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# INSIGHTS INTO FARMER BEHAVIOUR RESPONSES TO EMISSIONS PRICING

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*Report prepared for*  
He Waka Eke Noa Primary Sector Climate Action Partnership

*Report prepared by*  
Ruth Hungerford

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## EXECUTIVE SUMMARY

### INTRODUCTION

This report presents the results of a literature scan and selected key informant interviews into possible farmer behaviour responses to different emissions pricing options. It was commissioned by He Waka Eke Noa Primary Sector Climate Action Partnership and carried out by Momentum Research and Evaluation Limited in November 2021.

As New Zealand is one of the first countries to price agricultural emissions there is no specific research available about how farmers have responded to emissions pricing. However, there is literature on farmer responses to other environmental initiatives, policies and legislative frameworks. Resources reviewed for this report included peer-reviewed literature, as well as ‘grey’ literature reports, technical documents, articles, guides, podcasts, videos, literature reviews, fact sheets and webpages, accessed from online searches and/or provided directly by He Waka Eke Noa partners.

The full report includes the methodology, pricing options, discussion of the identified themes and a complete reference list of the 157 cited sources. The following is a summary of the key findings. It is recommended that the full report is referred to for more detail on the information summarised here.

### SUMMARY OF FINDINGS

Evidence from the literature indicates that cost is only one of the drivers of on-farm change. Farmers, growers, and landowners, including Māori landowners, are not one homogenous group; they run different operations, including some multi-use large-scale operations and farm in different ways on different land classes with different levels of capacity, commitment, and capabilities. There are examples of landowners who are implementing actions and/or are looking at their options for when pricing comes in, and examples of those who are not yet taking action. As farmers are not a homogenous group, encouraging on-farm change is not a ‘one size fits all’ approach, and the extent to which farmers implement changes on-farm is related to a mix of factors.

Factors which encourage on-farm changes include: farmers or landowners having pro-environmental beliefs or values; working with farmers and landowners so that they are invested and actively involved; making connections for farmers between the ‘issue’ (e.g., climate change), the regulations and their own farm practices; providing support to farmers (e.g., industry support, extension, incentives, resources, advice and information); having legislation, regulations, financial drivers (e.g. pricing, market forces); having affordable, effective mitigations; and allowing enough time for farmers to understand, make decisions and implement changes. This means that whilst emissions pricing and legislative requirements are drivers of change, the inclusion of broader programmes of support (e.g., extension, industry support, advice, information, incentives) alongside emissions pricing, is likely to encourage greater buy-in and uptake of on-farm changes to reduce emissions.

For Māori landowners, in addition to the above factors, historic land loss, confiscations and legislation have created a framework with significant administrative and financial costs, which limit and constrain landowners. Added to this is that Māori land is collectively owned, land quality ranges with a high percentage of marginal land, land use can be diverse and multi-faceted with some under lease and whilst there are established, well-governed Māori trusts, partnerships and corporations, there are also those without established management structures. This mean that in terms of emissions pricing and on-farm actions Māori landowners may be more limited in what they can do with their land, their operations may not fit ‘neatly’ into an emissions pricing framework based on single use operations, and

they will need time for the communication and decision-making processes to occur before actions can be implemented.

There is evidence that most Māori landowners are guided by kaitiakitanga, have pro-environmental values, and a longer-term vision for their land which can, and does, lead to being more likely to implement on-farm changes. However, the ability to implement change still relies on resourcing, capacity, land use capability and the availability of effective, practical, and acceptable mitigation options. This means that regardless of which pricing option is chosen, most Māori landowners will make choices based on their values and vision for the land balanced by what they can do within their structural, land use capability, and financial constraints.

In terms of which of the two emissions pricing options would be more or less likely to encourage farmers to reduce emissions, the evidence suggests that this depends to some extent on how the options are communicated and/or implemented to ensure that farmers can link the price to their operation and/or be rewarded for their on-farm actions, coupled with the availability of practical, affordable and effective mitigations. Provided the mitigations are available, a farm-level option is likely to be more effective for encouraging on-farm change, as it provides a direct link to their operation, allows for the diversity of farm operations and land use, and avoids averaging. The processor-level option, being a step removed from the on-farm operation, may be less tangible for many farmers and thus less of a driver of change, and if it does not have the ability to 'reward' farmers for making changes then it will potentially be less effective at encouraging change.

As discussed, there is limited evidence on farmers' actual responses to emissions pricing, primarily because it is a new approach. There are examples of farmers and Māori landowners who are trialling and /or committed to on-farm mitigations, and there has been modelling of the different options. However, until the pricing is implemented, the extent to which on-farm change occurs because of pricing, can only be surmised based on modelling and on what is known about behaviour in response to other initiatives, regulations and approaches. This means that there are gaps in the knowledge about landowners' responses. It would be useful, therefore, as the emissions pricing is implemented, to ensure that there is ongoing research and evaluation about landowner responses and the extent to which on-farm changes occur, both to inform the process and add to the national and international knowledge base.

## **CONCLUDING COMMENTS**

The literature scan confirms that there is no 'one size fits all' approach to on-farm change and that whilst cost is a factor in encouraging behaviour change, it operates within a context of human, structural, historical, contextual, biological, cultural and geographical factors that all determine whether farmers, growers and Māori landowners can, or will, make on-farm changes. Understanding the context, limits and/or constraints such as time, capacity and capability that landowners work within, and actively and proactively working with them to develop and implement options that enable them to manage their land sustainably, are therefore keys to effective and sustainable on-farm change.

## **RECOMMENDATIONS**

Based on the findings reported in this document it is recommended that:

1. The emissions pricing system includes broader programmes of support to encourage and enable farmers, growers, and Māori landowners to make changes to reduce emissions.

2. The emissions pricing system allows sufficient time for farmers, growers, and Māori landowners to implement changes.
3. The emissions pricing system recognises the administrative, geographic, historical, time and financial context which Māori landowners work within and includes provision to ensure Māori landowners are supported and not disadvantaged by the pricing system design, timeframes, expectations, and implementation.
4. As part of the implementation of the emissions pricing the impact on farmer and Māori landowners is evaluated and information gathered to add to the body of knowledge about on-farm change in relation to emissions pricing.

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## 1.0 INTRODUCTION

### 1.1 THIS REPORT

This report presents the results of a literature scan and selected key informant interviews into possible farmer behaviour responses to emissions pricing. The work was commissioned by He Waka Eke Noa Primary Sector Climate Action Partnership (He Waka Eke Noa) and carried out by Momentum Research and Evaluation Limited (Momentum) in November 2021. This chapter provides a brief background to the work, followed by the aim, objectives and methodology.

### 1.2 BACKGROUND

From 2025, under the Climate Change Response (Emissions Trading Reform) Amendment Act (2020), agricultural emissions will be included in New Zealand’s emissions trading scheme (NZ ETS), unless an alternative pricing regime is developed and agreed to (He Waka Eke Noa: Primary Sector Climate Action Partnership (HWEN), n.d.). This change makes New Zealand one of the first countries in the world to put a price on agricultural emissions (Interim Climate Change Committee (ICCC), 2019B; International Carbon Action Partnership (ICAP), n.d.).

He Waka Eke Noa, a five-year partnership between iwi/ Māori, Government, and primary industry, was set up in late 2019 in response to the legislative changes to “work together to implement a framework by 2025 to reduce agricultural greenhouse gas emissions and build the agriculture sector’s resilience to climate change” (Beef + Lamb New Zealand (B+LNZ), n.d.; HWEN, 2021, p.2.).

A key milestone is that “by April 2022 He Waka Eke Noa will advise the Government on potential alternative options to NZ ETS, for the pricing of agricultural emissions and recognition of sequestration.” (He Waka Eke Noa 2021, October, p.1). To date, He Waka Eke Noa has developed two alternative pricing options: (i) Farm-level Levy and (ii) Processor-level Hybrid Levy with the ‘backstop’ option being that agricultural emissions become part of the NZ ETS (HWEN, 2021, October; 2021, November 23). Please refer to Appendix One for details on the pricing options, agricultural emissions and what classifies as a farm.

He Waka Eke Noa has modelled the different options and from December 2021 through to March 2022, will engage with farmers and farmer groups about the pricing options (HWEN 2021, November 22B). He Waka Eke Noa commissioned the current work to provide further insights into possible farmer responses to the different pricing options.

### 1.3 REVIEW

#### 1.3.1 CONTEXT

He Waka Eke Noa is seeking information to help answer the core question: “in the context of a broader framework to reduce emissions, how much more effective could the pricing options be in creating an incentive for farmers to take up practices to reduce emissions than the economic modelling<sup>1</sup> suggests?”<sup>2</sup>

The hypothesis of He Waka Eke Noa is that “by participating in a pricing scheme alongside broader programmes of support, farmers will look to explore efficiencies and emission reduction opportunities in

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<sup>1</sup> The economic modelling “assumes farmers would only take up a practice or technique that reduces emissions when the technique/practice costs less than the emissions price i.e., they are economically rational.” However, anecdotal evidence suggests that farmers may have differing responses that are not necessarily ‘economically rational’. i.e. Anecdotal feedback suggests that leading farmers are already looking at ways to reduce/offset emissions, and that regardless of the price, farmers will look to reduce if they can see efficiency gains and/or that farmers will intensify to cover the bill. He Waka Eke Noa, Proposal briefing notes received 2 November 2021.

<sup>2</sup> Source: He Waka Eke Noa, Proposal briefing notes received 2 November 2021.

their system beyond those that are economically rational.”<sup>3</sup> He Waka Eke Noa is interested in gathering evidence for or against the above hypothesis, including ensuring that Māori agribusiness is reflected and included in the analysis.

### 1.3.2 PURPOSE

The purpose of the work being commissioned is to seek out evidence for or against the above hypothesis and to assist He Waka Eke Noa to determine the extent to which their pricing options will or will not incentivise farmers to take up practices to reduce emissions.

### 1.3.3 METHOD

In order to meet the above purpose three methods were employed: (i) a literature review;<sup>4</sup> (ii) four key informant interviews with two agricultural consultants and two industry staff; and (iii) one hui with seven key informants from He Waka Eke Noa partners.

## 1.4 THIS DOCUMENT

This document presents the findings of the research. There are three chapters:

<b>Chapter 2.0: Background</b>	<i>What can we determine from the literature about farmer behaviour? What factors are unique to Māori agribusiness and landowners?</i>
<b>Chapter 3.0: Emissions Pricing and Behaviour Responses</b>	<i>What can we determine from the literature about how farmers might respond to emissions pricing? How do factors unique to Māori agribusiness and landowners impact on possible responses to emissions pricing?</i>
<b>Chapter 4.0: Conclusions</b>	<i>What can be concluded about how farmers might respond to emissions pricing?</i>

### Notes:

- i. This is not an exhaustive review of literature, but is a ‘scan’, and it is not restricted to peer-reviewed literature but also includes ‘grey’ literature<sup>5</sup> including podcasts, videos, newspaper and online articles, newsletters, webpages, technical reports, guides, handbooks, fact sheets, government documents and case studies, as some examples. When the term ‘literature’ is used in this document it should be interpreted to include all the varied information sources.
- ii. Key informant interviews are not separately reported on in the document. Where information from the interviews is included in the write-up they are referenced as ‘Key informant interview, 2021.’
- iii. The audience for this report is primarily those involved with He Waka Eke Noa including but not limited to the staff, partner organisations and consultants and it is assumed that the reader has a reasonable level of knowledge and understanding of the work of He Waka Eke Noa and the primary industry sector in Aotearoa New Zealand. Further detail on the pricing options is provided in Appendix One.

<sup>3</sup> Source: He Waka Eke Noa, Proposal briefing notes received 2 November 2021

<sup>4</sup> Literature was accessed from online searches and sources and/or provided directly by He Waka Eke Noa partners.

<sup>5</sup> Grey literature is material produced by government departments, corporations, and other organisations that has not been published in book or journal form. It includes technical and research reports, annual reports, brochures and fact sheets, press releases, and white papers (Massey University, n.d.).

## 2.0 BACKGROUND

### 2.1 INTRODUCTION

This chapter presents findings from the literature scan to provide context and answer the questions: (i) what can we determine from the literature about how farmers<sup>6</sup> might respond to emissions pricing?; and (ii) what factors are unique to Māori agribusiness and landowners?

There are two sections: (i) Farmer Behaviour presents an overview and summary of farmer behaviour, enablers and barriers to change; (ii) Māori Landowners presents an overview and summary of key factors relevant to Māori landowners.

### 2.2 FARMER BEHAVIOUR

#### 2.2.1 OVERVIEW AND CONTEXT

The purpose of emissions pricing is to encourage farmers and growers to reduce their on-farm emissions (HWEN, 2021 November 22A; Horrocks, 2019/2020). Farmers will pay for emissions from their farm, with one method to be adopted nationally, either directly (i.e. via a farm level levy) or indirectly (i.e. via a processor level levy), but they can reduce this cost by putting in place mitigations to reduce their emissions (ICCC, 2019, p.54). Some economic modelling suggests that some farmers may be encouraged by emissions pricing to put mitigating actions in place in order to reduce the amount they have to pay, while some may choose to pay when the cost of change outweighs the price (Denne, 2021; ICC, 2019). There is some evidence from key informants and literature that some landowners may make changes that increase productivity (Hammond Wagner, Greenhalgh, et al., 2020; Hungerford, 2009; Key informant interviews, 2021; Motu, 2012). There is also evidence that some farmers, including Māori landowners, are already looking at ways to reduce or offset their emissions (AgMatters, 2021B, 2021C; Bargh, Douglas, et al., 2014; Key informant interviews, 2021; Reid, Rout, et al., 2021; Te Runanganui o Ngāti Porou, 2021).

Whilst economic factors can and do drive change, they are rarely the only reason why people are driven to change their behavior. Research shows that farmers' behaviour and decision-making choices, are "embedded within an intricate network of multiple factors" (Zhang, Long, et al., 2020, p. 1). As New Zealand is one of the first countries to price agricultural emissions, there is no specific research available about how farmers have responded to emissions pricing, however there is research available on farmer responses to other environmental initiatives, policies, and legislative frameworks.

The following section summarises key factors that influence farmers to adopt innovations, or change on-farm practices or operations, to mitigate environmental impacts.

#### 2.2.2 ENABLERS AND BARRIERS

Farmers and growers, both in New Zealand and internationally, have had to address the impact of farming on the environment and their responsibilities as landowners to address this whilst maintaining food production (European Commission, n.d.; Gray, 2018; Parliamentary Commissioner for the Environment (PCE), 2012). Evaluations of on-farm pilots, trials and initiatives and research into adoption of new practices and drivers of change, in New Zealand and internationally, have identified a range of enablers and/or barriers to farmer uptake of actions to mitigate environmental impacts (e.g. AgFirst, 2017; 2018; Barghusen, Sattler et al., 2021; Davies, 2012; Fenemor et al., n.d.; Gray, Sewell, et al., 2016;

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<sup>6</sup> Note that in the context of this report the term 'farmer' is used to mean the landowner, grower or farmer and including Māori landowners, who have the ability and/or responsibility to make on-farm changes to their system. This person or persons may live and/or work on the land, or they may be a non-resident landowner or a collective of people (e.g. a board, a trust, a corporation, an iwi, hapū or whānau, a co-operative or a partnership).



Hammond Wagner, Greenhalgh, et al., 2020; Hungerford, 2008; 2009; 2019; Journeaux, 2009; Trotman, 2017; Van Herzele, Gobin et al., 2013; van Reenen, 2012; Vanslembrouck, Van Huylenbroeck et al., 2002).

### **2.2.2.1 ENABLERS**

Factors which enable or encourage farmers to make changes on-farm are not a ‘one size fits all’ approach, do not operate in isolation and are often a mix of different motivators (Barnes, Beechner, et al., 2010; Key informant interviews, 2021; Van Herzele, Gobin et al., 2013). Some of these factors are external (e.g. tools, methods or approaches, support, market forces) and others are internal (e.g. farm operations or businesses, farmer characteristics, values or beliefs). Factors identified from the literature and interviews which can enable, encourage or ‘drive’ farmers to make changes on-farm include:

- **Working with farmers**: i.e. farmers being actively involved in the process (e.g. listening to farmers and working with them, ‘ground-up not top-down’, farmer-led, farmer-driven) (AgFirst, 2017; 2018; Barghusen, Sattler et al., 2021; BERG 2018; Davies, 2012; Fenemor et al., n.d.; Gray, Sewell, et al., 2016; Hungerford, 2008; 2019; Inman, Winter et al., 2018; Journeaux, 2009; OECD, 2012; Trotman, 2017; van Reenen, 2012; Whatley, 2019).
- **Making the connections**: i.e. making connections for farmers between the ‘issue’ and their farm or business (e.g. impacts of climate change on their farm or business specifically) (Agmatters, 2021B; Hungerford, 2019; Inman, Winter et al., 2018; MPI 2019; Motu, 2012).
- **Supporting farmers**: i.e. extension and technical support, resources, financial incentives, advice and information from regional councils, industry good, experts and advisors (Davies, Kaine et al., 2007; Fenemor et al., n.d.; Hungerford, 2019; Inman, Winter et al., 2018; Trotman, 2017).
- **Industry support infrastructure**: i.e. having a system in place to support farmers to collect and understand their data and impact and make the changes they need (e.g. Fonterra Farmer Insights reports; Sustainable Dairy Advisors) (Fonterra, 2021).
- **Communicating clearly**: i.e. ensuring there is clear, practical, consistent and accurate communication, and methods, to engage with farmers about the what, why and how (Fenemor et al., n.d.; Hungerford, 2019; Inman, Winter et al., 2018; Trotman, 2017; van Reenen, 2012);
- **Collective approaches**: i.e. those which involve a whole community and/or a collective of landowners (e.g. whole farm planning, sub catchment approaches, joint projects) (Fenemor et al., n.d; Gray, Sewell, et al. 2016; Hungerford, 2019; Inman, Winter et al., 2018; Sewell, Gray, Blair et al., 2014; Whatley, 2019).
- **The ‘neighbour’ effect**: i.e. ‘over-the-hedge’ farming; seeing what other farmers are doing (e.g. field days, visible projects, demonstration farms); peer support, peer pressure (Barnes, Beechener et al., 2010; Fenemor et al., n.d; Hungerford, 2019; MPI, 2019; Moran, Lucas, et al., 2013; UMR Research, 2014A; Vanslembrouck, Van Huylenbroeck, et al., 2002).
- **Farmer leaders**: Having respected farmer leaders who encourage others to get involved and/or lead by example (Hungerford 2019).
- **Individualised whole farm planning** i.e. working with each farm business, using Farm Environment Plans (FEPs), to support farmers to target interventions and actions to their specific business, soil types, topography, and farming system (Federated Farmers of New Zealand Ltd, 2019; Hungerford, 2016; 2019; Inman, Winter et al., 2018).
- **Environmental regulation**: i.e. compliance and legislative requirements (AgFirst, 2020; Hammond Wagner, Greenhalgh, et al., 2020; Hungerford, 2019).

- **Practical, evidence-based mitigations that work:** i.e. mitigations that are evidence-based, that work, that are easy to implement and are of benefit (e.g. financial, practical, operational, aspirational) to the farm operation (AgFirst, 2018; Barnes, Beechener et al., 2010; Biological Emissions Reference Group (BERG) 2018; Cortés-Acosta, Fleming et al., 2019; Gray, Sewell, et al., 2016; Jones, Jones et al., 2013; MPI, 2019; Turner, Payne et al., 2014; van Reenen, 2012).
- **Market Forces:** i.e. market access (e.g. being unable to sell their product unless they meet certain environmental indicators);<sup>7</sup> and/or market positioning (e.g. developing a premium product or brand so they can stay profitable with reduced product) and/ or brand and reputation as sustainable or environmentally focused. (Barnes, Beechener et al., 2010; Hungerford, 2019; Nestle, (n.d.); Taupō Beef and Lamb; 2016).
- **Mitigations that match the farm operation:** i.e. those that fit into the farm operation, typology and focus and have more than one benefit (e.g. reduce emissions, meet environmental goals, increase or maintain productivity, sequester carbon) (Agmatters, 2021C; Hungerford, 2020).
- **Financial incentives and profitability:** i.e. financial incentives, reward programmes (e.g. The Co-operative Difference, Taste Zespri, Te Ara Miraka, Lead with Pride (Fonterra Co-operative Group, 2021; Miraka, n.d.; Synlait, n.d.; Zespri, 2021), disincentives for non-compliance, no-cost or win-win, mitigations<sup>8</sup> (Barnes, Beechener et al., 2010; Fonterra, n.d.; Hungerford, 2019; Journeaux, Kingi, et al., 2017; MPI, 2019; Trotman, 2017; Zespri, 2021).
- **Pro-environmental beliefs:** i.e. farmers who believe in climate change and/or have pro-environment attitudes are more likely to implement on-farm practices or actions (Cortes-Acosta, 2019; Facciolia et al 2020 ; Hungerford, 2016; MPI, 2019; Prokopy, Floress et al., 2008; Scrimgeour, Kumar et al., 2017; UMR Research, 2014A; Zemo & Termansen, 2021).
- **Locus of control:** i.e. farmers having a sense of control and choice over their business and operation (e.g. that the actions being undertaken are ones they choose) (Price & Leviston, 2014).
- **Farmer characteristics and attitudes** – i.e. farmers’ characteristics, world views, mindsets, education levels, reasons for farming and personalities<sup>9</sup> (Agmatters, 2021A; Barnes, Beechener et al., 2010; BERG, 2018; Hungerford, 2008; Kaine and Johnson, 2004; Prokopy, Floress et al., 2008; UMR Research, 2014A; Vanslebrouck, Van Huylbroeck, et al., 2002; Zemo & Termansen, 2021).
- **Value-based farming;** i.e. farmers whose vision for their farm includes the environment (e.g. ‘a quadruple bottom line’, kaitiakitanga, leaving a legacy) (Agmatters,2021A; 2021B;2021C; Elliott & Wakelin, 2016; UMR Research, 2014B; 2014C).
- **Allowing time to change:** i.e. allowing farmers time to engage, to understand what is needed (Gray, Sewell, et al. 2016; Hungerford, 2019; Inman, Winter et al., 2018; van Reenen, 2012).

#### **2.2.2.2 BARRIERS**

There are a range of factors that inhibit farmers from making changes on- farm. The absence of some of the above enablers can be a barrier. For example, a top-down approach with no farmer engagement, little or no support or resourcing, minimal, limited or confusing communication and a lack of evidence-

<sup>7</sup> E.g. Nestle as one example is working towards ‘Net zero by 2050’ which requires farmers in their supply chain to reduce emissions (Nestle, n.d.).

<sup>8</sup> ‘No cost or win win’ mitigations are “investments, technologies or practices whose adoption reduces the environmental impact of a farm, and does not reduce the profitability of the farm, measured in conventional financial terms” (Jaffe, n.d.).

<sup>9</sup> Note that there are many ways that researcher and industry have categorised farmers in order to understand what motivates them and how best to work with them. For example, farmers might be segmented by the type of farm, demographics (e.g. age, ethnicity, gender), behaviour, attitudes, or beliefs. A discussion of all the different models is beyond the scope of this document, but the following sources have examples of some of the different theories and/or have used various segmentation processes to explain farmer responses: AgFirst, 2017; Barnes, Beechener et al.,2010; UMR Research, 2014A.

based practical applications will have little success in encouraging farmers to make changes. Factors identified from the literature which can be barriers to farmers making on-farm environmental changes include:

- **Financial constraints and profitability:** i.e. farming is a business and farmers need to remain economically viable - if a mitigation is too costly or will impact negatively on productivity, change is less likely (Cortés-Acosta, Fleming et al., 2019; Journeaux, Kingi, et al., 2017).
- **Lack of clear communication and information:** i.e. not providing reliable, consistent useful information to farmers in ways that they understand, engage with and trust (AgFirst, 2018; Barnes, Willock, et al., 2009; Cortés-Acosta, Fleming et al., 2019; Hungerford, 2008; 2020; Kerr, 2016; MPI, 2019; Motu, 2012; van Reenen, 2012).
- **Market forces:** i.e. many farmers will make decisions on selling product dependent on the market (e.g. if stock prices are low, then farmers may choose to increase stocking rates, buy in extra feed, keep stock on farm longer, regardless of whether their intention has been to do otherwise) (Barnes, Beechener et al., 2010).
- **Climate:** i.e. a 'bad season' or drought will impact on some farmers undertaking a specific action (e.g. adding extra nitrogen to facilitate crop or pasture growth, keeping stock on farm longer, buying in extra feed) (Barnes, Beechener et al., 2010; Barnes, Willock et al., 2009).
- **Geographical factors:** i.e. geographical features (e.g. topography, soil types) impact on the extent to which a farmer can make changes on-farm (Hungerford, 2008).
- **Farm management structures:** i.e. the way a farm is managed or structured (e.g. absentee owners, leases agreements, Māori freehold land) can impact on the extent and timing of actions (e.g. a lessee may not be able to implement a specific action on the leased land without the owner's permission; decision making processes for board/trust structures may be lengthy and delay uptake) (UMR Research, 2014C).
- **Scientific uncertainty:** i.e. a lack of evidence (or farmer *belief*<sup>10</sup> in the evidence) that something works or concern that the action will not address the issue or having put actions in place which have 'not worked' (e.g. riparian fencing strips too narrow, planting not filtering nutrients, DCDs showing up in end products) (Barnes, Willock, et al., 2009; Hungerford, 2019; 2020; Jones, Jones et al., 2013; Kerr, 2016; MPI, 2019; Morgan, 2012; Pomahaka Water Care Group; NZ Landcare Trust, 2018a, 2018b)
- **Limited mitigation options** i.e.: limited mitigation options available (Hungerford, 2008; Kerr, 2016)
- **Practicality of mitigations:** i.e. a mitigation needs to be practical if a farmer is going to adopt it and if they perceive it is not practical (even if it is) then they may not use it (Barnes & Toma, 2012; Jones, Jones et al., 2013; Cortés-Acosta, Fleming, et al., 2019).
- **Farmer perceptions of environmental issues:** i.e. a farmer not believing in climate change and/or that their operation is a contributor (Barnes & Toma, 2012; Glenk, Eory et al., 2014; Hungerford, 2019; Pomahaka Water Care Group, 2020; NZ Landcare Trust, 2018a, 2018b).
- **Farmer knowledge and understanding:** i.e. if a farmer does not have the knowledge or understanding of the problem (e.g. GHG emissions, climate change), the policy (e.g. emissions pricing)

<sup>10</sup> Note that if there is scientific evidence that something works but a farmer does not believe this (i.e. because it has not been communicated clearly from credible sources, in a way they understand) then this is a barrier to uptake (Barnes, Willock et al., 2009).

or the solutions (e.g. mitigations) they may be less likely to make changes. (AgFirst, 2020A; Barnes, Willock et al., 2009; MPI, 2019; Motu, 2012).

- **Farmer capability:** i.e. if a farmer does not have the skills or knowledge needed to implement actions and/or processes that are ‘too complicated’ (Kerr, 2016; Key informant interviews, 2021; MPI, 2019; Motu, 2012; Schroeder, Isselstein et al., 2013).
- **Farmer characteristics and attitudes** – i.e. farmers’ characteristics, world views, mindsets, education levels, reasons for farming and personalities (Agmatters, 2021A Barnes, Beechener et al., 2010; BERG, 2018; Hungerford, 2008; Kaine & Johnson, 2004; Motu, 2012; Prokopy, Floress et al., 2008; Schroeder, Isselstein et al, 2013; UMR Research, 2014A).
- **Lack of trust and control:** i.e. farmers not trusting the system, the advice or the support and/or not feeling that they have control and choice over their business (i.e. that they are being ‘done to’) (Price & Leviston, 2014).

## 2.3 MĀORI LANDOWNERS

### 2.3.1 OVERVIEW AND CONTEXT

Whilst the enablers and barriers identified in the previous section are applicable to Māori landowners, farmers and growers there are specific historic, legislative and structural characteristics of Māori land and farming in Aotearoa, which impact options for Māori landowners under an emissions pricing scheme. These characteristics include, for example, land tenure, ownership, administrative structures and lease arrangements, many of which are mandated via Acts of Parliament, limiting and constraining the development and use of Māori land (HWEN, 2021 November 23; Kingi 2008A).

As well, for many Māori landowners and related farming enterprises, a Māori perspective in terms of history of the land, whakapapa or genealogical linking, the way land is viewed (e.g. as Papatuanuku or Earth Mother as opposed to a sole economic resource) and acceptance that land is a taonga and therefore should be looked after carefully, is important.

The following section summarises some of the key factors relevant to Māori landowners which impact on making on-farm changes, including history and legislation, characteristics of whenua Māori and values and beliefs.

Notes:

- i. The term ‘Māori landowners’ is used, rather than ‘Māori farmers’ as the focus is on Māori-owned land used for farming (i.e. Māori freehold land, Māori customary land and general land owned collectively by Māori), rather than farmers who are Māori per se (i.e. Māori farmers who own general land as individuals and/or work as farmers on general land).
- ii. The terms ‘Māori land’ or ‘whenua Māori’ are used to mean land that is owned by Māori (usually as a collective) and which may be Māori freehold land, Māori customary land or general land owned collectively by Māori. Whilst the term Māori freehold land might describe most of the land that this section applies to, it does not cover the range of ‘land types’ that are owned (e.g. Māori land that was converted to general land but is still owned and farmed as if it was whānau or Māori freehold land, or general land that has been purchased by an iwi or corporation, which may or may not be converted to Māori freehold land).
- iii. The term ‘Māori agribusiness’ is used in this section to apply to larger-scale farming operations. It is a term that is often applied to farming on Māori land which does not fit easily into the primary sector’s mainstream framework (e.g. ‘dry stock farm’ or ‘dairy farm’) as many enterprises may have, for example, ‘forestry, apiculture, horticulture, livestock, tourism, processing and aquaculture,’ as part of their farm operation, which in itself may be only one part of an overall enterprise.

### 2.3.2 HISTORY AND LEGISLATION

Before 1840 almost all land in Aotearoa New Zealand was under the guardianship of Māori. By 1862 approximately two-thirds of the total land area, including most of the South Island, had been acquired by the Crown (Brady, 2004). By 1920 around eight percent of New Zealand land remained in Māori guardianship. Today, an estimated 1.4 – 1.5 million hectares (about 5-6% of New Zealand’s total land area) is Māori land (Brady, 2004; Business and Economic Research Limited (BERL), 2019; Kingi, 2008B; 2009; Te Puni Kōkiri, n.d.; 2019; Te Tumu Paeroa, n.d.).

Causes of Māori land loss include key Acts of Parliament which enabled land to more easily be purchased, confiscated or taken.<sup>11</sup> Further Acts, some of which were created to protect Māori interests<sup>12</sup> resulted in more restrictions, further alienation of land, changes to land titles, greater administrative costs for Māori landowners and further land losses (Addis, 2017; Brady, 2004; Kingi, 2008B; 2009; Ministry for Culture and Heritage, 2016; 2019; Te Puni Kōkiri, n.d.; Te Tumu Paeroa, n.d.).

#### 2.3.2.1 TE TURE WHENUA MĀORI ACT (1993)

Te Ture Whenua Māori Act (1993) is the primary legislation for Māori land and was intended to protect Māori land ownership ensuring it remained with the owners and could be passed to future generations (Harmsworth, Tahī et al., 2010).<sup>13</sup> This Act created a complex system of rules and regulations for Māori land which: (i) came with administrative, personal and financial costs; (ii) were difficult to understand and operate within; and (iii) limited and/or delayed owners’ ability to manage and make decisions in relation to their land (Brady, 2004; Ministry of Justice, 2020; Te Puni Kōkiri, n.d.; 2019). As one example, “owners of Māori Freehold Land must apply to the Māori Land Court if they want to administer their land and anyone who wants to succeed to interests in Māori Freehold Land must apply to the Court. This is different to General Land where, for example, a person does not need to apply to a Court to succeed to land interests left to them” (Brady, 2004, p.9).<sup>14</sup>

Recent amendments to this legislation (6 February 2021), provided amongst other changes, more streamlined administrative processes and clarity around succession and ensuring that land is ‘passed on’ to rightful descendants (Ministry of Justice, 2020). However, Māori land remains governed by the Act and continues to face a complex set of rules and regulations that non-Māori land does not.

#### 2.3.2.2 THE MĀORI TRUSTEE

The Māori Trustee was established by the Māori Trustee Act (1953) to “act as trustee to administer Māori freehold land and other assets on behalf of the beneficial owners” (Te Tumu Paeroa, n.d.). Services provided include administering trusts, convening owner hui, managing and distributing trust funds, leasing property on behalf of the trust and working with owners to facilitate them taking over administration of their whenua (Harmsworth, Tahī, et al., 2010; Te Tumu Paeroa, n.d.).

The history of this role means that the Māori Trustee is not always viewed favourably by landowners. Specifically, the compulsory acquisition of so-called ‘uneconomic’ Māori land and conversions of Māori

<sup>11</sup> E.g., the Native Lands Act (1862) which created the Native Land Court (renamed the Māori Land Court in 1947), whose operation led to it being named ‘Te Kōti Tango Whenua’ – the land-taking court (Kingi, 2008B). The New Zealand Settlements Act (1863) enabled confiscation of land without compensation from any North Island iwi ‘engaged in rebellion against her Majesty’s authority,’ resulting in large scale land losses for many iwi. The Native Lands Rating Act (1882) which set rates higher on Māori land, enabling it to be more easily taken for unpaid rates; Public Works Lands Act (1864) which applied to general and Māori land, however Māori land was often targeted for developments (Addis, 2017; Kingi, 2009; Ministry for Culture and Heritage, 2016; 2019; Te Puni Kōkiri, n.d.; Te Tumu Paeroa, n.d.).

<sup>12</sup> E.g. Māori Affairs Act (1953), Māori Affairs Amendment Act, (1967), Māori Trustee Act (1953), and Te Ture Whenua Māori Act (1993).

<sup>13</sup> E.g. Section 2(2) of the Act states: ... it is the intention of Parliament that powers, duties, and discretions conferred by this Act shall be exercised, as far as possible, in a manner that facilitates and promotes the retention, use, development and control of Māori land as taonga tuku iho by Māori owners, their whanau, their hapū, and their descendants. (Te Ture Whenua Māori Act, 1993).

<sup>14</sup> Note that recent amendments to Te Ture Whenua Māori Act (1993), effective from February 2021, have streamlined some processes, however many of the requirements remain – e.g. the need to apply to the Court to succeed the land interest (Ministry of Justice, 2020, p.3).



freehold land to general land,<sup>15</sup> were viewed by many as an attempt by the Crown to unfairly obtain Māori Land and are reasons why some “Māori landowners remain suspicious of the Trustee’s motives and are of the view that the Trustee acts as an ‘agent’ of the Crown” (Brady, 2004, p. 25; Ministry of Culture and Heritage, 2019).

Currently, the Māori Trustee administers as trustee or agent, approximately 88,000 ha – about 7% of whenua Māori across Aotearoa - on behalf of almost 100,793 owners. In 2020/2021 there were 1,751 Māori Land Trusts and other Māori entities, ten enterprises and 1,732 leases administered by Te Tumu Paeroa, including responsibility for some perpetual leases<sup>16</sup> (Te Tumu Paeroa, 2021, p.8).

### 2.3.3 WHENUA MĀORI

Te Ture Whenua Māori Act (1993) categorises Māori land into Māori customary land, Māori freehold land, general land owned by Māori and Māori reservations.<sup>17</sup> The majority of whenua Māori is Māori freehold land with over 27,000 land block titles (Brady, 2004; BERL, 2019; Cortes-Acosta, 2020; Harmsworth, Tahi, et al. 2010; Te Tumu Paeroa, n.d.; 2021).

Māori land generally has multiple owners and this number increases over time due to succession (Kingi, 2013; Reid, Smiler, et al., 2019). Te Ture Whenua Māori Act (1993) provides various formal management structures that owners can use to manage their land, such as land trusts and incorporations or by establishing reservations, all of which must be approved through, and are subject to the scrutiny<sup>18</sup> of the Māori Land Court (Community Law, n.d; Harmsworth, Tahi et al., 2010; Kingi, 2008B; 2013). Not all Māori land has a trust or formal management structure in place (Reid, Smiler, et al., 2019).

Māori land class, size and quality varies (BERL, 2019). In general blocks with a trust are, on average, larger with more owners, and the average block of freehold Māori land is 51ha with 103 owners (BERL, 2019). Whilst some land is of higher quality, a high percentage of land is of marginal quality,<sup>19</sup> some is landlocked and some is covered in indigenous forest or plantation pines (Harmsworth, Tahi et al., 2010; Ministry of Agriculture and Forestry (MAF), 2011; Reid, Smiler et al., 2019; Te Tumu Paeroa, n.d.). Some land is leased out via “a multitude of leasing arrangements, some of which are mandated, and most of which are very long-term” (HWEN, 2021, November 23, p. 8).

There are also a number of Māori farming entities who manage “multiple blocks of land ranging in size, and often with multiple land uses within one entity,” (HWEN, 2021, November 23, p. 8) and examples of collectives and partnerships formed between landowner trusts or incorporations to enable further development (Flaws, 2021; Kingi, 2013; Miraka, n.d.; Whangara Farms, n.d.). For a number of entities, farming may not be the primary business, but one business unit, amongst many others. For example, Tuaropaki Trust began as an Ahu Whenua Trust, formed in the 1950s, and now has a diverse portfolio which includes geothermal energy, communications, and milk processing, amongst other ventures (Tuaropaki, n.d.).

<sup>15</sup> “The Māori Affairs Act (1953) empowered the Trustee to take over ‘uneconomic’ Māori land and the Māori Affairs Amendment Act 1967 introduced compulsory conversion of Māori freehold land with four or fewer owners into general land, and increased the powers of the Māori Trustee to compulsorily acquire and sell so-called uneconomic interests in Māori land. (Ministry for Culture and Heritage (2019).

<sup>16</sup> Perpetual leases were established from the late 1800s and apply to Māori land reserves or land that was returned to Māori as compensation, and then leased by the Public Trustee under perpetual leases. Over time they have led to very low rental prices, financial barriers and limited control of owners over their land. Perpetual leases, also saw the introduction of a term known as ‘peppercorn rentals’ or rent/lease figures for small (i.e. like a peppercorn) amounts. (Te Tumu Paeroa, n.d.).

<sup>17</sup> See Appendix 3 for more detail on the land categories.

<sup>18</sup> Although not commonly exercised the Māori Land Court does possess full powers to remove trustees for example (Kingi, 2008, p.144).

<sup>19</sup> E.g. Harmsworth (2017) 80% Māori land is classified as Land Use Capability (LUC) 6,7 or 8.

Māori have been involved in food production in Aotearoa since arriving here. Following European settlement, a number of iwi were involved in enterprises growing and selling food and other natural resources (e.g. timber) domestically and internationally (Kingi, 2008B). Despite land confiscations and losses – which was often of the more productive land as this was more desired by European settlers - Māori have continued to farm and grow food for market on whenua Māori (Kingi, 2008B). BERL (2021, p. 35) reports the Māori primary sector asset base at \$23.4 billion and contribution to GDP at \$2.4 billion. Māori own and manage “an estimated 30 percent of plantation forest land, 10 percent of land used for kiwifruit and dairy production, and 25 percent of land used for sheep and beef production” (Reid, Smiler et al., 2019, p.6).

The development of productive and successful agricultural operations by Māori landowners has occurred despite facing significant barriers to development, including that Māori had a significant proportion of their land confiscated due to legislation, that the land they retained was less productive, that there was less access to finance due to financial processes based on individual not collective ownership, and that they face higher administrative and financial burdens due to Māori Land Court processes (BERL, 2019; Dewes, Walz, et al., 2011; Te Puni Kōkiri, 2017; 37 Degrees et al., 2008).

### **2.3.4 VALUES AND BELIEFS**

As noted in section 2.2, values and beliefs are key drivers and/or barriers for change on farms. Any consideration of landowner decision-making on Māori land, needs to take into account te Ao Māori and te Taiao and Māori landowners’ aspirations, views and beliefs connected to land.

There is no one Māori world view or way in which Māori landowners manage their land (MAF, 2011). However, whilst Māori landowners may have different land use, different tribal practices and different priorities, the key theme that seems to underpin Māori land use is the concept of kaitiakitanga (MAF, 2011; Ngāti Pāhauwera Development Group, 2020; Te Runanganui o Ngāti Porou, 2020). i.e.:

*For most, kaitiakitanga – a balancing of cultural, spiritual, social, environmental, economic and financial factors – will be a core aspiration and expectation. The tikanga of individual trusts and incorporations will also have a strong influence on the general conduct of day to day affairs and in the balancing of values in management decisions. (MAF, 2011, p. 22).*

For some Māori landowners, kaitiakitanga might be linked to improving the land in some way to make it more productive for coming generations while for others kaitiakitanga might be linked to land restoration, regenerating native plantings, improving water quality and biodiversity and for others, all these concepts are part of being kaitiaki (i.e. of the land and of the future generations) (Dewes, Walz, et al., 2011; MAF, 2011; Whetu Consulting, 2019).

In terms of Māori landowners’ approach to land use, there tends to be a broader and longer-term view of managing land in a sustainable way to ensure it can continue to provide in the long term, which ties into concepts of kaitiakitanga and taonga (Craig, Taonui, et al., 2012; Craig, Taonui, et al., 2018; Harmsworth, & Awatere, 2013; Hutchings, Smith, et al., 2017; MAF, 2011; Phillips, Woods, et al., 2014; Poipoia, 2018; UMR Research, 2014C).

*Taonga emphasises guardianship over ownership, collective and co-operative rights over individualism, obligations towards future generations, and the need to manage resources sustainably (Craig, Taonui, et al., 2012, p.1025).*

The theme of land retention, connection and belonging to the land is also highlighted in the literature (e.g. Collier, 2009; Kingi, 2013; Ormond & Ormond, 2018; Smith, Hutchings, et al., 2019; Te Puni Kōkiri,

n.d.B; The origins of the Māori kiwifruit industry, 2020; UMR Research, 2014C). Te Puni Kōkiri (n.d.B) in their report, 'why whenua matters' sum this up:

*Our whenua is our tūrangawaewae, our place to stand. It connects us to our whānau, our ancestors and to our future generations. (p.2)*

Other Māori landowners express this in different ways:

*We'll never sell our land, that's a one-way ticket to being nobody (Ormond & Ormond, 2018, p. 83).*

Other related values that underpin and impact on Māori landowners' choices and decision-making on their land include, but are not limited to whakapapa, manaakitanga, rangatiratanga, wairuatanga, whanaungatanga, mauri, ki uta ki tai, tauutuutu and mātauranga Māori (Craig, Taonui, et al., 2018; Dewes, Walzl, et al., 2011; Key Informant interviews, 2021; Kingi, 2013; Kingi, Wakelin, et al., 2016; MAF, 2011; Ormond & Ormond, 2018; Poipoia, 2018; Reid, Rout, et al., 2021; UMR Research, 2014C).



## 3.0 EMISSIONS PRICING AND BEHAVIOUR RESPONSES

### 3.1 INTRODUCTION

The previous sections have highlighted factors that can encourage, or inhibit, farmers to implement changes to mitigate their on-farm environmental impact including specific factors and characteristics relevant to whenua Māori and Māori landowners.

This chapter discusses the implications of these factors, to answer the questions: (i) what can we determine from the literature about how farmers might respond to emissions pricing? and (ii) how do factors unique to Māori agribusiness and landowners impact on possible responses to emissions pricing?

It is divided into the following sections: (i) Multiple factors affect decision-making; (ii) The importance of science: Mitigations that work; (iii) Cost-benefit; (iv) Working with farmers: Taking them on the journey; and (v) Māori landowners: Challenges and drivers.

### 3.2 MULTIPLE FACTORS AFFECT DECISION-MAKING

The factors that the literature identifies as drivers or barriers to change indicate that economic drivers are only one part of the equation. The literature is clear that prices can and do, have an impact on behaviour but “adoption behaviour is driven by a more complex set of motivating factors not accounted for in the MACC<sup>20</sup> approach” (Glenk, K., Eory, 2014, p.49). Factors such as mitigation options, a lack of trust, farm profitability, access to finance, land geography and topography, personal or collective beliefs, identity, attitudes, values, knowledge, capability and understanding all come into play in the decision-making process (AgFirst, 2018; B+LNZ, 2013; MAF, 2011; Moran, Lucas et al., 2013; Zemo & Termansen 2021).

*Farmer behaviour is driven by a range of factors; intrinsic, personal circumstances, social settings and norms, and economic factors. In short, human behaviour is very complex, and any policy designed to affect behaviour needs to be multi-faceted (AgFirst, 2018, p.9).*

The Taupō ‘cap and trade’ provides an example of heterogeneity where there were a range of landowner responses to the legislation. For example, some farmers made on-farm changes to reduce their nutrient leaching, some stopped farming and sold their land, some planted pine trees and some made changes which increased productivity and nutrient losses (Duhon, McDonald, et al., 2015; Hammond Wagner, Greenhalgh, et al., 2020; Morgan, 2012).

*Pines are now growing on land that was once home to sheep and cattle, crowding the farmers who have elected to stay (Morgan, 2012).*

*The cap has reduced farmers’ ability to intensify production, has decreased land values, and has significantly increased administration and compliance costs. These economic costs have led to social costs: significant land-use change has resulted from the policy, which has resulted in a number of farmers leaving the catchment (Duhon, McDonald & Kerr, 2015, p. 40).*

*... we decided after a lot of soul-searching that we would sell (Taupō Farmer, Hammond Wagner, Greenhalgh, et al., 2020, p.35).*

<sup>20</sup> Marginal abatement cost curves (MACC) are “a commonly used policy tool indicating emission abatement potential and associated abatement costs. They have been extensively used for a range of environmental issues in different countries and are increasingly applied to climate change policy” (Kesicki & Strachan, 2011, p 1195).

*However, there were two categories of behaviour reported where nutrient losses would be expected to increase: increased fertiliser use and increased stocking rate. In Taupō and Vermont, one and two farms respectively increased fertiliser use ... There were three instances in Taupō and Rotorua where farmers shifted to a higher nutrient leaching farm system, including transitions to dairy, sheep milking, and cattle breeding operations (Hammond Wagner, Greenhalgh, et al., 2020, pp. 34-35).*

With emissions pricing, the price or cost, is one factor but without other factors in play to encourage change, some farmers may not choose to make changes. This has been shown particularly clearly, when the mitigations are no cost or win-win or where farmers are incentivised (i.e. paid to implement certain actions) and yet uptake remains low as there are other factors impacting the decision making (AgFirst, 2018; Inman, Winter et al., 2018; Jaffe, n.d.; Moran, Lucas, et al., 2013).

*Non-adoption presents further challenges to the rational actor model that implicitly underpins win-win narratives and their use in policy. This assumes that individuals make rational decisions and act individually to maximize self-interest. Were this true, and assuming low transactions costs, win-wins would be quickly adopted by farmers weighing the private costs and benefits of the available options. ... In fact, a portfolio of research from the fields of experimental psychology, behavioural economics, environmental values and management of the commons has long contested the assumption that human decision-making is perfectly rational (Moran, Lucas, et al., 2013, p.612).*

It is also illustrated by situations where farmers are already voluntarily making changes, doing ‘more’ than what the regulations require or putting land into covenants, such as QEII for example (Agmatters, 2021c; Hungerford, 2020). This ‘going above and beyond’ is commonly observed amongst many Māori landowners and as well in some other farmers who have an environmental or guardianship value base (e.g. Agmatters, 2021C; Cortes-Acosta, 2020; Fry, 2018; Pierre, 2015; Reid, Rout et al., 2021; Tuaropaki, n.d.). For example:

*The shareholder position on environmental protection and sustainability contributed to the need for farm practices to exceed current requirements (Pierre, 2015, p. 27).*

*For a period of time, we didn’t have to do [required by law] riparian planting, for example. Just the fence was good enough, but we used to do that anyway, we used to cost that up as our cultural investment, around how we wanted to look after our land. We had cultural investment (Cortes-Acosta, 2020, p.42).*

*Tauutuutu also encourages Māori agribusinesses to exceed regulatory requirements. For example, the Lake Taupō Forest Trust has planted riparian strips up to ten times the required size (Reid, Rout et al., 2021, p.7.).*

*When these subsidies were removed, [they] continued their work using their own money. ... “To protect it all, we’ve put a QEII covenant on the area” (Fry, 2018).*

Enablers such as working *with* farmers, connecting the issue to their land and operation, understanding kaitiakitanga, involving farmer leaders, farmer discussion groups, field days, visible projects, collective approaches, incentives, and effective communication and engagement to help farmers to understand the issues and their role in mitigating climate change, therefore, become keys to encouraging on-farm changes.

*It is only through equipping farmers with a will to change behaviour, and the confidence and ability to do so, that systemic shifts in mitigation option adoption will become manifest (Inman, Winter, et al., 2018, p.24).*

*The biggest lesson to come out of the change, and one for all regional councils to heed as they look to impose similar regimes, is the need to engage with rural communities. ... Give them an understanding before slapping the rules in place, so they know the new thinking they need, about how nitrogen and phosphorous flows through their farming systems and the causes of the ebbs and flows (Morgan, 2012, p.1).*

### 3.3 THE IMPORTANCE OF SCIENCE: MITIGATIONS THAT WORK

Economic modelling of pricing approaches assumes to some degree that the landowners have the ability, capacity or resources, to be able to make changes to reduce the cost. In some situations this is true – although it is dependent on their circumstances and on the availability of options (Dolan, Hallsworth, et al., 2010; Inland Revenue Department and the New Zealand Treasury, 2018).

With emissions and emissions pricing the logic assumes, for example, that there are available, effective, affordable, practical ‘easy to use’ mitigation options that fit the values and vision of the landowner and which they can use to reduce their emissions and thus the cost. However, if the mitigations are not available, effective, practical, acceptable or affordable,<sup>21</sup> then farmers will not be able to implement them (Hungerford, 2008; 2019; 2020; Jaffe, n.d.; Motu, 2012) and some, as noted in the previous section, may look to options like increasing productivity, selling up, or converting to forestry.

*If someone comes to any business in New Zealand and says ‘hey we are going to tax you an extra 30 grand a year’ the farmer will do what every businessperson will do – they will either try to cut costs which is pretty hard at the moment or they will increase revenue and the only way they know to do that is to increase production. Farmers will just dial up the palm kernel truck or they’ll intensify and put more stock on which is not what you want (Dairy farmer, Waikato, Motu, 2012).*

The literature indicates that science is a key. Currently there are limits on what farmers can do to mitigate their emissions. If they do not have available, effective, proven, practical, affordable, acceptable options to mitigate their emissions then there is concern that some farmers may stop growing food and fibre and plant pine trees (Key informant interviews, 2021). To be effective, policy needs to take context into account (Dolan, Hallsworth, et al., 2010).

*Policy-makers should remember that the contexts in which people find themselves shape the options that are available to them and affect their ability to select these options. Attempts to encourage behaviour change that do not recognise these contextual factors are likely to breed frustration only. For example, there is little point attempting to encourage people to wash clothes at 15°C if most people’s washing machines do not have this option. Government can help people surmount these barriers, but only if they are recognised. Any attempt to encourage new behaviours needs to consider the wider context and choices available to people, rather than focusing narrowly on the desired behaviour (Dolan, Hallsworth, et al., 2010, p.10).*

### 3.4 COST BENEFIT

The financial cost of making changes cannot be left out of the equation as one goal of farming is to generate revenue to meet goals such as providing an income, paying the bills, enabling land to be retained and capital growth, for example. Decisions, for many, therefore, will be made at the economic level and if a mitigation is cost-effective and fits within the operation and its value-structure, it is likely to be implemented. The converse is true; that is if a mitigation is not cost-effective then many farmers may

<sup>21</sup> Note that affordability is relative (i.e. farm and farmer-specific); a farmer with high debt, low cash flow, limited access to finance or ability to service a loan, is less able to afford some mitigations, than a farmer with low or no debt, high productivity and easy access to finance.

choose not to make the change (DairyNZ n.d.A; n.d.B; Hammond Wagner, Greenhalgh, et al., 2020; Journeaux, Kingi et al., 2017; Motu, 2012; Van Herzele, Gobin et al., 2013).

*... participation in complex agri-environment measures is not simply a matter of weighing the money against the effort for adoption. Whereas money is an important driver of participation (in particular, for those adopting complex agri-environment measures) it plays widely differing roles depending on the level of farmers' reasoning (farm enterprise, single practice or landscape feature) and the importance they give to other considerations (environmental effect, production potential of land, goodness of fit etc.) (Van Herzele, Gobin et al., 2013, p.110).*

Market access, branding and reward programmes can also drive decisions; i.e. if market access is dependent on reduced emissions or processors incentivise good practice via reward programmes, or consumers 'demand' a certain standard, then producers are motivated to make changes in order to be able to sell and/or get higher prices for their product (Fonterra, 2021B; Key informant interviews, 2021).

Also, of course is the issue of resourcing; that is if a farm operation cannot afford to put an action in place then they may not do it (van Reenen, 2012). Farmers with low profit margins and/ or limited access to finance may not have options to diversify, change land use or retire land. As discussed earlier, Māori landowners may be overrepresented in those with limited access to finance.

*Most of the farmers interviewed wanted to undertake more practices, and the primary barrier to this was unsurprisingly, money (van Reenen, 2012, p. 2).*

There is some evidence that providing resourcing (e.g., funding or part-funding for on-farm mitigations), when coupled with regulations or concern about regulations, can assist those with limited resources and be a driver to assist some farmers, to make changes sooner.

*[I tell other farmers] yes, you have to do this [because of the regulations] but if you do it now then you can access some funding (Dry stock farmer, Hungerford, 2019, p.15).*

Having a pro-environmental attitude or a kaitiakitanga value-base can mitigate the effect of the cost barrier; that is if a farm operation has these underpinning values, they may choose, if they can afford it, to be less profitable in order to achieve environmental goals. For example:

*Tūwharetoa landowners themselves have made land-use decisions in order to protect the lake deliberately, often at the expense of potential commercial gain. Potentially productive lands, especially on the eastern side of the lake, were instead planted into forestry with the goal of reducing negative environmental impacts on both lake and land. As Asher explains, 'commercial gain didn't enter the picture', saying that for Tūwharetoa landowners the 'perspective is quite different from a normal landowner perspective' (Duhon, McDonald et al., 2015, p. 49).*

*George and Sharon Moss have been dairy farming in Tokoroa for nearly 40 years. Their impact on the climate wasn't a consideration back then, but it's at the forefront of how they farm now. They have moved from purely profit-focused, to seeking the sweet spot of people, planet and profit (Agmatters, 2021A).*

### **3.5 WORKING WITH FARMERS: TAKING THEM ON THE JOURNEY**

An overarching theme from across the national and international literature about effective, sustainable on-farm environmental change is the need to actively, and proactively, work with farmers at both the individual and collective level to ensure understanding, buy in, engagement and uptake of actions (e.g. BERG 2018; Hungerford, 2019; 2020; Inman, Winter et al., 2018; van Reenen, 2012).

*We need to take the people with us. ... They have to be 'led' - in laymen terms – [to] where they can relate to their farm and enterprise – there is a journey or a process to get them [there] (Dry stock farmer, Hungerford, 2019, p. 14).*

Farmers also need to have the tools to make the changes and a key theme in the literature on barriers to change is the skill base, ability, education and/or knowledge of the farmers both about the issue and the actions needed to mitigate it, which highlights the importance of communication, extension support and advice to enable farmers to make the changes.

*Some farmers don't have the skill base to implement some actions (Dairy farmer, (Motu 2012).*

The process to engage most farmers takes time and needs to occur if the change is going to be sustainable long term (Inman, Winter et al., 2018; van Reenen, 2012). Generally, farmers need to take ownership and feel they have some control in order to be motivated to make changes on their farms (Hungerford, 2019; Key informant interviews, 2021).

*It is only through equipping farmers with a will to change behaviour, and the confidence and ability to do so, that systemic shifts in mitigation option adoption will become manifest. In addition, compliance with environmental legislation is likely to be far higher where farmers buy-in to what they are being asked to carry out. This can only be achieved through mutual understanding which requires dialogue over an extended period of time; both at a farming network and individual farmer level (Inman, Winter et al., 2018, p.16).*

In terms of emissions pricing, if farmers cannot see the direct link between their operation and the 'issue' then they may be less inclined to make changes. In this context, therefore a farm-level levy option is more likely to drive on-farm change as it links directly to that specific farm operation, enabling the farmer to see where they can make an impact to reduce emissions and cost. It can also increase buy-in and engagement as farmers are involved with the process directly and have a sense of control over their own operation.

*Just trying to get the landowners to understand what the ETS is ... it's quite complicated, and telling them that someone would pay them for air. I got a lot of looks and a lot of shakes of the head. So just trying to get the understanding and I'm not the best drawer, but I took a little whiteboard along and tried to draw little trees absorbing carbon from factories putting carbon dioxide in the atmosphere (Cortes-Acosta, 2020, p.60).*

The processor-level hybrid option, being a step removed from the on-farm operation, may be less tangible for many farmers and thus less of a driver of change, and if it does not have the ability to 'reward' farmers for making changes then it will potentially be less effective at encouraging change. Whilst Emissions Management Contracts may assist farmers to 'buy-in' these are likely to appeal to farmers with the ability, time or resource to negotiate them and be a barrier for those without these factors.

### **3.6 MĀORI LANDOWNERS: CHALLENGES AND DRIVERS**

In addition to the factors already discussed, there are a number of other factors relevant to Māori landowners, that may impact on their responses to emissions pricing. These are discussed here and include: (i) structure and decision-making; (ii) leased land; (iii) finance and development; (iv) diversity of land use; (v) trust; and (v) kaitiakitanga and long-term thinking.

### 3.6.1 STRUCTURE AND DECISION-MAKING

A specific challenge for many Māori landowners is managing the needs of multiple owners and related to this, the administrative structures that many Māori landowners have to operate under. As noted by Kingi (2009) “Farming-by-committee throws up a number of challenges” (p.23).

The need to balance the needs of multi-owners or shareholders necessitates having a structure which enables this to occur in a way that is reasonably efficient. Whilst there are a significant number of Māori Trusts and corporations throughout Aotearoa which are established, set-up and well-governed, there are also examples of landowners who do not have established or effective governance or management structures which provides challenges for their ability to oversee, govern, or make decisions in relation to land (Collier, 2009; Dewes, Walz et al., 2011; Kingi, 2009). Into this mix is also the significant amount of whenua Māori (estimated 88,000ha) administered by Te Tumu Paeroa, on behalf of a growing number of owners (Te Tumu Paeroa, n.d.). For example, in 2020/2021 Te Tumu Paeroa maintained 100,793 owner accounts, held 350 owner hui and managed 1,732 leases (Te Tumu Paeroa, 2021, p.9).

In terms of emissions pricing and on-farm changes, regardless of the price being set, or whether it is a farm-level levy or processor-level levy, ‘time’ is a key factor for most Māori landowners; time for the communication, decision-making and implementation processes to be undertaken within the structural environment they operate within (Cortes-Acosta, 2019; 2020; UMR research, 2014C; Whetu Consulting, 2019).

*Any possible land-use decision faced challenges in reaching an agreement. Co-operation and trust among the multiple owners are crucial components in making decisions. Because of absentee and multiple owners, it is a time-consuming process. Even though trustees wanted to switch to forestry, this could only occur if landowners consented (Cortes-Acosta, 2019, p. 5).*

*The unique characteristics of Māori land under Te Ture Whenua Act (e.g., collectivity) mean Government policy and initiatives should be specifically tailored to a different process and timeframe in order for Māori business to equitably engage and take up opportunities (Harmsworth, Tahī, et al., 2010 cited in Whetu Consulting, 2019, p. 24).*

### 3.6.2 LEASED LAND

A significant proportion of whenua Māori is leased to other landowners or external parties (e.g. sharemilkers). Some of these leases are formal and managed either by the Māori Trustee or the whānau, hapū or iwi directly while others are informal arrangements between whānau, hapū or iwi (Te Tumu Paeroa, 2021; Key informant interviews, 2021). Some are ‘perpetual leases’ which throws up a number of other challenges (Carroll, 2021). In relation to emissions pricing, the decision about who is responsible for paying is of key import for Māori landowners as, with some of the leased land, depending on the arrangements, they may have limited ability to influence what occurs on their land.

For example, if the lessee is responsible for the price and has the right to make on-farm changes, they may make decisions to reduce their emissions that have long term consequences for the owners and which may, in the future, disadvantage them (e.g. planting trees for carbon credits may leave the owner with a liability in the future) (Neal, 2018). If the owners are responsible for the paying the levy from their land, even though they have leased it out, they may have limited ability to require the lessee to make changes to reduce emissions.

### 3.6.3 FINANCE AND DEVELOPMENT

As discussed earlier, historically, many Māori landowners have struggled to access finance for development (Dewes, Walz, et al., 2011 Kingi, 2008; Whangara farms, n.d.).



*Once banks knew the land was under [Te Ture Whenua Māori Act], with all the clauses geared towards land retention, they were not willing to lend money even if the Māori landowners had considerably more economic wealth tied up in the land than some equivalent European properties (Dewes, Walz, et al, 2011, p.38).*

A number of Māori landowners have utilised innovative means to access resourcing, including alternative finance options, forming partnerships and joint ventures, borrowing via other entities, accessing grants, and raising capital from other ventures or general land (Dewes, Walz et al., 2011; Whangara farms, n.d). However, not all Māori landowners have had the capacity and capability to utilise these options (Dewes, Walz et al., 2011; Harmsworth, Tahi, et al., 2010).

The historic lack of access to finance for development on Māori land has meant that to a certain extent the climate change ‘problems’ that emissions pricing is aiming to ‘fix’ are the result of intensification and development, that has occurred, primarily on general land. A 2008 report determined that Māori agribusiness contributed “less per capita to New Zealand’s total greenhouse gas emissions than non-Māori” (37 Degrees, et al., 2008, p. 9).

With emissions pricing Māori landowners might perceive that they are being unfairly taxed for something that they did not contribute to (Ministry for the Environment, 2008). In the context of the different pricing options, the processor levy may disproportionately impact Māori landowners who are more likely to have lower intensity farming operations. As well, regardless of the price being set, or whether it is a farm-level levy or processor-level levy, if mitigations are costly and Māori landowners have less access to finance, they may not be in a position to make changes on farm.

#### **3.6.4 DIVERSITY OF LAND USE**

Māori land holdings are diverse and a number of entities have multiple land uses, across different sectors, within their portfolio (HWEN, 2021, November 23, Tuaropaki, n.d.). In terms of emissions pricing there are implications for how the price is calculated. For example, are the emissions calculated across all the land holdings, even those that are not actively being farmed? UMR Research (2014) in their interview study with Māori landowners about nutrient limits noted that for some landowners the point was raised that it would be fairer if the whole holdings of a trust were taken into account – especially as in some cases significant parts of their holdings were remote and not suitable for farming, so it either remained in native bush or was used for forestry. i.e.:

*So I would say that if our farm was capped at its current land use while all these other portions of our land sat in very low emitting nutrient land uses then I would think that there is probably an argument for the whole land to be measured as its environmental foot print rather than just the farm. It was floated here in Taupō with the lake and kicked for touch. So, it was probably never really understood as well as it could have been by the authorities - they just wanted to do something about it. And a lot of our Māori land being farmed around New Zealand is like that. The farms are only part of their land holding (p.35).*

There are also other questions to consider. For example, how are the different land uses allowed for within the calculations with, for example a processor-level levy, where the landowners are providing product to more than one processor? Will this mean that Māori entities with different operations be paying more? Will registering as a collective address these issues?

Given the diversity of land holdings, a farm-level pricing option is more likely to allow for multi-land use operations and thus be more equitable and/or be perceived as fair and may encourage landowners to implement changes, whilst a processor levy may be less effective.

*...obligations at sector body or processor/company level may give rise to inequities in those bodies' subsequent allocations to farmers, particularly where different farm types are involved (37 Degrees South, et al., 2008, p.28)*

### **3.6.5 TRUST**

The impacts of colonisation must be considered when determining how emissions pricing will impact Māori landowners (Carroll, 2021). As noted earlier the history of whenua Māori, is one in which the governments enacted successive Acts of Parliament which were either specifically designed to take Māori land or where they were intended to protect Māori land, instead compounded losses, converted land to general land<sup>22</sup> and created unwieldy bureaucratic systems (Brady, 2004). Understandably, for many Māori landowners, this together with other acts of the Crown and settlers and breaches of Te Tiriti over the years, does not create an environment in which trust is paramount (Brady, 2004; Carroll, 2021).

*Māori are very wary of Government schemes, especially those that introduce penalties at the end of contract agreements and take away rights of control and ownership (Harmsworth, 2003, p.18).*

*Regulatory changes aimed at improving environmental sustainability and reducing the impact of climate change would have an impact on Māori landowners, who were still feeling the effects of historic legislation that impeded Māori land ownership (Carroll, 2021).*

One of the issues noted earlier is the importance of engaging farmers, 'taking them on the journey' and supporting and enabling farmers to make changes on farm. Where farmers do not feel that they have a level of control or choice, and/or do not trust the advice, the mitigations, or the information they are being given then they may be less inclined to engage with initiatives. For many Māori landowners the extent to which there is trust of the process is exacerbated by history, and highlights the importance of ensuring that communication processes and information are robust, culturally appropriate and meet the needs of Māori landowners.

### **3.6.6 KAITIAKITANGA AND LONG-TERM THINKING**

As noted earlier the attitudes of farmers can drive change and farmers who have pro-environmental attitudes and kaitiakitanga as a guiding principle are more likely to undertake environmental actions on farm (Agmatters, 2021C; Zemo & Termansen, 2021). This can be seen, in practice both within the Māori larger trusts and corporations, wherein environmental accountability is often one of the guiding pou (e.g. Ngāti Pāhauwera Development Group, 2020; Te Runanganui o Ngāti Porou, 2020), as well as in the work and practices already happening on many Māori farming operations, large and small, which are often 'above and beyond' what is required by legislation (Murray, 2020; Our Land Our Water (n.d.); Reid, Rout, et al., 2021; Smith, Hutchings, et al., 2019).

*Using our lands in the best way to balance production and the needs of the Taiao remains a key pou for us (Te Runanganui o Ngāti Porou, 2020, p.42).*

*Māori agrifood sector practices are informed by deep understanding of the interconnections and interdependencies between land, food, people and waterways. This research shows that these practices occur within diverse Māori economies at whānau, hapū, iwi and national levels, and result in a holistic, systems-based approach to farming and food that can create an 'upward spiral' of connected outcomes, such as oranga (well-being), tatai hononga (building social capital), tiaki taiao*

<sup>22</sup> i.e. The 1967 Amendment to the 1953 Māori Affairs Act introduced compulsory conversion of 'Māori freehold' land with four or fewer owners into 'general land,' and increased the powers of the Māori Trustee to compulsorily acquire and sell 'uneconomic interests' in Māori land. This has led to some distrust of the Māori Trustee ( Radio New Zealand, (2021)



*(maintaining and enhancing natural capital), and ōhanga (growing prosperity, economic capital*  
(Our Land Our Water (n.d).

Most Māori landowners, whether they are large- or small-scale operations, have a longer-term view (Collier, 2009; Harmsworth, Tahī, et al., 2010; UMR Research, 2014C). Selling their land is not an option, for most Māori landowners, both because they are restricted by legislation or they do not want to (i.e. taonga tuku iho, tūrangawaewae and kaitiakitanga) which means that they tend to have a longer term view of the whenua. This is illustrated, for example, by trusts having plans that are 100 year plans rather than five year plans (e.g. Miraka, Murray, 2020) and including, in their vision statements the intent to provide for future generations (e.g. Ngāti Pāhauwera Development Group, 2020; Smith, Hutchings, et al., 2019).

*The measure of success for Māori agribusiness on Māori freehold land is not only monetary but how all the other social, environmental, and cultural objectives important to the organisation are met. This is an essential difference in the way Māori organisations make decisions for their business and the way many general title farmers make decisions for their farming businesses (MAF, 2011, p. 22).*

This long-term thinking can be an asset for environmental decision making as it leads to decisions about sustainability, looking after not only te whenua, but also all aspects of te taiao to ensure that the land can still be healthy, support life and provide into the future.

*According to Ben, George and Pat, Onenui Station is at an exciting time in its development, with all decisions and future aspirations aligned with the task of future-proofing the whenua for the generations to come (Smith, Hutchings, et al., 2019, p. 5).*

The implications for this in terms of emissions pricing are that many Māori landowners are likely to want to make changes that will have a positive impact on the environment, and as such will be more inclined to make changes if needed, to reduce emissions. Whether the price is set at the farmer level or processor level, is likely to make little difference to these operations as they already have an intention to farm sustainably and are looking at ways to do that (Reid, Rout, et al., 2021; Murray, 2020). However, if the price option does not recognise or reward work that has or is being done, this may lead to further mistrust, frustration and disadvantage.

Being able to uptake changes, despite willingness to do so, will be limited by other factors such as, finance, access to support and advice, actions being aligned with tikanga and/or with visions and guiding pou. To this end, if the emissions price is set too high, then some Māori landowners may not be able to finance changes and/or if the mitigations are costly, do not work or are not appropriate or desired then the on-farm changes may be less likely to occur.

## 4.0 CONCLUSIONS

### 4.1 INTRODUCTION

This chapter discusses the findings from the literature scan and interviews, to answer the question, ‘what can be concluded about how farmers might respond to emissions pricing?’

### 4.2 WHAT CAN BE CONCLUDED?

Evidence from the literature reviewed for this report indicates that cost is only one of the drivers of on-farm change. Farmers, growers, and landowners, including Māori landowners, are not one homogenous group; they run different operations, including some multi-use large-scale operations and farm in different ways on different land classes with different levels of capacity, commitment, and capabilities. There are examples of landowners who are implementing actions and/or are looking at their options for when pricing comes in, and examples of those who are not yet taking action. As farmers are not a homogenous group, encouraging on-farm change is not a ‘one size fits all’ approach, and the extent to which farmers implement changes on-farm is related to a mix of factors.

Factors which encourage on-farm change include: farmers or landowners having pro-environmental beliefs or values; working with farmers and landowners so that they are invested and actively involved; making connections for farmers between the ‘issue’ (e.g., climate change), the regulations and their own farm practices; providing support to farmers (e.g., industry support, extension, incentives, resources, advice and information); having legislation, regulations, financial drivers (e.g. pricing, market forces); having effective, affordable mitigations; and allowing enough time for farmers to understand, make decisions and implement changes. This means that whilst emissions pricing and legislative requirements are drivers of change, the inclusion of broader programmes of support (e.g., extension, industry support, advice, information, incentives) alongside emissions pricing is likely to encourage greater buy-in and uptake of on-farm changes to reduce emissions.

For Māori landowners, in addition to the above factors, historic land loss, confiscations and legislation have created a framework with significant administrative and financial costs, which limit and constrain landowners. Added to this is that Māori land is collectively owned, land quality ranges with a high percentage of marginal land, land use can be diverse and multi-faceted with some under lease and whilst there are established, well-governed Māori trusts, partnerships and corporations, there are also those without established management structures. This mean that in terms of emissions pricing and on-farm actions Māori landowners may be more limited in what they can do with their land, their operations may not fit ‘neatly’ into an emissions pricing framework based on single use operations, and they will need time for the communication and decision-making processes to occur before actions can be implemented.

There is evidence that most Māori landowners are guided by kaitiakitanga, have pro-environmental values, and a longer-term vision for their land which can, and does, lead to being more likely to implement on-farm changes. However, the ability to implement change still relies on resourcing, capacity, land use capability and the availability of effective, practical, and acceptable mitigation options. This means that regardless of which pricing option is chosen, most Māori landowners will make choices based on their values and vision for the land balanced by what they can do within their structural, land use capability, and financial constraints.

In terms of which of the two emissions pricing options would be more or less likely to encourage farmers to reduce emissions, the evidence suggests that this depends to some extent on how the options are communicated and/or implemented to ensure that farmers can link the price to their operation and/or

be rewarded for their on-farm actions, coupled with the availability of practical, affordable and effective mitigations. Provided the mitigations are available, a farm-level option is likely to be more effective for encouraging on-farm change, as it provides a direct link to their operation, allows for the diversity of farm operations and land use, and avoids averaging. The processor-level option, being a step removed from the on-farm operation, may be less tangible for many farmers and thus less of a driver of change, and if it does not have the ability to ‘reward’ farmers for making changes then it will potentially be less effective at encouraging change.

### **4.3 WHAT ELSE WOULD BE USEFUL?**

There is limited evidence on farmers’ actual responses to emissions pricing, primarily because it is a new approach. There are examples of farmers and Māori landowners who are trialling and /or committed to on-farm mitigations, and there has been modelling of the different options. However, until the pricing is implemented, the extent to which on-farm change occurs because of pricing, can only be surmised based on modelling and on what is known about behaviour in response to other initiatives, regulations and approaches. This means that there are gaps in the knowledge about landowners’ responses. It would be useful, therefore, as the emissions pricing is implemented, to ensure that there is ongoing research and evaluation about landowner responses and the extent to which on-farm changes occur, both to inform the process and add to the national and international knowledge base.

### **4.4 CONCLUDING COMMENT**

The literature scan confirms that there is no ‘one size fits all’ approach to on-farm change and that whilst cost is a factor in encouraging behaviour change, it operates within a context of human, structural, historical, contextual, biological, cultural and geographical factors that all determine whether farmers, growers and Māori landowners can, or will, make on-farm changes. Understanding the context, limits and/or constraints such as time, capacity and capability that landowners work within, and actively and proactively working with them to develop and implement options that enable them to manage their land sustainably, are therefore keys to effective and sustainable on-farm change.

### **4.5 RECOMMENDATIONS**

Based on the findings reported in this document it is recommended that:

1. The emissions pricing system includes broader programmes of support to encourage and enable farmers, growers, and Māori landowners to make changes to reduce emissions.
2. The emissions pricing system allows sufficient time for farmers, growers, and Māori landowners to implement changes.
3. The emissions pricing system recognises the administrative, geographic, historical, time and financial context which Māori landowners work within and includes provision to ensure Māori landowners are supported and not disadvantaged by the pricing system design, timeframes, expectations, and implementation.
4. As part of the implementation of the emissions pricing the impact on farmer and Māori landowners is evaluated and information gathered to add to the body of knowledge about on-farm change in relation to emissions pricing.

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## APPENDIX 1: EMISSIONS AND PRICING OPTIONS

The following excerpt on definition of a farm, emissions and the pricing options are from He Waka Eke Noa: Primary Sector Climate Action Partnership, 2021, April; 2021, May; 2021, November 22A; and 2021, November 23.

### WHAT IS A DEFINED AS A FARM?

You are a farm if: you are a farming enterprise larger than 80 hectares; a dairy herd with a milk supply number; or a feedlot. This covers about 97% of agricultural greenhouse gas emissions and 25,000 farms.

### ABOUT AGRICULTURAL EMISSIONS

He Waka Eke Noa addresses on-farm greenhouse gas emissions; CH<sub>4</sub> and N<sub>2</sub>O, and aims to recognise on-farm sequestration of CO<sub>2</sub>.

#### METHANE (CH<sub>4</sub>)

- Generated by ruminants as a by-product of digestion. Most CH<sub>4</sub> is burped into the atmosphere by ruminant livestock. A small amount of CH<sub>4</sub> (less than 5%) also comes from dung and effluent systems.
- The total feed eaten by livestock on your farm (per kilogram of dry matter intake) is the driver of CH<sub>4</sub> emissions.

#### NITROUS OXIDE (N<sub>2</sub>O)

- Released into the atmosphere from dung and urine patches, and N fertilisers.
- The nitrogen content of feed and the amount of nitrogen applied are the main drivers of N<sub>2</sub>O emissions. Temperature and soil moisture can also play a role.

#### CARBON DIOXIDE (CO<sub>2</sub>)

- The main driver of net farm CO<sub>2</sub> emissions is the area of woody vegetation. Woody vegetation captures CO<sub>2</sub> but also releases it when cleared. The application of lime and urea nitrogen (N) fertilisers can also contribute to farm CO<sub>2</sub> emissions.
- Soil management can both release and sequester CO<sub>2</sub> and this is under investigation so it can be better quantified.
- Energy use is the other driver of farm CO<sub>2</sub> emissions. As it is already accounted for under the New Zealand Emissions Trading Scheme it is not included in your farm greenhouse gas emissions. However, it should be considered when assessing the costs and benefits of reduction opportunities, and to calculate your carbon footprint.

### PRICING OPTIONS

#### THE 'BACKSTOP' – AGRICULTURE IN THE NZ ETS

The Government has legislated that agricultural emissions will enter the NZ ETS if an effective, workable alternative is not put forward by the Partnership. The key features of the 'backstop' are:

- Emissions are calculated at the meat, milk, and fertiliser processor level, based on the quantity of product received from farms, or in the case of fertiliser, sold to farms.
- Processors would likely pass on the cost to farms based on the quantity of product processed, or fertiliser bought.
- Initially 5% of emissions from agriculture would be priced (95% of emissions would be freely allocated to processors). Free allocation is expected to reduce by one percentage point a year.
- All gases would be treated the same; i.e., methane and nitrous oxide would be priced at the same rate per tonne of carbon dioxide equivalent (CO<sub>2</sub>e).
- Currently only sequestration (carbon removals from vegetation) eligible for the NZ ETS is recognised.
- Government intends that any revenue raised through the backstop would be invested back into the agricultural sector to support further emissions reductions. This could include paying for sequestration not eligible for the NZ ETS (e.g., riparian plantings).

#### FARM-LEVEL LEVY

The key features of farm-level levy are:

- Emissions are calculated at farm level using farm-specific data. The farm then pays a price for its net emissions.

- A split-gas approach to pricing would be applied, which means that different levy rates would apply to short- (methane) and long-lived (nitrous oxide and carbon dioxide) gases. This approach reflects that methane is not required to reduce to net zero.
- Rewards eligible on-farm sequestration and can offset some of the cost of the emissions levy.
- Any revenue raised through the levy would be invested back into the agricultural sector to generate further emissions reductions through research and development, incentives to uptake technology, or actions on-farm that help reduce emissions.

#### PROCESSOR-LEVEL HYBRID LEVY

The key features of the processor-level hybrid levy are:

- Emissions are calculated at the meat, milk, and fertiliser processor level, based on the quantity of product received from farms, or in the case of fertiliser, sold to farms.
- Processors would likely pass on the cost to farms based on the quantity of product processed, or fertiliser bought.
- A split-gas approach to pricing would be applied, which means that different levy rates would apply to short- and long-lived gases. This approach reflects that methane is not required to reduce to net zero.
- Farms (individually or in collectives) could choose to enter into an Emissions Management Contract (EMC) to get a payment for reducing emissions and/or for recognising sequestration on-farm.
- Any revenue raised through the levy would be invested back into the agricultural sector to generate further emissions reductions through research and development, incentives to uptake technology, or to reward actions on-farm that help reduce emissions. One option considered for revenue recycling is an EMC.

#### ON-FARM SEQUESTRATION

Both the farm-level levy and processor-level hybrid levy would recognise on-farm sequestration. These would:

- Recognise some vegetation types not currently eligible for the NZ ETS. It would not recognise NZ ETS-eligible exotic forestry.
- Recognise vegetation categories that are either permanent (indigenous/native vegetation that will not be harvested) or cyclical (vegetation that is felled and re-established, generally exotic species).
- Recognise native regenerating/planted forests, riparian planting, shelter belts, perennial cropland, non-NZ ETS eligible woodlots/tree lots, and scattered exotics.
- Place liabilities on vegetation if it is cleared (permanent categories) or cleared and not replanted (cyclical categories). This only relates to vegetation that is entered into the He Waka Eke Noa system. There are also provisions for when vegetation is removed as a result of adverse events and customary harvest.
- Use different methods to calculate sequestration depending on the vegetation type.
- Provide a pathway for other forms of sequestration (e.g., soil carbon, tussock grasslands) to be onboarded when there is sufficient evidence or measurement techniques. (HWEN, 2021, November 22)

#### COLLECTIVES

Groups would be able to register in either of the two He Waka Eke Noa options as a *collective*. A collective is a group that chooses to work together to report their emissions, and potentially to reduce or offset them. This could include processors. This is a key consideration for Māori land that is often owned by whānau, hapū, iwi groupings, trusts and incorporations who may choose to respond in this way as collectives.

A collective could work alongside a pricing system in several ways. It would allow farm enterprises to link their farms and submit a single return, or for Industry Assurance Programmes to use their current systems to report on behalf of their members. This could involve internal trading within the collective. Reporting would be at the collective level rather than the individual farm. (HWEN, 2021, November 23, p.12)



## APPENDIX 2: WHENUA MĀORI

Te Ture Whenua Māori Act 1993 categorises Māori land into a number of different categories

- **Māori customary land** - land held by Māori in accordance with tikanga Māori. This land has never been converted to freehold title or been ceded to the Crown, so that Māori have the same title to it as they had in 1840. There is very little land in this category (Harmsworth, Tahi, et al. 2010; Te Tumu Paeroa, n.d.).
- **Māori freehold land** – land where Māori customary interests have been converted to freehold title by the Māori Land Court or its predecessors by a freehold order. This land, with very few exceptions, has not been out of Māori ownership, and is generally ‘collectively owned, multiple ownership.. The Māori Land Court determines whether land is Māori freehold land. Today almost all Māori land fits into this category (Te Tumu Paeroa, n.d.; 2020).
- **General land owned by Māori** - land where the majority of the owners are Māori. This land is subject to some of the provisions of Te Ture Whenua Māori Act. (Te Tumu Paeroa, n.d)
- **Māori reservations** - Māori land set aside as reservations for specific purposes. (Brady, 2004; Te Tumu Paeroa, n.d.; 2020)

The task of managing land, held under collective ownership has resulted in a range of different management and governance structures operating on Whenua Māori including different types of trusts, including:

- **Ahu Whenua Trusts** – this is the most common Māori land trust, similar to the section 438 trusts in the old Māori Affairs Act. They are intended to promote and facilitate the use and administration of the land in the interests of the owners
- **Whānau Trusts:** Preserve family links to particular land, but without expectation of individual interests or dividends
- **Kaitiaki Trusts:** Available for persons who are minors, or are suffering a disability and are unable to manage their own affairs and land
- **Whenua Topu Trusts:** Tribal trusts. Designed to facilitate the use and administration of land in the interest of iwi or hapū. This type of trust is used for receiving Crown land as part of any Treaty settlement
- **Pūtea Trusts:** Small uneconomic interests pooled for the common benefit without individual dividends. (Harmsworth, Tahi et al., 2010 p12)