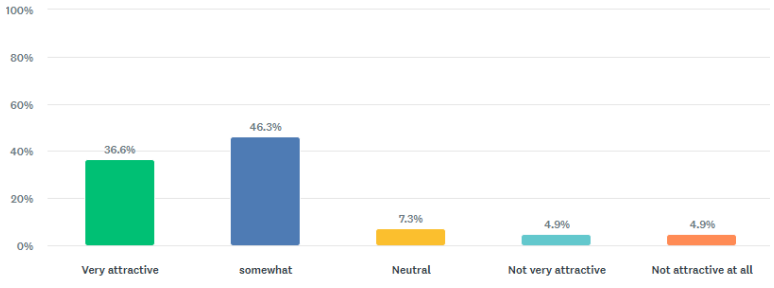

Figure 12
Attractiveness of biodiversity income

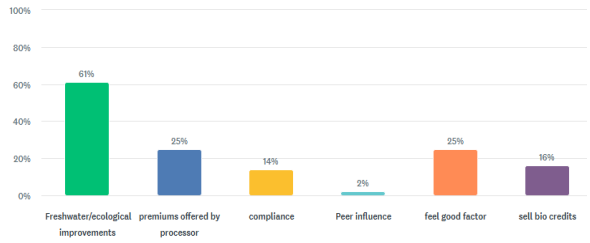

Figure 13 Incentives

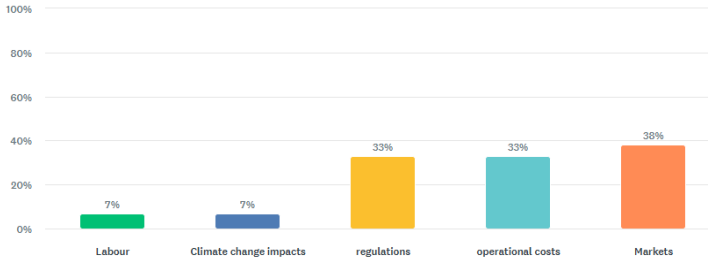

Figure 14 Challenges on farm

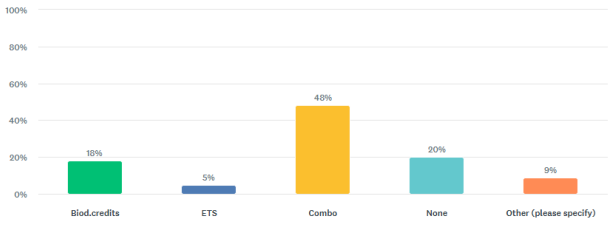

Figure 15 Which alternative income is preferable

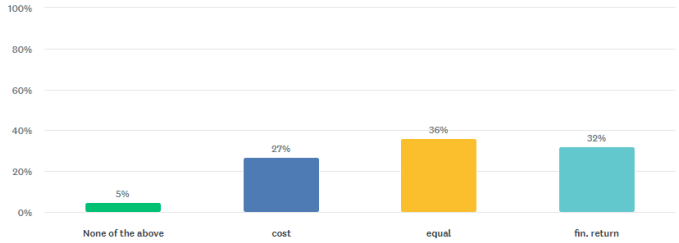

Figure 16 what is appetite for establishing natives/cost

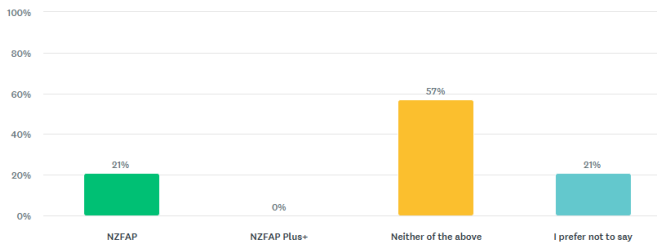

Figure 17 Accreditation status

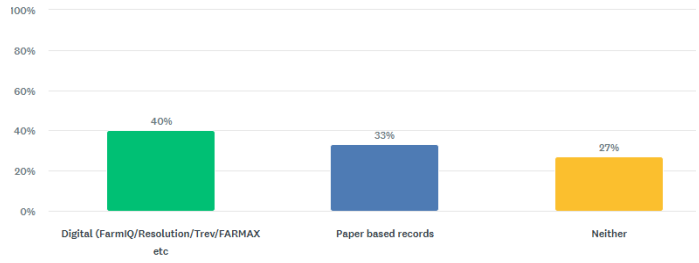

Figure 18 Farm management tools

Table 2 Summarisation of farmer survey results

Figure	Survey Topic	Key Results
5	Farm type	80% hill country and finishing blocks, 16% combination of the two
6	Demographic of decision maker	56-64 group 38%, 65+ group 30%
7	Planting activity over last 5 years	77% native plantings
8	Financing for planting	49% financed by farm business, 32% by grants from regional council
9	Biodiversity opportunity on farm	83% see opportunity for biodiversity credits
10	Attractiveness of biodiversity income	Very attractive and somewhat attractive: 73%
12	Incentives for biodiversity benefit	61% freshwater/ecological improvements, 35% premium on product, 16% selling biodiversity credits
13	Challenges	Volatile markets 38%, regulations and operational costs
14	Preferable alternative income	48% prefer combination of carbon credits and biodiversity credits (bundled)
15	Appetite for establishing natives	Cost exceeding financial return predictably low, costs equalling establishment or net financial return
16	Accreditation	57% not NZFAP or FAP+ accredited
17	Farm management app/tools	40% use digital management tool, 33% paper based records, 27% no management tools

Semi Formal interviews with Rural Professionals

Notes:

The main theme presented through the semi formal interviews was that measuring biodiversity is complex

Focus currently is on carbon through the Climate Response Act (Zero Carbon) Amendment

Organisations are expanding the story of food produced and are looking toward to the next competitive advantage

Lack of regulations or understanding hampers progress, hopefully being rectified with introduction of pilot programmes

Artificial intelligence can play a significant part in reducing monitoring and audit costs

Trust needs data and should be commoditised alongside the product, and that value is more than the product, it's also the information that associates it. 'Nature data is the new frontier'

Baseline measurements are lacking, so establishment of these baselines need to be measured. Then an opportunity arises to measure improvement compared to baselines.

Catchment groups and their ability to promote biodiversity as a byproduct of the work they are doing on the ground – measurement of plantings at a catchment scale instead of a farm scale could give the catchment greater creditability? The opportunity is there for catchment-based product, ie Taupo Lamb

Lack of centralised platform to trade credits – still in its infancy

There is an understanding that the cost of biodiversity can be passed onto some of the end consumers, but opportunity exists as an attachment to carbon credits more than a standalone option

Overwhelming support for a carbon biodiversity combo such as stacking

Thematic Analysis

- Measuring biodiversity is complex.
- Current focus is on carbon, as guided by the Climate Response Act (Zero Carbon) Amendment.

- Organisations are seeking to expand the story around food production and looking at future competitive advantages.
- A lack of regulation, centralisation or understanding presents challenges, though government incentives in pilot programmes may help address some these issues.
- Artificial intelligence has a role to play in administrative and monitoring costs
- Data builds trust. Data should be viewed as a commodity alongside products; information associated with products is seen as valuable (one comment was 'nature data is the new frontier').
- There is a lack of baseline measurements for biodiversity throughout the sheep and beef sector, highlighting a need for research, and in turn tracking relative to those baselines.
- Catchment groups are a great avenue for promoting biodiversity as a secondary outcome of their work; measuring plantings at the catchment rather than farm scale could help encourage engagement and further education.
- The distinction between actions and outcomes was discussed, and the complexities of outcomes compared to the simplicity of actions.
- The lack of a centralised platform for trading credits remains an issue, and the pilot programme is being observed with enthusiasm
- It is recognised that some biodiversity costs might be passed to end consumers, with greater potential as an attachment to carbon credits rather than as a standalone option, which gives support for combining carbon and biodiversity approaches, such as stacking and bundling.

Discussion

Farmer Survey Evaluation

Comparing contrasting and evaluating farmer responses in a survey has provided some valuable insights into farmer motivations, thought process and future thinking, with an overall theme that biodiversity credits could well be a financial opportunity, but there are additional benefits that farmers see apart from capitalising on native establishment protection and ongoing management, as well as some significant barriers.

Comparisons

Interest vs. Incentive: There's a strong interest in biodiversity credits (88% see an opportunity), but the attractiveness of them as a source of income is more varied (37% somewhat attractive). This suggests that while farmers recognize the potential, other factors beyond pure financial gain have garnered their interest. This highlights the perceived and real issue of biodiversity credits that was mirrored in the interview process; biodiversity credits sound like a great idea, but when investigated or thought about further, the implications of the complexities of measurement are realised, and this shows through these results.

Planting vs. Funding: The surveys show around 80% of farmers have planted natives, yet approximately 60% of these have self-funded projects, which shows that there is a greater awareness and motivation for farmers to make an impact on their local environment. This result however is interesting as it contradicts the question around at what level would the landowner retire unproductive land and establish native plants – it seems, unwittingly, that farmers have shown they have more stewardship values than they give themselves credit for – a majority seem to be funding their farm retirement areas out of the farming business already.

Sustainability & Credits: A combination of Biodiversity Credits and ETS (around 50%) as the strongest options suggest that the survey respondents are interested in methods that offer a way of generating income through environmental protection, that has both biodiversity and carbon emission impacts

Contrasts

Incentives vs. Challenges: Farmers are primarily motivated by "Freshwater/ecological improvement" (61%) when considering biodiversity, yet they see "Regulations" (31%) as their main challenge in traditional farming.

There is a potential conflict as regulations can both support and limit farmers' progress. While education has highlighted the benefits of land stewardship, farmers often view compliance as restrictive rather than supportive. Mistrust can become more common, partly due to poor communication between those administering the regulations and those required to comply. Regional Councils are working to improve engagement and education on this issue, while MPIs On Farm Support team has been the governments approach to breaking down some of these communication barriers in recent years.

Accreditation vs. Management tools: This can be seen by the survey response to NZFAP (50% said 'Neither of the Above') yet approximately 40% are currently using digital management tools. Farmers are seeing the advantage of using a farm management tool to create better efficiencies throughout the business, and as AI becomes more common and specialised, this is likely to increase (e.g. AI and the onset of wearables). However, the uptake of NZFAP was surprising; contrary to NZFAIs website data that over 8000 farms are currently accredited out of 9125 commercial farms nationally, the results of this survey do not reflect this. This statistic in itself is not part of the scope of the report to investigate, however, NZFAP can be seen as a great opportunity to capture biodiversity development and management on-farm and could be seen as a great tool going forward to help farmers start the journey of biodiversity reward and recognition.

It should also be noted that the increased uptake of a farm management tool can help reduce perceived barriers to NZFAP – in fact some of the farm management systems are designed around NZFAP requirements, for example FarmIQ has a dashboard dedicated to NZFAP accreditation, which creates streamlined data for both the farmer and auditor.

Common themes

High Awareness & Interest: Strong recognition of the opportunity and a willingness to engage in biodiversity initiatives.

Intrinsic Motivation: Drivers beyond pure profit (environmental benefits) create a more meaningful foundation for long-term commitment

Potential for Integration: most farmers see the value of combining biodiversity credits with existing programs like ETS, instead of the carbon market or biodiversity market operating in isolation from each other. This reflects the research in the literature review, as commentators are looking for environmental solutions that tick multiple boxes (Waterford et al. 2022)

Conflicting themes

Regulatory Hurdles: Regulations can be a large challenge and there are limited farmers accredited in NZFAP.

Unclear financial incentives: There is not a clear understanding of how biodiversity credits will create direct value – again mirroring what the interview process highlighted around complexity of biodiversity measurement

Operational Cost: There needs to be some clarity around financial and operational costs of biodiversity administration and auditing

Other points of interest

1) Among the minority of pine tree planters surveyed, most were aged 56-64, preferred premiums over biodiversity credits, and would only retire land if it was financially viable. This may reflect shifting views on monoculture plantations and some retaliation against the recent spate of whole farm afforestation, even with the limited financial incentives for native alternatives.
2) Farmers on finishing farms, which are typically more profitable per hectare, were more willing to cover the cost of native establishment costs themselves. Higher profits allow for greater reinvestment, increasing the likelihood of biodiversity initiatives. However, finishing farms often have fewer marginal areas suitable for retirement.
3) The 41-55 age group were more likely also to undertake a restoration project that might not be self-funding. Is this an indication of risk appetite for the younger age group, or a greater future focus.
4) Out of those who were happy for the cost to exceed the financial benefits of the project, 60% were doing it for freshwater and ecological outcomes, where only a small percentage were doing it for a premium or financial reward. Again, this highlights the instinctive stewardship that most farmers have for their land.
5) Those who saw market volatility as their operations biggest challenge were more likely to have grants fund any restoration or establishment costs.
6) Climate change challenges were only recognised as a challenge by the 25-40 age group. Is this age group inherently concerned around the business' sustainability through adverse weather events or is this a product of their awareness and upbringing over the last 20 years.

Rural Professionals

Measurement Complexity

The literature reviews and interviews confirmed that measuring biodiversity, and establishing a standard is complicated and complex. Unlike measuring other outputs such as carbon credits, the biodiversity market is challenging to compare in a similar format. Carbon credits can be easily measured (how many tonnes of CO_2 does a particular species sequester) and then measured on a per hectare basis. Lack of ability for a simple measurement means biodiversity, which is complex and context-dependent, cannot be measured using a single, clear metric. This makes it harder for farming businesses and downstream companies to quantify their environmental impacts and progress.

Carbon focus

Discussions during the informal interview process indicated that many organisations in New Zealand continue to use carbon as their primary measure of environmental impact, and this lines up with policy such as the Climate Response (Zero Carbon) Bill 2019, to achieve Paris agreements goals.

Part of this Bill was to establish a Climate Change Commission to independently advise the government on reducing carbon emissions. This shows how mature the carbon market and assessment is, with the Emissions Trading Scheme being in place since 2008.

This affects a market of supply and demand, whether through offsetting or a reduction in carbon emissions, by organisations, through compliance, paying registered landowners for the carbon that they sequester – a simple supply and demand equation. Once demand is defined, then supply becomes available, which is where a compliance-based system for industry such as energy production, steel production and mining and waste, and which underpins the value of the domestic carbon market.

Market Access and Branding

Products produced on farms with positive biodiversity credits could gain a distinct advantage in market access and branding. As consumers and buyers increasingly seek goods aligned with sustainability and environmental stewardship, the acknowledgment of biodiversity enhances a farm's reputation and opens up premium market opportunities. Such products may command higher prices, attract ethically minded consumers, and meet growing retailer demands. By associating their products with verified biodiversity outcomes, producers can create a distinct competitive

separation, build customer loyalty, and appeal to export markets where biodiversity credentials are becoming a competitive desire. This not only increases market access but also strengthens the overall brand value of producers committed to ecological restoration and biodiversity protection.

Lack of understanding from farmers

Farmers currently deal with a considerable amount of change. These challenges include market volatility, the threat of overreaching compliance, weather events and high input costs. Farmers have only recently in New Zealand understood the opportunity that carbon sequestration offers their business organisation, and it can take time, and more importantly, risk to invest in ventures other than the core products of food and fibre. Change on farm also takes time, and 'pivoting' can take seasons, if not years. This mindset can sometimes be a hinderance.

Greenwashing concerns: The voluntary carbon market overseas has been criticized for selling low-quality, cheap credits, with companies using offsets to portray a green image rather than making proper changes to their operations. This is a valid concern domestically and New Zealand want to make sure that there is a level of trust established with any biodiversity credit and can be a valid concern with self-assessment on farm. However, the current NZFAP accreditation is a high trust model and has helped bring education into best practice on-farm, yet to cause concern around food and fibre production. With the use of a high trust model, some of these concerns could be mitigated.

Lack of Centralised Platform

A significant barrier to establishment and growth of biodiversity credit markets in New Zealand is the lack of a centralised platform for trading biodiversity credits. Without a marketplace (such as the ETS provides), landowners, investors, and buyers face significant challenges in funding, letting the market decide the value of credits, and ensuring transparency in transactions. The lack of infrastructure slows market liquidity, financial interest, increases transaction costs, and, probably most importantly, creates uncertainty about the credibility and comparability of credits issued under different schemes.

New Zealand is already showing signs of multiple systems (Ekos, Toha) which could lead to a more fragmented instead of centralised biodiversity credit landscape.

Lack of Standardized reporting: The use of a single metric simplifies corporate reporting on environmental, social, and governance (ESG) performance, that would satisfy investor and stakeholder wants with familiar, straightforward figures. Is a single metric though the right approach to farm-based biodiversity measurement or is a split certified/uncertified approach more in line with measurement and data collection goals to help foster farmer engagement?

Cost of measurement

The cost of measurement for biodiversity credits causes a significant challenge in the development of biodiversity markets. Accurate measurement requires comprehensive monitoring of various ecological indicators, such as species presence, habitat quality, and ecosystem function, which often needs specialised expertise, investment in advanced technologies, and continuous field assessments. This results in high administrative and operational overheads, particularly for smaller landowners or projects with a smaller scale. As highlighted before, this could reduce the financial viability of farms participating in biodiversity credit schemes if the costs of measurement outweigh the returns, especially in cases where the this cannot be offset by economies of scale.

Catchment groups

Catchment groups were described by rural professionals interviewed as an effective method for educating farmers about environmental outcomes related to biodiversity. Many noted that such activities are already underway in established catchment groups. One interviewee mentioned the potential for catchment-led biodiversity measurement; however, accurately assessing and distributing this among different farm size, topographies, and personalities could get complex.

Contrasts and comparisons between Survey and Interviews

Undervaluation of carbon sequestration in native forestry

As discussed in the literature review, both rural professionals and farmers found that currently native bush to have significant economic benefit because carbon sequestration values are underestimated. Registering native vegetation in the ETS is seen as having only marginal value, unless large areas are available to achieve economies of scale.

Challenges and Barriers

The challenges and barriers are identified as being similar from both farmers and rural professionals. Measurement complexity dominates the conversation

Commodification of data

Farmers are using farm management tools more frequently as they become easier to use, according to surveys. Wearables will soon automate much of this data collection, adding value to products by providing useful information. While there is still a minor disconnect in data flow, some meaningful comparisons can be made between farmer data input and consumer information needs and wants

Conclusion

To conclude, this research has attempted to highlight both the opportunities and the complexities of establishing biodiversity measurement and credit systems alongside dry stock farming operations. While there is clear acknowledgement among farmers and rural professionals of the ecological and economic benefits of biodiversity, the adoption of biodiversity credits has a few challenges, specifically the complexity of measurement, the cost-effectiveness of measurement and assessment and the need for a standardised system

Despite these challenges, the findings demonstrate a genuine willingness among farmers to engage in biodiversity initiatives, often motivated by ecological values and compliance requirements, rather than premiums or selling biodiversity credits alone.

The research has shown a gap between farmers stated intentions regarding native planting and their actual, often self-funded, actions—suggesting that land stewardship values play a significant role. However, for widespread adoption, it is necessary to address knowledge gaps, facilitate education, streamline measurement tools, and have clearer government and industry support.

The potential for biodiversity credits to deliver both direct (e.g., product premiums or biodiversity credit value) and indirect (e.g., increased resilience, improved ecosystem services) economic benefits is obvious, but realising these potential needs ongoing research, collaboration between industry bodies and government.

Ultimately, by simplifying farmer entry level, supporting catchment groups and farmer education, and strengthening partnerships between government, processors, and farmers, New Zealand can better capitalise and commoditise the value of on-farm biodiversity.

This will not only enhance ecosystem services and farm resilience but also position the agricultural sector to create more value add and access premium markets.

As the biodiversity credit market matures, the upskilling of farmers, AI integration and farmer-friendly measurement systems and supportive policy frameworks will be critical in recognising and rewarding farmers as stewards of the land, ensuring long-term sustainability and prosperity for the sector.

Recommendations

Government

The government has announced pilot programmes for biodiversity credits and has initiated nine projects across the country. Government participation is crucial in ensuring stability and certainty, and there is potential for a centralised platform to be developed, preferably by central authorities, in the future. Clearly differentiating between certified and uncertified biodiversity credits will be important for encouraging farmer engagement and uptake. Farmer participation is vital, as sheep and beef farmers manage approximately one-quarter of the remaining native vegetation throughout New Zealand.

A benchmarking dollar value will also need to be determined for these farm biodiversity credits not unlike the reserve prices established for carbon credits

Ministry of Primary Industries

Accurate carbon sequestration data should be included in the lookup tables that differentiate between established indigenous forests and newly established native forests, as current data is broad and imprecise (*NIWA, 2025*). This may support the establishment of native forests on marginal land and provide an incentive to enhance the protection of existing areas.

Government and processors (combined)

To encourage farmer participation in measuring, managing, and enhancing on-farm biodiversity, it is important to establish a reasonably achievable standard of reporting. While various tools are available for biodiversity measurement, many require specialist assistance, which incurs additional costs. Current available resources such as the Landcare Research Biodiversity Assessment tool could be recognised as part of the NZFAP accreditation process. With stock exclusion and pest management programmes, basic biodiversity measurements could be assumed with minimal administrative cost, providing a baseline measurement. Over time, this process may develop further as advances in technology and AI make data collection more accessible, allowing for improved tracking of progress, based on original baseline data. Establishing a baseline for biodiversity—such as areas

fenced from farmed animals and implementing a pest management plan—can serve as an entry point for monitoring. Farmers will not participate in schemes that require high input but deliver minimal or unclear return (Kay, 2025)

Although maybe not as valuable as some of the outcomes-based credits like Ekos or Toha, entry level gives farmers a starting point, and maybe some direction as to how biodiversity can be measured in its most basic form, with the opportunity to educate and develop as the process and market evolves.

Processors, NZFAI and the NZFAP+ Programme

Processors can help by setting up clear credit rules, running pilot programmes, and backing research on how restoring native plants is good for the environment and economy. They also get involved in accreditation projects like NZFAP and FAP+, which will open opportunities of farmers and landowners. When everyone—industry groups, government, stakeholders—works together, it sparks new ideas, lines up market rewards, and spreads good practices across the board.

These organisations could offer financial or expert advice, making it easier for farmers to get into biodiversity credits. Processors staying involved means the whole system is fairer, stronger, and better at providing solid ecological information, plus producers can market these attributes to their consumers to attract a premium on product

NZFAI, owned by its members, faces challenges in measuring biodiversity, as highlighted in recent analyses. Currently, about 8,000 farms hold NZFAP accreditation, with NZFAP+ as the next level. Biodiversity currently has a limited role in NZFAP+, but research indicates that again, simply fencing off areas from grazing animals and implementing pest management plans effectively supports biodiversity development, recognising farmers for these actions encourages broader participation. Tracking is straightforward—by counting hectares—and values are determined by credit buyers or land users. Keeping requirements simple will help more farmers get involved and share their experiences within the community.

Farmers and landowners

Although NZ is still in its pilot phase, sheep and beef farmers have an opportunity to contribute to biodiversity protection, positioning themselves for the opportunity future biodiversity credit programmes might create. Farmers should begin or continue assessing their properties to identify eligible land—

such as areas of native vegetation or bush blocks—for biodiversity credits, prioritising those with fencing and established pest management systems.

Developing a Pest Management Plan is essential; existing regional council plans, or national projects such as Predator 2050, may already be operating within areas. Innovative tools like the AT220 trap by NZ traps have demonstrated significant success as self-resetting devices, reducing labour requirements and effectively controlling possum and rat and feal cat populations. Online resources, such as TrapNZ, create an opportunity to enter accurate data collection and quantification of pest control efforts.

Fence off established indigenous forest to exclude livestock and help enable natural regeneration.

Engaging with local catchment groups or industry-led pilot programmes that promote biodiversity can provide valuable guidance, resources, and networking opportunities.

Proactive processors are best positioned to reward farmers for their contributions, compared to those who lag. Farmers should actively support these forward-thinking processors.

Create records of management activities, monitoring outcomes, and improvements in biodiversity. This data is essential for potential future credit claims. Farm management tools are becoming more mainstream and can help reduce workload.

Participate in Accreditation Schemes: Where available, enrol in formal schemes such as the NZ Farm Assurance Programme Plus (NZFAP+) to build farm business credibility.

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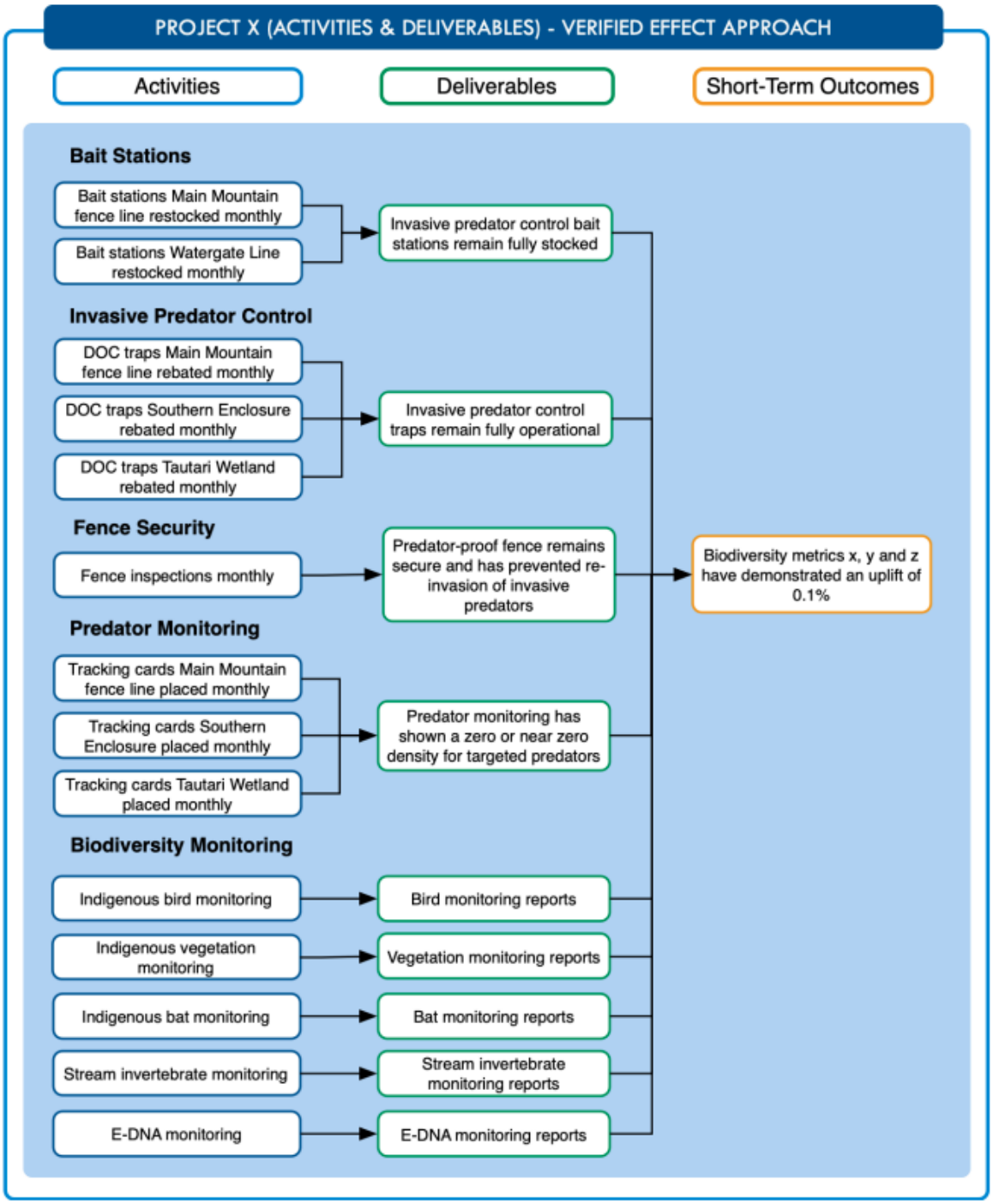
Appendices

Ekos Hypothetical example of project deliverables and Outcomes



$ Per Hectare Analysis

For Northland / Waikato / Bay of Plenty Region, Finishing Farms (North Island)

	2023-2024	2024-2025 (PROVISIONAL)	2025-2026 (FORECAST)
REVENUE PER HECTARE			
Wool	22.12	26.93	33.24
Sheep	324.96	338.11	424.36
Cattle	988.87	1,210.60	1,167.34
Dairy Grazing	164.45	195.99	209.46
Deer + Velvet	1.07		
Goat + Fibre			
Cash Crop	264.25	291.98	216.05
Other	126.28	58.74	59.89
Total Gross Farm Revenue	1,889.86	2,122.35	2,110.32
EXPENDITURE PER HECTARE			
Wages	144.84	144.70	146.13
Animal Health	52.17	52.72	57.02
Weed & Pest Control	30.60	28.65	31.52
Shearing	27.26	26.36	30.09
Fertiliser	239.42	285.96	347.56
Lime	8.57	33.52	36.39
Seeds	54.98	45.85	47.28
Vehicle Expenses	50.58	50.14	51.00
Fuel	52.08	48.14	49.28
Electricity	14.14	14.90	15.76
Feed & Grazing	72.49	74.50	77.36
Irrigation Charges			
Cultivation & Sowing	28.07	24.36	25.79
Cash Crop Expenses		32.66	23.21
Repairs & Maintenance	138.13	143.27	151.86
Cartage	48.72	50.14	51.58
Administration	54.95	55.59	56.73
Total Working Expenses	1,027.58	1,122.35	1,209.74
Insurance	31.35	33.81	34.96
ACC Levies	8.04	8.88	9.17
Rates	53.75	57.31	60.17
Managerial Salaries	14.47	14.61	14.90
Interest	240.09	200.86	169.63
Rent	127.97	128.94	131.81
Total Standing Charges	475.68	444.41	420.63
Total Cash Expenditure	1,503.26	1,566.76	1,630.37
Depreciation	89.03	91.69	100.29
Total Farm Expenditure	1,592.28	1,658.45	1,730.66
Farm Profit Before Tax	297.58	463.90	379.66

$ Per Hectare Analysis

For Northland / Waikato / Bay of Plenty Region, Hill Country (North Island)

	2023-2024	2024-2025 (PROVISIONAL)	2025-2026 (FORECAST)
REVENUE PER HECTARE			
Wool	23.34	31.40	32.79
Sheep	304.11	374.19	420.47
Cattle	660.26	854.19	930.47
Dairy Grazing	73.03	116.98	124.65
Deer + Velvet	3.47	0.84	1.29
Goat + Fibre			
Cash Crop	3.37	3.02	3.49
Other	54.20	31.49	31.97
Total Gross Farm Revenue	1,121.78	1,412.09	1,545.12
EXPENDITURE PER HECTARE			
Wages	101.56	101.16	104.65
Animal Health	49.35	50.00	52.09
Weed & Pest Control	12.73	13.95	16.28
Shearing	35.21	36.98	36.28
Fertiliser	144.01	161.16	183.49
Lime	4.47	15.12	15.35
Seeds	6.68	6.51	6.74
Vehicle Expenses	36.64	36.51	37.21
Fuel	30.08	27.91	29.07
Electricity	10.80	11.16	11.63
Feed & Grazing	43.05	44.19	44.88
Irrigation Charges			
Cultivation & Sowing	3.35	4.65	4.88
Cash Crop Expenses			
Repairs & Maintenance	91.92	97.67	104.65
Cartage	18.35	20.93	23.26
Administration	32.44	32.79	32.79
Total Working Expenses	630.94	671.16	713.95
Insurance	22.83	24.88	26.74
ACC Levies	7.00	7.44	7.67
Rates	36.96	38.37	39.07
Managerial Salaries	18.16	18.37	18.60
Interest	166.83	136.51	117.91
Rent	30.34	30.70	31.40
Total Standing Charges	282.12	256.28	241.40
Total Cash Expenditure	913.06	927.44	955.35
Depreciation	63.54	65.12	67.44
Total Farm Expenditure	976.59	992.56	1,022.79
Farm Profit Before Tax	145.19	419.53	522.33

$ Per Hectare Analysis

For Northland / Waikato / Bay of Plenty Region, Hard Hill Country (North Island)

	2023-2024	2024-2025 (PROVISIONAL)	2025-2026 (FORECAST)
REVENUE PER HECTARE			
Wool	34.88	45.63	45.04
Sheep	386.68	447.11	510.52
Cattle	358.88	404.15	430.67
Dairy Grazing	13.87	14.81	15.56
Deer + Velvet			
Goat + Fibre			
Cash Crop			
Other	33.54	33.04	33.19
Total Gross Farm Revenue	827.84	944.74	1,034.96
EXPENDITURE PER HECTARE			
Wages	75.40	74.07	75.56
Animal Health	46.03	47.41	47.11
Weed & Pest Control	16.71	17.04	17.48
Shearing	57.46	57.63	54.81
Fertiliser	86.36	126.81	136.44
Lime	0.24	0.59	5.93
Seeds	1.32	2.96	2.96
Vehicle Expenses	24.26	24.59	25.19
Fuel	19.50	18.52	19.26
Electricity	8.01	8.59	8.89
Feed & Grazing	18.73	19.26	20.00
Irrigation Charges			
Cultivation & Sowing	1.03	2.67	2.67
Cash Crop Expenses			
Repairs & Maintenance	65.24	74.07	81.48
Cartage	9.37	9.63	10.07
Administration	23.01	22.81	22.96
Total Working Expenses	463.66	517.04	541.48
Insurance	15.64	17.04	16.30
ACC Levies	5.39	5.48	5.48
Rates	30.01	31.11	32.59
Managerial Salaries			
Interest	177.32	157.19	132.59
Rent	12.43	12.59	12.89
Total Standing Charges	240.78	223.41	199.85
Total Cash Expenditure	704.44	740.44	741.33
Depreciation	36.94	37.19	38.52
Total Farm Expenditure	741.38	777.63	779.85
Farm Profit Before Tax	86.46	167.11	255.11

Survey Questionnaire

Farmer Survey

Biodiversity and Farming decisions

1. How would you class your farm?

- ◯ Hard hill country
- ◯ Hill Country
- ◯ Finishing
- ◯ Other (please specify)

2. In what age demographic does the farm decision maker(s) fit

- ◯ 25-40
- ◯ 41-55
- ◯ 56-64
- ◯ 65+

3. Have you considered planting or have you planted trees on your property in the last 5 years

- ◯ have planted pinus radiata
- ◯ Have planted natives
- ◯ have planted (other)
- ◯ Still considering
- ◯ not considering

4. If you answered 'have planted natives' above, how was this financed

- ◯ costs absorbed by the farming business/mortgage
- ◯ a grant (govt, regional council or other public body)
- ◯ Proceeds from carbon credits
- ◯ low interest sustainability loan
- ◯ Other (please specify)

5. Do you see an opportunity for generating biodiversity, and therefore biodiversity credits on your land?

- ◯ Yes
- ◯ No

6. How attractive would you find biodiversity credits as a source of income?

- ◯ Very attractive
- ◯ Somewhat attractive
- ◯ Not very attractive
- ◯ Not attractive at all

7. What would be the **MAIN** incentive for you to set aside a piece of land for biodiversity benefit (choose one)

- ☐ Freshwater/ecological improvements
- ☐ premiums offered by processor
- ☐ Front footing the potential licencing to farm (either social licence or a potential future consent process)
- ☐ Peer influence
- ☐ feel good factor
- ☐ opportunity to sell biodiversity credits in an open market

8. What do you see **your main challenge** with traditional sheep and beef farming? (select one only)

- ☐ Market volatility
- ☐ Environmental regulations
- ☐ High operational costs
- ☐ Labor shortages
- ☐ Climate change impacts

Other (please specify)

9. Which option do you believe offers the best long-term economic sustainability alongside your current farming operation?

- ◯ Biodiversity credits
- ◯ Emissions Trading Scheme (ETS) and carbon credits
- ◯ combination of biodiversity and carbon credits
- ◯ Traditional sheep and beef farming only - no biodiversity credits or carbon credits
- ◯ Other (please specify)

10. at what level would you consider retiring unproductive pastoral land and establishing native plants

- ◯ environmental benefit only - cost exceeded economic benefit
- ◯ cost of establishment equalled economic benefit
- ◯ economic benefit outweighed cost of establishment
- ◯ None of the above

11. Is your farm business NZFAP accredited

- ◯ NZFAP
- ◯ NZFAP Plus+
- ◯ Neither of the above
- ◯ I prefer not to say

12. Do you use a farm management tool/app?

- ◯ Digital (FarmIQ/Resolution/Trev/FARMAX etc
- ◯ Paper based records
- ◯ Neither