



SCALING CLIMATE FINANCE

FOREST FINANCE INSTRUMENTS

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MōHIO

ABOUT

Climate Innovation Lab

This body of work is made possible by the foresight and generosity of ANZ as a Founding Principal Partner of the Climate Innovation Lab.

The Climate Innovation Lab is a collaborative effort between Partners. Partners are high-level leaders from the private sector that contribute funding and/or expertise to selected instrument development. Partners are organisations that are leaders in their sectors of expertise and/or represent key market stakeholders.

The Lab draws on this experience and expertise in order to inform well designed, scalable financial instruments.

Mōhio

The Climate Innovation Lab is hosted by Mōhio, a think-and-do tank that works on an inclusive, equitable and tika transition for a low-emissions New Zealand.

Through its climate finance work stream, Mōhio aims to realign investment with the creation of genuine public value by enabling projects and activities that deliver combined social, environmental and economic impacts.

Principal Partners



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Disclaimer

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1. Preface

Climate finance is a growing part of the global investment landscape.¹ Capital is being channelled into climate-aligned projects and activities to deliver mitigation and adaptation benefits that benefit the environment and society more widely. This transition is occurring at all levels of capital markets, from the smallest grants or microloans to the largest transactions among corporations and countries.

But not enough is being done. Annual financing gaps for fulfilling the pledges of the Paris Agreement and UN Sustainable Development Goals (UNSDGs) run into trillions of dollars. The Intergovernmental Panel on Climate Change (IPCC) says that an annual investment of US\$2.4 trillion – about 2.5% of the world’s economy – is needed in the energy sector until 2035 to limit temperature rise to below 1.5 °C from pre-industrial levels.² The Business & Sustainable Development Commission recently estimated that a similar volume of additional investment is required to meet the UNSDGs in developing countries alone.³ Current financial flows are insufficient.

Institutional will to address this shortfall is growing. Investment barriers are being addressed by regulatory and finance sector reforms, such as Aotearoa Circle’s Sustainable Finance Forum. But a key area for further market development is increasing the supply of investment-grade product which meets the risk-and-return requirements across the investment spectrum, particularly at the institutional level.

The Climate Innovation Lab (‘the Lab’) is one of a growing number of initiatives around the world that uses financial innovation to mobilise and redirect some of the US\$71 trillion currently invested in global capital markets.⁴ Forestry presents a major opportunity for climate finance, in New Zealand and elsewhere. Climate-aligned future forests are a necessary (but not sufficient) element of a multi-dimensional response to the climate crisis. Many institutional and private investors are making public commitments to sustainable and impact investing. The challenge is to bring these intentions to bear on forestry, to drive the maximisation of its environmental benefits.

This Working Paper identifies unrealised opportunities for increasing investment into New Zealand’s forestry sector, by articulating the potential for delivering integrated impact through innovative, well-informed capital allocation decisions. Redirecting finance and funding through climate finance instruments – such as those described in the pages that follow – can accelerate the shift toward a low-emissions future.

¹ See the Climate Policy Initiative’s analysis of climate finance flows at:
<http://www.climatefinancelandscape.org/>

² Intergovernmental Panel on Climate Change (IPCC), 2018. *Global Warming of 1.5°C: Summary for Policymakers*, IPCC: Geneva.

³ Business & Sustainable Development Commission, 2017. *Better Business Better World*, BSDC: London.
<http://report.businesscommission.org/report>

⁴ Shub, G. et al., 2016. *Global Asset Management 2016: Doubling Down on Data*, BCG website.
<https://www.bcg.com/publications/2016/financial-institutions-global-asset-management-2016-doubling-down-on-data.aspx#chapter2>

2. Executive Summary

Forestry, land use, and land-use change will play a major role in New Zealand's transition to a low-emissions future. This will involve an increase of forest area, but also a diversification of forest management systems in order to ensure that the right tree is in the right place for the right purpose.

The establishment of new forests not only delivers climate-related benefits through carbon sequestration and climate adaptation, but also diverse environmental and social benefits. These include, and are not limited to, habitat for native biodiversity, erosion control, avoided sedimentation, flood mitigation, improved water quality, green job opportunities, and the exercise of kaitiakitanga.

The One Billion Trees Programme is a clear signal that the public value of forestry is recognised and prioritised by the current Government. The creation of Te Uru Rākau, a dedicated forestry agency, along with its commitment to develop a long-term afforestation strategy, sets New Zealand on a trajectory to delivering future forest as part of a more diversified rural landscape.

Currently the majority of plantation forest in New Zealand is privately-owned, and the majority of future forest planting is likely to occur on private land, largely sheep and beef farmland. A significant proportion of the likely land for afforestation is owned by Māori, so any scalable proposition must avoid misalignment with Māori values and aspirations.

The forestry sector faces a variety of challenges, including an overdependence on the China market and vulnerability to changes in demand; a weakening social license for clear-fell forestry systems; growing public expectations for the non-timber benefits of forests including climate and water regulation;

and growing adaptation challenges as climate change impacts increase.

To create a more diverse, integrated landscape, forest finance will play an important enabling role, by mobilising capital for non-conventional forest management systems which are desirable for their non-market benefits and creation of added public value. Increasing these financial flows not only supports the United Nations' Sustainable Development Goals, but fulfils specific targets related to sustainable finance within these goals.

The purpose of this Working Paper is to explore forest finance instruments that enable opportunities in sustainable and impact-first forestry, where the creation of social and environmental value – in addition to financial return – plays a central role in the instrument's value proposition, and where climate risk is explicitly factored into the provision of finance.

These forest finance instruments are derived from a literature review of sustainable finance innovation internationally, combined with a localised analysis of the New Zealand context. This is to recognise the unique geographic, economic and cultural characteristics, in particular the importance of Māori values, aspirations and capacities to deliver a more climate-aligned landscape across Aotearoa.

The proposed instruments are as follows:

- 1. Environmental Impact Bond (EIB):** This is a pay-for-results instrument that is designed to deliver native forest outcomes with reduced risk of project failure. By crowding in capital from multiple parties and re-allocating risk among them, the EIB will expand and sustain the capital pool for planting continuous native forest on erosion-prone marginal land in New Zealand. The foundation of the EIB is a commitment from a Primary Outcome

Funder, such as a regional council, to pay for forest outcomes that meet pre-agreed impact targets. This commitment then draws in Partner Outcome Funders who stand to benefit from the impacts, as well as investors who purchase the bond and thereby supply the finance needed to establish forest. The EIB proposed here is similar to the Native Forest Bond Scheme proposed by Mōhio in 2018,⁵ but repurposed for regional- rather than national-scale issuance. The standardisation of the EIB can lead to its replication elsewhere, thereby reducing transaction costs through scaling up.

2. **Leveraged Carbon Fund (LCF):** The LCF aims to achieve new forest planting at scale by acquiring a diverse land base and forestry rights for establishing New Zealand Emissions Trading Scheme (NZ-ETS) qualified forests. The forests will produce long-term timber assets, as well as New Zealand Units (NZUs) that will be sold annually, on an Off-Take Agreement basis, for the lifetime of the Fund. Proceeds of the sale of NZUs will be used to service a loan that significantly leverages the Fund's assets. Achieving scale in both the timber and carbon stock will attract an institutional buyer of these assets at the end of the holding period. The Fund's aim is to create low-cost, high-value carbon sinks that generate a market-rate after-fee internal rate of return (IRR) to investors.
3. **Continuous Cover Forestry Fund ("the Fund"):** The Fund is designed to upscale continuous cover forestry (CCF) in New Zealand by bridging the barriers of finance, facilitation and

specialist technical knowledge. The Fund would purchase forestry management rights from forest owners who want to exit from clear-fell systems, then transition these forests into continuous cover forestry over time. Crucially, the vertical integration of specialised capabilities into the Fund, particularly through acquiring silvicultural expertise and specialised equipment, can assist the Fund to overcome existing barriers for CCF, and to create impact-first forestry assets that satisfy strong sustainability requirements among investors. This model is feasible for conventional species, such as *Pinus radiata*, but promises optimal long-term outcomes for high-value timber species, including natives such as totara, which offer a unique proposition for future markets.

4. **Green Covered Bond:** Covered bonds issued by banks supported by high-quality forestry assets in New Zealand. The cover pool would be constituted by certified sustainable forests (such as Forest Stewardship Council certification), or forests that attain even greater impact standards by setting aside land of particular conservation value, increasing forest diversification, or increasing biodiversity or erosion protection. In addition, bonds would be issued under a green bond framework, such as the Green Bond Principles or Climate Bond Initiative standards. Bonds would mainly be marketed to institutional investors who wish to invest in projects that mitigate climate impact and that promote sustainable development in the forestry sector.
5. **Climate Risk-Adjusted Loans (CRALs):** This involves a family of

⁵ See Lindsay and Hall (2018), *Native Forest Bond Scheme: Indicative Business Case*, Auckland: Mohio Research Ltd. Available on request.

potential financial products that reflect climate risk through the setting of interest rates. Firstly, Climate Resilient Loans are a potential class of forestry loans that offer lower interest rates to forest managers who implement climate adaptation best practices. Secondly, Sustainability Improvement Loans adjust the interest rate over time to reflect ongoing changes to the sustainability practices of the borrower. Either strategy may help to incentivise sustainability practices among forest managers, especially where these practices correspond to climate-related risks from physical impacts or environmental litigation.

6. Community Funding Programme (the Programme): This is a project-level structure for raising low-cost capital for investment-grade issuers like local councils to deliver climate adaptation, community resilience and biodiversity outcomes. The underlying bond would have a retail format, in order to meet market demand for green or climate-aligned investment opportunities. Given the low credit risk of issuers and the bond's strong exposure to positive social and environmental impacts, it is anticipated that the bond could offer low interest rates. Moreover, by subordinating financial imperatives to a strong alignment to community aspirations, market barriers to delivering ecologically desirable outcomes can be overcome by leveraging greater commitments of volunteer labour, public funding contributions, and coordination with existing initiatives involved in ecosystem restoration and pest control.

7. Natural Climate Solutions Exchange ('the Exchange'): Natural Climate Solutions (NCS) are land use activities that create or restore an ecosystem in order to store or

sequester carbon, alongside other social and biodiversity benefits. The Natural Climate Solutions Exchange ('the Exchange') would enable parties to purchase NCS outcomes to easily compensate for adverse environmental effects arising from development activities. Demand for NCS will be driven by developers applying to local councils for resource consents under the 1991 Resource Management Act (RMA). Supply of NCS will be driven by conservation groups who seek funding to restore native ecosystems, including natural forest, in high value conservation areas. The unit of value (the NCS Unit) exchanged between parties is derived from a hierarchy of ecosystem services and a scoring rubric which sets expectations for the quality of services being purchased by the developer. The Exchange introduces a standard methodology by which an offset can be certified as achieving additionality. It would also standardise relationships with mana whenua organisations, such that alignment with te Tiriti of Waitangi is built into each NCS Unit, reducing the transactions costs for all parties while guaranteeing the gains.

The objectives of this Working Paper are two-fold:

(1) to galvanise the local conversation about the opportunities for innovative financial instruments to deliver climate outcomes; and

(2) to use these proposals as catalysts for gathering "coalitions of the willing" who can bring these instruments to market.

This Working Paper serves as an invitation to participate in that latter aim, to flesh these concepts out by developing a business case (using the New Zealand Treasury's Better Business Case framework) to actualise these projects.

The Working Paper is laid out as follows:

Section 3 provides a lay of the land, both the current state of the forestry sector in New Zealand, and also the state of forest finance.

Section 4 discusses the impact framework for the Forest Finance Working Paper, covering the GIIN Impact Strategy, relevant IRIS metrics and the UN Sustainable Development Goals.

Section 5 describes each climate finance instrument by providing a summary of the finance gap it seeks to overcome, how each instrument will bridge that gap, then a discussion of its impact, additionality and feasibility.

Section 6 describes changes to the enabling environment, especially the regulatory framework, that could help to increase the viability of these instruments.

Section 7 summarises the instruments that we chose not to develop into initial concepts, and provides our reasoning why.

Section 8 is a Glossary to assist the reader with acronyms and relevant terminology.

Appendix 1 is a description of the Climate Innovation Lab's methodology and approach, which explains key concepts such as 'climate finance' and 'additionality'.

Appendix 2 is our additionality analysis for each instrument, which gives a sense of the extent to which each instrument breaks free from business-as-usual.

Appendix 3 is an indicative business case for continuous cover forestry, drawing on New Zealand-based and international analysis.

3. Lay of the Land

3.1. The Landscape

To align to a low-emissions future, land use patterns in Aotearoa New Zealand need to change. Forestry will play a role in this, but, to preserve its social license, new forests will need to be done well – that is, the right tree must be planted in the right place for the right purpose.

From the perspective of the 2016 Paris Agreement, forests contribute to New Zealand’s obligations in three ways. First, forests contribute to climate adaptation by enhancing the resilience of the land and associated catchments to extreme weather events. Second, forests contribute to climate mitigation by absorbing carbon dioxide from the atmosphere as trees grow. Third, forest investment contributes to climate finance which requires the channelling of financial flows toward projects and activities that deliver measurable climate-aligned impacts.

Land use trends have not favoured New Zealand forestry in recent years. Due to conversion of forests into farms, the volume of CO₂ removals by New Zealand forests reduced from about 30 million tonnes in 1990 to 22 million tonnes in 2017, a 27 per cent decrease in negative emissions.⁶ Meanwhile, the expansion and intensification of pastoral agriculture has driven a 13.5% increase in agricultural emissions over the same period. This intensification was driven by higher fertiliser use, more cows and fewer sheep, more animals per hectare, and more irrigation. These trends not only cut against climate change objectives, but also drive declines in

other environmental indicators, such as freshwater quality (see Box 1 below).

Under business-as-usual, New Zealand can expect this environmental degradation to continue. The country would fail to meet its Paris Agreement targets through domestic emissions reductions, which would require New Zealand to purchase international emissions reductions instead. New Zealand’s forward liability has been estimated at \$14-36 billion over the 2021-2030 period.⁷ Reliance upon international emissions reductions further invites risks related to uncertainties around when and if international markets will be established, what future carbon prices will be, and the supply of credible units.⁸

The alternative is to steer land use toward a more favourable balance of agriculture and forestry. Ideally, New Zealand’s landscapes will be:

- aligned to domestic and international emissions reductions targets;
- financially, environmentally and socially sustainable;
- delivering positive integrated impact;
- resilient to climatic and economic change;
- and supportive of native biodiversity.

The likely pathway to this outcome is an integrated landscape approach.⁹ Very simply, this involves working with, rather than against, the complexity of the landscape. It recognises the diversity among various landscapes, and also within any particular

⁶ Ministry for the Environment (MfE) and Statistics New Zealand (Stats NZ), 2019. *Environment Aotearoa 2019*. Wellington: NZ Government, p.224.

⁷ Ministry for the Environment (MfE), 2017. *Briefing to the Incoming Minister for Climate Change: Climate Change Portfolio*. Wellington: NZ Government, p.7.

⁸ Kerr, S. et al., 2017. *An Effective NZ ETS: Clear price signal to guide low-emission investment*. Motu Note #28, Wellington: Motu.

⁹ Hall, D. 2018. *The Interwoven World | Te Ao i Whiria: Toward an Integrated Landscape Approach in Aotearoa New Zealand*. Discussion paper. Auckland: The Policy Observatory, pp.17-32. This is reinforced by the Parliamentary Commissioner for the Environment, 2019. *Farms, Forests and Fossil Fuels: The Next Great Landscape Transformation*, Wellington: PCE. <https://www.pce.parliament.nz/publications/farms-forests-and-fossil-fuels-the-next-great-landscape-transformation>

landscape, in regards to microclimate, terrain, hydrology, soil type, biodiversity and also the communities that live there.¹⁰ A landscape approach then complements these diverse needs and expectations with suitable land uses, among which diverse forestry management systems are critical. This is demonstrated in the image below.

So, the New Zealand landscape would not be dominated only by intensive forestry systems, such as clear-felled forestry using exotic species like *Pinus radiata*, it would also utilise continuous cover forestry systems, such as selective harvesting or small-coupe felling, and permanent forestry systems, such as carbon farming and conservation.

A landscape approach would also integrate trees into agricultural landscapes, through agroforestry, silvopastoral and agroecological systems, including increased horticulture.

Presently, forestry employs 20,000 people and contributed \$6.9 billion to our economy in the year up to June 2019.¹¹ However, New Zealand's forestry sector is dominated by one system: *Pinus radiata* monocultures under a clear-felling system, which accounts for 89% of all planted forests.¹² This system is suboptimal from both a climate mitigation and adaptation perspective. Over the long run, permanent forest stores more carbon than clear-cut forests, even if the former consists of



10 Sayer, J. et al. 2013. Ten Principles For a Landscape Approach to Reconciling Agriculture, Conservation, and Other Competing Land Uses. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 110(21): 8349-8356. Reed, J. et al., 2016. Integrated landscape approaches to managing social and environmental issues in the tropics: Learning from the past to guide the future. *Global Change Biology*, 22 (7).

11 Ministry for Primary Industries (MPI), 2019. *Situation and Outlook for Primary Industries: September 2019*, Wellington: NZ Government.

12 New Zealand Forest Owners Association, 2018. *Facts and figures 2016/2017*. Wellington NZ: NZFOA & MPI.

Box 1. The State of the New Zealand Environment

The recent *Environment Aotearoa 2019* report shone a light on environmental deterioration. To highlight some issues with relevance to this report:

- **Changes to the vegetation on our land are degrading the soil and water.**
 - Annually, 192 million tonnes of soil is lost into waterways, with detrimental effects for freshwater, estuarine and marine environments.
 - The economic losses associated with soil erosion and landslides are estimated to be at least \$250–300 million a year.
 - While forest can prevent erosion, the area of exotic forest decreased by about 1 per cent between 2008 and 2012; and 0.2 percent loss of native forests (reduced by 16,000 hectares) between 1996 and 2012.
- **Our waterways are polluted in farming areas.**
 - Median concentrations of nutrients, pathogens, and sediment in rivers are 2–15 times higher in pastoral farming areas than natural conditions.
- **Our native plants, animals, and ecosystems are under threat.**
 - Nearly 4,000 native species threatened or at risk of extinction.

slow-growing native species and the latter consists of fast-growing exotic species.¹³

Moreover, these forests are susceptible to erosion and debris flows during 'the window of vulnerability' between rotation cycles and monocultures are less resilient to extreme weather events due to their lack of ecological diversity.¹⁴ Finally, the lack of forest diversity can entail economic risk; for example, the recent decline in demand from China for unprocessed *Pinus radiata* logs is forecast to deliver a 16.2% drop in forestry export revenue for the year ending June 2020,¹⁵ a consequence of the sector's over-reliance on this single market.

The challenge, then, is to diversify the feasible options for landowners who wish to convert pastoral land to forest, and to create the financial instruments that enable this change.

This Working Paper proposes a number of such instruments.

3.2. The Financial Landscape

Forests draw on financial capital in different ways, depending on ownership type. We might divide owners into (1) large forestry companies, (2) smaller forest entities, and (3) investment funds. The key factor for forest finance is its long timeframes, which means that returns on investment from new forests take decades to materialise.

Large forestry companies have limited financing options, because these companies generally have credit ratings that are less than investment grade. Their finance will mainly come from bank debt, typically limited to maximum 5 year terms. Bank financing of forestry will be limited only to companies that manage multiple plantations, because financing for new forests is difficult unless the

¹³ West, T. A. P. et al. 2019. 'Carbon payments for extended rotations in forest plantations: Conflicting insights from a theoretical model.' *Ecological Economics* 163: 70-76. Lewis, S. L. et al. 2019. 'Restoring natural forests is the best way to remove atmospheric carbon.' *Nature* 568: 25-28, doi: 10.1038/d41586-019-01026-8

¹⁴ Satchell, D. 2018. *Trees for Steep Slopes*. Report Supported by the Forest Growers Commodity Levy.

https://www.nzffa.org.nz/system/assets/3025/Report_-_Trees_for_steep_slopes.pdf

¹⁵ Ministry for Primary Industries (MPI), 2019. *Situation and Outlook for Primary Industries: September 2019*, Wellington: NZ Government.

borrower is receiving income from other sources.

Smaller entities access finance through more diverse means. A smaller forestry company, such as Roger Dickie (NZ) Ltd., acts as a broker and forest manager on the behalf of investors. Māori organisations such as Ngāi Tahu Forest Estates and Lake Taupō Forest Trust finance from their own balance sheets, drawing upon forest assets and capital returned through Crown settlements. Small private forest owners, such as farm foresters, will most likely need to finance forests from their own balance sheets. Regulatory incentives for the agricultural sector to increase afforestation will be further constrained by the reduced funding capacity of banks, due to increased regulatory capital requirements.

Investment funds provide their own finance, by raising capital from investors. This includes TIMOs (Timberland Investment Management Organisations) such as Hancock and Global Forest Partners LP; REITs (Real Estate Investment Trusts) such as Rayonier; or institutional investors, such as the owners of Kaingaroa Forest (which are NZ Super Fund, Canada's Public Sector Pension Investment Board, and Harvard Management Company). However, it is noted that institutional investors play a relatively minor role in New Zealand forestry, which is unusual given its relative attractiveness to investors (e.g. political stability and ease of doing business). This suggests a potential opportunity to increase this ownership class, especially by offering climate-aligned investment products.

From an investor perspective, forestry is an advantageous asset class. It has low correlation with other major asset classes, a positive correlation with inflation, and generally good returns relative to risk and volatility. Its underlying assets are perpetual

in nature, with a continuing cash yield when managed well. Finally, depending on the management strategy, forestry can deliver a variety of environmental and climate-related benefits, which can contribute to the greening of investment portfolios.

Globally, the total value of the 'investible universe' of timberland is relatively small as a pool of assets. David Brand, CEO of New Forests, estimates it is 'probably in the order of USD\$200-400 billion depending on how you define "investible"'.¹⁶ Of this, around USD\$100 billion is already owned by timber real estate investment trusts (REITs) and institutional investors, either directly or through investment managers. About 70% of these owned assets are in the United States, 20% in Australia and New Zealand, and 10% throughout the rest of the world. Excluding the REITs, about 60% of institutional investment is via funds, and more than half of the capital is from public pension funds.

Over the last 20 years, asset turnover has slowed internationally, as capital sought real assets. This has created a seller's market, with forestry perceived as being overbought. However, this creates an opportunity for disruptive new investment strategies which may revive forestry as an asset class, at least in part by aligning forestry outcomes with the global effort to address the twin crises of climate change and biodiversity loss.

To some extent, this transition is beginning through the emergence of carbon farms, or permanent forest sinks, as a distinctive asset class. This carries its own distinctive risks, especially if trees are subsequently harvested and carbon credits need to be purchased by the forest owner, thereby exposing them to market risk. Nevertheless, new players are entering the market, including large emitters who are buying land and planting their own forests to create long-term sources of carbon

¹⁶ David Brand, 2019. 'Transforming the Forestry Asset Class', Briefing by the CEO of New Forests Asset Management Pty Ltd (New Forests).

credits to hedge the carbon price. These parties are typically investment grade, so have access to a variety of funding sources.

4. Impact Framework

This section identifies frameworks that could be used for evaluating the impact of the instrument proposals in the next section. These are drawn from the Global Impact Investing Network's (GIIN) Navigating Impact project, the IRIS metrics for impact, and the UN Sustainable Development Goals. As indicators, these are global in scope, which enables simply communication of impact strategy among international parties. However, the emphasis on generality means a loss of particularity, especially indicators that reflect regional needs or cultural requirements such as tikanga Māori. Accordingly, it is anticipated that, when these instruments are advanced to the next stage of development, that an impact framework is designed which draws both on internationally standardised metrics, plus New Zealand-specific indicators.

4.1. Te Ao Māori

In the political context of Aotearoa New Zealand, the implications of land-use decisions for Māori have paramount importance. This is a matter of constitutional importance, given that te Tiriti o Waitangi promises tino rangatiratanga, or unqualified sovereignty over lands, property and treasures (taonga). It is also a matter of pragmatic importance, because Māori are over-represented in the primary sector, both as farmers and foresters. Consequently, it is estimated that there is some 558,000 hectares of Māori-owned land that is ETS-eligible and appropriate for afforestation, about 60% of which is marginal land.¹⁷ As such, a substantial proportion of

land that could attract climate finance flows is owned by Māori. If forest finance instruments are misaligned with Māori values and aspirations, then their feasibility will be diminished, because Māori will be less likely to engage as landowners or investors in forest.

There is not currently a standardised framework for quantifying impact for Māori values. There is, however, a number of proposals which capture elements of such a framework. For example, Tahito is an equity fund that integrates Māori values – whanaungatanga, aroha and mauri – into its screening methodology.¹⁸ At the project level, Kepa Morgan's Mauri Model is a decision making tool that integrates indigenous values into sustainability assessments.¹⁹ At the society level, Maria Bargh identifies a number of attributes of just transition in her Tika Transition Toolbox.²⁰ There are also longstanding efforts to identify indicators for Māori wellbeing – from Mason Durie's pathbreaking work on waiora, to more recent efforts to incorporate Māori indicators into the Living Standards Framework.²¹

It is beyond the scope of this report to provide a framework for the climate finance instruments discussed below. However, co-designing such a framework must be the initial step to designing instruments that have such significant implications for Māori landowners and communities. In the meantime, the Lab assumes a general preference among Māori for native species, or at least an intention to transition forests to native species over the long run.²²

¹⁷ Garth Harmsworth, Marino Tahī & Chris Karamea Insley, 2012, *Climate change business opportunities for Māori land and Māori organisations*, MPI Technical Paper No: 2012/43, Ministry for Primary Industries.

¹⁸ See Tahito's website: <https://jmiwealth.co.nz/tahito>

¹⁹ See the Mauri-o-meter website:

<http://mauriometer.org/>

²⁰ Maria Bargh, 2019, 'A Tika Transition', in *A Careful Revolution: Towards a Low-Emissions Future* (David Hall, ed.), Wellington: BWB Texts.

²¹ Mason Durie, 1998: *Whaiora: Māori health development*, Auckland: Oxford University Press; and Te Puni Kokiri & NZ Treasury, 2019, *An Indigenous Approach to the Living Standards Framework*, Discussion Paper 19/01, Wellington: NZ Government.

²² Pia Pohatu, Sophie Hale, Leo Mercer, 2019, 'Māori land owners' decision-making processes around native forest regeneration', Motu Note #38, Motu Economic and Public Policy Research: Wellington.

4.2. GIIN Strategy

From an investor perspective, the forestry sector has a spectrum of potential impact, with varying impact and return motivations. The Global Impact Investment Network (GIIN) describes this spectrum as follows:²³

- **Conventional forestry investment** generally focuses on financial return with less priority given to additional environmental and social impacts.
- **Sustainable forestry investment** aims to minimise the negative impacts of forestry activities both for present and future generations.
- **Impact-first investment** takes this inclination one step further by actively seeking investment opportunities that create additional, positive impacts for a particular environment or community.

This Working Paper assesses investment opportunities at the sustainable and impact-first end of the spectrum. Investors with these

motivations have a number of strategies to employ, which GIIN describes as follows:²⁴

- **Increasing production of sustainable wood products.**

Investments in this strategy aim to increase the production of wood and wood-based products from responsibly managed forests and plantations in order to maintain or restore tree cover, enhance forest productivity, improve rural livelihoods, and provide forest resources for future generations.

- **Increasing production of sustainable non-wood forest products.**

Investments in this strategy aim to increase the production of sustainably grown and harvested non-wood forest products (NWFPs) – both cultivated and wild – to boost local incomes, achieve food security, prevent or reverse land degradation, and build resilience to extreme weather events caused by a changing climate.

- **Increasing sustainability of local economies and communities.**

Conventional Forestry	Sustainable Forestry	Impact-first Forestry
Few social and/or environmental factors considered in decision-making.	Environmental stewardship of the land into the long-term.	Seeks a positive outcome to the land and communities.
Forestry Investment Sectors		
<p>Impact-first Forestry</p> <ul style="list-style-type: none"> ▪ Actively seeks and manages investments for positive outcomes. <ul style="list-style-type: none"> ▪ Tracks, reports and manages key impact metrics. ▪ Investment term reflects the social and/or environmental goals of the plantation. 		

²³ Global Impact Investment Network (GIIN), 2019. *Scaling Impact Investment in Forestry*, New York: GIIN. <https://thegiin.org/research/publication/forestry>

²⁴ The Navigating Impact project was created by the Global Impact Investing Network (GIIN) to help investors select impact strategies and adopt metrics that indicate performance toward their goals. See <https://navigatingimpact.thegiin.org/>

Investments in this strategy aim to create green jobs and deliver shared prosperity through land use, particularly with regards to forests and forest resources.

- **Improving the conservation of forests and forest resources.**

Investments in this strategy aim to increase the conservation of forests by focusing on economic activity that maintains existing forests, especially valuable intact forest landscapes.

- **Reducing net emissions through forestry.**

Investments in this strategy aim to reduce carbon emissions from forestry and land use by avoiding or reducing emissions, or by sequestering carbon in biomass above ground (stems, branches, and foliage) or below ground (roots, plant litter, and soil) as a climate mitigation and adaptation strategy.

Sustainable and impact forestry investments may deprioritise financial returns in relation to social and environmental impact, but this does not mean foregoing a positive financial return. A 2017 report by GIIN and Cambridge Associates which analysed 18 impact-focused forestry funds from 1997–2014 found that risk-adjusted market rates of return are achievable, so long as individual funds were successfully selected.²⁵ Since inception up until 2014, these impact funds produced a pooled net internal rate of return (IRR) of 5.9%, comparing favourably with conventional timber funds, which returned 3.3% over the same period using the same set of vintage years. Top quartile funds returned at least

8.6% compared to at least 4.2% for conventional timber funds.²⁶

4.3. IRIS Metrics

To measure progress, IRIS metrics are a key tool for asset managers.²⁷ IRIS (Impact Reporting and Investment Standards) is a set of standardised metrics that can be used to measure and describe the social, environmental, and financial performance of organisations and businesses that receive impact investment capital.²⁸ IRIS provides a library of around 400 widely used social and environmental metrics, and standardised definitions that leverage global best practice and expert input. The system is non-prescriptive, which means that individual companies and investors can choose to track the most relevant metrics for their ESG goals. IRIS is broadly aligned with the targets and indicators of the Sustainable Development Goals (SDGs),²⁹ as well as the Impact Management Project (IMP) which is emerging as a framework of international consensus.

Please turn the page for a list of IRIS metrics that may apply to the instruments sketched out in Section 5.

²⁵ Note this applies equally to impact investing funds and conventional funds. See GIIN and Cambridge Associates, 2017. *The Financial Performance of Real Assets Impact Investments: Introducing the Timber, Real Estate, and Infrastructure Impact Benchmarks*.

²⁶ For a more recent analysis of 24 asset owners and managers in the impact and sustainable forestry space, some of which have operations in New Zealand, refer to GIIN, 2019, *Scaling Impact Investment in Forestry*, p.28.

²⁷ IRIS is the catalogue of generally accepted performance metrics, managed by the GIIN. See www.iris.thegiin.org.

²⁸ The authors have chosen to work with IRIS due to its long track record in the impact investing marketplace and high degree of acceptance among leading impact investors globally. Investors and companies have alternate options to choose from including internally designed metrics or other third-party metric providers.

²⁹ For a full explanation of the SDG and IRIS alignment, please refer to GIIN, 2019. *IRIS+ and the SDGs*. <https://iris.thegiin.org/document/iris-and-the-sdgs/>

IRIS Metric	Summary	Rationale
Area of trees planted: Native Species (PI3848)	Area of land on which native species of trees were planted during the reporting period.	Metric provides an indication of the forest lands long-term sustainability.
Area of Trees Planted: Total (PI4127)	Area of land on which trees were planted by the organisation during the reporting period.	Metric provides an indication of the forest land's long-term sustainability.
Forest Management Plan (OI2622)	Indicates whether the organisation implements a forest management plan.	Metric provides an indication that management practices are being undertaken
Land Directly Controlled: Sustainably Managed (OI6912)	Area of land directly controlled by the organization and under sustainable cultivation or sustainable stewardship. Report directly controlled land area sustainably managed during the reporting period.	The metric provides an indication of the sustainability practices being implemented.
Greenhouse gas emissions avoided due the carbon offsets sold (P12787)	The number of metric tonnes of CO2 equivalent and corresponding monetary value.	The metric provides an indication of the financial value generated by the forest.
Ecosystem services provided (PD8494)	<p>Ecosystem services provided by land directory or indirectly controlled by the organisation during the reporting period. These are likely to include:</p> <ul style="list-style-type: none"> ▪ Biological raw materials ▪ Regulation of water timing and flows ▪ Erosion control ▪ Maintenance of soil quality ▪ Habitat ▪ Primary production ▪ Recreation and ecotourism ▪ Ethical/spiritual values ▪ Educational/inspirational values. 	Metric enables the instrument to describe, in a standardised way, the environmental and social value that the forest asset creates.
Jobs maintained at directly supported/financed enterprises: Total (P15691)	The total number of full-time equivalent employees working for enterprises financed or supported by the organisation at the end of the reporting	Metric helps to demonstrate the social and economic impact of the instrument funding, which is frequently in under-served rural communities.

4.4. UN Sustainable Development Goals

At the higher level, forest investment can also align with multilateral ambitions such as the United Nations' Sustainable Development Goals (UNSDGs). The UNSDG indicators do not generally have sufficient granularity to make distinctions between forestry projects, at least not to the degree that the GIIN strategies and IRIS metrics do. Nevertheless, it is worth noting that the instruments described below in Section 6 all align with the following targets:

Goal 13: Climate Action

- **Target 13.1**

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

- **Alignment with Paris Agreement**

The UNSDGs note that Goal 13's objectives for climate action are principally operationalised through the Paris Agreement.

Goal 15: Life on Land

- **Target 15.1**

By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

- **Target 15.2**

By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

- **Target 15.3**

By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

- **Target 15.4**

By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

- **Target 15A**

Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.

- **Target 15B**

Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.

5. Instrument Proposals

This section sets out the proposals for forest finance instruments. Each subsection begins with an overview of the instrument, a description of the finance gap that the instrument intends to fill, a detailed discussion of instrument structure, then finally a brief analysis of each instrument's impact strategy, additionality and feasibility. Further detail about the Lab's Methodology can be found in Appendix 1 and the Additionality Analysis in Appendix 2.

Each concept is distilled from a more comprehensive analysis which was workshopped and distributed to internal advisors. These involved a risk and risk-mitigation analysis, implementation process, and more detailed analyses of instrument structures, stakeholder roles, and constraints. Further details can be made available by the Lab on request; however, this Working Paper shall prioritise brevity over comprehensiveness.

5.1. Environmental Impact Bond

5.1.1. Overview

The Environmental Impact Bond (EIB) is a pay-for-results instrument that is designed to deliver native forest outcomes with reduced risk of project failure. By crowding in capital from multiple parties and re-allocating risk among them, the EIB will expand and sustain the capital pool for planting continuous native forest on erosion-prone marginal land in New Zealand. The foundation of the EIB is a commitment from a Primary Outcome Funder, such as a regional council, to pay for forest outcomes that meet pre-agreed impact

targets.³⁰ This commitment then draws in Partner Outcome Funders who stand to benefit from the impacts, as well as investors who purchase the bond and thereby supply the finance needed to establish forest. The mechanism enables regional councils (1) to crowd in additional funders and increase the pool of available capital, (2) to target highly vulnerable land where the public benefits of afforestation are greatest, (3) to pay directly for successful forest outcomes and thereby reallocate project risk onto impact investors, (4) bring forward the intervention and thereby the avoided costs, and (5) to create meaningful regional jobs by shifting contracting toward private- and community-sector service providers. The EIB proposed here is similar to the Native Forest Bond Scheme proposed by Mōhio in 2018,³¹ but repurposed for regional- rather than national-scale issuance. The standardisation of the EIB can lead to its replication elsewhere, thereby reducing transaction costs through scaling up.

5.1.2. The Finance Gap

In regards to New Zealand's afforestation strategy, one highly desirable outcome is to establish permanent or continuous-cover forest of predominantly native species on marginal erosion-prone land. A 2017 analysis for the Ministry for Primary Industries (MPI) puts the scale of moderate to extremely erosion-prone land suitable for afforestation at 1.131 million hectares, about 4.2% of New Zealand's total land area, at a cost of \$100–150 million per year through lost soil, nutrients and production; and damage to trees, houses, infrastructure, and waterways.³²

Two regions are especially exposed to these erosion risks: Manawatu-Wanganui and Tairāwhiti/Gisborne. For example, an MPI

³⁰ OECD & German Development Institute (DIE), 2014. *Technical Workshop on Results-Based Funding*. <https://www.oecd.org/dac/peer-reviews/technicalworkshoponresultsbasedfunding.htm>

³¹ See Sam Lindsay and David Hall, 2018. *Native Forest Bond Scheme: Indicative Business Case*. Auckland: Mōhio. Available on request.

³² See Ministry for Primary Industries website: <https://www.teururakau.govt.nz/dmsdocument/28985/direct>

analysis of Tairāwhiti/Gisborne puts the scale of moderate to extremely erosion-prone land suitable for afforestation at 200,000 hectares, about one-quarter of the region's total land area.³³ Retaining this land in pasture will lead to ongoing terrestrial erosion and sedimentation into waterways, which will be exacerbated by climate change as the frequency and intensity of extreme weather events increases. These impacts have financial implications for asset owners, whose risk damage from erosion and flooding in vulnerable catchments.

From a climate adaptation perspective, this erosion-prone pastoral land is a serious liability. From a climate mitigation perspective, it is an unrealised opportunity for carbon sequestration on land that is only marginally productive for farming. Accordingly, the New Zealand Government has launched initiatives to address this issue.

The Direct Landowner Grants being distributed through the One Billion Trees Programme provide subsidies for native planting (e.g. \$4,000/ha for native trees, \$1,800/ha for mānuka/kānuka and \$1,000 for native regeneration), as well as 'top-ups' for planting on erosion-prone land (\$500/ha). However, these grants are demand-led, so the upscaling of native afforestation is not only limited by the funding pool, but also by landowner demand. Moreover, because these grants only cover a proportion of the total costs – native forest restoration can cost anywhere between \$4,000/ha for assisted regeneration to \$66,000/ha for commercial quality forest – it is uncertain that the landowners most in need of capital are accessing the grants. Finally, grants are vulnerable to project risk, because landowners may lack requisite knowledge, resulting in high mortality rates. This also spills over into political risk for the

Government, because grants may come to be regarded as an ineffective use of public money.

The Government has also made \$34 million available through the Hill Country Erosion Fund (HCE) to help landowners and regional councils to assess and treat erosion-prone land: 'The HCE is a partnership between MPI, regional councils and landowners that aims to protect erosion-prone land through implementing sustainable land management practices. It funds projects that are beyond the scope of regional councils to address on their own and takes a total catchment approach involving landowners and community members to identify issues and create solutions. Nine regions have benefited from the fund since 2007.'³⁴

However, the scale of the problem far exceeds this scale of funding. Extrapolating from an analysis by Ekos, the cost of planting 200,000 hectares of new forest in the Tairāwhiti/Gisborne region would be \$385–600 million.³⁵ Alternatively, we might consider expenditure on particular projects, such as expenditure on emergency works along State Highway 35 caused by landslides and other weather related events over the last seven years. These have averaged \$3.2 million per year, far exceeding the budget of \$2 million per year. Failure to find the remaining capital will slow the region's progress and leave assets increasingly vulnerable to climate-related impacts.

There is no one solution to addressing this financing gap. Regional councils like GRC will have to take a both/and approach: on the one hand, spending existing funds as efficiently as possible, while on the other hand identifying new funding sources and financing approaches

³³ See Walsh et al. 2017. "Valuing the Benefits of Forests: Final Report", Report Prepared for the Ministry for Primary Industries. Wellington: NZ Government. See also MPI website (last accessed 8/2/2018): <https://www.mpi.govt.nz/funding-and-programmes/forestry/afforestation-grant-scheme/>

³⁴ Ministry for Primary Industries (MPI) website: <https://www.mpi.govt.nz/news-and-resources/media-releases/34-million-for-more-erosion-control-work-over-next-4-years/>

³⁵ Ekos, 2017. *Hawkes Bay Climate Resilience Programme*, p.6.

to extend the range of financing tools to adequately sustain projects.

5.1.3. Closing the Gap

Environmental Impact Bonds (EIBs) are a promising tool for New Zealand's forest finance toolkit. EIBs are a kind of results-based financing (RBF), or outcomes-based funding, where the results are defined in advance and outcome funders pay only once their successful achievement is independently verified.

The impact bond structure originated in the social sector as Social Impact Bonds (SIBs), then adapted to environmental outcomes by David Nicola in 2013.³⁶ The first ever EIB was issued on 29th September 2016 by Washington DC Water and Sewer Authority, sold to Goldman Sachs and the Calvert Foundation with the proceeds going towards establishing green infrastructure to control storm-water runoff and improve water quality.³⁷ The project manager, Quantified Ventures, is providing advisory services to other cities to replicate the EIB model elsewhere, including Louisiana to restore wetlands, Atlanta to enhance flood resilience, and Baltimore to address water pollution.³⁸

In the context of New Zealand's regions, the EIB may work like this: a Primary Outcome Funder, such as a regional council, would commit to realising a particular outcome, such as native forest established on vulnerable land. Because the Primary Outcome Funder may face budgetary constraints, Partner Outcome Funders will be identified to share the costs of outcomes, such as government

agencies or asset owners that stand to gain from the outcomes. This consortium of Outcome Funders will then guarantee to pay for the successful realisation of native forest outcomes, and will agree upon targets that must be met for repayment (e.g. x stems per hectare, y tonnes of carbon sequestered, z percentage of native species). On the basis of this guarantee, a bond is issued, which is purchased by impact-oriented investors with an appetite for premium environmental impacts. The proceeds are disbursed by an Intermediary, which manages the EIB, to Contractors who establish the forest in line with the impact targets. If the impact targets are met, then the investors receive the principal plus a coupon (or interest payment) in reward for the risk. If the impact targets are not met, then the investors face some kind of penalty, such as no coupon, or a reduction on the principal. In short, the payback is pegged to the project's success. (A fuller exposition of this model, the Native Forest Bond Scheme, which uses Treasury's Better Business Case framework, can be supplied by Mōhio upon request.)³⁹

In regions such as Manawatu-Wanganui and Tairāwhiti/Gisborne, an EIB transaction could be structured to expand and sustain the pool of capital for planting permanent or continuous-cover native forest on erosion-prone marginal land. The EIB mechanism would:

- crowd in additional 'partner outcome-funders' and increase the pool of capital;
- enable greater control over determining outcomes than grants by

³⁶ Nicola, D., 2013. *Environmental Impact Bonds*, CASE i3 working paper 1, Durham: Duke University Fuqua School of Business.

³⁷ See DC Water, 2016. 'DC Water, Goldman Sachs and Calvert Foundation pioneer environmental impact bond', Media Release, 29th September 2016. Retrieved from <https://www.dewater.com/whats-going-on/news/dc-water-goldman-sachs-and-calvert-foundation-pioneer-environmental-impact-bond>.

³⁸ See Dakoti Gangi, 2017. 'EDF and TNC partner on new Environmental Impact Bond to fund coastal restoration',

19th July 2017. Environmental Defense Fund (EDF) website. Retrieved from <http://business.edf.org/blog/2017/07/19/edfs-new-environmental-impact-bond-to-support-coastal-restoration/>

³⁹ See Lindsay and Hall, 2018. *Native Forest Bond Scheme: Indicative Business Case*, Auckland: Mōhio. Available on request.

aligning impact targets to where the public benefits of afforestation are greatest;

- reallocate project risk to impact investors by paying for successful outcomes only;
- enable planting to begin earlier through the mobilisation of investor capital, thereby bringing forward the avoided costs of erosion and sedimentation; and
- create meaningful regional jobs by shifting contracting toward private sector actors.

Consequently, this financing arrangement may lead to more secure long-term funding. Standard municipal bonds allow issuers to quickly access capital markets to finance critical public projects. Because entities such as regional councils have dedicated revenue sources, such as rates, municipal bonds are generally regarded as relatively low risk, enabling councils to borrow in their own name. The results-based payment structure also means that public outcome funders, such as regional councils, can reduce the risks of project failure and share the costs of intervention, thereby preserving prudence as a manager of public money.

Moreover, while the evidence on green bond pricing is still developing, there is emerging empirical analysis to support the hypothesis that premiums for green bonds are slightly lower than for standard bond equivalents, which implies a market preference for green bonds.⁴⁰ Accordingly, regional councils may be able to access capital on slightly lower than market rates, especially if reinforced with green bond accreditation through an organisation such as Climate Bonds Initiative.

⁴⁰ Baker, M. et al. 2018. *Financing the Response to Climate Change: The Pricing and Ownership of U.S. Green Bonds*. <http://dx.doi.org/10.2139/ssrn.3275327>; & Olivier Zerbib, 'The effect of pro-environmental

Finally, although the cost of capital is likely to be high for initial transactions, due to the EIB's complex structure and hence added transactions costs, these costs would diminish once the bond is standardised and replicated elsewhere. A pilot programme ought to be implemented in order to create a template for future deals.

5.1.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN's Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	X
Increasing production of sustainable non-wood forest products	√
Increasing sustainability of local economies and communities	√
Improving the conservation of forests and forest resources	√
Reduce net emissions through forestry	√

The EIB has a strong impact strategy with positive social and environmental impacts, given that its contracted outcomes are clearly defined in relation to the urgent problem of erosion-prone pastoral land in New Zealand, and also the creation of non-timber revenue through carbon sequestration. It is strongly additional (see Additionality Analysis in Appendix 2) by introducing a novel funding structure for environmental remediation which is designed to diversify and enlarge the capital pool. However, these strongly climate-aligned outcomes are dependent on strong commitments from the outcome funder, and a

preferences on bond prices: Evidence from green bonds', *Journal of Banking and Finance*, 98 (p. 39-60), 2019.

willingness to pay a fair price for the contracted and non-contracted outcomes. An advisable way forward is to establish pilot sites to acquire performance data and to consolidate effective contracts, then standardise this structure for replication elsewhere, such that the upscaling of EIBs overshadows the initial transaction costs.

5.2. Leveraged Carbon Fund

5.2.1. Overview

The Leveraged Carbon Fund (the LCF) aims to achieve new forest planting at scale by acquiring a diverse land base and forestry rights for establishing New Zealand Emissions Trading Scheme (NZ-ETS) qualified forests. The forests will produce long-term timber assets, as well as New Zealand Units (NZUs) that will be sold annually, on an Off-Take Agreement basis, for the lifetime of the Fund. Proceeds of the sale of NZUs will be used to service a loan that significantly leverages the Fund's assets. Achieving scale in both the timber and carbon stock will attract an institutional buyer of these assets at the end of the holding period. The Fund's aim is to create low-cost, high-value carbon sinks that generate a market-rate after-fee internal rate of return (IRR) to investors.

5.2.2. The Finance Gap

Timberland portfolios have historically been a common allocation for institutional investors both domestically and internationally. In New Zealand, NZ Super Fund's single largest investment is Kaingaroa Timberlands in the central North Island, valued at \$NZ1.5 billion,⁴¹ a holding comprising of 4% of the overall Fund's size. At a global level, the total amount of institutional investment in forestry has surged from an estimated US\$10–15

billion in the early 2000s to over US\$100 billion today.⁴²

While calls are growing for institutional investors to divest from fossil fuels and invest in forestry to tackle climate change,⁴³ the main drivers behind the growth in forestry allocations are more commonplace. Institutional investors have traditionally allocated to forestry for similar reasons as for other real assets such as real estate and commodities. Timber is a useful way of diversifying a fund's portfolio, particularly as an inflation hedge, or as an asset with a relatively low correlation to equity and bond markets (see Section 3.2). Other factors are more specific to the forestry industry, such as long-term appreciation of the underlying land, the growth in value of trees as the forest matures, and the potential for multiple income streams from different uses of the assets, such as timber production and sale of carbon credits. As a long-term, relatively illiquid asset, timber is not suitable for all investors and, hence, institutional investors will expect to be compensated for the illiquidity through a return premium over time.

As institutional investors increase their public commitments to impact investing, forestry investments also become increasingly attractive to asset owners and managers for their ability to deliver positive environmental impacts, such as climate change mitigation and land restoration, and social impacts, such as community resilience and quality job creation. Planting and managing forests requires significant capital investment and, because forests take decades to mature for harvesting, investments in forestry are ideally suited to long-term sovereign or institutional investors with patient capital.

However, asset managers in the sustainable timber space face a persistent challenge in raising capital from institutional investors,

⁴¹ As at 30 June 2016.

⁴² UNPRI, *Forestry: An Emerging Asset Class*, 2019. <https://www.unpri.org/forestry/forestry-a-growing-asset-class/4391.article>

⁴³ <https://www.greenpeace.org/new-zealand/press-release/super-funds-950m-fossil-fuel-divestment-aha-moment-for-nz-economy/>

especially from overseas. Insofar as New Zealand relies on afforestation to meet its climate change obligations through the Paris Agreement, this challenge in raising capital has serious implications. However, in order to attract greater institutional investment from within New Zealand and from overseas, investors will need certainty that they can deploy a meaningful level of capital where there is liquidity throughout the lifespan of the forest.

5.2.3. Closing the Gap

The LCF aims to create significant volumes of negative emissions – that is, to remove CO₂ from the atmosphere through carbon sequestration – by financing and developing forests that generate New Zealand Units (NZUs). It is guided by the assumption that NZUs are currently undervalued, given that higher carbon prices will be needed to drive emissions reductions to meet New Zealand's international commitments, particularly the 2030 target to reduce emissions to 30 per cent below 2005 levels. The Fund aims to take advantage of this potential mispricing, while providing much-needed upfront capital for climate mitigation and conservation finance.

The LCF would achieve this by acquiring forestry rights across a geographically diverse land base to establish ETS-eligible forests to sequester carbon and generate NZUs.⁴⁴ The LCF would target the purchase and licensing of marginal land suited to afforestation and develop a portfolio of NZU assets and forest assets comprising of predominately production forests with some permanent native forests. The LCF could also include a portfolio of continuous cover forests, potentially incorporating the proposed Continuous Cover Forestry Fund (see §5.3) as a subsidiary.

⁴⁴ For more information refer to <https://www.teururakau.govt.nz/growing-and-harvesting/forestry/forestry-in-the-emissions-trading-scheme/forest-land-in-the-ets/>

⁴⁵ This structure is seen in the Dryland Carbon partnership. The partnership includes greenhouse gas (GHG) emitters such as Z Energy and Air New Zealand

Forest insurance would be a necessary expenditure.

The LCF would acquire lands primarily via fee simple (also known as freehold) holdings, and, where appropriate, through forestry rights. The General Partner who manages the Fund would establish fast-growing forest that are actively managed for maximum growth rates to improve timber yield and NZU volume. Over the course of the holding period, NZUs would be sold to the Counterparty (i.e. a large emitter) in the year that they are certified by the New Zealand Government. Each sale would be contracted to a rated counterparty on a long-term, off-take agreement basis over the lifetime of the Fund. The Limited Partners in the LFC structure would be private investors; however, this could also be a role for large-scale emitters⁴⁵ and institutional investors. The LCF may be listed to increase liquidity and gain wider access to investors.

Proceeds of the sale of NZUs would be used to service a loan facility that prudently leverages the fund's pool of available capital. The primary strategy is to achieve sufficient scale in both the timber and carbon stock to attract an institutional buyer of these assets at end of the fund's lifetime. Since the LCF investments are repaid through the sale of NZUs to a counterparty, which represent a verified and quantifiable emissions reduction, the LCF's financial returns are directly tied to a recognised climate mitigation activity.

5.2.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN's Navigating Impact, see Section 4.

who seek a regular supply of NZUs for offset or surrender use, and for landowners seeking to income from marginal land without having to invest capital.

Impact Strategy	
Increasing production of sustainable wood products	X
Increasing production of sustainable non-wood forest products	X
Increasing sustainability of local economies and communities	X
Improving the conservation of forests and forest resources	X
Reduce net emissions from forestry	✓

The LCF has only a weak impact strategy, insofar as it is primarily designed to upscale business-as-usual forest systems by improving access to capital, not to improve the sustainability or impactfulness of existing forestry systems. Accordingly, it is moderately additional (see Additionality Analysis in Appendix 2) by promising to crowd in capital by accessing new sources, yet relying on conventional forest management systems. In other words, it is focused more on quantity rather than quality of forests.

5.3. Continuous Cover Forestry Fund

5.3.1. Overview

The Continuous Cover Forestry Fund (‘the Fund’) is designed to upscale continuous cover forestry (CCF) in New Zealand by bridging the barriers of finance, facilitation and specialist technical knowledge. The Fund would purchase forestry management rights from forest owners who want to exit from clear-fell systems, then transition these forests into continuous cover forestry over time. Crucially, the vertical integration of specialised capabilities into the Fund, particularly through

⁴⁶ For a review of CCF in the New Zealand context, see Ian Barton, 2008. *Continuous Cover Forestry*. Pukekohe: Tane’s Tree Trust.

acquiring silvicultural expertise and specialised equipment, can assist the Fund to overcome existing barriers for CCF, and to create impact-first forestry assets that satisfy strong sustainability requirements among investors. This model is feasible for conventional species, such as *Pinus radiata*, but promises optimal long-term outcomes for high-value timber species, including natives such as totara, which offer a unique proposition for future markets (see Appendix 3).

5.3.2. The Finance Gap

Continuous cover forestry (CCF) refers to forest management systems, such as selective harvesting or small coupe felling, that maintain a continuous canopy cover throughout the practice of timber extraction. For example, the National Environmental Standards for Plantation Forestry (NES-PF) defines ‘low-intensity harvesting’ as maintaining a minimum of 75% canopy cover at all times for any given hectare of forest land.

CCF is relatively rare in New Zealand.⁴⁶ It is, however, prevalent elsewhere in the world, especially northern Europe.⁴⁷ Broadly speaking, CCF is preferred over clear-fell forestry because of its avoidance of negative social and environment impacts and its mitigation of certain risks. In particular, CCF is valued for:

- **Reduced incidence of erosion and sedimentation:** because CCF maintains a continuing presence of forest, hence no “window of vulnerability” following harvest.
- **Reduced debris management:** because forestry debris is trapped by other trees and absorbed into forest litter.

⁴⁷ For instance, see the Pro Silva website <<https://www.prosilva.org/>> which promotes close-to-nature forestry throughout Europe.

- **Reduced disruption to native flora and fauna:** because the forest ecosystem and hence habitat for biodiversity is minimally disrupted.
- **Delivers stable and ongoing cash yield:** because selective harvesting brings timber continually to market, like clipping the coupon on a bond, with less exposure to timber price fluctuations (see Appendix 3 for further discussion).
- **Reduced biophysical risks from fire, pests, diseases and windthrow:** because uneven-aged forests, especially with diverse species, are more resilient and therefore less vulnerable to catastrophic forest loss than even-aged monoculture forests.
- **Reduced risk of loss of social licence to operate:** because environmental risks are fewer, employment opportunities are ongoing, and aesthetic value is sustained by continuous canopy cover.

From a climate finance perspective, these features of CCF contribute to its alignment to climate adaptation objectives. Firstly, a CCF forest, with a diverse mix of age and species, is likely to be more resilient to shocks and less prone to catastrophic forest loss than an even-aged monoculture. Secondly, the forest will hold a carbon stock that is roughly equivalent to the average carbon sequestered by a clear-felled plantation forest over consecutive decades, although without the saw-tooth pattern of rotation cycle. As such, it will see a similar carbon revenue stream to an equivalent clear-felled forest under the ETS's averaging approach.

Thirdly, CCF plantation forestry is a profitable land use. This is demonstrated for

conventional forestry species, such as the Wardle family's Woodside forest near Oxford, which harvests *Pinus radiata* under a target diameter system. Further modelling predicts that this system could be profitable elsewhere, albeit slightly less profitable than clear-fell forestry (see Appendix 3 for further discussion). However, the opportunity for CCF really lies with high-grade logs from high-quality species which cater to premium markets. In particular, there is an opportunity for New Zealand to be a supplier of unique indigenous timbers with highly coveted characteristics. Such forests would enjoy strong social licence from tangata whenua and local communities, as well as added environmental benefits. As Maiti Andrews-Cookson told us, 'Transitioning forests to indigenous CCF provides a valuable way to restore mana to iwi' by re-establishing native timbers for Maori cultural use such as mahi whakaira. Moreover, from a financial perspective, while the market price for *Pinus radiata* (at the time of writing) is around \$120 per cubic metre, totara can achieve a wholesale price of \$2,000–3,000 for high-grade heartwood, or up to \$4,000 for air-dried heartwood.⁴⁸ These high prices, plus some immunity to the market volatility for *Pinus radiata*, can offset some of the higher forest management costs of CCF, and may even warrant the more costly forms of extraction which are suited to steep slopes (such as cable or aerial systems). The disadvantage, of course, is that native species are slower growing; for example, totara may take twice as long to reach the same standing volume that *Pinus radiata* achieves in 25 years. However, for institutional investors with long time horizons, the shift to native timber may create the opportunity for investors to outperform more short-term focused investors over the long-run.

As such, CCF is a sorely under-realised asset class that would deliver significant public value

⁴⁸ Paul Quinlan, 2011. *Existing Uses and Market Development Opportunities for Naturally Regenerating*

Totara Timber. SFF Project (L10/145) Report for the Northland Totara Working Group.

and opportunities for sustainable forestry with significant social and environmental impacts.

The major barriers to CCF (according to interviews with forestry experts) are:

- an unwillingness among forestry-sector incumbents to accept a reduced rate of return by transitioning forest assets from clear-fell to CCF;
- a lack of technical expertise in selective harvesting;
- limited access to specialised harvesting equipment;
- cultural and institutional inertia (or path-dependencies) which lock-in clear-fell systems; and
- perceived risks (real or imagined) by land- and forest-owners for an unfamiliar silvicultural system.

If these transitional barriers were overcome, then there are growing opportunities to engage with new investors who have an interest in sustainable and impact-oriented investments.⁴⁹ Moreover, such investors may not be dissuaded by potentially lower rates of return, because they buy into this rate of return from the outset, rather than accept a lower rate of return on an existing investment.

Also, there are new windows of opportunity for CCF, especially as social licence diminishes for clear-fell forestry in particular catchments, as awareness of climate-related weather risks increases, and as regulatory constraints tighten. On the latter point, it is important to mention the National Environmental Standard for Plantation Forestry (NES-PF), introduced in May 2018. This has made conventional clear-

fell plantation forestry a discretionary activity on land classed as red-zoned for erosion susceptibility.⁵⁰ However, the NES-PF defines certain continuous cover forestry systems as a permitted activities for which resource consent is not required, both for selective harvesting where >75% of canopy cover is maintained on any hectare of forest land, and small-coupe harvesting where no more than 2 hectares are removed in a year. This creates a significant advantage for CCF under the NES-PF on red-zoned sites, because it does not face the costs and risks of applying for a resource consent. This could include red-zoned land being converted from pasture to forest, which would be susceptible to erosion if not forested, but unattractive to foresters committed to a clear-fell system.⁵¹ Under the right conditions, it could also involve the conversion of forests which were historically planted with an intention to clear-fell, but risk infringing new rules, incurring liabilities, or suffering loss of social licence if clear-felled as intended. Such forests risk becoming 'stranded assets', where the expected return on investment cannot be realised. However, such forests could potentially be managed under a CCF system as a permitted activity, thereby securing a more modest long-term revenue stream.

5.3.3. Closing the Gap

The Fund creates a new opportunity for investors to buy-into the distinctive value proposition of CCF, accepting a lower rate of financial return alongside greater environmental benefits and the mitigation of various risks. The Fund would involve vertical integration by acquiring forestry management rights, as well as the necessary expertise and specialised harvesting equipment, much of which is lacking in New Zealand's forestry sector. However, as the Fund scales up, this

⁴⁹ GIIN 2019. *Scaling Impact Investment in Forestry*.

⁵⁰ See the Ministry for Primary Industries website: <https://www.mpi.govt.nz/growing-and-harvesting/forestry/national-environmental-standards-for-plantation-forestry/>

⁵¹ Gepp, Wright & Hall, 2019. *A Review of the Resource Management (National Environmental Standards for Plantation Forestry Regulations 2017. Report prepared for Environmental Defence Society (EDS) and Forest & Bird*. Retrieved from: <http://www.eds.org.nz/assets/pdf/Review%20of%20NES-PF%20FINAL.pdf>

vertical integration 'creates operational efficiencies that can enhance return and allow for better management of risk.'⁵²

The Fund would create revenue through the purchase of forestry rights, then the subsequent management of these forests under CCF principles. The Fund would purchase forestry rights from forest owners whose assets are (1) at risk of being stranded if managed under a clear-fell system due to regulatory changes, risks of environmental damage (such as erosion), threat of litigation, or prospective loss of social licence; and (2) suitable for being converted into a CCF system (i.e. forests with existing stand diversity). Essentially, the Fund would offer an exit strategy for forest owners whose forests risk becoming 'stranded assets', but which could nevertheless be a desirable and profitable asset, especially under the different expectations of more impact-oriented investors. The Fund could manage these transitions by taking full ownership of the forest, or partial ownership as a joint venture.

The Fund uses the unique value proposition of CCF to attract investors who are willing to buy into its integrated social and environmental and financial impacts, ideally with a focus on native species or the conversion to native species (through interplanting and succession) over the long-run. Given the Fund's underlying proposition, it is also likely to be attractive to mission-oriented public-sector entities, because of the additional public value that CCF generates, especially as part of climate adaptation strategy, and also the opportunity to have a catalytic and transformative effect on the forestry sector by upscaling CCF and building national capabilities and expertise which will have residual benefits throughout the forestry sector more widely. An international example is the €12.5 million investment that the European Investment Bank (EIB) made through its natural capital finance facility (NCFC) for CCF in Ireland, with

⁵² GIIN 2019. *Scaling Impact Investment in Forestry*, p.26.

the intention of having a catalysing effect in a country also dominated by clear-fell systems.

The Fund could take a variety of institutional forms. It could use a similar structure to the Leveraged Carbon Fund, or be a subsidiary within the Leveraged Carbon Fund proposed above (see §5.2). Or it could model itself as a Timberland Investment Management Organisation (TIMO) with a niche impact-oriented interest in building a portfolio of CCF assets. Or, if structured as a joint venture with Government through a blended finance arrangement, it could be structured as a Special Purpose Vehicle to enable multiparty funding.

5.3.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN's Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	✓
Increasing production of sustainable non-wood forest products	✓
Increasing sustainability of local economies and communities	✓
Improving the conservation of forests and forest resources	✓
Reduce net emissions through forestry	✓

The Continuous Cover Forestry Fund has a strong impact strategy by its mission-oriented pursuit of impact-oriented forestry investment. It is also strongly additional (see Additionality Analysis in Appendix 2), by upscaling a forest management system that is rare, and thereby creating premium investment opportunities. However, there are

significant uncertainties about its feasibility, particularly the scale of diverse forest stands that could be converted into CCF for short-term revenue, and also access to human capital. Creating a project pipeline – that is, suitable forests for conversion to CCF with willing sellers of cutting rights – would be vital. Given the significant public value of upscaling CCF, plus the wider multiplier effects as forestry workers gain experience and expertise in managing forests under a CCF regime, there is a strong case for Government participation. The rarity of CCF could justly be perceived as a market barrier for which public investment is warranted, in order to diversify and future-proof New Zealand’s forestry sector.

5.4. Green Covered Bond

5.4.1. Overview

Covered bonds issued by banks supported by high-quality forestry assets in New Zealand. The cover pool would be constituted by certified sustainable forests (such as Forest Stewardship Council certification), or forests that attain even greater impact standards by setting aside land of particular conservation value, increasing forest diversification, or increasing biodiversity or erosion protection. In addition, bonds would be issued under a green bond framework, such as the Green Bond Principles or Climate Bond Initiative standards. Bonds would mainly be marketed to institutional investors who wish to invest in projects that mitigate climate impact and that promote sustainable development in the forestry sector.

5.4.2. The Finance Gap

Sustainably managed and certified forests face a number of financing challenges compared to conventionally managed forests. This is primarily because sustainably managed forests tend to accrue fewer benefits in the short-term yet greater benefits over the long-term. A major factor driving the financial

disadvantage in sustainably managed forests is the slow growth-rate achieved in indigenous forests compared to exotic forest species. Moreover, sustainably managed forests often require activities (such as the preparation of forest management plans and chain of custody certification) that increase the upfront costs of the plantation, further reducing profitability. Through improvements in silviculture practices, pricing and market access and technological advancements, the price competitiveness for sustainably produced timber may improve over time. However, these forests often lack access to traditional capital markets and highly regulated institutional investors as sustainable forest managers struggle to communicate the risk/return profile to prospective Limited Partners (LPs), as well as understand the investment requirements of the LPs. This can contribute to long due diligence processes and high transaction costs, thus restricting the flow of scalable investment products into the market and reducing the flow of capital into the sector in general.

5.4.3. Closing the Gap

A covered bond is a bond that is backed by a pool of high-quality assets originated by the issuing bank. The so-called ‘cover pool’ consists of relatively low-risk assets, such as real estate. If this pool of assets that meet certain environmental criteria, such as energy-efficient buildings or sustainable forestry assets, then the covered bond may be designated ‘green’ in reference to a relevant standard, such as Climate Bonds Initiative.

Cover pool assets are segregated from a bank’s other assets so that covered bond investors are able to enforce their security interest over them in the event of the bank’s default. Crucially, this structure creates greater security by providing dual recourse via the issuer’s balance sheet and a legally ring-fenced bankruptcy-protected pool of assets. Covered bond issuance thereby improves banks’ ability to source long-term funding

from investors by issuing much higher-rated debt.⁵³ This potentially enables banks to make loans for the eligible assets at a lower cost.

In regards to forestry, in 2018, Landshypotek Bank issued Sweden’s first green covered bond to finance sustainable forestry. At USD\$5.6 billion, it is also the largest green issuance ever made in the Swedish market. The bond has a ‘cover pool’ of certified sustainable forests (Programme for the Endorsement of Forest Certification, or Forest Stewardship Council) which set aside 5% of productive land area for conservation. Properties must have 5% deciduous trees to promote increased diversification, increased biodiversity and storm protection. The forests are privately owned, and the bond is backed by forest holdings totalling 320,000 hectares (for comparison, this is more than 5 times the size of Lake Taupo). The forests are expected to absorb more than two million tonnes of CO2 every year, or about 40,000 tonnes CO2 for every USD\$100 million invested. The bond has been issued under a green bond framework that is pursuant to the Green Bond Principles. The framework received a second opinion from Centre for International Climate and Environmental Research (CICERO) and was given a Dark Green shading.⁵⁴

There is approximately 1.2 million hectares of FSC certified forest in New Zealand. This amount of FSC land would suggest that New Zealand has the volume of assets for a bond of this nature, especially if other sustainable forestry practices are taken into account in the green bond framework. The bond’s green credentials could be deepened by adding further requirements, such as the retention of permanent forest on sites that are highly susceptible to erosion, or a required transition

⁵³ Because green covered bonds are a relatively new product, there are not enough case studies to confirm this via empirical analysis. However, a recent indicative analysis of issuance from Deutsche Hypothekenbank and Landesbank Berlin found that ‘the green covered bonds priced inside the issuer’s interpolated yield curve’. See S&P Global Ratings, ‘Credit FAQ: What’s Behind The Rise In Green Covered Bond Issuance?’, June 26, 2018, <https://www.spratings.com/documents/20184/4918240/Green+Covered+Bonds.pdf>

into continuous cover forestry systems (as discussed in §3.1).

The Reserve Bank of New Zealand imposes a limit on banks’ issuance of covered bonds. This limit is set at 10 percent of a bank’s total assets, in order to balance the benefits of covered bond issuance against the potential impact on unsecured creditors. Therefore, each new issuance would have to be considered on a case-by-case basis with the issuing bank.

5.4.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN’s Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	√
Increasing production of sustainable non-wood forest products	√
Increasing sustainability of local economies and communities	X
Improving the conservation of forests and forest resources	√
Reduce net emissions through forestry	√

Green Covered Bonds have a strong impact strategy, given that the cover pool focuses on certified sustainable forest management. Importantly, but to a lesser extent, Green Covered Bonds incorporate forest conservation and restoration practices,

⁵⁴ CICERO notes that forest management may entail the use, contracting or purchase of machinery running on fossil fuels. It encourages the extension of Landshypotek’s framework to record these emissions and to promote the use of biofuels in order to align forest management operations with the requirements of the future low carbon society. This extension may also be relevant in a New Zealand context given our heavy reliance on hydro-electricity and a potential need to diversify renewable energy sources in the future.

thereby pushing the product toward the impact-first end of the investment spectrum. The key aims are to promote the green tagging of sustainable forests, incentivise forest owners to improve their forest management practices, acquire new properties at preferential interest rates, and collect data on the environmental benefits of such lending practices. The emphasis on sustainable practices and public disclosure may, in turn, attract new investors; thereby helping to generate stable demand, pricing and liquidity for a series of green covered bonds that focus on more diverse climate-aligned outcomes (such as energy efficient mortgage lending). Despite the recent rise of issuance internationally, there remains scope for growth, as the volume of green covered bonds is well below the broader green bonds market. Green Covered Bonds are moderately additional (see Additionality Analysis in Appendix 2) given that the product is an extension of green finance into the traditional area of covered bonds, which banks are familiar with. It is worth noting, however, that the Reserve Bank of New Zealand sets out a number of requirements relating to covered bonds, which each issuing bank would need to meet.

5.5. Climate Risk-Adjusted Loans

5.5.1. Overview

Climate change creates risks not only for asset owners, but also the creditors who finance them. Creditors have an interest in seeing these risks adequately managed, and can influence the activities of asset owners through the terms on which finance is offered. Climate risk-adjusted loans are a family of potential financial products that reflect climate risk through the setting of interest rates. Firstly, Climate Resilient Loans are a potential class of forestry loans that offer lower interest

rates to forest managers who implement climate adaptation best practices. Secondly, Sustainability Improvement Loans (SILs) adjust the interest rate over time to reflect ongoing changes to the sustainability practices of the borrower. Either strategy may help to incentivise sustainability practices among forest managers, especially where these practices correspond to climate-related risks from physical impacts or environmental litigation.

5.5.2. The Finance Gap

Climate change increases the frequency and severity of natural events – such as extreme weather events like windstorms and drought, or novel outbreaks of pests and disease due to changing temperature and humidity levels – which makes forest investment riskier. It is noted that, in general, climate adaptation faces a significant financing gap, with only 6.5% of global climate finance flows directed toward adaptation or dual mitigation/adaptation projects and activities.⁵⁵ Similarly, it has been estimated that only 3-5% of green bonds proceeds can be traced to adaptation and resilience (worth about US\$12 billion).⁵⁶

This poses challenges for the forestry sector – with further implications for the national interest, given New Zealand’s reliance on plantation forests for negative emissions. Catastrophic forest loss would not only have serious economic implications through the loss of timber assets and jobs, but it could frustrate national efforts to reach emissions targets. For example, it is estimated that the cumulative impact of the mountain beetle outbreak for British Columbia in the 2000–2020 period will involve losing 270 million tonnes of carbon. The outbreak converted B.C.’s forests from “a small net carbon sink to a large net carbon source both during and immediately after the

⁵⁵ Buchner, Barbara; Pdraig Oliver, Xueying Wang, Cameron Carswell, Chavi Meattle, and Federico Mazza, 2017. *Global Landscape of Climate Finance 2017*. San Francisco: Climate Policy Initiative.

⁵⁶ Parhelion Underwriting, 2018. *Forest Resilience Finance - Opportunities and Challenges*. Report commissioned by the Government of Switzerland, Federal Office for the Environment (FOEN) for Forest Adaptation Finance side-event at UNFCCC COP 24.

outbreak.”⁵⁷ A similar event in New Zealand could make it challenging to reach emissions targets through domestic reductions, creating a risky and potentially costly dependency on international units.

In this changing context, forest adaptation options are recommended, such as the reduction of rotation lengths for clearfell forestry, a shift from monoculture to mixed stands, planting alternate genotypes or new species, sanitation thinning, and other strategies.⁵⁸ Yet these adaptation strategies may involve high costs for forest-owners because they may require extensive modifications to forest management. There is a role for finance to encourage and enable these adaptation strategies, in order to reduce the risks to forest assets. Creditors and investors also have a financial interest in risk mitigation that meets the evolving challenges of climate change.

Private insurance can help to mitigate the financial costs of forest loss. A 2010 survey of forest companies which own or manage nearly 60% of New Zealand’s plantation estate found that 36% of this forest was insured for fire, and only 19% insured for wind.⁵⁹ Generally, small forest owners tended to have insurance, whereas large forest owners relied on self-protection and self-insurance through forest management decisions. From a climate policy perspective, these latter strategies are vital, because insurance only covers the financial liabilities from the loss of carbon, not the material loss and its contribution to CO₂ emissions. As such, it has been noted that forest insurance contracts could themselves be vectors for encouraging adaptive management.⁶⁰ However, internationally,

forest insurance has low uptake; indeed, New Zealand, by global standards, has relatively high levels of forest insurance which reflect its relatively high risks. Self-protection and self-insurance are likely to remain key vectors for navigating climate risks.

Finally, climate risks are not only biophysical, but also social. Certain forest management practices, due to their environmental and cultural impacts, may increasingly find their social licence to operate (SLO) withdrawn. This creates project risk where certain activities are subject to public opposition, or resistance from shareholders or staff; or regulatory risk where certain activities are prohibited by law. It also creates liability risk where plaintiffs seek compensation through litigation. Ultimately, these can be costly for forest managers, and further increase the risk of default on outstanding loans.

5.5.3. Closing the Gap

Climate Resilient Loans (CLRs) offer lenders flexibility in debt-to-income and other underwriting considerations, so that borrowers can qualify for larger loans or lower interest rates if their activities achieve certain standards for climate resilience. A CLR might be concessional, offered on below-market interest rates in order to reflect its reduced risk. Alternatively, the CLR could be benchmarked at market rates, while the risks of forests that do not meet climate resilience standards could be priced into loans.

An analogy can be drawn with green mortgages. A 2013 study of American homes with or without ENERGY STAR ratings found that ‘default risks were on average 32 percent lower in energy-efficient homes, controlling for

⁵⁷ W. A. Kurz et al., 2008. ‘Mountain pine beetle and forest carbon feedback to climate change.’ *Nature* 452(7190): pp.987-990.

⁵⁸ Spittlehouse D. L. & Stewart R. B., 2003. ‘Adaptation to climate change in forest management.’ *BC Journal of Ecosystems Management* 4:1-11. Bolte A. et al. 2009. ‘Adaptive forest management in central Europe: climate change impacts, strategies and integrative concept.’ *Scand J Forest Res* 24:473-482. Yousefpour R. et al., 2012. ‘A review of decision-making approaches to handle

uncertainty and risk in adaptive forest management under climate change.’ *Ann For Sci* 69:1-15; Keenan R. J., 2015. ‘Climate change impacts and adaptation in forest management: a review.’ *Ann For Sci* 72:145-167. ⁵⁹ Manley B. & Watt R., 2009. *Forestry insurance, risk pooling and risk minimisation options*. Report prepared for MAF Project CM-09 under MAF POL 0809-11194. ⁶⁰ Brunette, M., Couture, S. & Pannequin, F., 2017. *Annals of Forest Science*, 74(41). <https://doi.org/10.1007/s13595-017-0639-9>.

other loan determinants.⁶¹ As the study concludes: 'By reducing the household energy burden, the models suggest that owners of efficient homes are more likely to continue to meet their mortgage obligations.' Applied to forestry companies, the same logic follows. Forest managers who take climate risks seriously, and who integrate adaptation 'best practice' into the forestry management systems, will be less likely to default. This justifies a reassessment of interest rates, especially by pricing the risks of forest managers who have not implemented adaptation practices.

An alternative to CRLs is Sustainability Improvement Loans (SILs). SILs have been defined as 'loans that involve conditionality related to the sustainability performance of the borrower. In these instruments, the borrower receives a lower interest rate if they improve the performance on a sustainability indicator... [T]hese aspects of sustainability performance can reduce environment-related risks and thus credit risk, some of which can be passed on to the borrower in lower interest rates.'⁶² Existing SILs typically involve 'revolving credit facilities whose interest rate is partially adjusted (a premium or discount is usually applied to the margin) depending on the evolution of the borrower's sustainability performance... [which] may either be assessed based on external ESG ratings or KPIs, on the reaching of internal sustainability targets measured internally or externally, on the company's listing on a sustainability index, or on several of the above at the same time.'⁶³

In contrast to the CLR, an SIL rewards improvement, not mere achievement, thus it continues to encourage further sustainability

gains and doesn't simply reward past achievements.

It is noted that – all things being equal – SILs may negatively impact banks' profitability in two ways. First, SILs would involve higher due diligence requirements and associated operational expenses. However, as long as there is an economy of scale, such costs would typically be marginal over time. Second, SILs may forego revenue through lower interest rates, which may hinder the upscaling of the product. (The same is also true for CRLs.) Thomä et al. argue that this could be compensated through a Green Supporting Factor: a limited risk-weight adjustment (10-20%) to the capital requirements for the loan (see further discussion in Section 6).⁶⁴

5.5.4. Impact and Additionality Analysis

For a description of the impact strategies in GIIN's Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	√
Increasing production of sustainable non-wood forest products	X
Increasing sustainability of local economies and communities	√
Improving the conservation of forests and forest resources	√
Reduce net emissions through forestry	√

61 UNC Center for Community Capital & Institute for Market Transformation, 2013. *Home Energy Efficiency and Mortgage Risks*. Research Report. https://communitycapital.unc.edu/files/2013/03/IMT_UNC_HomeEEMortgageRisksfinal.pdf

62 Jakob Thomä, Ben Caldecott, Soline Ralite, 2019. *Sustainability Improvement Loans: a risk-based approach to changing capital requirements in favour of sustainability outcomes*. Berlin, 2° Investing Initiative; Oxford, Smith School of Enterprise and the Environment, p.4.

63 Jakob Thomä, Ben Caldecott, Soline Ralite, 2019. *Sustainability Improvement Loans: a risk-based approach to changing capital requirements in favour of sustainability outcomes*. Berlin, 2° Investing Initiative; Oxford, Smith School of Enterprise and the Environment, p.5.

64 Ibid. See also Jacob Dankert, Lars van Doorn, Henk Jan Reinders and Olaf Sleijpen, 2018. *A Green Supporting Factor – The Right Policy?* SUERF Policy Note, Issue No 43, October 2018, De Nederlandsche Bank N.V. (DNB).

Climate Risk-Adjusted (CRA) Loans have a strong impact strategy, as a potentially powerful mechanism for inducing better sustainability outcomes in the forestry sector, especially among the large forestry companies that are most reliant on bank debt (see §3.2). This instrument is founded on a strong alignment with creditors' concerns to manage risks of default and the implementation of more climate-aligned forest management. Insofar as CRA Loans involve fairly standard practices of risk adjustment, these loans are moderately additional (see Additionality Analysis in Appendix 2). However, CRA Loans, such as the proposals above, are likely to emerge organically from the market, especially as improved knowledge of actual and potential climatic impacts emerges from climate change risk assessments. Given that such information would be required to implement an instrument of this kind anyway, a more prudent use of resources is to undertake the risk assessments themselves, and to pull together evidence for adaptation frameworks.

5.6. Community Funding Program

5.6.1. Overview

The Community Funding Programme is a project-level structure for raising low-cost capital for investment-grade issuers like local councils to deliver climate adaptation, community resilience and biodiversity outcomes. The underlying bond would have a retail format, in order to meet market demand for green or climate-aligned investment opportunities. Given the low credit risk of issuers and the bond's strong exposure to positive social and environmental impacts, it is anticipated that the bond could offer low interest rates. Moreover, by subordinating financial imperatives to a strong alignment to community aspirations, market barriers to delivering ecologically desirable outcomes can be overcome by leveraging greater commitments of volunteer labour, public funding contributions, and coordination with

existing initiatives involved in ecosystem restoration and pest control.

5.6.2. The Finance Gap

Retail investors have changing expectations about where their savings are invested. Principles of responsible investment are growing in prominence and increasingly include climate change as a factor, by screening out fossil fuel investments or increasing exposure to investments that support the low-emissions transition. In New Zealand, initiatives like Mindful Money are educating retail investors about where KiwiSaver funds are invested, and offering tools to identify which funds better match their ethical preferences.

There are, however, limited retail investment options for climate finance available in New Zealand. Although several impact funds have emerged in New Zealand in recent years, these are only open to professional investors. This leaves a gap in the market for retail offerings that are specifically aimed to assist with climate transition and resilience work in New Zealand communities.

New Zealand does have an active retail bond market. Typically, these bonds are issued by investment-grade rated corporates, household name companies, and local government bodies. However, only a few green bonds have been issued in retail format, and these have tended to finance or refinance business-as-usual activities that happen to be environmentally friendly, rather than additional activities which create new climate-aligned impacts. While Government is a natural funder of additional activity that generates community-wide benefits, it is constrained by its funding cap, and disinclined to issue green sovereign bonds that create quality distinctions in sovereign debt.

5.6.3. Closing the Gap

A Community Funding Programme (henceforth, the Programme) with a focus on climate adaptation, community resilience and biodiversity outcomes would create a retail offering that is clearly aligned to social and environmental benefits in a given area. The bond would be issued by an investment-grade entity, such as a city or regional council. The finance raised would be used to fund projects with benefits that clearly accrue to local communities. It would also establish a platform to crowd-in contributions from other public and private entities with an interest in the targeted outcomes, and to coordinate volunteer work in the community.

The Programme is, in certain respects, a similar play to the Environmental Impact Bond discussed earlier (see §5.1). However, where the EIB is oriented toward the interests of investors who require a financial rate of return, the Programme is oriented toward the interests of local communities who benefit most from the optimal balance of social, environmental and economic benefits. As such, the Programme is not a standard commercial model, which conforms to conventional expectations of risk and return. However, by directly maximising the public good, the Programme can crowd in public and philanthropic funding, in-kind support from corporates, and community volunteering – all of which reduce the cost of capital.

Accordingly, the Programme would be structured around an agreed project, whose financing requirements would be met through the issuance of a bond to fund council, community organisation and private contractors. Each project would take a holistic approach aimed at delivering defined outcomes, but with flexibility to adapt and improve programs, and to explore better ways of achieving outcomes.

The bond underlying the Programme would be repaid by revenue from the sale of wood and

non-wood forest products, such as NZUs or other carbon credits, income from selective harvesting, and so on. The Programme would also be supplemented for initial upfront planting and maintenance costs by partnering with community organisations such as Trees that Count and Predator Free 2050, as well as public sector funding for non-market goods such as erosion control or natural hazard mitigation. There might also be some income stream coming from the council and/or landowners, etc. to cover savings (or avoided costs) from the amelioration and maintenance of erosion prone land. These contributions would help to boost the lower returns expected from slower-growing planting natives and reduced opportunities for harvesting.

A whole-of-business approach would be needed, to take into account not only the immediate project finance, but also the future costs of maintenance (pest control, fire-fighting, etc.) to ensure that the project was self-sustaining and repaid over the long term. The amount raised by issuing the bond may also include sufficient proceeds to pay coupon on the bond until the revenue stream started to be received.

The bonds would be issued for terms sought by retail investors, typically up to five years, potentially refinanced at maturity through further bond issues until the project was repaid. (Higher issue amounts, if applicable, would be supported by the increase in value of the underlying security.) Given the Programme's strong alignments to the public good and the low default risk of the underlying bond, the Programme may suffice with below-market rates of interest in order to maximise the community benefits. Investors could be given the opportunity to elect to donate their interest and to reinvest at maturity. Investors would receive regular updates on the performance of the projects versus target levels, and on opportunities to volunteer in activities that create benefits in their own and other regions.

The bond would be guaranteed by the relevant council in whose region the work was undertaken, or by the Crown, or by some central authority (e.g. Local Government Funding Agency). The effective liability under the guarantee would be expected to be nil. The bonds would be structured to be self-sustaining, with very limited risk of the guarantee being drawn upon, as well as an option for security to be liquidated to support repayment if necessary. However, the provision of the guarantee would make the bond easier to understand for retail investors and reduce funding costs. Once the bonds for a project were repaid, the security would revert to the relevant council.

This structure would enable the guarantors to take a holistic and integrated approach to projects, especially across the landscape scale, rather than discrete pieces of planning. Vitally, it would also get the community involved in a positive way, rather than risking a negative backlash by raising rates to fund future interventions.

5.6.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN’s Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	X
Increasing production of sustainable non-wood forest products	✓
Increasing sustainability of local economies and communities	✓
Improving the conservation of forests and forest resources	✓
Reduce net emissions through forestry	✓

The Community Funding Programme has a strong impact strategy with positive social and environmental impacts. Its focus is to deliver holistic projects and activities that enhance community resilience, and also to create a platform that enables community involvement in the delivery of outcomes. It is also strongly additional (see Additionality Analysis in Appendix 2) by creating climate-aligned retail investment opportunities where there are few today, despite growing demands for climate-aligned investment. Similarly, to the EIB (§5.1), the Community Funding Programme does require the guarantors, such as central or local government, to buy into the specific outcomes. However, given that these entities are already engaged in these outcomes, through grants and subsidies, the Programme is simply a way to consolidate such efforts under a more ends-oriented plan and to pursue broader community engagement. It is recommended that a pilot programme be explored in collaboration with organisations like Trees That Count and Predator Free 2050 who can contribute their on-the-ground expertise.

5.7. Natural Climate Solutions Exchange

5.7.1. Overview

Natural Climate Solutions (NCS) are land use activities that create or restore an ecosystem in order to store or sequester carbon, alongside other social and biodiversity benefits. The Natural Climate Solutions Exchange (‘the Exchange’) would enable parties to purchase NCS outcomes to easily compensate for adverse environmental effects arising from development activities. Demand for NCS will be driven by developers applying to local councils for resource consents under the 1991 Resource Management Act (RMA). Supply of NCS will be driven by conservation groups who seek funding to restore native ecosystems, including natural forest, in high value conservation areas. The unit of value (the NCS Unit) exchanged between parties is

derived from a hierarchy of ecosystem services and a scoring rubric which sets expectations for the quality of services being purchased by the developer. The Exchange introduces a standard methodology by which an offset can be certified as achieving additionality. It would also standardise relationships with mana whenua organisations, such that alignment with te Tiriti of Waitangi is built into each NCS Unit, reducing the transactions costs for all parties while guaranteeing the gains.

5.7.2. The Finance Gap

There are strong imperatives for urban development throughout New Zealand, especially in areas such as Auckland and Queenstown that face problems of housing affordability. This ongoing growth puts pressure on the natural environment. It is estimated that New Zealand has lost 90 per cent of its native wetlands to agricultural and urban development.⁶⁵ This habitat loss is not merely historical. Between 1996 and 2012, there was a net loss of 71,000 hectares of indigenous land cover (including around 16,000 hectares of indigenous forests) through clearance, conversion, and development.⁶⁶ This land conversion has climate implications, through the loss of ecosystem resilience and the release of carbon and methane, as well as wider implications for biodiversity habitat, water regulation, soil stabilisation and so on.

Regional councils are caught in the middle of these trade-offs. By giving effect to the Resource Management Act (RMA), councils are the relevant authority for the integrated management of the natural and physical resources of a region. Their responsibilities

include, on the one hand, ensuring sufficient development capacity for residential and business land to meet expected long-term demands of the region; and on the other hand, making decisions about the effects of land use, water quality and quantity, the coastal marine area, soil conservation, and more.

However, regional councils face serious resource constraints due to cost pressures and current regulatory arrangements that oversee local authority funding and financing.⁶⁷ This frustrates regional councils' capacity to fulfil their responsibilities. Also, because urban development increases a region's economic productivity, whereas environmental monitoring and compliance requires significant resources to adequately undertake, there is a natural bias for the former over the latter which regional councils may find challenging to reset in favour of environmentally aligned outcomes.⁶⁸

5.7.3. Closing the Gap

Biodiversity offsetting is one way to counterbalance this damage, once efforts to avoid, remedy or mitigate are exhausted. Offsetting (also known as bio-banking) involves the exchange of environmental harms in one area or context with improvements in another, thereby resulting in a no-net-loss, or better yet a net-gain, position.

Biodiversity offsetting is not required under the RMA. However, the Resource Legislation Amendment Act (2017) has increased its prominence by clearly identifying it as a mechanism that can be offered by applicants to address project impacts on biodiversity, supplemented by planning provisions that specify objectives for biodiversity

⁶⁵ Ministry for the Environment and Ministry for Primary Industries. 2018. *Essential Freshwater: Healthy Water, Fairly Allocated*, Wellington: NZ Government, p.9.

⁶⁶ Ministry for the Environment and Statistics New Zealand, *New Zealand's Environmental Reporting Series: Our Land 2018: At a Glance*, Wellington: NZ Government, p.3.

⁶⁷ New Zealand Productivity Commission. (2019). *Local government funding and financing: Draft report*.

<https://www.productivity.govt.nz/inquiries/local-government-funding-and-financing/>

⁶⁸ Marie Brown et al., 2015. *Vanishing Nature: Facing New Zealand's Biodiversity Crisis*. Auckland: Environmental Defence Society & The Law Foundation New Zealand.

management (i.e. no-net loss, or net gain), and that identify the appropriate use of offsets to achieve this. While the 2017 amendment is expected to produce an increased use of offsetting for resource consent applications, 'a consent authority cannot require the provision of an offset'. Rather, because 'the law does not specifically require offsets, it is up to the applicant to offer an offset, or for the decision-maker to... conclude that providing an offset might be the only practical way to meet the [biodiversity] requirement in the RMA.'⁶⁹ The reasons for recommending an offset include disruption to areas of significant habitat, indigenous biodiversity and environmental importance, but also issues of concern for mana whenua and giving effect to te Tiriti o Waitangi.

Nationally, however, there is a poor record of enforcing and implementing the conditions of consent in respect to biodiversity offsetting. One audit of 81 case studies across New Zealand, with 245 conditions relating to ecological compensation, found that 35.2% of requirements were not being achieved.⁷⁰ There are a number of legitimate concerns about offsetting, one of which is that offsets will not have long-term integrity.

One way to mitigate this risk is to require the purchase of existing outcomes, which have met a requisite standard, rather than the creation of new offsets that require monitoring and evaluation. This could be achieved through a Natural Climate Solutions Exchange (henceforth 'the Exchange'), which provides a platform for the exchange of projects with verified climate-aligned, environmental and socio-cultural benefits.

⁶⁹ Fleur Maseyk, Graham Ussher, Gerry Kessels, Mark Christensen & Marie Brown, 2018. *Biodiversity offsetting under the Resource Management Act: A Guidance Document*. Prepared for the Biodiversity Working Group on behalf of the BioManagers Group for Local Government New Zealand, p.6.

⁷⁰ Brown M. A., Clarkson B. D., Barton B. J., & Joshi C., 2013. 'Ecological compensation: an evaluation of regulatory compliance in New Zealand.' *Impact Assessment and Project Appraisal*: 31(1):34-44.

⁷¹ Griscom et al. 2017. 'Natural climate solutions.' *PNAS* 114(44): 11645-11650.

Natural Climate Solutions (NCS) are a strategy for reversing the aforementioned declines. NCS are defined as 'conservation, restoration, and improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands.'⁷¹ At a global level, it is estimated that NCS could provide 37% of all mitigation needed to stay below 2°C global warming.⁷² Restoration of forests and other vegetation are among the most impactful NCS options, but NCS may also include wetlands, grasslands, agroecological systems, and potentially even 'blue carbon' stocks such as kelp forests. The UN Climate Action Summit in September 2019 reinforced this approach under the Nature-Based Solutions coalition, co-led by New Zealand and China.⁷³ It is also being formalised through frameworks for accounting and measurement.⁷⁴

On the demand-side, the recognition, issuance and exchange of Natural Climate Solution Units (NCS Units) could be more effective and efficient for developers who are managing the impacts of development activities. By purchasing pre-established outcomes, which are consistent with relevant design principles and mana whenua engagement, the developers may avoid uncertainties and complications from managing biodiversity offsets.

On the supply-side, the Exchange could be an important financing tool available to conservation groups for restoration of native forest and vegetation, as well as other kinds of ecosystem restoration. By being traders of pre-established outcomes, there is a greater

⁷² Ibid.

⁷³ See UN Global Compact website (last accessed 30/9/2019): <https://www.unglobalcompact.org/take-action/events/climate-action-summit-2019/nature-based-solutions>

⁷⁴ Quantis, 2019, *Accounting for Natural Climate Solutions: Guidance for Measuring GHG Emissions from Land, Forests and Soils Across the Supply Chain*, Quanti International.

capacity for quality control, as well as the opportunity to create a coordinated, well-integrated environmental asset, such as an ecological corridor that constitutes multiple offsets, rather than the creation of multiple solitary offset projects that emerge randomly from uncoordinated transactions.⁷⁵ This is also an opportunity for iwi and other mana whenua organisations to take the lead in restoration activities.

The NCS offers a promising framework for biodiversity offsetting. The RMA offers no direction in this regard, nor criteria for assessing the adequacy of offsets. Nevertheless, Horizons Regional Council, Auckland Council and Christchurch Council have all begun to include biodiversity offset provisions in their statutory plans and policy statements. Yet adapting NCS for the Ecological Enhancement and Monitoring Plan (EEMP) of biodiversity offsets can ensure that these are optimally aligned to climate mitigation and adaptation benefits. This pivots the Exchange’s offering to climate-oriented purchasers of verified outcomes, creating the conditions for scalable financing of NCS in New Zealand. Further demand could be attracted through corporate responsibility activities, such as farm sustainability plans being increasingly required by organisations like Dairy NZ, Fonterra and Beef + Lamb.

There are currently no known credit exchanges between third parties in New Zealand.⁷⁶ However, these are established features of the international landscape. According to one analysis, there are 39 existing compensatory mitigation programmes around the world, with another 25 in various stages of development or investigation.⁷⁷ The total market size is conservatively estimated at US\$1.8–2.9

⁷⁵ Greg Severinsen and Raewyn Paert, 2018. *Reform of the Resource Management System: The Next generation: Synthesis Report*. Environmental Defence Society and the Law Foundation, p.238.

⁷⁶ Marie Brown, 2017. *Banking on biodiversity: The feasibility of biodiversity banking in New Zealand*. Auckland: Environmental Defence Society.

⁷⁷ Madsen, B., Carroll, N., Moore-Brands, K., 2010. *State of Biodiversity Markets Report: Offset and Compensation*

billion, as 80% of the represented programs are not transparent enough to accurately estimate size. The environmental impact of this market protects over 85,000 hectares of land in conservation management or permanent legal protection. In North America, compensation programs are well developed. Payments between US\$1.5–2.4 billion being made annually. This may be because offsetting in New Zealand generally relies upon resource consent applicants delivering biodiversity gains themselves to compensate for the impacts of development. This contrasts with many other countries – for example, Australia, Germany, and the United States – which enable the transfer of liability to deliver offsets to third parties. In New Zealand, in some cases, responsibility can be informally shared with other parties, but there are limitations to this practice. For instance, under the RMA, the original consent holder retains “strict liability” responsibility for the delivery of the biodiversity gain, regardless of any private contractual arrangements. Maseyk et al. have noted that credits or ‘third party agreements have not been extensively applied in New Zealand, largely because of the lack of a clear, enforceable mechanism by which responsibility of generating lasting biodiversity benefits on the ground can be transferred from the consent holder and enforced.’⁷⁸

5.7.4. Impact and Feasibility Analysis

For a description of the impact strategies in GIIN’s Navigating Impact, see Section 4.

Impact Strategy	
Increasing production of sustainable wood products	X

Programs Worldwide. Ecosystem Marketplace. <http://www.ecosystemmarketplace.com/wp-content/uploads/2015/09/sbdmr.pdf>

⁷⁸ Fleur Maseyk, Graham Ussher, Gerry Kessels, Mark Christensen & Marie Brown, 2018. *Biodiversity offsetting under the Resource Management Act: A Guidance Document*. Prepared for the Biodiversity Working Group on behalf of the BioManagers Group for Local Government New Zealand, p.61.

Increasing production of sustainable non-wood forest products	X
Increasing sustainability of local economies and communities	√
Improving the conservation of forests and forest resources	√
Reduce net emissions through forestry	√

The Natural Climate Solutions Exchange has a moderate impact strategy, by eschewing economic impacts through the production of wood and non-wood products, to instead focus on recreating native ecosystems with maximum climate mitigation and adaptation benefits. Insofar as it promises a way to monetise native restoration that is either ineligible for the ETS, or slow to acquire carbon revenue due to its focus on slow-growing native species, then the Exchange is strongly additional (see Additionality Analysis in Appendix 2). The greatest impediments to the Exchange are the regulatory and legal uncertainties around biodiversity offsetting in the New Zealand context, and the lack of a sizable market, given that offsetting is not required under the RMA. Implementing the Exchange would require improvements to these factors, especially by strong endorsement from a regional council. The inclusion of such an Exchange in Auckland’s draft Climate Action Framework is one possible avenue.

6. Changing the System

In this section, we describe how changes to the enabling environment, particularly through regulatory reform, or changes to supply- and demand-side factors, could help to improve the viability of the instruments described above.⁷⁹

6.1. Enabling Environment

The enabling environment for climate finance can be defined as various interrelated factors – such as regulatory, bureaucratic, fiscal, informational, political, and sociocultural factors – that influence the capacity of actors to engage in climate-aligned projects and activities in a sustained and effective manner.⁸⁰ In regards to forest finance in the New Zealand context, there are two important initiatives that could improve the viability of climate-aligned investment: (1) the ‘Zero Carbon Amendments’ to the 2002 Climate Change Response Act (CCRA) and (2) the Sustainable Finance Forum being led by Aotearoa Circle.

The so-called Zero Carbon Act – that is, the 2019 amendments to 2002 Climate Change Response Act – may increase the viability of the underlying business models for the above instruments, especially by reducing regulatory risks and improving returns from carbon revenue. In particular, the establishment of the Climate Change Commission may reduce some of the regulatory changes to the Emissions Trading Scheme that have frustrated foresters over its lifetime since 2008. Relatedly, the establishment of five-yearly carbon budgets, along with complementary policy proposals, may create a degree of certainty for carbon revenues which could strengthen business models (such as the

above structures) that rely on carbon financing.

With regards to the financial sector itself, reform initiatives such as the Sustainable Finance Forum, led by Aotearoa Circle, promise to recalibrate demand-side factors to increase financial flows into sustainable and climate-aligned outcomes.⁸¹ For example, requirements for disclosure of climate risk may increase the attractiveness of climate-aligned assets such as sustainable and resilient forests. Similarly, a reassessment of risk-and-return preferences among asset managers, in a way which recognises the risks of stranded assets and climate impacts, may assist asset managers to revisit their understanding of fiduciary duty in the context of the low-emissions transition.

6.2. Payments for Ecosystem Services

As discussed earlier, there is a growing appreciation not only that forests have diverse environmental benefits, but also that these benefits are not being adequately valued by market and non-market mechanisms. Part of the investment attraction of impact forestry – which outperforms conventional forestry on selected environmental indicators – is the expectation that these benefits will eventually be monetised, or that conventional forestry will eventually incur costs for the damages that it currently externalises. Either initiative, both imposing payments for ecosystem services or penalties for ecosystem disservices, can favour the competitiveness of better aligned projects.

Currently, the One Billion Trees (1BT) Programme is effectively paying for ecosystem services through its direct landowner grants, which offer top-up rates for planting on

⁷⁹ Hall, D. 2018. *The Interwoven World | Te Ao i Whiria: Toward an Integrated Landscape Approach in Aotearoa New Zealand*. Discussion paper. Auckland: The Policy Observatory, pp.40-43.

⁸⁰ David Hall and Sam Lindsay (2017), *Climate Finance Landscape for Aotearoa New Zealand: A Preliminary*

Survey, Report Prepared for the Ministry for the Environment, Auckland: Mōhio.

⁸¹ Aotearoa Circle, 2019. *Sustainable Finance Forum Report: Interim Report 2019*. Auckland, NZ.

erosion-prone land, and also grants more money to native over exotic species in recognition of their added biodiversity and cultural value. Such payments do not cover the full cost of native forest establishment – the 1BT grants cover only a portion of the cost – but such payments could make the difference for business models that would otherwise be marginal or less competitive than conventional commercial forestry models. Tāne’s Tree Trust has noted that native timbers, such as kauri, could be managed profitably under conventional forestry business models if certain non-timber values were monetised.⁸²

Accordingly, a wider range of payments for ecosystem services could be made available, which reflect public value for urgent environmental problems, such as biodiversity payments, water regulation, avoided sedimentation, and so on. Alternatively, penalties could be incurred by activities that result in environmental harms, such that there is a business advantage in avoiding them while still delivering forest products. This is not only relevant for sustainable forestry vis-à-vis intensive forestry systems, but also other land uses such as agriculture which don’t necessarily pay the full costs of environmental damage.

These payments could also be distributed in innovative ways. One example is performance payments which reward the achievement of specified environmental outcomes. The Nature Conservancy, for example, has explored this model at the international level through Sustainable Land Bonds.⁸³ These are long term fixed-rate bonds issued by a developing country and placed with investors in global capital markets. However, a third-party government in a developed country commits to making performance payments based on proven environmental gains, thereby

supplying a coupon which makes the bond more attractive to purchasers. This model could certainly be adapted to the instruments above as a blended finance mechanism, where Government commits to paying performance payments on regional or private-sector bonds that rewards environmental outcomes, and provides a coupon where returns might otherwise have been marginal.

6.3. Purchase Obligations

One of the challenges for diversifying forest systems in New Zealand is the ETS’s indifference, even its disadvantaging, of non-Pinus forests. By valuing only carbon, irrespective of forest system, the ETS is indifferent to the added value that other forest types might deliver, such as the broader cultural and ecological value of native forest, or the avoided environmental harms of continuous cover forestry. Also, because NZUs are awarded by annual increments to forest carbon stocks, the ETS rewards fast-growing species such as *Pinus radiata* with greater carbon credits (and hence greater cash revenue) over the short-term, while the carbon yield of slower growing species is discounted into the future.

Purchase obligations are one way to ensure increasing demand for diverse forest types, and potentially to increase price through increased demand. This instrument is familiar in the energy sector overseas, such as the UK’s Renewables Obligation (RO). It is one of the main support mechanisms for large-scale renewable electricity projects in the UK. It places an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources. This is administered through Renewables Obligation Certificates (ROCs) which are issued to operators of accredited renewable generating stations for the

⁸² David Bergin & Greg Steward, 2004. *Kauri: Ecology, Establishment, growth and management*. New Zealand Indigenous Tree Bulletin No. 2. New Zealand Forest Research Institute, Rotorua.

⁸³ The Nature Conservancy, 2018. *Sustainable Land Bonds: How governments can finance climate commitments and strengthen rural economies*. https://www.nature.org/content/dam/tnc/nature/en/documents/Sustainable_Land_Bonds_Report.pdf

electricity they generate. Operators can trade ROCs with other parties. ROCs are ultimately used by suppliers to demonstrate that they have met their obligation. And when suppliers do not present a sufficient number of ROCs to meet their obligation over the one-year reporting period, they must pay an equivalent amount into a buy-out fund.

The same could be applied to the ETS's surrender obligations, where a certain proportion of NZUs are required to come from native forests and/or forests that retain continuous canopy cover. This could create a premium price that makes these forest systems more economically viable, which would contribute to the viability of the instruments above.

6.4. Green Supporting Factor / Brown Penalising Factor

A Green Supporting Factor (GSF) involves lowering capital requirements for certain climate-friendly investments, such as energy-efficient mortgages or electric cars. This is being proposed as part of the EU Action Plan on Sustainable Finance, by reducing the risk weights of green investments. A green taxonomy has been prepared in anticipation of this development, which sets out which instruments should receive the GSF.

One worry is that the creation of a green taxonomy reinforces the status of green finance as a niche product, with a higher cost of capital given the more onerous auditing requirements, when actually green finance ought to be mainstream. Working in the opposite direction, therefore, an alternative is to develop a Brown Penalising Factor (BPF) that increases capital requirements for investments that are misaligned with climate-related objectives, and that reflect their greater default risk over the long-run.

Some critics have worried that a sector-wide GSF would create unwarranted risks to the financial system. They argue that the essence of capital requirements is to safeguard financial solidity and stability, and in lieu of conclusive evidence that green exposures are indeed less risky, then a GSF may increase financial stability risks and distort the principle of risk-based capital requirements.⁸⁴ The same logic applies to BPF.

A more prudent approach is to apply a GSF/BPF to specific instruments, especially when these reflect its lower risk. In regards to products such as the Risk-Adjusted Loans or Continuous Cover Forestry Fund, where there is a strong case that the underlying assets have a lower risk profile, there could be a limited risk-weight adjustment to the capital requirements for the loan. Lowering the capital requirements could be used to compensate for the lower interest rates being charged by creditors in order to advantage to climate-friendly investments.

6.5. Carbon Futures Markets

Several of the instruments discussed in the Working Paper rely on carbon financing from the New Zealand Emissions Trading Scheme (NZ-ETS). So far, however, participation in the NZ-ETS, especially by smaller forest owners, has been lower than expected, because registration in the NZ-ETS involves exposure to various financial risks, particularly uncertainty around changes to carbon price. These uncertainties can be reduced through regulatory change (see §6.1); however, regulation entails its own risk of further reforms.

In the New Zealand context, Andrew Coleman has explored the potential for forward markets, futures markets, or carbon-lending markets to manage these risks. He concludes that such arrangements, if designed well,

⁸⁴ Ibid. See also Jacob Dankert, Lars van Doorn, Henk Jan Reinders and Olaf Sleijpen, 2018. *A Green Supporting Factor — The Right Policy?* SUERF Policy

Note, Issue No 43, October 2018, De Nederlandsche Bank N.V. (DNB).

could raise the total returns from forestry investments with minimal risks to forest owners, and simultaneously reduce the risks facing other firms contemplating carbon reducing investments. He argues: 'If forest owners could lend units, they would earn carbon interest income as they accumulate carbon units, while avoiding the risk that the carbon price rises. If investors could borrow units, they could sell them to fund carbon reducing investments and eliminate the risk that the investments would be unprofitable if the price of carbon fell.'⁸⁵ The above instruments could also benefit from the shifting of risk and the greater liquidity in the forestry market.

⁸⁵ Andrew Coleman, 2016. *Forest-based carbon sequestration, and the role of forward, futures, and carbon-lending markets: a comparative institutions*

approach. University of Otago and Motu Economics and Public Policy Research, December 2016.

7. Excluded Instruments

In this section, we highlight financial instruments or products that we considered but discounted as viable possibilities, and provide some rationale for doing so.

7.1. Sovereign Green Bonds

Sovereign bonds, issued by the New Zealand Government, are a potential mechanism for raising capital for forestry. Given that government issuers are generally low credit risk, the money could be raised on favourable terms.

Sovereign forestry bonds could take a variety of forms. A bond could be issued simply to raise capital for forest planting, like a standard infrastructure bond. Alternatively, a recent proposal is the 'Eden bond', proposed by Henry Boucher (Sarasin & Partners) as follows:⁸⁶

'Eden bonds' would be a new class of government bonds with the ability to revert land to a natural state. They would be issued to investors on a long-term basis but structured as a lease on a parcel of re-wilded land. That land will then be repurchased by the government at a 'gilt-edged' fixed price in, say, 50 years. In the meantime, the government pays a small interest rate for the guarantee that the land remains uncultivated and that a local workforce is employed to manage the transition back to the wild and to police it. The holder of these 'Eden bonds' could even earn additional income by selling carbon credits and credits for providing other public goods, including the restoration of populations of endangered species. The holder of an Eden bond has to work harder for their return, but it will be a higher return than on a conventional government bond'.

However, it is the Lab's understanding that, at the current time, the issuance of sovereign green bonds by the New Zealand Government is not considered appropriate, due to various legal complexities, the problem of differentiating the quality of its debt, and the creation of additional costs for no reduction in funding costs. As such, the Lab has not explored sovereign issuance until the New Zealand Government makes a clear commitment to sovereign green issuance.

⁸⁶ Henry Boucher, 2019. 'Eden bonds: Can money grow on trees?' Sarasin & Partners website. <http://www.sarasinandpartners.com/global->

[home/insights/article/article-557-oct19-eden-bonds---can-money-grow-on-trees](http://www.sarasinandpartners.com/global-home/insights/article/article-557-oct19-eden-bonds---can-money-grow-on-trees)

8. Glossary

AGS: Afforestation Grant Scheme.

CCF: See Continuous Cover Forestry.

CCRA: Climate Change Response Act 2002.

Clear fell systems: Forestry management systems which create an even-aged stand for clear-felling entire forest areas at the point of maturity.

Climate finance: Investment and expenditure – public and private, domestic and transnational – that demonstrably contributes to climate mitigation, adaptation or both.

Climate Resilience Loans: Loans whose interest rates and terms and conditions reflect the integration of climate adaptation strategies, thereby reducing their exposure to climate-related risks.

Climate Risk-Adjusted Loans: Loans whose interest rates and other conditions reflect a prudent integration of climate risk.

Continuous cover forestry (CCF): Forestry management systems which maintain a permanently irregular forest structure and continuous canopy cover (i.e. >75% per hectare) through the selective felling of individual trees.

EIB: See Environmental Impact Bond.

Environmental Impact Bond (EIB): A debt instrument for financing projects that pay returns based on outcomes, such that investors only collect a return on their investment if the project proves to be successful.

ESG: Environmental, social and governmental.

FY: Fiscal Year.

GIF: See Green Investment Finance.

Green Investment Finance (GIF): The GIF is a publicly-funded green capital facility to accelerate low-emissions investment, established through the 2018 Budget.

M&E: Monitoring and Evaluation.

Mauri: Essential life force or essence in te ao Māori, which relates to the well-being of both people and the environment.

MBIE: Ministry of Business, Innovation & Employment.

MfE: Ministry for the Environment.

Mixed stands: Forest ecosystems that are not dominated by one species (i.e. <80% of any single species). Contrast with monoculture.

Monoculture: Forest ecosystems that are dominated by one species (i.e. >80% of any single species). Contrast with mixed stands.

MPI: Ministry for Primary Industries.

Natural Climate Solutions: conservation, restoration, and improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands.

NCS: Natural Climate Solutions.

NCS Units: The units or credits awarded for recognition of activities that meet criteria for a “natural climate solution”, which can then be sold on the NCS Exchange.

NDC: Nationally Determined Contributions.

NGO: Non-government Organisation.

NPO: Non-profit Organisation.

NPV (Net Present Value): the difference between the present value of cash inflows and the present value of cash outflows over a period of time.

NZ-ETS: New Zealand Emissions Trading Scheme.

NZU: New Zealand Unit.

RBF: See Results-Based Finance.

REIT: Real Estate Investment Trust.

Results-Based Finance (RBF): A form of funding for project implementation or service provision, where the principal, who provides the funding, pays the agent, who implements the project or provides the service, upon achieving predefined results. Related concepts include outcomes-based funding, pay-for-results funding, or pay-for-performance funding.

PFSI: Permanent Forest Sink Initiative.

SIB: See Social Impact Bond.

SIL: See Sustainability Improvement Loans.

Social Impact Bond: A contract with the public sector or other outcome funder, whereby it pays for better social outcomes in certain areas and passes on the part of the savings achieved to investors.

Stranded assets: These are assets which are losing economic value well ahead of their anticipated useful life due to changes in technology, regulations, legislation, societal norms, environmental shocks or other powerful forces.

Sustainability Improvement Loans (SILs): Loans that involve conditionality related to the sustainability performance of the borrower, where the interest rate is partially adjusted depending on the evolution of the borrower's sustainability performance.

UNFCCC: United Nations Framework Convention on Climate Change.

Appendix 1. Climate Innovation Lab Methodology

A1. An Entrepreneurial Approach

The Lab takes an entrepreneurial approach in three senses. First, it takes an entrepreneurial approach to product development. Second, it understands the public policy process through the lens of policy entrepreneurship, and advances concepts in that spirit. Third, the Lab is a neutral platform for intrapreneurs from public and private sector organisations to explore and refine their innovations.

First, climate finance innovation is an entrepreneurial exercise in the standard commercial sense, insofar as the Lab seeks to address a gap in the market by designing climate finance products to invest in. However, the Lab does not understand entrepreneurship to be an individualised activity, whereby solitary actors are responsible for innovation and independently reap all the rewards. Rather, the Lab sees entrepreneurship as a collective process, which necessarily involves relationships with others – through drawing on existing research and analysis, co-designing instruments to ensure it meets the needs of investors and other stakeholders, and creating coalitions of the willing to bring the instrument concepts to market. Similarly, the rewards of entrepreneurship should be distributed in a way that reflects this co-creation, not least through the deliberate creation of positive externalities that deliver substantial public benefits.

Second, the Lab is influenced by the idea of policy entrepreneurship, an important empirical literature which recognises that public policy is itself the product of entrepreneurial activity. This theory of policy diffusion is distinct from the traditional theory of rationalist problem-solving, whereby

solutions are solved by purposeful, evidence-based policy design. Rather, policy entrepreneurs exploit ‘windows of opportunity’ to advance readymade policy solutions as problems appear, especially in moments of political crisis. To navigate the complexities of real-world policy environments, policy entrepreneurs learn to (1) tell good stories that grab the attention of policy makers, (2) produce solutions in anticipation of attention to problems, and (3) adapt their strategy to each new ‘window of opportunity’ that emerges.⁸⁷ Insofar as some climate finance instruments will require government involvement – either through changes to the enabling environment for climate finance, or through public investment (see §A7 on blended finance below) – then it is important that climate innovation is designed and diffused in a way that is responsive to the realities and constraints of policy makers.

Finally, the Lab strives to provide a neutral space that people from the public and private sector can meet to co-create investment solutions to climate-related challenges. In this sense, it is a space where intrapreneurs – that is, people within an organisation who promote innovation internally to push beyond business-as-usual approaches – can explore ideas and solutions that they have devised from inside their own organisations, with their own particular insights about opportunities and constraints.

A2. A Climate-Conscious Investment Strategy

There are two general questions which ought to guide climate-conscious investors.

The first question is: ‘Does the investor want to reduce risks to their portfolio and make it more resilient in the future?’ If the answer is yes, then the investor should employ a screening strategy that closes doors to

⁸⁷ For review, see Paul Cairney, 2018. ‘Three habits of successful policy entrepreneurs’. *Policy & Politics*, 46(2), pp.199–215.

investments that increase portfolio risk, such as foregoing carbon-intensive capital expenditure that may become stranded assets in the near future.

The second question is: 'Does the investor want their investment portfolio to be involved in solution-creation to advance economic performance, social progress and environmental sustainability?' If the answer is yes, then the strategy should open doors to investments that actively seek to create that future, such as including renewable energy and sustainable forestry in the investment portfolio. The aim of the Lab is to create such opportunities for investors to shift capital into (see §A3 below).

Analysing these questions, in light of the science and economics of climate change, will encourage investors to divest from the high-emissions economy that still predominates, and invest into the low-emissions economy that is emerging from beneath it.

A3. Supporting Climate-Conscious Investment

The purpose of the Lab is to create climate finance instruments that meet the needs of climate-conscious investors, so that when such investors open doors to the low-emissions future, there are investment opportunities available. The Lab considers a broad array of activities and strategies that may achieve climate alignment in an investment portfolio (for the full investment spectrum, see Figure 1 below). These include:

- *Responsible Investment* which is screened to exclude investments that conflict with ESG criteria;
- *Sustainable Investment* which focuses on positive environmental and social outcomes through investment

selection, portfolio management and investment committee engagement;

- *Thematic Investment* which centres on one or a cluster of issue areas where social and/or environmental need creates a commercial opportunity; and
- *Impact Investment* where there is an intention to create a positive social and/or environmental impact beyond financial return.

The Lab is particularly focused on the last strategy, Impact Investment, because this is where the non-financial impacts are given the greatest relative weighting over financial returns. (The next step along the spectrum is philanthropic grant-giving, where financial returns are disregarded altogether). To impose discipline on the prospective management of investment, the Lab draws on the IFC's Operating Principles for Impact Management by considering strategy, origination and structuring, portfolio management, exit, and independent verification.⁸⁸

⁸⁸ For a more detailed explanation, refer to World Bank Group, 2019. Investing for Impact: Operating Principles

for Impact Management. International Finance Corporation.

ESG Risk Management					
Sustainable Investment Opportunities					
Deeper Impact Opportunities					
Traditional	Responsible	Sustainable	Thematic	Impact-first	Philanthropy
<p>Little or no focus on non-financial factors of underlying investment decisions.</p> <p>Investments could include tobacco, pornography, fracking, for example.</p>	<p>Investments are excluded based on ESH risk.</p> <p>Screened investments include landmines, nuclear energy, fossil fuels, for example.</p>	<p>Focus on positive social and environmental outcomes through investment selection and investment committee engagement.</p> <p>Carbon footprint, waste production factors, for example.</p>	<p>Centres on one of a cluster of issue areas and social and environmental need creates a commercial growth opportunity.</p> <p>Investments could include affordable housing, for example.</p>	<p>Investments intend to create a positive social and/or environmental impact beyond financial return.</p> <p>Expanding access to important services, such as renewable energy, for example.</p>	<p>Financial returns are disregarded in favour of social and/or environmental impact.</p>

Figure 1: Investment Spectrum (from David Hall and Sam Lindsay, 2017. *Climate Finance Landscape for Aotearoa New Zealand: A Preliminary Survey*, Report Prepared for the Ministry for the Environment, Auckland: Mōhio).

The Lab’s investment approach anticipates environmental, social and governance (ESG) in portfolio selection, but also cultural factors. The inclusion of culture in this framework is particularly relevant for Aotearoa New Zealand, because giving effect to te Tiriti o Waitangi / the Treaty of Waitangi requires engaging with Māori communities and organisations through principles of partnership, reciprocity and active protection.⁸⁹ As such, the sustenance of Māori culture ought to be an aim of impact investment, and Māori values ought to be among the criteria that define success. In this regard, the Lab finds inspiration in such initiatives as the Tahito wealth fund which selects companies in light

⁸⁹ Maria Bargh, ‘Tika Transition’, in *A Careful Revolution* (David Hall, ed.), Wellington: BWB Texts.

⁹⁰ See Kapa Morgan’s mauri-o-meter website: <http://www.mauriometer.com/>

of indigenous values, and Kapa Morgan’s Mauri Model for assessing project management.⁹⁰

A4. Climate Finance Outcomes

The UNFCCC defines climate finance by the intended outcome of investment: “Climate finance aims to reduce emissions of GHGs, and to enhance sinks of GHGs and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts.”⁹¹ In other words, climate finance involves financial flows to projects and activities that deliver mitigation benefits, adaptation benefits, or dual mitigation/adaptation benefits.

The Climate Policy Initiative estimates that, on average between 2015 and 2016, US\$410 billion of climate-aligned finance flowed from private and public sources for climate

⁹¹ UNFCCC Standing Committee on Finance, 2014. *2014 Biennial Assessment and Overview of Climate Finance Flows Report*. Bonn, Germany: United Nations Framework Convention on Climate Change (UNFCCC).

adaptation and mitigation purposes.⁹² Capital is increasingly being channelled into vehicles that prioritise and enable climate-aligned projects to deliver mitigation and adaptation benefits, as well as a range of other socially inclusive outcomes. This transition is occurring around the globe, at all levels of capital exchange, from the smallest loan or donation to the largest transactions among corporations and countries.

A5. Transnational and Domestic Financial Flow

In the Lab's view, climate finance refers to both transnational and domestic financial flows, where the latter refers to finance which is sourced from, and used in, the same national jurisdiction.

The Lab's primary focus is climate finance with domestic use-of-proceeds – that is, financial flows that support activities and projects within New Zealand, where the source of finance may derive from inside or outside the country. The reason for this domestic focus is simply that, while sustainable development assistance is crucial for global cooperation and fulfilling the Paris Agreement, it is also important that New Zealand attracts climate finance to meet its own domestic targets for climate mitigation and adaptation. It is worth recalling that the UNSDGs are meant to be regarded as a set of goals and targets for developing and developed countries, in the knowledge that all countries need to make progress on a truly sustainable development.

⁹² Buchner, Barbara; Pdraig Oliver, Xueying Wang, Cameron Carswell, Chavi Meattle, and Federico Mazza, 2017. *Global Landscape of Climate Finance 2017*, San Francisco: Climate Policy Initiative.

⁹³ See Development Finance International (DFI) and Oxfam International, 2015, *Financing Sustainable Development Goals*; UNCTAD, 2014, *World Investment Report: Investing in the SDGs: An Action Plan*; World Bank, 2014, *From Billions to Trillions: MDB Contributions to Financing for Development*.

A6. Addressing the Finance Gap

The finance gap is the difference between the investment required to meet obligations such as the UNSDGs and Paris Agreement, and investment currently directed into meeting these obligations.

It is generally accepted that the annual financing gap for reaching the targets set out in the UNSDGs and Paris Agreement is in the trillions of dollars.⁹³ The Business & Sustainable Development Commission recently estimated that US\$2.4 trillion of additional investment is required to fulfil the SDGs in developing countries alone.⁹⁴

Addressing the finance gap requires a substantial increase in investment across the board. However, given the political constraints of governments, it is generally agreed that private sector investment will play a vital role, especially for providing scale. To attract more private capital, New Zealand, along with the rest of the world, needs to pursue innovative finance solutions (such as blended finance) to mobilise some of US\$71 trillion currently invested in global capital markets.⁹⁵

⁹⁴ Business & Sustainable Development Commission, 2017. *Better Business Better World*, BSDC: London. <http://report.businesscommission.org/report>

⁹⁵ Shub, G. et al., 2016. *Global Asset Management 2016: Doubling Down on Data*, BCG website. <https://www.bcg.com/publications/2016/financial-institutions-global-asset-management-2016-doubling-down-on-data.aspx#chapter2>

A7. The Role of Blended Finance

In the context of climate action, blended finance involves the strategic use of public and philanthropic funding to mobilise private capital flows that intend to enable climate-aligned projects and activities.⁹⁶ By using public investment to 'crowd in' private investment, blended finance is a strategy for scaling up climate finance. It enables public organisations to overcome financial constraints by catalysing external sources of finance; and it enables private organisations to overcome constraints on shareholder expectations of risk and return. As the Blended Finance Taskforce⁹⁷ puts it:

...blended finance uses public or philanthropic money to improve the risk-return profile or commercial viability for a private investor, allowing it to invest in places and projects where it wouldn't otherwise go, by mitigating a raft of real or perceived barriers, including political risk, currency volatility, lack of liquidity, weak local financial markets, knowledge gaps about investment opportunities, and challenging the investment climates, including poor regulatory and legal frameworks.

The effectiveness of blended finance derives from its capacity to:

- *increase capital leverage* by using public and philanthropic funds to facilitate larger volumes of private capital.
- *deliver risk-adjusted returns* by structuring finance in a way that re-allocates risk and better aligns with market expectations.

⁹⁶ See the Blended Finance Toolkit by OECD and World Economic Forum: <https://www.weforum.org/reports/blended-finance-toolkit>

⁹⁷ Blended Finance Taskforce, 2018. *Better Finance, Better World*. Consultation Paper of the Blended Finance Taskforce, prepared by the Business & Sustainable

- *enhance impact* by combining the skills and knowledge of public and private stakeholders.

A8. 'Crowding-in' Capital

'Crowding in' refers to investment strategies that attract diverse sources of finance – from governments, philanthropic donors or private sector investors. Given the extent of total investment required to transition New Zealand to a low emissions economy, it is important that investment structures enable participants to co-invest wherever possible, in order to increase the total available pool of capital that can be deployed to climate-aligned outcomes. Such a strategy intentionally avoids instances where private investors are 'crowded-out' of investment opportunities by public investments that substitute, rather than complement or stimulate, private investment activity.

A9. Additionality in Investment Structures

Additionality refers to a material deviation from business-as-usual to overcome barriers that would have prohibited the investment had a new set of circumstances not been created. By way of example, this could mean increasing an enterprise's access to finance, successfully navigating a difficult policy landscape, developing new business models within a market, or raising the ESG outcomes of the enterprise.

Although there is disagreement over how additionality should be defined, the concept has become an important part of the climate finance vocabulary.⁹⁸ The reason for this is two-fold. First, the Copenhagen Accord committed in developed countries to deliver

Development Commission and SYSTEMIQ, p.22. <https://www.blendedfinance.earth/better-finance-better-world>

⁹⁸ Brown, J., Bird, N. & Schalatek, L., 2010. *Climate Finance Additionality: Emerging Definitions and Implications*. Climate Funds Update, Policy Brief No. 2. <https://www.odi.org/publications/4931-climate-finance-additionality-emerging-definitions-and-their-implications>

'new and additional' resources to developing countries for measures taken to address climate change. Second, both public and private investors have a mandate to ensure the effectiveness of their investment is compatible with less than 2°C of global warming. Investment time and resources into sectors that are close to, or have already reach market saturation is not effective.

A multi-criteria framework developed by Climate Policy Initiative⁹⁹ identifies eight criteria that are split into two categories:

- **Venture-specific criteria:** examine the set of circumstances that are specific to the individual enterprise and the role that the intervening finance played in enabling the transaction. The factors are the (1) 'crowding-in' or attracting of private investment, (2) access to finance otherwise available, (3) demonstration to other market participants, and (4) improved ESG standards or enterprise quality.
- **Context-specific criteria** examines four factors to place the investment within a context wherein the greater the barriers to investment, the more likely that the investment is additional. These factors are the (5) policy environment, (6) institutional environment, (7) market landscape, and (8) a country's access to developed value-chains and qualified human capital. For each factor, the presence or lack of barriers to private investment informs a determination about whether the investment would have happened if not for a new set of circumstances taking place.

Each criteria is assessed based on stakeholder interviews, literature and enterprise

documents. A determination is then made on the presence of a given factor and the specific role that new funding played in enabling this condition.

The Lab has adapted this framework for its additionality analysis of the above instruments (see Appendix 2). Given that New Zealand's policy framework, institutions, markets and supply chains are relatively robust, especially by comparison with developing countries, the Lab's additionality analysis focuses only on venture-specific criteria. Inclusion of context-specific criteria tends to dilute the signal, because context-specific additionality tends to be similar across all instruments within the New Zealand context.

⁹⁹ Donovan Escalante, Dario Abramskiehn, Karoline Hallmeyer and Jessica Brown, 2018. *Approaches to assess the additionality of climate investments: Findings from the evaluation of the Climate Public Private Partnership Programme (CP3)*. Climate Policy Initiative.

<https://climatepolicyinitiative.org/publication/approaches-to-assess-the-additionality-of-climate-investments-findings-from-the-evaluation-of-the-climate-public-private-partnership-programme-cp3/>

Appendix 2. Additionality Framework

minimally additional (1-9), moderately additional (10-14), or strongly additional (15-20).

Below is the additionality framework that assesses each instrument’s likely deviation from business-as-usual. This framework focuses on four venture-specific criteria (see below), which relate to the novelty of each specific climate finance instrument. If the instrument has a similar structure and outcomes to existing instruments, it is minimally additional.

If the instrument has novel features and properties that go beyond the status quo, it is increasingly additional. We rank these four factors below on a scale of 1-5, then classify their total additionality as being either

Venture Specific Criteria	
Crowding-in Private Investment:	<ul style="list-style-type: none"> ▪ Did private finance in the venture occur alongside, or after, the public investment? ▪ Investments are more likely to be additional if public finance mobilised additional finance, either by playing a broker function to bring in other investors, lending credibility that persuades other investors to invest, or providing management support to the venture to encourage other investors to participate.
Access to Finance:	<ul style="list-style-type: none"> ▪ Could the venture access finance from other sources on comparable terms? ▪ Investments are more likely to be additional if comparable finance was unavailable prior to the investment or if the public or philanthropic investment increased a venture’s access to finance.
Demonstration Effect:	<ul style="list-style-type: none"> ▪ Will the venture demonstrate new business models or technologies and thus promote changes in investor behaviour? ▪ Investments are more likely to be additional when investor behaviour changes to pursue new options.
Improved ESG Standards:	<ul style="list-style-type: none"> ▪ Will the venture increase ESG impact against IRIS metrics and/or other non-financial conditions tied to the investment? ▪ Investments are more likely to be additional if the ESG impact is increased in a way that would not have otherwise occurred.

Environmental Impact Bond					19/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Leveraged Carbon Fund					12/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Continuous Cover Forestry Fund					16/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Green Covered Bond					14/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Climate Risk-Adjusted Loans					11/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Community Funding Programme					17/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					
Natural Climate Solutions Exchange					15/20
Crowding-in Private Finance					
Access to Finance					
Demonstration Effect					
Improved ESG Standards					

Appendix 3. Investment Case for Continuous Cover Forestry

One of New Zealand’s best known and most-studied examples of continuous cover forestry (CCF) in New Zealand is Woodside, near Oxford, managed by the Wardle family.¹⁰⁰ It uses a target diameter harvesting (TDH) system, where trees are removed on an annual basis when their stem reaches a certain diameter (60 cm).

A recent discounted cashflow analysis which modelled this system for four case sites (three in Greater Wellington, one in Hawkes Bay) found that this system is profitable, although less so than a clear-felling system (see Figure 2 below).¹⁰¹

For example, the Net Present Value for TDH at 50cm was 11-22% lower than a clear-fell system. However, the latter system externalises a number of negative environmental impacts,¹⁰² which leaves clear-fell systems at greater risk of litigation,

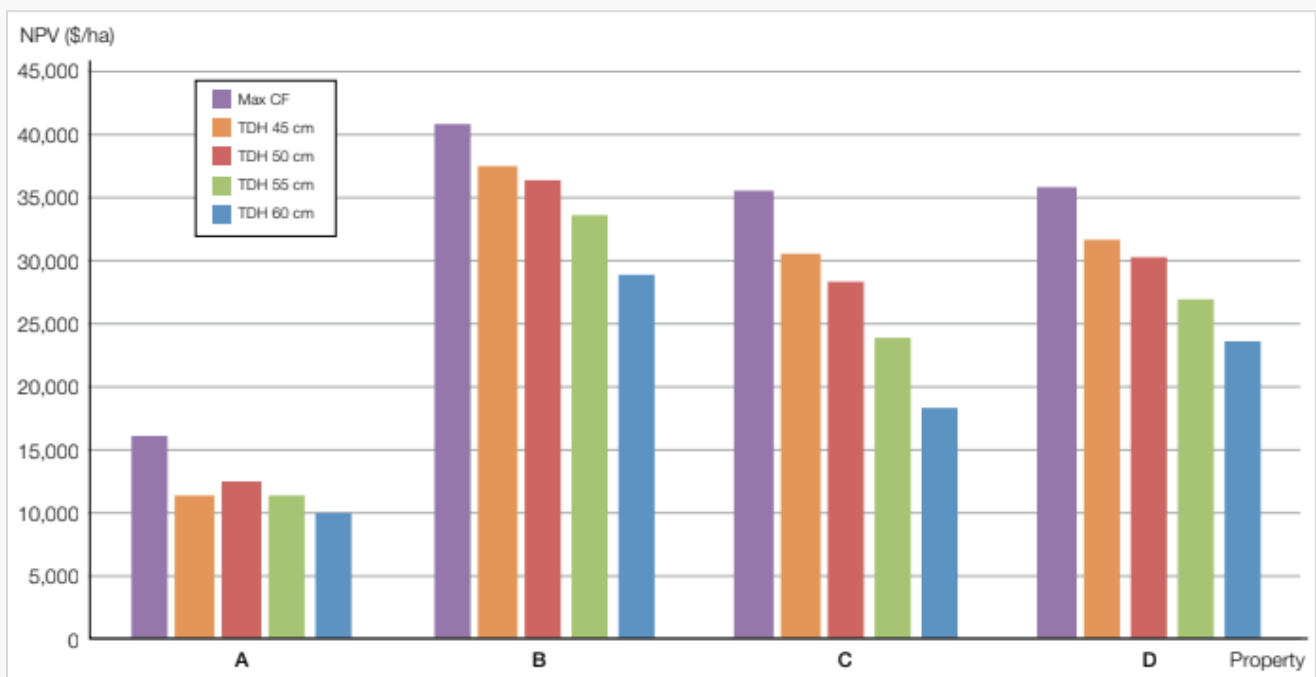


Figure 2: NPV (\$/ha) for different target diameters (TDH in cm) at each case-study site. “Max CF” is the NPV from clear-felling at the optimal rotation age and is the maximum possible profitability for the forest on the case-study site. Actual NPV values varied between properties due to different crop ages, site productivities, and harvesting and transport requirements (modified from Bloomberg et al. 2019).

¹⁰⁰ Perry C, Bloomberg M, Evison D. 2015. ‘Economic analysis of a target diameter harvesting system in radiata pine.’ *NZ Journal of Forestry* 59(4) p2-8; and Wardle J. 2019. ‘Management of radiata pine using selective harvesting and natural regeneration.’ *NZ Journal of Forestry*, 63(4), 25-28.

¹⁰¹ Mark Bloomberg, Eric Cairns, Denny Du, Harriet Palmer and Chris Perry, 2019. *Alternatives to clear-felling radiata pine*. New Zealand Journal of Forestry.

¹⁰² ‘The difference in economic performance can be thought of as the economic cost of using a TDH system to sustain the ecosystem services provided by the forest and lost at harvest under a conventional clearfell regime.’ Mark Bloomberg, Eric Cairns, Denny Du, Harriet Palmer and Chris Perry, 2019. *Alternatives to clear-felling radiata pine*. SFF Project Tere 405485: summary of project outcomes. February 2019.

regulatory constraints, and loss of social licence. If these environmental costs are internalised for clear-fell forestry, or if CCF's ecosystem services are monetised, then the relative profitability of CCF would improve (see §6.2). Also, CCF may still be a more profitable land use on certain sites than non-forestry uses, such as pastoral agriculture.

As an asset, CCF forests have points of difference to clear-felling systems which may be attractive from the perspective of short- to medium-term investors. For example, the investment analysis that informed the European Investment Bank's €12.5 million commitment to CCF in Ireland – which was designed to diversify Irish forestry away from clear-fell systems – argued that:¹⁰³

- CCF **delivers a stable cash yield**, with less exposure to timber price fluctuations, as the entire forest area is partially harvested every few years – like 'clipping the coupon' on a bond.
- Transformation to CCF **brings forward cash flows** because of heavier thinning in early years.
- CCF **minimises the costs of replanting** by relying on natural regeneration to establish replacement trees.
- CCF **produces larger, more valuable trees** and a higher proportion of saw logs, which achieve a higher price per m³.
- **Management and harvesting costs are not prohibitive** when the benefits of CCF are taken into account, especially if ecosystem services are monetised.

- CCF **grows and maintains the capital value** of the forest in perpetuity.
- CCF **reduces biophysical risks** as diverse, mixed-age stands are less vulnerable to pests, disease and windthrow events.

For large-scale, long-term institutional investors, points 1 & 2 are less relevant, because managing multiple forests over long time horizons will tend to smooth out these benefits. However, point 4 and 6 are vital from the institutional investor perspective, because a strategy for high-grade, high-quality species can increase the per hectare capital value of forests over time. In the New Zealand context, establishing native forests or high-quality exotic timbers, or the conversion into such forests over time, ensures that such forests are a growth asset.

¹⁰³ These bullet points are adapted from McMahon, P. and Sarshar, D. and Purser, P. 2016. *Investing in*

Continuous Cover Forestry. Report prepared by SLM Partners, p.3.

SCALING CLIMATE FINANCE

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