

Research Article

Rainforest carbon financing in New Zealand: A case study of REDD+ on Māori land

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Abstract: This study examines a case study of the Rarakau Rainforest Conservation Project on Māori-owned land in western Southland – New Zealand's first and only REDD+ project. It explores the potential for REDD+ projects on Māori land throughout the country. Key findings show that REDD+ is technically feasible in New Zealand, but commercially dependent on (currently low) demand in the domestic retail carbon offset and 'corporate social responsibility' market. Market research suggests that there is sufficient demand to cater to the needs of a small number of REDD+ projects, but insufficient demand to roll out a nation-wide scheme.

Key words: carbon, conservation, Māori, New Zealand, rainforest, REDD+.

Introduction

Reducing emissions from deforestation and/or forest degradation (REDD⁺¹) is a forest carbon-financing framework initiated by the United Nations Framework Convention on Climate Change (UNFCCC) in 2005. It is a framework that also extends beyond the UNFCCC and is included in the World Bank Forest Carbon Partnership Facility, bilateral arrangements and the international voluntary carbon market. REDD+ is usually conceived as an activity restricted to developing countries such as Indonesia and Brazil. However, the geography of REDD⁺² can extend to any country where the reduction or avoidance of Greenhouse Gas (GHG) emissions from indigenous forest is relevant. REDD+ includes avoiding a reduction in forest carbon stocks in a forest-remaining-as-forest activity (called 'Improved Forest Management' in carbon markets). This involves changing land use

from a baseline scenario of selective logging to a project scenario of protected forest.

New Zealand supports approximately 6.4 million ha of indigenous forest (24% of the total land area), two thirds of which are located in protected areas. Approximately 1.2 million ha is privately owned (and not protected). Of this, some 400,000 ha is commercially harvestable (Ministry for Primary Industries 2013a), of which about half is located on Māori land (Hammond 2001). A study by KPMG (2013a) indicated that approximately 251,800 ha of privately owned (including Māori-owned) land contained tall indigenous forest with commercially viable volumes of key native timbers: rimu (*Dacrydium cupressinum*), tawa (*Beilschmiedia tawa*), red beech (*Nothofagus fusca*) and silver beech (*N. menziesii*). The potential annual volume available for harvesting comes to approximately 200,000 m³ of sawlog-quality timber, with a value to

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landowners in the order of \$31 million annually. Actual logging rates are much lower, with annual returns to landowners of around \$2 million (KPMG 2013a).

Māori landowners control a relatively large natural resource that is eligible (in principle) for timber harvesting and therefore eligible for REDD+ projects that protect forest. Carbon financing already operates in the New Zealand forest sector through the New Zealand Emissions Trading Scheme (NZETS) (Ministry for Primary Industries 2015a) and the Permanent Forest Sinks Initiative (PFSI) (Ministry for Primary Industries 2015b). However, this is restricted to growing new forests established after 31 December 1989 (i.e. not REDD+). As a result, owners of tall indigenous forest established prior to 1990 remain locked out of the compliance carbon market. In contrast, the international voluntary carbon market can, in principle and by definition, operate anywhere where the compliance carbon market does not. All of New Zealand's mature indigenous forests were established prior to 1 January 1990 and, therefore, lie within the carbon accounting boundary of the voluntary carbon market.³ Voluntary carbon market standards available to support REDD+ projects include the Verified Carbon Standard (VCS), Plan Vivo and the ISO14064-2 standard.

This study encompasses a case study of New Zealand's first and only REDD+ project: the Rarakau Rainforest Conservation Project on Māori-owned land in western Southland. The author led the development of this project to test the technical and commercial feasibility of rainforest carbon financing, to answer the following question: 'To what extent is REDD+ a realistic conservation financing option for Māori owners of indigenous forest at scale?' To answer this question, the technical and commercial feasibility of this REDD+ carbon project is examined. Although this pilot project was undertaken on Māori land, the insights generated apply to any privately owned indigenous forest in New Zealand.

A noteworthy carbon accounting clarification: The second commitment period of the Kyoto Protocol (2013–2020) made it mandatory for ratifying nations to account for carbon stock change in pre-1990 forests (i.e. including tall indigenous New Zealand forest).

However, New Zealand elected to exit the Kyoto Protocol and was (at the time of writing) still developing the 'post 2015' national forest carbon policy. In the mean time, the Ministry for Primary Industries has stated specifically: '[The] Rarakau [project] does not appear to constitute double counting with New Zealand's international and national level accounting of emission reductions under the UNFCCC or its subsidiary agreement the Kyoto Protocol ... [because] net emissions and removals within New Zealand's pre-1990 forests during 2013–2020 will not be formally accounted for within the international compliance system under the Kyoto Protocol ... [and] the additional effects of indigenous forest crediting projects would be unlikely to be captured in the national inventory'. MPI goes on to state that any 'voluntary carbon market credits issued for the additional effects of pre-1990 indigenous forest crediting programmes [such as the Rarakau project] would therefore be fully additional to the national accounts' (Ministry for Primary Industries 2013c).

This article is part of a wider study exploring the political ecology of rainforest carbon financing (e.g. McGregor *et al.* 2014; Astuti & McGregor 2015; Dixon & Challies 2015; Howson & Kindon 2015; McGregor *et al.* 2015; Weaver 2015).

Eligible REDD+ activities on Māori land

REDD+ functions by enabling the creation and sale of carbon offsets from rainforest (i.e. indigenous forest) protection as compensatory revenue for voluntarily giving up rights to logging (and associated revenues). In the international carbon policy language, the term 'deforestation' refers to a permanent loss of forest cover and implies transformation to another (non-forest) land use (FAO 2010). The term 'degradation' in contrast refers to the reduction in forest biomass (e.g. through selective logging) without a permanent loss of forest cover or a change in land use. Deforesting indigenous forest is not legal in New Zealand (apart from small scale farmland clearance in some local government jurisdictions). However, selectively harvesting timber

from an indigenous forest is legal, so long as it meets the low-impact timber harvesting rules of the Ministry for Primary Industries (2013b). If the rate of carbon benefits from the Raraku Rainforest Conservation Project (3.3 tCO₂e/ha/year) were scaled up to the rest of Māori-owned eligible forest, the annual carbon benefit (emission reductions and enhanced removals) would come to some 658,536 tCO₂e/year. This would be enough to offset 26% of all Air New Zealand international flights annually⁴ or offset emissions from 146,630 return flights from Auckland to London.

The age-old challenge in the private protection of public goods is how to compensate private landowners for giving up property rights to legally sanctioned revenue from activities like logging. Catalysing a landowner decision to undertake long-term protection (and relinquish rights to timber revenues on their own land) is probably the most important causal factor in rainforest protection at scale on private land anywhere in the world (see Knii-tila & Saastamoinen 2002; Borner *et al.* 2009; Adams *et al.* 2010; Fisher *et al.* 2011 for examples of discussion on opportunity costs in forest conservation). While a minority of rainforest owners may be willing to protect their forest without compensation, this is not true for the vast majority.

Many indigenous peoples who own rainforest have acute economic development needs, including relatively underprivileged situations, located long distances from centres of employment opportunity and lacking in capital to develop strong local businesses. A survey of 23 REDD+ projects (located in Africa, South America and South East Asia) by Sunderlin *et al.* (2014) found that compensatory (performance-based) payments for rainforest protection was the single most important success factor.

Indigenous landowners commonly regard their rainforest as an asset that can be monetised for significant local economic development gains. Conservation commonly directly obstructs these economic development opportunities. Herein lies one of the most common drivers of timber harvesting on land owned by indigenous peoples. Alternative income streams do exist for rainforest owners,

including non-wood forest products and tourism. However, in practice, such economic development alternatives usually help address timber opportunity costs marginally at best (see White & Minang 2011 for an overview of REDD+ opportunity costs). As such, these alternatives will typically only exist as a sweetener for landowners already motivated to protect their forests (i.e. a minority).

A good example of the failure to adequately address the opportunity costs associated with forest protection on land owned by indigenous peoples is the current threat to the East Rennell UNESCO rainforest World Heritage Site. In 2015, the East Rennell landowners began discussions with logging and mining interests as a way to generate income from a form of economic development that would destroy its World Heritage status. Another is the recent destruction (by logging) of rainforest in the UNESCO rainforest World Heritage Site at Marovo Lagoon⁵ – both in the Solomon Islands. Here, forest conservationists have thus far failed to deliver any realistic economic development alternatives to logging on these islands, and as a result, the motivation by indigenous landowners to protect the rainforest has dissipated catastrophically for Marovo Lagoon and is an imminent threat at East Rennell.

Providing an opportunity for landowners to create and sell carbon assets in lieu of timber assets from their rainforest is potentially a game-changing turn of events in the rainforest conservation-financing sector. This can enable such landowners to achieve their locally determined economic development aspirations through employment in conservation management and reinvestment of carbon revenues (as they would do with timber revenues).

Case study

The Rowallan Alton (Māori) Incorporation (RAI) owns a 1,212-ha block of coastal land (indigenous forest and pasture) at Raraku in western Southland, adjacent to Fiordland National Park (Weaver *et al.* 2012). This incorporation was established to aggregate a set of smaller land parcels into a single entity to drive economic development on this land

through (i) logging to clear forest for pasture and to generate revenue from timber and (ii) establishment of pastoral farming on cleared lands.

In 2008, the author invited the RAI Management Committee to participate in a rainforest carbon project – the Rarakau Rainforest Conservation Project – protecting 738 ha of coastal rainforest (i.e. all the rainforest remaining on RAI land). The author had previously worked with RAI in negotiations with the Crown (in 2001) in relation to an historical forestry and land dispute and by 2007 knew the RAI secretary as a friend and colleague. The proposition: to forego rights to timber harvesting in exchange for the opportunity to generate revenue from the sale of carbon offsets. Even though the landowners have strong cultural connections to the land, this connection is a productive one and not a romanticised connection built on a willingness to just own land and not benefit materially from it. For this reason, the landowners pooled land resources to form a Māori incorporation to provide economic development opportunities

for future generations. Noteworthy here is that the landowner’s decision to give up timber harvesting property rights was contingent on compensatory payments to cover the opportunity costs of conservation and to help finance conservation management (Figures 1 and 2).

From the outset, this project involved a strategic partnership between RAI, Carbon Partnership (the author’s consulting business) and Ekos (a social enterprise charity established by the author). The role of RAI is to own the project, provide the forest resource and own the carbon offset assets produced. The role of Carbon Partnership is to undertake the technical requirements of project design, development and implementation. The role of Ekos is to own the methodological IP (held in open source), maximise environmental and financial integrity of the project and act as a retail sales and marketing agent. It is worth noting that Carbon Partnership and Ekos have interests in other rainforest carbon projects (one each in Fiji, Vanuatu and the Solomon Islands) developed by the author in partnership with other charities – Live & Learn Fiji, Live & Learn Vanuatu and the Natural Resource Development Foundation (Solomon Islands). Ekos, therefore, can be seen as a social enterprise charity dedicated to providing enabling infrastructure for market-based conservation financing.

RAI received a grant from Te Puni Kōkiri (Ministry for Māori Development) to undertake the project in 2008 (Weaver 2012), and project development occurred between 2009 and 2014. The business model for the project



Figure 1 Rarakau Rainforest Conservation Project in western Southland, New Zealand.

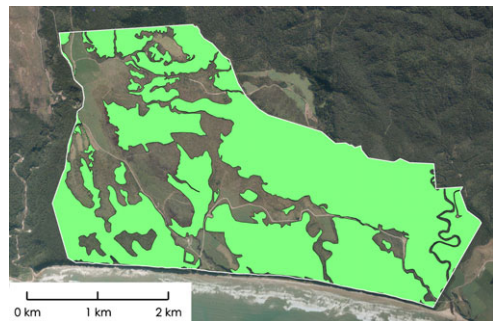


Figure 2 Map of Rarakau Rainforest Conservation Project showing protected rainforest (shading) and farmland within the land ownership boundary of the Rowallan Alton (Māori) Incorporation.

involves a transparently determined carbon offset unit price that covers the landowner's timber opportunity cost plus measurement, reporting, verification and administration, sales/marketing costs for the carbon project. The timber opportunity costs are calculated to match annually what RAI would earn from milling timber over the 50-year (renewable) project period. This means that RAI carries no financial sacrifice by taking the forest protection route instead of the timber-harvesting route (apart from a different financial risk profile than timber).

Market access challenges

A rainforest carbon project needs to produce carbon offsets to an international *carbon offset producer standard* that is appealing to carbon offset resellers and consumers. The most popular carbon offset producer standard (globally) is the VCS commanding 57% of market share across all sectors (Hamrick & Goldstein 2015). Applying this offset producer standard, however, comes at a high transaction cost (see Weaver 2015), particularly when developing a new methodology as was required for this project. The only other carbon offset producer standard available was the ISO14064-2 standard. Accordingly, this project was developed to meet the methodological requirements of the VCS standard but certified to the ISO14064-2 standard (certifying it to the VCS standard would have cost >NZ\$100,000 in auditing costs alone).

Applying the ISO14064-2 standard enabled the project to overcome a transaction cost barrier on the supply side, but this standard's unpopularity among resellers created a market access barrier on the demand side. The unpopularity of the ISO14064-2 standard in the international carbon offset wholesale market is influenced by *carbon offset consumer standards* such as the Australian National Carbon Offset Standard (NCOS) and the International Carbon Reduction and Offset Alliance (ICROA) (Weaver 2015). These offset consumer standards do not include the ISO14064-2 standard in their list of eligible offsets, and for this reason, most carbon offset resellers (wholesale buyers) are unwilling to place these units

with their business customers (e.g. businesses seeking to make carbon neutrality claims).

Because this project was prevented from accessing the carbon offset wholesale market, the only way to monetise the offsets was to retail carbon offsets directly to carbon offset consumers that were (i) geographically attuned to the project location (i.e. - New Zealand businesses) and (ii) not sensitive to carbon offset consumer standards. No New Zealand businesses contacted by this project during the commercial pilot phase were sensitive to the ISO14064-2 standard or concerned that ICROA or NCOS did not list this standard. Their main concern was twofold: (i) that the carbon offsets are certified to an international standard (they are) and (ii) that measurement of the customer's carbon footprint (required to determine how many carbon offsets to purchase to achieve carbon neutrality) would be undertaken according to an international standard (the carbon footprint measurement services offered to customers is undertaken according to the ISO14064-1 standard).

Engaging offset retail consumers requires the development of:

- 1 Demand side carbon management services and infrastructures (e.g. carbon certification marks, and demand side carbon footprint measurement reporting and verification protocols) and
- 2 Marketing, branding and sales effort.

Both of these components of carbon offset retailing come at a considerable cost to develop, thus adding a barrier to carbon credit monetisation requiring additional project capitalisation.

Capitalising carbon projects

When a carbon project transitions from wholesaling to retailing, the business structure of the project is forced to change. Unit prices need to increase to cover the additional costs of retailing infrastructure and effort. This effort usually needs to be capitalised prior to income from sales revenues but necessary to cause future revenue flows. This positions a project

in the typical space of a commercial business start-up where commercial assets coming down a pipeline need to be monetised in order to finance the business from unit sales. However, capitalising a start-up retail commercial entity presents another financing challenge. Grant and debt financing are the two principle types of capital raising available to a charity. This project used grant funds for project development and is still seeking grant funding to fund the commercial pilot. Thus far, the commercial pilot phase has been funded through a combination of in-kind contributions, cash grants from the author and a private loan to fund a part-time salary for a market researcher.

The strategic decision to operate the commercial side of the project as a charity instead of a private company was driven by a desire to demonstrate to the landowner, funders, market watchdogs and buyers that the purpose of the commercial venture is to cause rainforest protection (a charitable purpose) rather than generate profit. This purpose is reflected in transparent cost-based offset prices for this project. The logic is to keep unit prices down so that this venture can maximise the volume of forest protection per dollar invested. Keeping unit prices down was also needed in order to remain competitive in a market where industrial-scale carbon offsets are available at low wholesale prices on the world market. For example, Certified Emission Reduction units (CERs) in the compliance carbon market collapsed from €24 per tCO₂e in 2008 to below €1 per tCO₂e in 2014/2015. Prices in the voluntary carbon market (including REDD+ carbon) are affected by low compliance prices because voluntary buyers can source their offsets from the compliance market if they choose. In spite of this downturn in compliance prices, voluntary offset prices have remained consistently higher than the CER price but have been in steady decline since 2008, averaging at US\$3.80 in 2014 (Hamrick & Goldstein 2015).

Equity finance is another option for funding project commercialisation but would require the project to be restructured as a limited liability company and offer shares to a finance partner (not under consideration by Ekos trustees at present). Attracting capital from an

equity partner will typically include an obligation to share governance with that partner. This enables the equity partner to influence business management in line with investor interests. This influence can enhance the business management discipline of a project but may not always be compatible with the business culture of the social enterprise driving it. This can include pressure to drive up prices to satisfy the pace and volume of dividend returns to the investor.

Shifting from a charity to a for-profit business also eliminates the opportunity to market the project as a charitable initiative. This is relevant in a relatively new philanthropic market where market research showed many potential customers and landowners were sensitive to the motivations behind the sales strategy. It is also important to have a clearly defined point of difference to the offerings of competitors. For example, the 2015 break-even unit price for carbon offsets from the Rarakau Rainforest Conservation Project is retail: NZ\$15.49 (US\$9.86) and wholesale: NZ\$12.91 (US\$8.22). This compares with a retail unit price of approximately NZ\$28 and NZ\$35, respectively, for two domestic retail competitors.

When the original purpose of a social enterprise is to cause rainforest protection but where equity financing shifts the purpose *ipso facto* to profit, then this opens an interesting applied conversation (to be had elsewhere) about eco-capitalism versus (say) green liberalism. The inclinations of the charity operating this project reside in the latter where market-based mechanisms for conservation are seen as a valuable tool for conservation financing but where a profit margin sufficient to satisfy an investor could have relevance to the integrity and durability of conservation outcomes. For example, when profit becomes a central component of the enterprise, then the unit price will trend upwards to a willingness-to-pay threshold, with downward pressure on production costs. This could impact two key areas of a project business model:

- 1 *Raising prices*: The proportion of the unit price that goes directly to rainforest protection (and associated buyer perceptions about integrity) will diminish in comparison

with the proportion that goes to servicing investor dividends;

- 2 *Reducing production costs:* The financial resource available to invest in non-technical dimensions of project implementation (e.g. funds to enable maintaining strong relationships with landowners) may become increasingly difficult to justify in-house because this will negatively impact dividends.

Of the NZ\$15.49 retail unit price for the Rarakau Rainforest Conservation Project, 42% goes to the landowner, and the balance goes to transparently covering the costs of project measurement, reporting, verification, administration, sales and marketing. The 58% of the project budget that does not go to the landowner is only marginally covering production costs for this project.

The prospect of capitalising a commercial business presents a conundrum for a social entrepreneur intermediary in REDD+ who is faced with the very practical challenge of how to sufficiently raise funds using private finance. One salient question is whether to insist on 100% control of a small venture or be willing to accept much less control of a venture that is potentially orders of magnitude larger. Causing rainforest protection at a large scale is certainly compatible with the aspirations of the project and the charity that drives it. The question of its ability to grow and endure with integrity is of central importance to its strategic decisions and, in turn, on its survival. This reality mitigates against some of the principles of best practice in REDD+ intermediary behaviour as recommended by Porras and Nhandumbo (2015) because it nudges the project towards non-charitable terms (and associated internal business management culture) imposed by suppliers of private capital.

Hybrid financing options available to the social entrepreneur include structuring the venture as a 'Benefit Corporation' or 'B-Corp' – a cross between a charity and a for-profit company (e.g. see Chen & Kelly 2015 for an introduction to B-Corps). Here, business rules might permit dividends to be available only to an equity partner and no other financial stakeholder. Another option is for the project business to grow organically (grow in response to

growth in demand based on internal financial resources), but this is only possible if the social enterprise business can survive without access to external capital. If this patient path is elected, the question then turns to how to finance that patience because social entrepreneurs typically have bills to pay and are not usually on salaries. Yet another option is to find a willing impact investor (i.e. an investor seeking to cause social impact and not necessarily maximise a financial return).

Sales

The Rarakau Rainforest Conservation Project is a small project producing 2,430 carbon offsets annually. It can be self-sustaining only (i) if demand can match supply at the break-even asking price and (ii) if the pace/timing of sales keeps up with the on-going resourcing needs of the project (unless grant funding is found to sustain these resourcing needs separately to commercial sales).

Sales experience since the commercial pilot phase began in late 2014 showed a slowly growing level of interest, with sales coming in from mostly small-scale buyers (e.g. flight offsets) and a few medium-sized businesses. Sales experience has thus far shown that (i) it can take a long time to develop a trusted customer relationship with no guarantee of a sale (probably old news to most carbon offset resellers) and (ii) that there are barriers to the uptake of carbon offsetting. Carbon offsetting typically requires carbon footprint measurement in the customer business (i.e. to enable a carbon neutrality calculation to be made). This comes at a cost to that business because such measurement and reporting will either be conducted in-house at a cost (if the customer has this capability) or outsourced for a service fee. If a business is new to carbon management, they will often allocate limited funds to the exercise. Carbon footprint measurement and reporting can cost between NZ\$1,000 and NZ\$10,000 depending on the size and complexity of the business. If this cost soaks up the bulk of funds budgeted for carbon management, then such businesses often measure their footprint and no more. This helps a business understand its environmental performance,

enables inefficiencies to be eliminated and generates a sense of progress (without offsetting any carbon footprint). So the Rarakau Rainforest Conservation Project cannot usually engage a sale until and unless the business customer has already invested in carbon footprint measurement. The exception to this is flight offsets offered by this project (which uses the project's online carbon calculator).

At the time of writing, the charity operating the project (Ekos) had achieved a modest volume of carbon offset sales (more than 700 tCO₂e but less than 1,000 tCO₂e from an annual production of 2,430 tCO₂e) and with indicators of likely continued growth in sales volumes. The highest volumes of offsets were purchased by small- to medium-sized businesses seeking carbon neutrality, coupled by numerous individuals purchasing offsets (small volumes) for domestic and international flights. All sales are ex post (i.e. no forward purchasing arrangements).

The slow pace of sales experienced by this project during the first year of the commercial pilot is not uncommon for this sector. For example, an annual global survey of the voluntary carbon market in 2013 by Ecosystem Marketplace found that 30 million tCO₂e of forestry and land use units remained unsold at years end (Peters-Stanley *et al.* 2014). By 2014, this had risen to 44 million tCO₂e (Hamrick & Goldstein 2015). Respondents to the 2014 survey (Hamrick & Goldstein 2015) reported lack of demand as a significant factor in a 'buyers market', with supply exceeding demand and falling prices.

In the absence of strong government leadership in promoting environmental and climate change responsibility in the business sector, a lack of demand stimulus translates into low demand for voluntary offsetting (see Weaver 2015 for a global view on this same issue). Furthermore, New Zealand corporate responsibility is lagging behind international trends, and this means there is a lack of competition in the market for demonstrating environmental/sustainability leadership. For example, a 2013 KPMG survey of corporate responsibility reporting globally (KPMG 2013b) showed that this sector is still in its infancy in New Zealand. That year, approximately 47% of companies in New Zealand published a

sustainability report versus Australia 82%, USA 86%, Colombia 77%, Canada 83%, South Africa 98%, Denmark 99%, Sweden 79%, UK 91%, Singapore 80% and Japan 98% (for a few examples). Of the 41 countries surveyed, New Zealand was placed fourth from the bottom in terms of corporate responsibility reporting (beating only Greece, Kazakhstan, Israel and the United Arab Emirates) (KPMG 2013b).

Regulatory development has shown to have by far the most influence on voluntary carbon market performance. Unregulated companies (i.e. not points of obligation in a compliance carbon market jurisdiction) are more likely to voluntarily offset carbon emissions if they operate in the vicinity of compliance offset markets (Hamrick & Goldstein 2015). The NZETS will have had an effect on the (very small) NZ voluntary offset market, with low carbon compliance prices likely to have influenced a downward price trend and/or diminished demand on the voluntary sector. For example, spot prices for NZUs fell to below NZ\$2/tCO₂e in 2013 (Carbon Forest Services 2015) where compliance (and voluntary) buyers were also able to source CERs offshore for as little as NZ\$0.18/tCO₂e (C. Milne, pers. comm., 2014).

In spite of low background compliance market wholesale prices, none of the customers contacted in the Rarakau Project market research during 2015 were price-sensitive to the retail price offered. In fact, several conference event customers contemplating domestic flight offsets through this project felt that the low price offered (e.g. NZ\$3.28 to offset a return flight Wellington to Dunedin using correct emission factors) signalled that the offsets were not 'proper' and did not buy as a result.

Conclusion

The original question of this paper asks: 'To what extent is REDD+ a realistic conservation financing option for Māori owners of indigenous forest at scale?' The commercial pilot phase of project development for the Rarakau Rainforest Conservation Project has shown that after 4 years of project development and a year of market research and sales effort, it is still too early to fully answer this question.

Notwithstanding, 2015 sales indicators and market research suggest that a) current levels of demand are likely to be sufficient to sustain the first project, and b) there is potential for demand side growth to accommodate a cluster of projects, perhaps aggregating to some 10,000–30,000 hectares at best (i.e. not a nation-wide programme of rainforest protection). This could potentially include rainforest on non-Māori lands, but because the original funding came from the Ministry for Māori development, there is an obligation to provide benefits to Māori in the first instance. Furthermore, the marketing strategy for Ekos is to focus on the supply of rainforest carbon offsets from indigenous forests owned by indigenous peoples.

Existing protected areas on private land (e.g. those under Queen Elizabeth II (QEII) covenants) are not eligible for carbon crediting projects in the international voluntary carbon market because these forests have already been legally protected, and the carbon stocks contained within are not under threat from logging. The only forests that would be eligible are those where a project can demonstrate 'additionality' (i.e. where commercial timber harvesting is very likely during the 50-year project period if the carbon project does not go ahead).

Any significant scale-up in supply (i.e. replicating the Rarakau project in other locations) is fundamentally dependent on sufficient demand to sustain additional supply. As such, this is a demand-driven activity and is dependent on a sales and marketing vehicle capable of tapping into much larger volumes of demand than presently experienced. If intergovernmental and/or national policy on climate change and/or corporate responsibility takes an upward turn, then this would very likely drive up demand for voluntary carbon offsets. Then perhaps a larger-scale supply programme could operate, the size of which would be determined by the value of aggregated demand. To this end, the 2015 UN Paris climate deal is sending a stronger intergovernmental policy signal that says: 'the carbon goal posts now have much deeper roots'. Regulatory backdrops tend to influence voluntary actions and markets. This market signal may lead to greater uptake of voluntary carbon

management among New Zealand businesses, which in turn could lift the New Zealand private sector off the bottom of the OECD corporate social responsibility performance ladder.

Voluntary carbon markets present an opportunity for new sources of environmental financing for rainforest protection (in theory). In practice, commercial challenges, global trends and poor domestic policy support for market-based approaches to conservation are limiting the potential of this new sector. A salesperson might say that a nascent revolution in environmental financing is on the make. A scientist would probably be more subdued. The outcome will ultimately be determined by genuine investment – voluntary buyers of carbon offsets at scale and funders (including impact investors) willing to support pioneering social enterprise. Both depend on prioritising the opportunity to make a difference, where building a sustainable future becomes an integral part of making a living.

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Endnotes

- 1 In 2007, a '+' was added to the UNFCCC definition of REDD to signify the inclusion of 'conservation of forest carbon stocks, sustainable management of forest, and the enhancement of forest carbon stocks'.
- 2 REDD+ is being used here in its broader sense rather than just in the context of a potential financing instrument of the United Nations Framework Convention on Climate Change.
- 3 In late 2012, New Zealand exited the Kyoto Protocol. New Zealand has also excluded pre-1990 indigenous forests from the NZETS and associated compliance jurisdiction. Furthermore, the Ministry for Primary Industries confirmed that the Rarakau Rainforest Conservation Project exists outside the compliance carbon accounting boundary with no risk of double counting (MPI letter to the author 2013).

- 4 This was calculated using revenue passenger kilometers (RPK) data from the Air New Zealand's 2014 annual report, combined with emission factors for short and long haul flights from the NZ Ministry for the Environment.
- 5 Marovo Lagoon is the world's largest and best-defined double barrier-enclosed saltwater lagoon system (UNESCO 2015: <http://whc.unesco.org/en/tentativelists/5414/>).

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