Ministry for the Environment
Manatū Mō Te Taiao

# Māori Impacts from the Emissions Trading Scheme

## Detailed Analysis and Conclusions

Prepared by
37 Degrees South Limited and Cognitus Advisory Services Limited

New Zealand Government

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# Important Notice

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# Foreword

Tena koutou.

Tena koutou, otira, i nga tini mate, kei tena marae, kei tena marae, e takoto ake nā. Kei te tangi tonu te ngakau, ki a rātou kua haere ki tua o te ārai.

Heoi ano, tena tātou tonu nei, ā me ngā mihi hoki o te wā, o Matariki e arataki nei, i a tatou.

Arā ngā piki me ngā heke o te mahanatanga o te ao e noho nei tātau. E whakaaro tahi ana a Aotearoa me era iwi nunui o te ao ki te waihanga kaupapa hei whakapumau i to tatou oranga ki runga ki te mata o te whenua.

E ngākaunui ana te iwi Māori ki tenei kaupapa nui whakaharahara a, e ngakau nui ana ki nga kaupapa kua whakaputaina mai e te kawanatanga hei whakatinana i ona ake whakaaro. Ko tona whainga nui ia, ko te whai wāhi nui tonu o nga Iwi ki roto i ngā whiriwhiringa katoa e pa ana ki tenei kaupapa.

Ma konei, ka taea e ratou te pupuri i o ratou tikanga me to ratou nei ake mana ki runga ki o ratou whenua otira ki nga taonga katoa i mahue iho e nga matua tipuna. Ma konei ano ka whakatipu kaha te oranga whanui o o ratou whanau o o ratou hapu a ka kiia o ratou uri he tangata

Kia maumahara tatou ki te whakatauaki e kii a nei:

**“He aha te mea nui o Te Ao?**
**he tangata, he tangata, he tangata”**

[TRANSLATION] Greetings,

Let us pay respects to the departed from all regions. Let us also rejoice in our lives and in this season.

Māori embrace the challenge of the Government’s ambitious climate change programme as New Zealand works with the countries of the world to find new and innovative solutions to address to the serious climate change problems facing the world today.

In doing so, always holding dear to core values as Māori, preserving our ancestral lands that are the essence of who we are, to realise the dreams and aspirations of our elders.

Māori are committed to participating fully towards implementation of the of the climate change programme that may enable our children and grandchildren to face a safe and secure future.

Let’s remind ourselves of a wise Māori proverb:

**“What is the most important thing in the world?**
**It is people, it is people, it is people”**

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# 1 Introduction

## 1.1 Purpose of report

This report provides an analysis of the likely impacts of the Government's proposed emissions trading scheme (ETS) on Māori. It also considers how the ETS might affect Māori differently from non-Māori. Both positive and negative effects are considered. It takes the basic details of the proposed ETS as read, and so does not repeat them here. The purpose of this report is to inform the consultation process that the Government is undertaking with Māori in relation to the ETS, and ultimately to inform the finalisation of climate change policy by the Government.

This report does not consider a number of things. Notably, it does not address issues arising in relation to the ETS under the Treaty of Waitangi, instead focusing on the ownership and use of assets by Māori. It does not consider the impact of climate change itself on Māori, or the desirability of a climate change response by New Zealand. It does not consider the relative merits of climate change mitigation versus climate change adaptation. Nor does it critique the ETS, or debate alternatives to an ETS (such as a carbon tax), instead taking the ETS, as proposed, as given. Finally, the report does not attempt to define interests at an iwi level, instead considering national and (where possible) regional impacts.

Importantly, this report does not provide a comprehensive discussion of the likely absolute and relative impacts of the ETS on Māori. It has not been possible to prepare such a comprehensive analysis, not least because important ETS details such as how certain free allocations of New Zealand Units (NZUs) will be made within the agricultural sector, and how assistance to households to compensate for rising electricity prices, have not been announced. Furthermore, details such as carbon accounting methodologies, compliance regimes and ETS-related taxation are not yet finalised. Additionally, the timeline for the finalisation of ETS details has not permitted a more detailed examination of the scheme's impacts.

The report is structured as follows:

- The balance of Section 1 describes the assumed Māori interests of relevance to the ETS impact assessment, and outlines methodology and data sources.
- Section 2 discusses simple measures of the relative contribution of Māori to New Zealand's greenhouse gas emissions.
- Section 3 provides a snapshot of aspects of the economic and socioeconomic position of Māori.
- Section 4 sets out likely high-level and generic ETS impacts for various sectors relevant to consideration of the ETS's impacts on Māori.
- Section 5 discusses the likely impacts of the ETS on Māori in absolute terms.
- Section 6 extends the Section 5 discussion by considering the ETS's likely impacts on Māori relative to its impacts on non-Māori.
- Section 7 summarises the report's findings.

## 1.2 Assumed Māori interests

This report acknowledges that Māori are keenly interested in the values of sustainability. Importantly, these values arise under three main heads – economic, social, and environmental. These, and other assumed Māori interests, are summarised below.

### 1.2.1 Economic sustainability

Economic sustainability and importantly the ability for Māori to participate fully in any/all related economic opportunities from the ETS emerged strongly as the most important key theme from the national series of Māori consultation hui. Sir Apirana Ngata believed that Māori success was dependent on Māori adaptation and flexibility. He did not see this as conflicting with the retention of Māori culture. Ngata's famous proverb (whakatauki) to a young Māori child reflects his counsel on the importance of Māori pursuit of economic advancement alongside other core value drivers:

*"Grow tender shoot for the days of your world*
*Turn your hand to the tool of the European for the well being of your body*
*Turn your heart to the treasures of your ancestors as a crown for your head*
*Give your soul unto God the author of all things"*

### 1.2.2 Land sustainability

Māori land is so central to Māori cultural values, beliefs and identity many Māori consider it essential to retain Māori land as a distinct tenure system giving expression to the whanaungatanga of whanau and hapu ties between people and the land. Māori land is "taonga tuku iho" or an inheritance to be passed from generation to generation. Further, it is not the mere passing of the title that is significant, rather it is the network of turangawaewae links that the land ownership represents that are to be maintained:[1]

*"Ko te whenua te waiu mo nga uri whakatipu"*
*(the land will provide sustenance for future generations)*

### 1.2.3 Cultural sustainability – people

Given the historical and cultural ties Māori have with particular regions, Māori are assumed to have a greater interest in preserving the economic viability of their assets within those regions. By so doing, Māori are assumed to be concerned with sustaining their communities within those regions, and also the environment in which those communities live and operate.

*He aha te mea nui o Te Ao, he tangata, he tangata, he tangata*
*What is the most important thing in the world?*
*It is people, it is people, it is people.*

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[1] *Māori Land Tenure Group*, Hui Taumata, June 2006.

### 1.2.4 Other assumed Māori interests

Māori are also assumed to be interested with their ongoing ability to govern the management of their assets, and their ability to turn their assets to higher and better use, both now and as future new technologies allow.

Māori are further assumed to be interested in bearing only a fair, equitable and proportionate burden of the costs of climate change mitigation in New Zealand. In determining what constitutes a fair, equitable and proportionate burden Māori are assumed to be concerned with their level of economic development relative to non-Māori (as a consequence of past Crown actions or otherwise), as well as their relative contribution to New Zealand's greenhouse gas emissions. Māori are also assumed to be keenly interested in the development opportunities that international emissions trading could offer.

More specifically, Māori are assumed to be interested in the impacts of the ETS on:

a) Māori household living costs – eg, in terms of likely ETS impacts on electricity and liquid fuel (and gas) prices, and hence on the prices of other goods and services affected by electricity and fuel prices

b) Māori employment prospects – eg, in terms of likely ETS impacts on sectors in which Māori employment is concentrated

c) the value, usability, riskiness, and return potential of Māori-owned assets – including assets acquired by Māori pursuant to Treaty settlements, or future such settlement assets

d) the preservation and protection of ancestral lands

e) the ability of Māori to govern the use of Māori-owned assets.

## 1.3 Methodology and data sources

This report compares the impact of the ETS on Māori against the counterfactual of no climate change policy. Clearly it can be argued that absent the ETS the Government will likely implement some form of climate change policy in the first Kyoto "commitment period" (CP1, being 2008–2012 inclusive), given its commitments and liabilities under the Kyoto Protocol. However, since such alternatives are likely to be more costly and/or less effective than an ETS-like mechanism, it is assumed that even an alternative suite of climate change policies will eventually need to converge on an ETS-like scheme. Hence, to provide a meaningful distinction between the ETS and status quo, the status quo is assumed to involve no emissions charge or carbon sink credit in the economy.

In assessing the economic impacts of the ETS on Māori this report shies away from referring to a unitary "Māori economy", given that Māori interests – like non-Māori interests – will not be homogenous. Instead, to the extent that the available data permits, this report considers Māori economic interests at a disaggregated level, in an attempt to isolate where Māori economic interests might diverge under different aspects of the ETS. Thus, for example, Māori with predominantly forestry interests might experience different ETS impacts from Māori with predominantly fishing or agricultural interests. Moreover, Māori with mostly pre-1990 forestry interests might experience different ETS impacts from those with mostly post-1989 forestry interests. Similarly, among Māori with forestry interests, those with mostly exotic forestry interests might experience different impacts from those with mostly indigenous forestry interests.

While preparing this report it was identified that certain key sectors and certain regions account for the bulk of Māori economic interests. This remained broadly true whether Māori land uses and economic interests were measured in terms of land areas or dollar values, with the key exceptions being the major urban centres (in which the value of Māori economic interests is less tied to owning large areas of land). As it happens, the regions with the largest Māori land interests are also those with a higher Māori share of population than the national average. Accordingly, analysis in this report has been directed mainly at the fishing, forestry, farming and geothermal energy sectors, since they account for most of the Māori economic base, as well as significant shares of Māori employment. Moreover, focus has also been directed at the six regions with the largest Māori land interests by area (and relative Māori populations) – in decreasing order they are Waikato, Hawke's Bay, Gisborne, Manawatu-Wanganui, Bay of Plenty and Northland. Finally, focusing on land areas rather than values may distort the actual importance of each land type to Māori. For example, if dairy farming per hectare is more valuable than sheep and beef farming per hectare, then the relative Māori interest in each farm type will be more balanced. For want of better data, analysis in this report proceeds on the basis of available land area figures.

While focusing on these sectors and regions will account for most of the value of Māori economic interests, it must be acknowledged that this should not understate the importance of ETS impacts in regions or sectors where Māori have more limited economic interests. For example, where Māori have limited economic interests as a consequence of having lost economic resources due to past Crown actions (as was particularly the case in the South Island), they may in fact suffer greater adverse ETS-related impacts by virtue of not being able to diversify those impacts across a wider asset base. Accordingly, there may be certain disproportionate Māori interests from the ETS – both positively and negatively – not highlighted in this report.

In preparing this report it has not generally been possible to produce original primary data. Instead, reliance has been placed on existing data, particularly:

a) "Māori economy" – *Māori Economic Development: Te Ohanga Whanaketanga Māori*, NZIER, 2003, and *Māori Business and Economic Performance: A Summary Report*, NZIER, September 2005

b) Māori land ownership institutions and statistics – *Hui Taumata Māori Land Tenure Review Group: Discussion Paper*, 23 June 2006, *National Māori Land Information Project: Final Report*, Land Information New Zealand, 2004, and *Māori Land Administration: Client Service Performance of the Māori Land Court and the Māori Trustee*, Report of the Controller and Auditor General, March 2004

c) Māori land-use details – *Māori Perspectives on Kyoto Policy: Interim Results*, Harmsworth G, Landcare Research, 2003, and *Māori Land Analysis Version 1.1: Results by Region*, MAF Policy,[2] December 2006[3]

d) Māori socioeconomic position – *The Social Report: Indicators of Social Wellbeing in New Zealand*, Ministry of Social Development, 2006, and *The Net Worth of New Zealanders: A Report on their Assets and Debts*, Statistics New Zealand, 2002

e) other Māori economic and socioeconomic indicators – *Census* data from Statistics New Zealand, as well as specialised data requests based on the *Household Economic Survey*, Statistics New Zealand, 2004.

Primary data has been obtained in discrete areas, typically based on direct approaches to Māori asset-owning bodies, and sometimes other bodies with access to industry data. Examples include holdings of pre-1990 Crown Forestry Licensed lands held by iwi pursuant to completed Treaty settlements, and fishing quota held by Māori (largely due to the 1992 "Sealords" deal).

Given the absence of comprehensive primary data and lack of time to comprehensively assess the data to hand, our analysis has been supplemented by discussions with a range of parties and organisations. These discussions have been directed at filling in data gaps as best as can be in the time available, and to gain perspectives from affected parties on how the ETS is likely to affect their interests.

Only limited, incomplete and sometimes contradictory or obviously deficient data is available on the nature and extent of Māori asset ownership. Of particular note is the understatement of Māori forest land ownership in certain key data sources, as well as the absence of published data detailing Māori and non-Māori interests in pre-1990 and post-1989 forests. The absence of such data weakens the conclusions that this analysis can reach regarding the ETS's impacts on different Māori forestry interests. Accordingly, its conclusions will in many instances be indicative at best.

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[2] Ministry of Agriculture and Forestry emphasises that the Māori Land Information Base from which this database was created is not an authoritative database of Māori land use, but simply the best dataset currently available. It is recognised in this report that this database contains inaccuracies and inconsistencies, but it is used despite this given the absence of a superior alternative.

[3] Note that limited other detailed published research has been undertaken elsewhere within Crown Research Institutes.

## 1.4 Key sectoral impacts and issues

Table 1.1 summarises the key sectoral impacts and issues identified in this report.

**Table 1.1: Key ETS impacts on and issues for Māori (by sector)**

| Sector | Key impacts | Key issues |
|---|---|---|
| Post-1989 forestry | Opportunities for value-enhancing carbon sequestration on compliant land if landowners elect to enter them into the ETS.<br>Alternative schemes available.<br>Possible opportunities for Māori to further differentiate sink credits for additional value. | Liabilities for natural losses.<br>Compliance costs and penalties.<br>Some post-1989 reversion may qualify for credits. |
| Pre-1990 forestry | Land values to be reduced, relative to economy with no emissions charges, to the extent that land conversion options are made less valuable. Little or no impact likely where conversion options are limited.<br>Value loss offset to some extent by free NZU allocations, possibly with windfall gain. | Free NZU allocations based on forest land areas to favour less valuable forests.<br>Forthcoming decisions on the inclusion of pre-1990 indigenous forestry in ETS.<br>Forestry lessors can be liable for lessees' carbon emissions if they deforest plantings after lease expiration before those plantings reach eight years of age.<br>Value impact on Crown Forestry Licensed lands included in completed Treaty settlements.<br>Compliance costs and penalties. |
| Wood processing, and pulp and paper | Sector may enjoy slight boost due to ETS, with Māori enjoying disproportionately positive employment impacts. | |
| Agriculture | Farming profitability and hence land values are likely to be reduced, relative to an economy with no emissions charges.<br>Value loss offset to some extent by free NZU allocations. | No decisions yet made on:<br>• points of obligation for emissions liabilities<br>• how liabilities will be devolved to farmers<br>• recipients of free NZU allocations or<br>• how free NZUs will be devolved to farmers.<br>Need for Māori to engage in governance processes to resolve these important issues.<br>Not clear whether more or less intensive farming types to be most affected by ETS, or how ETS will affect farming development opportunities. |
| Food processing | Long-term sector growth likely to be lower than in an economy without emissions charges. | Māori employment, especially in meat processing, may be disproportionately negatively affected. |
| Fishing | Fishing and processing costs to rise, though perhaps to lesser degree for deepwater fishing than for inshore fishing.<br>Quota and fishing company values may fall to some degree as a consequence, relative to an economy with no emissions charges. | Māori employment, especially in processing, may be disproportionately negatively affected.<br>Fish processing unlikely to qualify for free NZUs to mitigate impacts of higher electricity costs on processing competitiveness. |
| Geothermal | Electricity generators likely to enjoy windfall increase in profits due to higher electricity prices.<br>Non-electricity geothermal energy users to face higher costs. | Māori non-electricity geothermal energy users unlikely to qualify for free NZUs to mitigate impact of emissions charges on asset values. |

| Sector | Key impacts | Key issues |
|---|---|---|
| Households | Lower-income Māori households to face greater impact of higher electricity prices than similar non-Māori households.<br>Higher-income Māori households to face greater impact of higher transport fuel prices than similar non-Māori households. | Relatively low Māori home ownership rates mean Māori less able to take advantage of support measures to improve home energy efficiency.<br>Measures to reduce impact of higher electricity prices on low- to middle-income families may need more refined targeting. |

# 2 Māori Contribution to New Zealand Greenhouse Gas Emissions

In considering whether Māori bear a proportionate or disproportionate share of greenhouse gas mitigation costs under the ETS, it is relevant to enquire as to the relative contribution of Māori to New Zealand's greenhouse gas emissions. To compare Māori and non-Māori emissions it is necessary to consider both emissions from consumption, as well as from Māori productive activities (such as deforestation of pre-1990 forests). Furthermore, it is necessary to consider not just direct emissions by Māori (eg, through electricity and liquid fuel consumption), but also indirect emissions. These indirect emissions may arise, for example, through the consumption of goods and services which require electricity and liquid fuels for their manufacture or supply.

Using 2004 household expenditure data from Statistics New Zealand, the total expenditure by Māori households is 14 per cent of total household expenditure. Given Māori constitute 15 per cent of the New Zealand population this suggests Māori contribute marginally less to New Zealand's total greenhouse gas emissions measured in consumption terms than non-Māori, all other things being equal, but not significantly so. However, further data presented in Sections 5 and 6 on Māori household electricity and motor fuel consumption suggest that certain Māori sub-groups have relatively high direct emissions from these sources, so the use of overall consumption figures may not be an accurate guide as to relative Māori emissions.

In production terms, analysis by NZIER suggests the "Māori economy" constitutes only 1.4 per cent of total economic value added in New Zealand,[4] which likely reflects a relatively low proportion of the New Zealand productive sector owned by Māori (eg, only 6 per cent of all land in New Zealand is Māori land). The distribution of Māori value added is relatively uneven, however, with Māori value added estimated to constitute 37.1 per cent of total fishing value added, 7.5 per cent of agriculture value added, 2.0 per cent of forestry value added, and lower proportions of total value added in other sectors. Assuming these economic value added statistics correlate with emissions, on a per capita basis Māori contribute a greater share of fishing-sector related emissions than non-Māori, all other things being equal. However, for all other sectors, including forestry, Māori contribute less per capita to New Zealand's total greenhouse gas emissions than non-Māori, all other things being equal.

[4] NZIER, 2003, *Māori Economic Development: Te Ohanga Whanaketanga Māori*, p.9.

Conversely, Māori emissions based on land use and land-use change data may be relatively high compared with non-Māori. Data presented in Section 3 suggests there is a relatively high proportion of Māori land in more emissions-intensive activities such as beef farming, as well as relatively low Māori interests in lower-emitting sheep farming, compared with the proportion of non-Māori land in each such activity. While Māori have relatively high interests in pre-1990 forestry (both indigenous and exotic), there is evidence to suggest that the greater part of emissions relating to deforestation (ie, changing land use out of pre-1990 forestry) comes from non-Māori sources.[5] Also, while Māori interests in high-emitting dairy farming, and lower-emitting mixed sheep and beef farming, are relatively comparable to those of non-Māori, evidence exists for more conservative stocking policies on Māori farms and greater Māori farming of under-developed or marginal land as compared with non-Māori farms. Given the significance of mixed sheep and beef farming for total land use, relatively lower Māori emissions for these farm types may mitigate any greater emissions from other sources, hence the net relative contribution of Māori to emissions from land use and land-use change is unclear.

Taking these crude approaches into account, there may be reason to speculate that Māori contribute less to New Zealand's total greenhouse gas emissions per capita than non-Māori, and hence could expect to shoulder only a commensurate burden of greenhouse gas mitigation costs. However, without more reliable data it is not possible to state any definitive conclusion. While in principle the ETS should only charge Māori for the emissions they actually make, practical arrangements could hinder or help Māori groups or individuals relative to non-Māori to access opportunities or mitigate costs from the ETS, thus creating distributional inequalities.

[5] Smith B, Horgan G, 2006, *Area of Forest 'at Risk' from Deforestation*, August, www.maf.govt.nz.

# 3 Māori Economic and Socioeconomic Position

## 3.1 Overview of the Māori economy

The most-commonly cited estimate of the Māori asset base and the Māori contribution to New Zealand's economy is that provided by NZIER in its 2003 publication *Māori Economic Development: Te Ohanga Whanaketanga Māori*.[6] This publication suggests the following:

a) Primary industries (including agriculture, forestry, fishing and mining) accounted for 50 per cent of Māori commercial assets, as compares with 11 per cent of assets of the New Zealand business sector overall.

b) Only 10 per cent of Māori commercial assets are in secondary industries such as manufacturing and construction, with the remaining 40 per cent of Māori assets being involved in tertiary industries.

c) Māori control up to 37 per cent of the domestic fishing quota in New Zealand, making them a disproportionate participant in this sector per capita.

d) Agriculture, fishing and home ownership account for 75 per cent of the output of the Māori economy.

e) Māori control around 10 per cent of New Zealand land involved in forestry, but this often arises through forestry rights owned by third parties.

The Māori primary sector asset base is weighted towards Bay of Plenty, Waikato and Northland, and also Nelson (presumably Sealord).[7] In terms of total assets by region (ie, including secondary and tertiary industry assets), 48 per cent of the Māori asset base is located in Auckland, Waikato and Bay of Plenty.[8] However, as mentioned in Section 1, most of the Māori land base outside of the main urban centres is located in six key regions, namely Waikato, Hawke's Bay, Gisborne, Manawatu-Wanganui, Bay of Plenty and Northland. In terms of Māori employment the key agriculture, forestry and fishing sectors, as well as processing in each such sector, are of obvious importance in terms of possible ETS impacts.

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[6] Updated figures on the size of the Māori economy are provided in Te Puni Kokiri, 2007, *Nga Kaihanga Hou: For Māori Future Makers*, October. However, these updated figures do not provide the same degree of detail as NZIER (2003), hence this report continues to cite the earlier figures.

[7] NZIER, 2005, *Māori Business and Economic Performance: A Summary Report*, September, p.4.

[8] NZIER (2005), p.6.

## 3.2 Māori land-based activities

We turn now to describing the Māori interest in agriculture and forestry in greater detail. Using indicative data drawn from the Māori Land Information Base, as summarised in the 2006 Ministry of Agriculture and Forestry publication *Māori Land Analysis Version 1.1: Results by Region*, Figure 3.1 summarises the relative proportion of Māori and non-Māori land represented by each of 14 farm types at a national level. These 14 farm types account for 95 per cent of all land recorded in the Māori Land Information Base as summarised by Ministry of Agriculture and Forestry.

From this figure it is evident that sheep and beef farming constitutes the largest use of Māori land, with forestry (both exotic and indigenous, and both pre-1990 and post-1989), and beef cattle farming, the next most significant land uses. While sheep and beef farming constitutes only a marginally higher fraction of Māori land use than for non-Māori, the Māori proportions for beef cattle farming and forestry are markedly higher.

**Figure 3.1: Proportion of Māori and non-Māori land in main farm types (by area)**

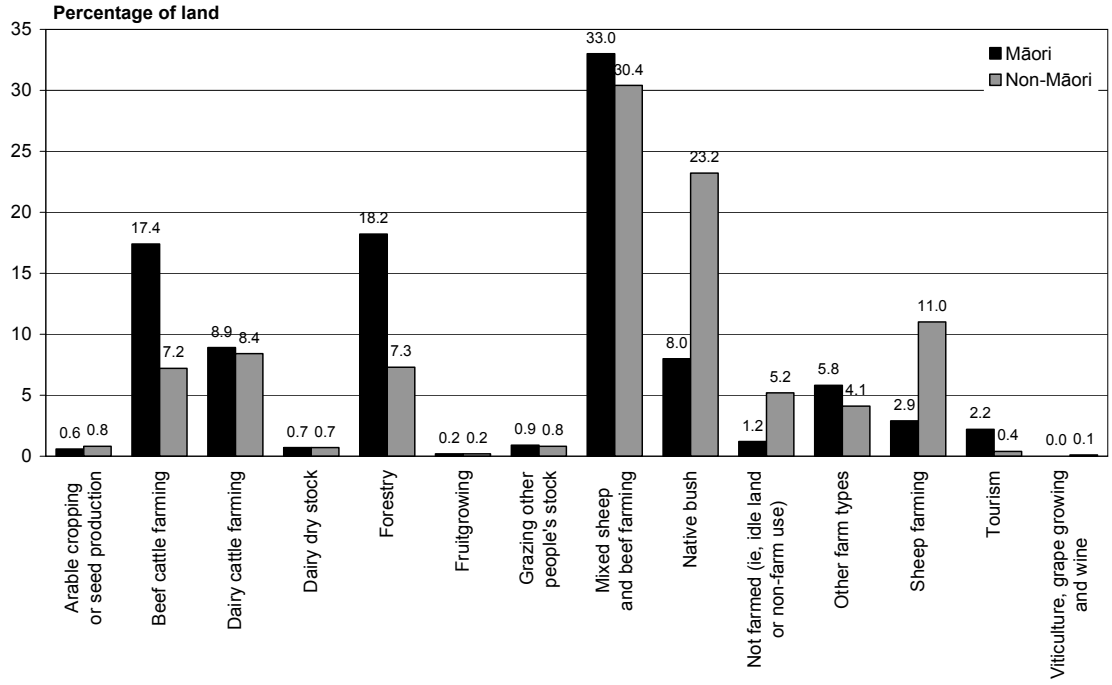


Figure 3.1 suggests a much higher proportion of non-Māori land being in native bush than for Māori, but this figure includes conservation estate managed by Department of Conservation, so the non-Māori proportion is biased upwards accordingly. The higher non-Māori proportion in sheep farming is likely explained by sheep farming in the South Island High Country. Given evidence of more conservative stocking policies on Māori-owned farms, these area-based comparisons may overstate the intensity of Māori farming relative to non-Māori farming for like farm types.[9]

[9] Eg, see Ussher, G., 2002, *A Comparative Study of the Physical and Financial Performance of Māori owned and European owned Farm and Horticultural Businesses in Northland*, www.maf.govt.nz

Interestingly, according to this database a greater share of Māori land is committed to dairy cattle farming, although this constitutes the fourth largest use of Māori land behind sheep and beef farming, forestry, and beef cattle farming. These four farm types account for some 77 per cent of all Māori land, but only 53 per cent of non-Māori land (although this figure is biased downwards by the inclusion of Department of Conservation land).

To delve behind the national figures, Table 3.1 disaggregates Māori interests in the main land-use types for the six most significant regions in terms of Māori land areas. As can be seen, the Waikato (which also takes in the Central North Island and Taupo areas) ranks consistently high in terms of total Māori land interests across the major land uses.

**Table 3.1: Most significant regions by area in which Māori have interest in major land uses**

| Land use | Area of Māori land involved in main land-use types | Most significant regions by area of Māori land in that land use |
|---|---|---|
| Sheep and beef | 218,612 ha | Gisborne (almost 70,000 ha)<br>Waikato (almost 50,000 ha)<br>Manawatu-Wanganui (40,000 ha)<br>Hawke's Bay (30,000 ha)<br>Northland (10,000 ha) |
| Forestry* | 120,253 ha | Waikato (50,000+ ha)<br>Hawke's Bay (20,000+ ha)<br>Gisborne, Bay of Plenty, Northland, Manawatu-Wanganui (10,000 ha each) |
| Beef | 115,067 ha | Waikato (almost 30,000 ha)<br>Hawke's Bay, Northland (20,000 ha each)<br>Bay of Plenty, Gisborne (15,000+ ha each) |
| Dairy | 58,824 ha | Waikato (20,000+ ha)<br>Bay of Plenty (almost 15,000 ha)<br>Northland (almost 10,000 ha)<br>Taranaki, Gisborne, Manawatu-Wanganui (almost 5,000 ha each) |
| Tourism | 14,727 ha | Hawke's Bay (almost 14,000 ha) |
| Grazing other peoples' stock | 5,961 ha | Northland (almost 2,000 ha)<br>Waikato (1,500 ha)<br>Bay of Plenty (1,000 ha)<br>Manawatu-Wanganui, Taranaki (almost 500 ha each) |
| Dry stock grazing | 4,704 ha | Waikato (3,000 ha) |
| Fruit growing | 1,476 ha | Bay of Plenty (almost 1,200 ha)<br>Hawke's Bay, Gisborne (almost 200 ha each) |

* Māori forestry interest understated as a proportion of Māori land.

Data from Ministry of Agriculture and Forestry on Māori exotic and indigenous forestry interests as at 2001 is summarised in Tables 3.2 and 3.3.[10] This data underestimates the Māori forestry interest substantially, not least because the Māori Land Information Base does not classify general land owned by Māori for forestry as Māori forestry land. For example, not reflected in the Māori Land Information Base figures is the fact that Māori own almost 97,000 hectares of formerly Crown-owned Crown Forestry Licensed lands as a consequence of settled Treaty claims. Furthermore, the Māori Land Information Base data is quite dated – due to increased deforestation since 2005, as well as low new planting rates, it may not provide an accurate assessment of the current position.

With these caveats in mind, note that 31 per cent of the total exotic forest estate is located in the Central North Island. Note also that around 680,000 hectares of new exotic forests, or 38 per cent of the exotic estate, are estimated to have been planted from 1990 to 2006. This suggests 62 per cent of the exotic estate, or 1.12 m hectares, is in pre-1990 forestry. The vast majority of the private indigenous estate is likely to be in pre-1990 forests.

**Table 3.2: Māori and non-Māori exotic forestry interests as at 2001**

| | Māori | Non-Māori | Total | |
|---|---|---|---|---|
| North Island | 117,062 | 1,142,938 | 1,260,000 | 70% |
| South Island | 3,468 | 536,532 | 540,000 | 30% |
| New Zealand | 120,530 | 1,679,470 | 1,800,000 | |
| | 7% | 93% | | |

**Table 3.3: Māori and non-Māori private indigenous forestry interests as at 2001**

| | Māori | Non-Māori | Total | |
|---|---|---|---|---|
| North Island | 265,900 | 778,420 | 1,044,320 | 73% |
| South Island | 21,621 | 360,261 | 381,882 | 27% |
| New Zealand | 287,521 | 1,138,681 | 1,426,202 | |
| | 20% | 80% | | |

[10] Ministry of Agriculture and Forestry personal communication, plus 2006 *National Exotic Forest Description*. Note that widely divergent indigenous forestry figures are available from alternative sources. For example, see Hammond D, 2001, *Development of Māori Owned Indigenous Forests*, and Griffiths A, 2002, *Indigenous Forestry on Private Land: Present Trends and Future Potential*.

## 3.3 Issues with the ownership and use of Māori land

Māori land ownership differs in a number of important ways when compared with non-Māori land ownership. Notably, the Māori Land Act 1993, or Te Ture Whenua Māori 1993, defines different classes of Māori land, and provides for a range of governance entities and processes for controlling the use and retention of Māori land. These governance entities include the commonly-used Ahu Whenua Trusts (covering 50 per cent of Māori land area), as well as incorporations (covering a further 13 per cent of Māori land area). The processes for controlling the use and retention of Māori land include requirements for consensus-based rather than simple-majority based asset management decision-making, as well as the capacity of the Māori Land Court to intervene in asset management decisions made by Māori asset-owning trusts and incorporations.

This capacity derives from the distinctive provision in Te Ture Whenua Māori for the retention of Māori land assets by such bodies, as provided by the Act's strong restrictions on the "alienation" of Māori land. Alienation relates not just to the outright sale of such land, but also to the granting of leases over that land, and the granting of mortgages for raising debt capital, among other things. A consequence of these strong restrictions is that Māori land-owning bodies constituted under Te Ture Whenua Māori typically face considerable difficulty in raising external capital, and it is extremely difficult (ie, prohibitively costly or otherwise impossible) to rationalise the ownership of Māori land assets.

The difficulty in raising capital is made worse by the fact that much of the land such bodies own is often of low productive potential and hence security value, is small and often poorly located, is not surveyed (and hence titled), and has a relatively large number of owners (increasing over time as succession rules pass ownership to each new generation). It is also made worse by lenders' reluctance to lend to such bodies for fear of being unable to realise asset value in the event their loans go bad, and negative publicity potential where Māori ancestral land is forcibly sold to repay debts. The capacity of the Māori Land Court to intervene in land management decisions where the retention of Māori land is at risk raises additional complications and risks for would-be lenders.

As to the nature of Māori land itself, until recently more than half of Māori land blocks were thought to be unsurveyed and hence untitled (the Māori Land Court advises that the figure now stands at 21 per cent). Māori land blocks are typically small (average of 57 hectares, with 68 per cent less than 10 hectares in size), are non-contiguous (hence harder to rationalise), have multiple owners (average of 80 per block), and a third are landlocked. Furthermore, over 60 per cent of such blocks have no management structure, and 81 per cent of Māori land is non-arable (compared with 71 per cent of all land nationally). The 2.3 million ownership interests in Māori land compare with the total number of interests represented by the other 94 per cent of land in New Zealand. The implied cross-ownership interests in different Māori land-owning bodies means for many Māori landowners their share of returns from a given land block constitutes a negligible part of their overall income, meaning they have little incentive to invest much in the governance and management of such blocks.[11]

[11] Figures from *Hui Taumata Māori Land Tenure Review Group Discussion Paper*, 23 June 2006, and Māori Land Court personal communication.

Given both the institutional peculiarities of Māori land ownership, and the specific characteristics of Māori land, much Māori land is undeveloped or relatively under-developed.[12] Indeed, as two commentators put it:

> *"Much Māori land is currently locked out of development although it can be adjacent to highly productive land and located in a market driven economic environment".*[13]

> *"... Māori land may suffer from fragmentation of development effort, increased transaction costs and slower development timeframes. The more complicated ownership structure and possible non-economic drivers for development that differentiate the development process for Māori land from general land must be recognised as they are central to an understanding of wider land development issues."*[14]

Such factors serve to limit the economic use and ownership rationalisation of Māori land, and may impede the ability of Māori landowners to take advantage of opportunities under the ETS and complementary measures (eg, the Permanent Forest Sinks Initiative). On the other hand, between 40,000–50,000 hectares of marginal Māori land is in pasture, and could be suitable for reforestation or scrub regeneration such as that envisaged under the ETS in respect of post-1989 forests. Much of this land is located in the Gisborne/East Coast and Northland regions.[15]

These factors also serve to affect the value and riskiness of Māori land assets. The alienation restrictions imposed on Māori land under Te Ture Whenua Māori amount to what in economic terms are called "liquidity constraints". Such constraints are commonly found in both theoretical and empirical studies to impose considerable value discounts relative to comparable assets without such constraints.[16] This means that Māori land subject to alienation restrictions should be worth less than comparable land not subject to those constraints. Moreover, a predicted consequence of the asset illiquidity imposed on Māori land by Te Ture Whenua Māori restrictions is to make the holding of other, non-constrained assets less risky.[17] Hence, Māori land should be worth less than otherwise comparable non-Māori land, and ironically other land should be a less risky investment for its owners by virtue of the Te Ture Whenua Māori constraints.

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[12] There is also evidence of Māori-owned farms operating at lower profitability than non-Māori owned farms in the same region, with more conservative stocking policies on Māori-owned farms, land limitations and capital constraints offered as partial explanations. See for example, Ussher G, 2002, *A Comparative Study of the Physical and Financial Performance of Māori owned and European owned Farm and Horticultural Businesses in Northland*, www.maf.govt.nz; Livingston P, undated, *Farm Performance Variations*, research prepared for Ministry of Agriculture and Forestry by AgFirst Consultants, www.maf.govt.nz; and Hayes, 1999, *An In-depth Comparison of the Financial and Physical Performance of Farms in the Gisborne-Wairoa District,* cited in NZIER 2002, *Natural Resource Policy and Māori Economic Development*, Report to Te Puni Kokiri, September.

[13] Robertson B, 2004, *Māori Land Tenure: Issues and Opportunities*, paper prepared for the New Zealand Institute of Surveyors Annual Conference, Auckland, October, p.6.

[14] Land Information New Zealand, 2004, *National Māori Land Information Project: Final Report*, p.5.

[15] Harmsworth G, 2003, *Māori Perspectives on Kyoto Policy: Interim Results*, and Harmsworth G, 2004, *Māori and Climate Change: Carbon Sequestration Opportunities on Māori Land*.

[16] For example, see Silber W, 1991, "Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices", *Financial Analysts Journal*, 47(4), July/August, 60–64.

[17] Longstaff F, 2005, *Asset Pricing in Markets with Illiquid Assets*.

Based on such theory and evidence it might be inferred that any adverse value impacts of the ETS on Māori land should be less than that on non-Māori land. However, while Māori land should be worth less than otherwise comparable non-Māori land, it cannot be immediately deduced that any loss of conversion potential on non-Māori land is also relatively less than for non-Māori land. This is because the potential conversion value on Māori land may be high relative to that for comparable non-Māori land, for example due to relative under-development (whether due to financing constraints, institutional restrictions on land ownership, or otherwise). Hence, any further constraints on Māori land development as a consequence of the ETS could in fact result in even higher proportionate value losses for Māori land than non-Māori land.

## 3.4 Māori socioeconomic position

The socioeconomic position of Māori relative to non-Māori can be measured using various combinations of indicators.[18] Among these indicators include:

a) a similar urban/rural split to the European population

b) a lower life expectancy than non-Māori

c) the highest unemployment rate of all ethnic groups, and lower employment rate and median hourly earnings than for European New Zealanders

d) a high proportion of Māori are on low incomes (although this may reflect a younger age distribution), and Māori have much lower net worth than European New Zealanders

e) a high incidence of household overcrowding, and relatively low home ownership rates.

[18] For example, see *The Social Report 2006: Indicators of Social Wellbeing in New Zealand*, Ministry of Social Development.

# 4 Likely High-Level Generic Impacts of the ETS

## 4.1 Electricity and liquid fuel prices

The ETS will lead to increased electricity and liquid fuel (ie, petrol and diesel) prices. At the indicative levels of carbon prices used in official publications (ie, $15/tonne and $25/tonne), the price increases are relatively small (ie, 1–2 cents per kWh (or 5–10 per cent) for electricity, and 3.7–6.1 cents per litre (or 2.5–4 per cent) for petrol),[19] especially when compared with historical price changes in such energy costs.

In fact the ETS will also lead to increased gas prices, and to secondary increases in prices of goods and services for which electricity, liquid fuel and gas prices are input costs (eg, food products via higher processing and transportation costs). Whether the price impact of the ETS is relatively high or low will depend on the level of international carbon prices once the relevant sectors are introduced into the scheme. Whether the ETS leads to "one-off" or successive increases in such prices will hinge on the future course of such international carbon prices. Global carbon prices will evolve according to the demand for carbon credits to offset emissions liabilities (which relates in part to the evolution of the Kyoto Protocol itself, particularly beyond 2008–2012, as well as global economic growth), and the development of technologies to reduce emissions (eg, carbon capture and storage).

Higher transportation costs can be predicted to fall relatively more heavily on rural communities, given the greater travelling distances they face, although numerically their burden will be less than that for non-rural communities. The burden of higher electricity prices can be predicted to fall more heavily in those parts of the country that are relatively cold, such as in the deep south of the South Island, where energy demands for heating are higher (and where Māori populations are relatively low).

These increased costs will fall at both the consumer and producer levels. Households will face higher energy costs, although the Government has signalled that support for low- and middle-income families will be made available to mitigate the impacts of the ETS on electricity prices.

Higher liquid fuel costs will particularly affect industries with high transport cost components, such as forestry and, especially, fishing. In the case of fishing, there may be different impacts on inshore and deep-sea fishing, with deep-sea vessels potentially able to skirt around the ETS by sourcing fuel from countries not imposing emissions charges on fuels. Higher electricity costs will affect industries reliant on electricity for energy-intensive processing, such as wood, pulp and paper, meat and dairy processing, and also sectors reliant on refrigeration and cool-stores (eg, horticulture). The Government has signalled possible relief measures for industries that are exposed to international trade, that have significant work forces at risk, and/or which have the potential to relocate to countries that lack greenhouse gas emission pricing.

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[19] Table 7.2, *The Framework for a New Zealand Emissions Trading Scheme*, p.111.

## 4.2 Pre-1990 forests

Devolving deforestation liabilities to owners of pre-1990 forests should encourage the retention of a greater proportion of such forests in forestry, rather than see them converted into non-forestry uses, all other things being equal. This should result in a net negative impact on pre-1990 forest land values relative to no emissions pricing, since it will reduce the opportunities faced by some pre-1990 forest owners to convert their land into higher and better uses, at the margin. For example, economic modelling analysis commissioned by the Federation of Māori Authorities suggests that, at an initial carbon price of $15/tonne and initial milk-solids price of $4.42/kg, pre-1990 forest value as at June 2005 would be 13 per cent less with deforestation liabilities devolved to landowners (without any free emissions right allocations) than if they were retained by the Government.[20] This value loss arose from reduced dairy conversion options. At an initial carbon price of $25/tonne ($43/tonne) the corresponding value loss was estimated to be 19 per cent (47 per cent) relative to government retention of deforestation liabilities. If landowners were assumed to be unable to take advantage of free pre-2008 deforestation – whether due to institutional constraints on land-use changes or otherwise – the value loss rose to 18 per cent. This figure rose to 26 per cent if only post-2012 deforestation was assumed possible.

This negative forest value impact will be small or even non-existent, however, where pre-1990 forest lands currently lack higher or better alternative uses (given current land-use technologies), and/or with free NZU allocations to forest landowners. It will also be small where forest landowners face other constraints on changing land use. These might include replanting requirements under the Resource Management Act, or other land-use restrictions such as those emerging in some parts of the country to manage the nitrification of waterways, or Department of Conservation opposition to native scrub clearance.

Where pre-1990 forests have essentially no alternative use in the foreseeable future, such as might be the case with many indigenous forests (if pre-1990 indigenous forestry is to be included in the ETS) or forestry on extremely marginal land, the ETS's impact may be inconsequential. In fact, if the owners of such lands receive a free allocation of NZUs under the proposed ETS, this could result in an initial windfall gain, which could be important to Māori who are large stakeholders in this estate. This is because those NZUs can be traded now for value that was not otherwise attainable, although at the expense of possible future development options. Importantly, the extent of any such gain will depend on the type of allocation mechanism, which initially at least will be based on simple forest land area, favouring lower-valued forests over higher-valued ones.

Another important, related consideration is the extent to which owners of pre-1990 forests are able to apply for exemptions under the proposed ETS. Notable among these is the provision for owners of forest blocks of up to 50 hectares to apply for exemption from deforestation liabilities. This exemption, however, is not available to owners of related bodies which in aggregate hold more than 50 hectares of pre-1990 forests.

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[20] Meade R, 2006, *Relative Forest Valuation with the Retention and Devolution of Carbon Credits and Harvest Liabilities under the Kyoto Protocol: Representative Non-Kyoto Forest*, report prepared by Cognitus Advisory Services Limited for the Federation of Māori Authorities. Results cited with permission. The analysis assumed log, carbon and milk-solids prices evolved according to mean-reverting stochastic processes. At higher initial milk-solids prices the loss in land value due to deforestation liabilities would increase, all other things being equal.

## 4.3 Post-1989 forests

New forest plantings (ie, afforestation) should be encouraged by providing owners of post-1989 forests with the possibility of earning carbon credits on their forests (under the ETS, or the complementary Permanent Forest Sinks Initiative), or otherwise receiving subsidies to encourage post-1989 planting (under the possible Afforestation Grant Scheme). For example, economic modelling analysis commissioned by the Federation of Māori Authorities suggests June 2005 forest value, at an initial carbon price of $15/tonne, could have been increased by 46 per cent with the devolution of carbon credits and harvest liabilities to forest owners from 2008, relative to government retention of those credits and liabilities.[21] At an initial carbon price of $40/tonne the value increase was estimated to be 84 per cent. Increased forest value through devolved credits and liabilities has also been predicted by other New Zealand research, though it is not clear what carbon prices were assumed in that analysis.[22] This value gain may be tempered to some degree, however, due to the relatively increased area of pre-1990 forest land that will be retained in forestry, and increased post-1989 plantings, which will have the effect of reducing domestic log prices at the margin, relative to no emissions costs or sink credits.

Indeed, to the extent that overseas forestry nations implement similar forestry measures to those in the ETS, increased retention of pre-1990 forests in forestry, and increased post-1989 plantings, should be expected to constrain growth in long-term international log prices, all other things being equal.[23] Whether post-1990 plantings become more or less economic as a consequence will hinge on the degree to which international carbon prices evolve to support economic carbon sequestration, or to which alternative uses for wood fibre (such as bioethanol) develop. Global carbon prices will evolve according to the demand for carbon credits to offset emissions liabilities, and the development of alternative technologies to reduce emissions.

At current carbon price levels (often indicatively assumed to be in the order of $15–25/tonne of carbon dioxide equivalent ($tCO_2e$)), at least some post-1989 forest plantings will be made viable by virtue of carbon sequestration opportunities. Where rising transport costs due to emissions costs make harvest uneconomic on more remote forest areas, the combined effect of these charges and carbon sequestration value may result in certain remote marginal lands being converted into permanent forest cover.

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[21] Meade R, 2006, *Relative Forest Valuation with the Retention and Devolution of Carbon Credits and Harvest Liabilities under the Kyoto Protocol: Representative Kyoto Forest*, report prepared by Cognitus Advisory Services Limited for the Federation of Māori Authorities. Results cited with permission. The analysis assumed that carbon and log prices evolved according to mean-reverting stochastic processes.

[22] Guthrie G, Kumareswaran D, 2007, *Carbon Subsidies, Taxes and Optimal Forest Management*.

[23] Some research suggests timber prices will initially rise under emissions pricing, as the resulting longer forest rotations reduce timber supply, but will eventually fall as more forests are planted. See Sohngen B and Mendelsohn R, 2003, "An Optimal Control Model of Carbon Sequestration", *American Journal of Agricultural Economics* 85(2), 448–457.

## 4.4 Wood processing, and pulp and paper

The net effect of reducing deforestation and encouraging afforestation should be an increased supply of wood-fibre for processing in New Zealand. There is also likely to be an increased supply of fibre from alternative species more suited to carbon sequestration than Pinus Radiata, such as varieties of Eucalyptus, Redwood and Douglas Fir, although with longer forest rotations. While this should be positive for the continuation of this sector, and hence for employment in the forestry and processing sectors (potentially favouring Māori), this should be balanced against the negative impact of higher electricity and liquid fuel costs (which increase the risk that processing is shifted to countries without emissions charges). In turn, such higher energy costs should encourage the substitution of alternative fuel sources for processing, such as increased use of wood-based energy production (which should increase the net returns to foresters, at the margin, if not the total demand for wood-fibre). Macroeconomic modelling analysis by Infometrics predicts modest increases in wood processing output, and in pulp and paper production, both short-term (in 2008–2012) as well as longer-term (2025), relative to an economy with no emissions charges, as a consequence of the ETS (setting aside short-term adjustment costs, and dynamic/uncertainty impacts on investment, among other things).[24]

## 4.5 Agriculture, and food processing

Placing emissions charges on agriculture post-2012 will ultimately affect optimal stocking levels and farming type, at the margin. Conflicting research exists as to whether dairy farming will be more or less affected than other farming types by the introduction of an emissions charge. This is despite the fact that dairy farming produces the highest methane emissions per stock unit, with beef farming the next most emitting, and sheep farming emitting at much lower levels.[25] Certainly an emissions charge should result in lower overall emissions across all farm types, as a consequence of reduced farming at the margin across all types. It should also result in more marginal farm land being retired into forestry or reversion, and possibly some conversion from dairying into less-intensive farm uses at the margin (as well as reduced conversion into dairying).

However, farm type changes resulting from emissions charges will depend not just on the cost of emissions, but also the impact of emissions charges (net of any offsetting emission unit allocations) on the relative profitability of different farm types. Official figures suggest average payouts to dairying will fall by more than other farm types, followed by sheep farming and then beef farming.[26] However, economic modelling by Motu suggests an emissions charge of $25/tonne or $50/tonne (without free NZU allocations) would reduce sheep and beef revenues as a proportion of total revenue by more than for dairying. At the higher emissions charge Motu's modelling suggests the profitability of dairying should fall by more as a percentage of

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[24] *General Equilibrium Analysis of Options for Meeting New Zealand's International Emissions Obligations*, October 2007.

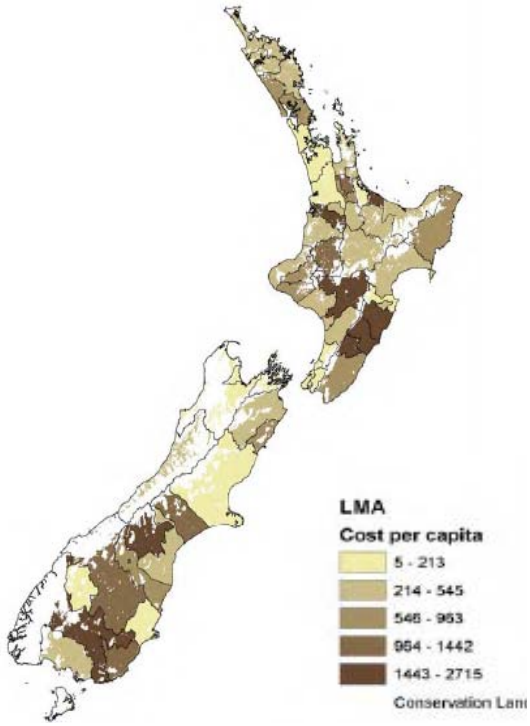
[25] See http://www.niwascience.co.nz/ncces/ghge/agricultural.

[26] Table 7.4, *The Framework for a New Zealand Emissions Trading Scheme*, p.112.

average farm profits than for sheep and beef farming.[27] It is therefore unclear from these conflicting figures whether emissions charges will reduce dairying by more or less then less-intensive farming types.

The 2005 Motu analysis provides assessment of the regional impacts from a $25/tonne emissions charge on agriculture. The incidence of a farmer-level emissions charge is predicted to fall mostly on farm profits, although with some burden shifted to agriculture sector workers. While sheep and beef farmers are predicted to be unable to shift any of the emissions charge incidence to customers, a small ability to do so is predicted for dairy producers. A charge of $25/tonne is predicted to reduce dairy farm revenue by 7 per cent based on 2002 payouts. For sheep and beef farmers a higher impact is predicted, namely an 11 per cent decline on 2002 payouts. Figure 4.1, taken from the 2005 Motu analysis, identifies the areas most affected by an agricultural emissions charge in per capita terms.

**Figure 4.1: Motu analysis of per capita distribution of a $25/tonne agricultural emissions charge**




[27] Sin I, Brunton E, Hendy J, Kerr S, 2005, *The Likely Regional Impacts of an Agricultural Emissions Policy in New Zealand: Preliminary Analysis*, Motu Working Paper 05-08, June; and Hendy J, Kerr S, Baisden T, 2006, *Greenhouse Gas Emissions Charges and Credits on Agricultural Land: What Can a Model Tell Us?*, Motu Working Paper 06–04, June.

On a per capita basis the areas most affected by agricultural emissions charges are Gore and MacKenzie in the South Island, and Taihape (having the highest national average impact of $2,715/person), Waipukurau, Te Kuiti and Dannevirke in the North Island (which are mostly sheep and beef regions, though with some dairy). The areas most affected are also those with relatively high employment rates, though also with relatively low rates of formal education. They are also the areas with the highest numbers of agriculture and fishery workers. The likely employment impacts in areas most affected by emissions charges are therefore somewhat ambiguous, except that agricultural sector workers are likely to face the strongest employment impacts. As to the socioeconomic characteristics of rural areas with high agricultural emissions charges per capita, they differ little from those of rural New Zealand as a whole. In particular, no clear relationships were found between agricultural emissions charge impacts per capita and ethnic mix in the relevant area. How the combined effects of agricultural, forestry and other emissions charges differed by ethnicity was not considered.

As discussed above, agricultural processing will also be affected by rising fuel and electricity costs. Taking such increased costs and direct agricultural emissions costs into account, macroeconomic modelling by Infometrics suggests that both meat and dairy processing will experience minimal output changes in 2008–2012 due to the ETS.[28] However, output in these sectors declines in 2025 across a range of scenarios, relative to the case where no emissions charges are introduced into the economy. Infometrics emphasises, though, that it is unlikely that output in these sectors will fall in absolute terms due to the ETS – rather they will not grow by as much as they would had no emissions charges been introduced.

Finally, deferring the introduction of agriculture into the ETS until 2013, while introducing other sectors earlier, means agriculture will implicitly be enjoying greater government support than those other sectors over 2008–2012.

## 4.6 Geothermal electricity generation and industrial processes

Placing emissions charges on users of geothermal energy for electricity generation and industrial processes should reduce the profitability of such activities, all other things being equal. In the case of geothermal electricity generation, however, since geothermal generators can generate at less cost than thermal generators which also face emissions charges, wholesale electricity price rises due to the ETS are likely to provide them with higher generation profits (indeed, higher electricity-sector wide profits are predicted in official documents). Industrial users of geothermal energy, however, will likely just face higher energy costs, absent any relief measures.

[28] *General Equilibrium Analysis of Options for Meeting New Zealand's International Emissions Obligations*, October 2007.

## 4.7 Research and development, and innovation

By increasing the cost of greenhouse gas emissions the ETS should encourage changes in production levels, types, and methods so as to reduce emissions. In part this will be brought about by making existing emissions-reducing technologies more viable. Alternatively, it will increase the profit opportunities for developing such technologies, and hence should be expected to increase technology-based research and development (R&D) and innovation directed at reducing emissions. Given high participation by Māori in especially the agriculture/farming sector, Māori will need to play an important participatory role in defining the way in which the Government frames its investment into research and development to develop these technology responses to reducing emissions. Māori have demonstrated a keen interest in fully exploring how R&D may enable its economic development interests and aspirations. However, this is currently limited to very few well-organised bodies like the Federation of Māori Authorities who have facilitated the development of cluster-based R&D strategies (ie, in forestry).[29] However, the current research framework is overly complex and strongly favours larger organisations like Crown Research institutes and universities. Recent policy changes within the Foundation for Research Science and Technology have further de-emphasised the role of applied research in favour of more blue skies research. Moreover, there is a lack of accountability to practically report against key metrics around delivery of science targeted specifically toward Māori research needs. This complexity amounts to another institutional barrier preventing Māori practically participating and using R&D as a key enabler of their economic development interests. There is a real need for greater targeting of R&D investment focused specifically on overcoming the unique institutional barriers faced by Māori and on meeting research issues that are particular to Māori.

## 4.8 Impacts in perspective

Macroeconomic modelling of the ETS by Infometrics suggests the scheme will have a zero to small positive impact on private consumption, and on GDP in world prices in the first Kyoto commitment period.[30] In the longer term, by 2025, it is predicted to have a small positive impact relative to no emissions costs or sink credits in the economy. Under either the ETS or government retention of credits and liabilities, long-term private consumption and GDP in world prices are both lower than if there were no emissions pricing, but only modestly so. The net impact of emissions pricing is to slightly reduce growth in production and consumption below what it might otherwise have been, but in the context of ongoing positive overall growth.

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[29] Technology Strategy. Catalyst R&D. Federation of Māori Authorities, August 2004.

[30] *General Equilibrium Analysis of Options for Meeting New Zealand's International Emissions Obligations*, October 2007.

However, such modelling makes no allowance for adjustment costs, and also sets aside dynamic considerations such as the impact on long-lived irreversible investments of increased uncertainties (eg, from a volatile carbon price). It also tends to obscure the potentially significant impacts of ETS-like schemes on particular sectors or parts of the economy such as those experienced during the economic reforms of the late 1980s. While overall economic impacts may be small at an aggregated level, they are potentially large and uneven for the particular sectors in which they have the greatest impact. Considering forestry, for example, they can even have impacts of differing direction, with pre-1990 foresters facing potential net declines in asset values, but post-1989 foresters facing net increases. In the case of the Infometrics analysis, such forestry impacts were not modelled. Hence, when considering sectoral or demographic impacts of the ETS, such macroeconomic models are potentially of limited use.

Additionally, modelled climate change policy impacts tend to be based on an assumed level of carbon price. In *The New Zealand Framework for an Emissions Trading Scheme,* economic modelling uses two carbon pricing scenarios of $15 and $25/tonne (ie, per $tCO_2e$), with sensitivity analysis using higher figures sometimes provided. It is unusual for carbon prices to be explicitly modelled, even though they can be expected to be quite volatile, and affected by modelled phenomena such as economic growth. A wide range of possible carbon prices is possible both over 2008–2012 and the longer term, with either very high or very low prices possible. Analysis by McKinsey & Company suggests that significant abatement opportunities can be expected for €40 (approximately NZ$75) or less,[31] implying a longer-term upper bound on carbon prices, although short-term volatility could involve even higher prices. Given the considerable uncertainty in the likely course of this key parameter, particular regard should be had to how sensitive predicted policy impacts are to changes in its value. For illustrative purposes this report discusses results based on the values of carbon prices assumed in the relevant modelling, noting those assumed values without making a prediction as to what the likely actual carbon price will be.

Clearly sectors facing net emissions costs under the ETS (eg, agriculture, and pre-1990 forestry) will prefer carbon prices to be low. Conversely, sectors able to profit from carbon sequestration or avoided emissions (eg, post-1989 forestry) will prefer carbon prices to be high. Indeed, post-1989 foresters with forests having relatively low average ages should prefer carbon prices to be high while their forests are maturing, and low once they sequester carbon more slowly or near harvest. That way they would enjoy high carbon sequestration value as their forests grow, and low liabilities once they near harvest date. Such considerations highlight just some of the diversity of risks and opportunities different sectors may face as carbon prices change over time.

As emphasised above, many of the predicted ETS impacts are "at the margin", or assume that all other things remain equal. In reality an international shift towards ETS-like schemes will result in potentially significant repositioning in global markets, as can be seen with rising dairy prices being in part caused by increased demand for food-based bio-ethanol. Conversely, the international competitiveness of New Zealand firms may not be materially changed if competitor nations also adopt similar schemes, although the omission of important producers such as China, Australia and the US from emission pricing in 2008–2012 means competitiveness issues may arise at least in that period.

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[31] Enkvist PA, Naucler T, Rosander J, 2007, "A Cost Curve for Greenhouse Gas Reduction", *The McKinsey Quarterly*, No.1, 36–45.

Just as important, however, in assessing the relative importance of ETS-related impacts is the likely future course of the underlying "fundamentals" of each sector. Volatile oil and electricity prices mean that ETS-induced changes in energy costs may be relatively modest overall, unless international carbon prices should rise significantly. Similarly, ongoing world economic growth and hence the demand for New Zealand food and other primary exports are likely to be the greater drivers of sectoral profitability. Where sectors are currently marginal, however, and likely to remain so for the foreseeable future, the ETS may make the difference between ongoing viability and failure. Hence, general predictions of ETS impacts should be regarded with considerable caution, and with these perspectives in mind.

# 5 Likely ETS Impacts on Māori – Absolute

## 5.1 Electricity and motor fuel prices

Based on 2004 household expenditure data from Statistics New Zealand, electricity accounts for 3.6 per cent of Māori household expenditures, while motor fuels account for 4.7 per cent. At the indicative levels of carbon prices used in official publications (ie, $15/tonne and $25/tonne), electricity and liquid fuel prices are predicted to increase by 1–2 cents per kWh (or 5–10 per cent) for electricity, and 3.7–6.1 cents per litre (or 4–7 per cent) for petrol.[32] Even if it is assumed that Māori households do not reduce their energy usage to reduce their exposure to ETS-related price increases, changes of the above magnitude would be small in the context of overall household expenditures.

Additionally, changes of the predicted order of magnitude are small when compared with average annual energy price increases. Data published by the Ministry of Economic Development shows that average consumer energy prices have risen significantly since 1974.[33] Over this period consumer electricity and liquid fuel prices rose by 9–10 per cent per annum on average, although the average annual increases in electricity prices have been lower in more recent years (eg, over 2000–2006, electricity prices rose 6 per cent per annum on average). Any ETS-related rises in the price of electricity and liquid fuels will reflect a one-off impact from the ETS's introduction (similar to the introduction of GST in October 1986), as well as any subsequent rises if the price of carbon should rise over time. The magnitude of such impacts may or may not be as significant as usual volatility in fuel prices in particular, which are tied to the international price of oil.

The ETS can be argued to exacerbate this trend of rising energy prices, and certainly for those on relatively fixed incomes any additional expenditures may give rise to worsened living standards. However, most social distributions in New Zealand are inflation-indexed, although with a lag, so those households dependant on such distributions should not experience any significant decline in household purchasing power from these likely electricity and fuel price increases. Other households – by implication those with labour- or asset-based incomes – should similarly anticipate some ability to increase incomes to keep track with rising electricity and fuel costs, particularly since the absolute increases are likely to be small.

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[32] Table 7.2, *The Framework for a New Zealand Emissions Trading Scheme*, p.111.

[33] *Energy Data File*, June 2007.

It should be noted, however, that relatively low Māori home ownership rates suggest a relatively high Māori renting rate. Renting households have a lower ability and incentive to make investments in energy efficiency so as to reduce their exposure to increased electricity prices. Renting also reduces households' ability to take advantage of any government support to make such investments. Together these suggest a relatively high number of Māori will be less able to undertake energy efficiency investments to reduce their electricity consumption. While possible changes in regulation to require landlords to insulate rental properties may over time improve the energy efficiency of rental properties, this will likely involve some increase in the cost of renting, although the net impact is unclear. Also unclear is whether Māori would tend to bear any such net impact, or substitute towards possibly cheaper rental accommodation not covered by the regulation.

The Government has signalled an intention to offer assistance to low- and middle-income households to mitigate the impact of higher electricity costs (but not liquid fuel costs) due to the ETS. This support is likely to include not just subsidies to improve home energy efficiency, but also taxpayer-funded, power bill rebates. Where households receive inflation-indexed social distributions the latter would amount to double-compensation for rising electricity costs.

Finally, aside from direct increases in household electricity and fuel costs, ETS-related rises in these prices should be expected to filter into the prices of goods and services for which electricity and liquid fuels are input costs. No data is available indicating the likely magnitude of such downstream cost increases, so it is not possible to gain a sense of their likely importance for Māori households. However, once again, inflation indexation of social distributions, and earnings inflation, should dampen any such impacts on household disposable incomes.

## 5.2 Fishing

Fishing is a sector that involves negligible land use and involves little greenhouse gas emissions beyond fuel and energy consumption. Its exposure to the ETS lies mainly in increased liquid fuel costs, and to a far lesser degree, increased electricity costs (for land-based refrigeration and processing). Fuel costs are estimated to account for up to 60 per cent of fishing operating costs.[34]

ETS-related increases in fuel costs are likely to impact inshore fishers more so than deep-sea fishers, given the latter are able to refuel outside of New Zealand's territorial waters and so may avoid having to pay such increased costs. Additionally, fish processing can be done aboard fishing vessels in some instances, reducing any impacts of higher electricity costs, or can be shipped frozen for further processing in countries with lower processing costs. Accordingly the impacts of the ETS on fishing costs may be mitigated, even if this comes at the cost of domestic processing employment. Given the importance of the fishing sector for Māori employment, any such loss in processing could prove significant for Māori employment. Section 5.8 discusses research published on the impacts of emissions charges on Māori employment in the fishing sector.

[34] "Seafood industry energy-efficiency savvy, says chief executive", press release by New Zealand Seafood Industry Council, 25 June 2007.

The fishing industry is not currently to be offered free NZUs under the ETS, except perhaps via industrial production allocations in respect of increased electricity costs, subject to proposed eligibility criteria including a 50,000-tonne minimum emissions threshold. This threshold is likely to preclude free allocations to fishing, and in any case no allocation is proposed in relation to ETS-related, transport-fuel price increases. With Māori owning a large share of this sector this implies a greater per capita ETS burden than for non-Māori. Conversely, in principle, this greater burden should be commensurate with the greater Māori share of fishing sector emissions, all other things being equal. In either case, to the extent that fishing operators cannot avoid additional ETS-related costs, this will reduce the value of individual transferable quota to some degree.

## 5.3 Agriculture

Based on land areas (rather than values), Māori agricultural interests at a national level relate mainly to mixed sheep and beef farming (33 per cent of Māori land), as well as beef cattle farming (17 per cent), and to a lesser extent, dairy farming (9 per cent). The common perception of more marginal farming and less less-intensive agriculture land use by Māori farmers is likely based in a range of factors, including more conservative stocking policies, poor land-use capability, limited access to capital, deficits in information and managerial expertise, and often small landholdings with multiple owners.

The Government has signalled its initial preference that agricultural processors/companies (enteric fermentation) and importers/producers (fertiliser) be the relevant points of obligation under the ETS, with farmers and sector bodies being alternatives. In respect of free NZU allocations, three possibilities are farmers, processors and sector bodies. Farmer-level obligations would be relatively costly, while 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. For example, if subsequent allocations of emission costs are not targeted according to emissions, then farmers involved in relatively low-intensity farming would bear disproportionate costs. This could be the case for Māori sheep and beef farmers, for example, relative to both non-Māori sheep and beef farmers with higher sticking rates, as well as more intensive land uses such as dairying. Methods for determining the emission liability will be the subject of consultation between the Government and points of obligation. Allocations to sector bodies or processors/companies may therefore give rise to governance issues for Māori, particularly if Māori are unable to exert influence on those bodies' decision-making processes (eg, due to capital constraints limiting participation in co-operative processors).

On the other hand, provided Māori are free to form qualifying sector bodies, and/or provided points of obligation and free allocation recipients are not cast in stone, there should be capacity for Māori to opt for alternative models if existing ones do not meet their needs. A challenge for Māori will be to ensure they fully engage in the associated governance processes in the early stages of the ETS development for agriculture to ensure Māori interests are served and flexibility is retained to amend any unsuitable arrangements. In terms of free NZUs, Māori are likely to benefit from direct farm-level allocations, especially if they are allocated on an averaged rather than emissions-related basis given the relatively low intensity of Māori farming. If NZU allocations are tied to historic emissions, however, low intensity farmers would face new costs in developing their land into higher-intensity land uses.[35] Once again, the importance of Māori being fully engaged in the process for determining such important details is highlighted.

If points of obligation are not the same as the parties receiving free allocations, potential exists for mismatches between devolved ETS liabilities and free NZUs. This would tend to benefit Māori if free allocations were based on some basis other than strict emissions intensity, and if devolved emissions costs reflected emissions intensity, given the common perception of a relatively high Māori interest in less-intensive farming, under-developed land, and marginal farming.

One possibility raised in the ETS consultation documents is for agriculture to face a progressive obligation for emissions rather than a full obligation offset by declining allocations of free NZUs. Such a progressive obligation would make the sector liable for increasing amounts of its emissions over time, and would not involve free NZU allocations. To the extent that Māori lacked confidence in the governance processes determining how agricultural emission liabilities and free NZU allocations are devolved to farmers, there is possibly some merit in a progressive obligation scheme. That way Māori would need to only be concerned with how the progressive emissions liabilities are devolved to farmers, and would face less risk of a mismatch between devolved ETS liabilities and free NZUs. However, debate about progressive allocations should be at least as intense as the debate that is likely regarding the devolution of emissions liabilities and free NZUs to farmers, since it combines elements of each into a single debate. Furthermore, having separate debates about emissions liabilities and NZUs offer opportunities for off-setting gains and losses for Māori. Hence it is unclear whether Māori would be better or worse off under progressive obligations than with a full obligation offset by declining allocations of free NZUs.

Where the ETS imposes costs but offers no new opportunities for value creation it will negatively affect farm land values, all other things being equal. It will do so by limiting land development potential, or simply by increasing farming costs and/or forcing lower agricultural productivity (eg, through lower stocking levels). These effects will be mutually reinforcing, with lower farm land values affecting the level of capital farmers can raise, and hence the level of farm development in which they can engage. Given the already low level of capital access and development of Māori farms, this additional impact may be greater for Māori farmers than others not sharing similar institutional constraints. Conversely, where the ETS also offers new value-creation opportunities, such as in wind-farming (alongside existing farming operations or otherwise), then farm values might in fact improve, all other things being equal. These too would be mutually reinforcing, but in a positive direction.

[35] Similar issues arise in respect of nitrate emissions rules in the Lake Taupo catchment, where emission rights have been "grandfathered" according to historical emissions intensity.

Themes that recur across the sectors in which Māori have significant ownership interests, and which are relevant in the case of Māori agriculture, include the following:

a) Deficits in information and managerial expertise – on Māori farms the related deficits in "absorptive capacity" may hamper the uptake of new technologies and farming practises that reduce farm-level emissions and hence exposure to emissions charges: Māori farmers may need extra help in order to overcome these deficits and impacts.

b) Participation in emissions-reducing R&D – for similar reasons Māori farmers may require extra help to ensure they participate in such programmes.

c) The ETS will give rise to extra compliance costs, and also new penalties for non-compliance – these may increase the risk of bankruptcy on Māori farms, and hence the risk of ancestral lands being lost (depending on how aggressive the ETS's penalties regime turns out to be, with analogies to rates arrears of possible relevance).

While the ETS may ultimately reduce agricultural output relative to the alternative of no emission costs and sink credits, the greater drivers of agricultural growth are likely to remain unrelated to emissions. Accordingly, the impact of the ETS on agriculture sector employment, and Māori employment in the sector, is likely to be driven by wider economic influences. Section 5.8 discusses research published on the impacts of emissions charges on Māori employment in the agricultural processing sector.

## 5.4 Pre-1990 forestry

As mentioned earlier, the forestry figures available from the Māori Land Information Base significantly understate the Māori interest in forestry. Not reflected in the Māori Land Information Base figures is the fact that Māori own almost 97,000 hectares of former Crown Forestry Licensed lands which almost certainly involve pre-1990 exotic forests. Additionally, Māori own a further 26,447 hectares of land subject to forestry leases to the Crown (managed by Ministry of Agriculture and Forestry's Crown Forestry Group, and dominated by the Lake Taupo and Lake Rotoaira forest leases) which involve pre-1990 exotic forests. For these facts alone it can be predicted that Māori have a significant share of exotic forest land in the pre-1990 category. Given future Treaty settlements will almost certainly involve further pre-1990 Crown Forestry Licensed lands, with Land Information New Zealand managing 494,000 hectares of possible such lands, the scale of the Māori interest in pre-1990 forest lands may well rise very quickly.

Furthermore, Crown Forestry Licensed lands are commonly large – the average licence area managed by Land Information New Zealand is almost 22,000 hectares. Similarly, all but one of the leases managed by the Crown Forestry Group exceeds 50 hectares. Where Māori landowners lease their lands to foresters, commonly such leases will also be of sufficient scale to warrant the transaction costs of entering into a lease. Additionally, the Māori land statistics summarised earlier suggest that blocks of Māori land are on average 57 hectares, with 68 per cent less than 10 hectares in size – raising the prospect that many Māori forest landowners may qualify for an exemption to deforestation liabilities. However, given multiple cross-interests across Māori landowning bodies, proposed ETS grouping rules may preclude this possibility in many cases. For these reasons, Māori pre-1990 exotic forest lands are more than likely caught under the ETS's deforestation rules.

A further possible issue for Māori landowners arises where land has been allowed to revert to scrub or native bush, whether due to lack of capital for alternative land uses or otherwise. Some species (eg, kanuka) have the potential to grow to a height and density sufficient to qualify as a forest under the Kyoto Protocol and proposed ETS rules. Where such reversion arose pre-1990, this raises the prospect of such lands being treated as pre-1990 forests, and thus attracting deforestation liabilities if the land is put into non-forestry uses in the future. Accordingly, the extent to which Māori land is caught under the deforestation rules, with the associated obstacles this places on such land being put to higher-valued non-forestry uses, may be greater than expected.

The owners of pre-1990 forest land do not accrue carbon credits as their associated forests grow, but nor do they face liabilities upon harvest of such forests (or from natural carbon losses, such as wind damage or fire). So long as such lands are retained in forestry or actively regenerated no deforestation liability arises. However, should such lands be put into alternative land uses – eg, converted into dairying – a deforestation charge will arise under the ETS, based on the carbon deemed released.[36] Figures produced by the Ministry of Agriculture and Forestry suggest the level of deforestation charge envisaged in the December 2006 Sustainable Land Management consultation paper would have precluded conversion into low-intensity farming such as sheep and beef farming, although higher-valued conversions such as dairying may remain viable (at the then dairy payout prices, which were lower than present prices).[37]

Consequently, the value of pre-1990 forest land should not be expected to increase due to the ETS, but is likely to instead decrease relative to its value without deforestation charges. The extent of any decrease will depend on the conversion potential of the land, and the existence of any other obstacles to conversion (eg, RMA replanting requirements, nitrate rules, etc) – if deforestation is not feasible in the foreseeable future, then the value impact may be negligible. Conversely, any capital constraints faced by Māori landowners may preclude replanting of pre-1990 forests, so if deforestation liabilities preclude otherwise feasible alternative land uses then those landowners may find themselves forced into allowing low-valued reversion on their land.

One potential complication for Māori owners of pre-1990 forest lands is the inability to make rapid or radical changes to land use. Whether due to governance issues under Te Ture Whenua Māori, capital constraints, lack of information and managerial expertise, or having granted long-term forestry leases/rights to third parties, it is possible that Māori owners of pre-1990 forest lands have been slow to take advantage of the opportunity to deforest their lands before any deforestation liability arises from 2008. Certainly some non-Māori parties have been actively deforesting large areas before 2008. A consequence of this is that Māori may be relatively poorly positioned to avoid deforestation liabilities under the ETS, and may therefore face relatively higher value impacts as a consequence.

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[36] An important detail in this regard is the deemed amount of carbon released if a forest is replanted but then deforested before the crop reaches an age of eight years. In this case the deforestation liability under the ETS will be based on the carbon stored in the previously harvested crop, not the immature crop. Māori landowners with forestry leases granted to third parties will need to be conscious of this when managing their lands following lease termination.

[37] Smith B, Horgan G, 2006, *Area of Forest 'At Risk' from Deforestation*, August, www.maf.govt.nz.

Māori owners of pre-1990 forest lands may enjoy windfall gains, however, under the proposed ETS. Free allocations of NZUs are to be made to such landowners on a pro rata (ie, area-based) rather than targeted (ie, value-based) basis. Where land values and/or deforestation potential are low, the value per hectare received under such free allocations may disproportionately compensate for lost conversion potential. This may particularly be the case if pre-1990 indigenous forests are to be included in the ETS (which is a matter subject to consultation and further policy development), given existing restrictions on the commercial use of indigenous forests.

As for agriculture, Māori face issues regarding pre-1990 forest lands in relation to ETS compliance costs, the risk of penalties for non-compliance, and heightened bankruptcy risk (which may or may not put the ownership of ancestral lands at risk). Since details of the compliance regime are yet to be finalised, it is not possible to gauge the extent of these risks, and Māori will have an interest in shaping the development of such rules. Additionally, Inland Revenue and the Treasury have suggested for consultation purposes that both deforestation liabilities and associated free NZU allocations should be treated as capital for tax purposes (ie, giving rise to neither taxable receipts nor deductible expenditures).[38] Clearly Māori land-owning organisations would face cash-flow difficulties if the finalised tax rules instead treated free NZU allocations as taxable receipts.

Finally, Māori will be interested in whether or not ETS exemptions are granted for papakainga purposes. If not, then developing housing on Māori-owned land under this scheme may become less feasible. This too is subject to consultation and subsequent policy development, in which affected Māori will have an interest.

## 5.5 Post-1989 forestry

Unlike for pre-1990 forest lands, owners of lands suitable for post-1989 forestry face potential value opportunities under the ETS that may increase their asset values. These opportunities are only available, however, if landowners apply to have their lands covered by the ETS and can satisfy the associated conditions of entry. Naturally landowners should only do so if they expect the resulting benefits to sufficiently compensate them for the risks and costs they assume. By earning tradable carbon credits for the carbon stored in post-1989 forests such landowners may be able to generate additional value from forestry, even after accounting for harvest liabilities and liabilities for any natural carbon losses (eg, due to wind damage or fire). By generating this value on some parts of their land, this may in fact relieve the capital constraint faced by Māori on other parts of their land, and hence facilitate greater development of Māori land. It also provides a financial incentive for Māori to consider rationalising otherwise uneconomic land blocks to enable this opportunity to be exploited (although transaction costs arising under Te Ture Whenua Māori may still prove prohibitive, unless support is made available to facilitate this).

[38] Inland Revenue Department and the Treasury, 2007, *Emissions Trading Tax Issues*, September.

Based on the data presented earlier, Māori may be well-placed to take advantage of this opportunity, particularly in the Gisborne/East Coast and Northland regions, with potentially large areas of suitable land. Part of this opportunity relates to the use of marginal land that is not suitable for alternative uses, or which might only just be viable in alternative uses (eg, marginal sheep and beef farming). Where land is currently not being used and is not covered in pre-1990 reversion of sufficient scale to fall under the pre-1990 deforestation rules, it could be planted in forest in order to generate carbon credit value. Conversely, where the land is used for marginal farming, it could either be planted in forest instead, or allowed to revert if the species involved have the potential to grow to a sufficient height and density to constitute a forest under the Kyoto Protocol and ETS rules. Indeed, where post-1989 reversion in suitable species has occurred, such reversion could already qualify for the generation of carbon credits. Furthermore, there is scope under the ETS for land deforested after 1990 to be entered back into the ETS as post-1989 forestry in order to earn carbon value, but if such deforestation occurs after 31 December 2007 then all associated deforestation charges would first have to be met.

By reducing the viability of pre-1990 deforestation, and increasing the viability of post-1989 forestry, the ETS is likely to stimulate forestry-related employment. This would arise in both the forestry and wood processing sectors, which are significant employers of Māori. Conversely, ETS-related increases in energy prices will increase transportation and processing costs, with offsetting effects. Also, to the extent the ETS encourages the retirement of marginal farmland into forestry, this may have a small offsetting effect on Māori farming and agricultural processing employment. In all cases, however, more fundamental economic drivers (ie, than the ETS) are likely to dictate changing employment levels in these sectors. Section 5.8 discusses research published on the impacts of emissions charges on Māori employment in the forestry, wood processing, and pulp and paper sectors.

Possible constraints Māori might face in taking advantage of such opportunities include a lack of capital for forest establishment, a likely lack of land-use data as of 1990 and land description details required to validate an application for entry into the ETS (given widespread lack of survey and title on Māori land blocks), and possible deficits in information and managerial expertise. As for agriculture, the latter may be addressed through additional support to enable Māori landowners to take advantage of the scheme. Additionally, governance issues associated with land-owning bodies created under Te Ture Whenua Māori 1993 may hinder such bodies from entering their lands into the ETS within the required 18 months of ETS legislation being passed. This could result in Māori being slow to take advantage of ETS opportunities, with the next proposed opportunity to enter lands into the ETS as post-1989 forestry being after 2012. Finally, there is some question over how the receipt of NZUs for carbon sequestration, and the cost of emission units to cover harvest liabilities, should be treated for tax purposes.[39] Inland Revenue and the Treasury suggest that NZU receipts should be treated as revenue and hence taxable, and also that the cost of emissions units required to meet harvest liabilities should be deductible. However, the timing of tax liabilities and deductions will be important, as they could give rise to cash flow difficulties that potentially affect Māori land-owning bodies more than others.

[39] Inland Revenue Department and the Treasury, 2007, *Emissions Trading Tax Issues*, September.

Where full entry into the ETS is not feasible, alternatives such as the Permanent Forest Sinks Initiative and Afforestation Grant Scheme may be suitable. The Permanent Forest Sinks Initiative requirement that covenants be registered against titles may deter some Māori landowners, but the greater international tradability of credits generated under the initiative could provide offsetting benefits.[40] While the ETS reduces the scope for landowners to generate carbon value through voluntary carbon offsetting, some limited opportunities remain.[41] Moreover, Māori entrepreneurs may be able to play a leading role in marketing carbon sequestration opportunities to Māori landowners, simplifying the process, reducing transaction costs, and overcoming any information and managerial deficits in the process.

Finally, Māori may also have an opportunity to leverage their indigenous identity, and cultural attributes such as kaitiakitanga to differentiate any carbon credits generated by post-1989 forestry on Māori land for additional carbon credit value. Since NZUs generated under the ETS will be traceable, it should be feasible to "brand" those units generated by Māori. To the extent international demand materialises or can be stimulated for such attributes – as well as other attributes such as enhancing water quality, etc – this may enhance the value Māori can generate from post-1989 forestry. It may be efficient for Māori to take a coordinated approach to such differentiation, and for such differentiation to be facilitated (as opposed to simply possible) under the design of registry and trading rules for NZUs under the ETS. Important in this regard will be the certification of such indigenous attributes in some internationally-recognised manner. This might require an extension or replication of the Toi Iho model for Māori branding, and/or liaison with appropriate international carbon certification agencies.

## 5.6 Regional considerations

Table 5.1 illustrates where the strongest divergences between Māori foresters and farmers, and among dairy and other farmers, might arise within and across the six most significant regions in terms of Māori land area.[42]

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[40] The Permanent Forest Sinks Initiative will generate internationally tradable Assigned Amount Units, or AAUs, instead of NZUs as generated under the ETS for post-1989 forestry (which are currently subject to international tradability restrictions).

[41] Eg, see Ward M, Hutton M, Renwick J, 2007, *Carbon Neutrality, Carbon Footprints, Offsets ... and Credibility*, October.

[42] As the data in this table is drawn from the 2006 MAF publication *Māori Land Analysis Version 1.1: Results by Region,* based on the *Māori Land Information Base*, the caveats regarding this data discussed in sections 1 and 3 apply.

**Table 5.1: Possible divergences of Māori interests within and between six main regions**

| | Proportion of regional Māori land in main farm types | | | | | |
|---|---|---|---|---|---|---|
| | Beef, dairy, sheep and S&B | Forestry* | Ratio* | Beef, sheep and S&B | Dairy | Ratio |
| Waikato | 60% | 30% | 2 | 47% | 13% | 4 |
| Hawke's Bay | 54% | 21% | 3 | 53% | 1% | 48 |
| Gisborne | 86% | 12% | 7 | 83% | 3% | 29 |
| Manawatu–Wanganui | 62% | 12% | 5 | 58% | 4% | 13 |
| Bay of Plenty | 61% | 17% | 4 | 41% | 21% | 2 |
| Northland | 73% | 21% | 3 | 56% | 16% | 3 |

* Māori forestry interest understated as a proportion of Māori land, biasing figures in first ratio column upwards.

Assuming forestry and farming activities are separately owned, the greatest intra-regional divergence in interests between Māori foresters and farmers is likely to arise where the ratio of farming to forestry is high, ie, in Gisborne, Manawatu-Wanganui and Bay of Plenty. Conversely, the greatest divergence in interests between Māori dairy farmers and other Māori farmers is likely to arise where there is a high ratio of non-dairy to dairy farming types, ie, in Hawke's Bay, Gisborne, and Manawatu-Wanganui.[43] Where multiple farm types are owned by the same Māori owners, however, these divergences in interest will be less pronounced, and possibly vanish depending on the balance of those owners' respective farm type interests.

Alternatively, the greatest inter-regional differences in Māori interests are likely to arise between those regions with markedly different ratios of farming to forestry, and of non-dairy to dairy farming. While regions with a high ratio of farming to forestry should favour a more generous ETS treatment of agriculture relative to forestry, regions with low such ratios will be concerned with the ETS's treatment of forestry to a greater degree. Similarly, regions with predominantly low-intensity (ie, non-dairy) farming should prefer intensity-based ETS cost allocations but free NZU allocations being made on a more averaged basis.

It is more reasonable to assume little cross-ownership of different farm types by Māori across regions than it is to assume no cross-ownership of different farm types within a region. Based on such considerations, Table 5.1 suggests that the greatest divergences in Māori interests regarding the relative treatment of forestry and farming should arise between Gisborne and Manawatu-Wanganui on the one hand, and Waikato on the other. It also suggest that the greatest divergences in Māori interests regarding the relative treatment of low- and high-intensity farming should arise between Hawke's Bay and Gisborne on the one hand, and Bay of Plenty, Northland and Waikato on the other.

[43] It may be questioned why beef farming is included with sheep and mixed sheep and beef farming, given methane emissions from beef cattle are significantly higher than from sheep, although not nearly as high as from dairy cows. This report treats beef cattle farming as being more alike in its nature to sheep and mixed sheep and beef farming than it is to dairying.

## 5.7 Geothermal energy

Placing emissions charges on users of geothermal energy for electricity generation and industrial processes should reduce the profitability of such activities, all other things being equal. In the case of geothermal electricity generation, however, the affected generators can generate at less cost than thermal generators which also face emissions charges, so predicted wholesale electricity price rises due to the ETS will provide them with higher generation profits. Industrial users of geothermal energy, however, will likely just face higher energy costs, absent any relief measures.

This aspect of the ETS will have an impact on relatively few Māori. A notable instance of Māori interests in geothermal activities includes the Mokai geothermal system, with Tuaropaki Trust owning 75 per cent of a geothermal electricity generator, as well as geothermal hot-houses for horticulture. Similarly, Ngati Tuwharetoa (Bay of Plenty) own geothermal assets in Kawerau having acquired them under the iwi's Treaty settlement. Also, the pending Te Arawa (KEC) Treaty settlement includes purchase rights over Crown geothermal assets in the Ngatamariki field.

## 5.8 Employment

Analysis published by Waikato University researchers examines the impact of emissions charges on Māori employment across different economic sectors.[44] Based on previous research finding that the probability of Māori and Pacific Islanders losing work was more than twice the probability for other ethnic groups, they assume the Māori probability to be twice the probability for all New Zealanders. Assuming emissions charges of $13/tonne and $32.50/tonne, the effect of this assumption and sector-specific employment impacts from emissions charges combine to suggest a 2.6–3 per cent decline in overall Māori employment, as compares with a 0.5–0.7 per cent fall for non-Māori (ie, roughly a quarter of the Māori employment fall).

This research makes no allowance for free NZU allocations to affected sectors, and hence may overstate the employment impacts for the primary and primary processing sectors (although deforestation rates and hence shifts from forest product processing towards other sectors such as agricultural processing will be overstated without free NZU allocations being assumed). While this assumption will bias the absolute and inter-sectoral employment effects of emissions pricing, there is less reason to believe it will bias the relative Māori and non-Māori impacts within sectors. The more significant predicted sector impacts are summarised in Table 5.2.

[44] Khatep M, Scrimgeour F, 2003, "Impacts of Emissions Charges on Māori Employment", *Māori Sustainable Economic Development Bulletin* 1(1), Spring.

**Table 5.2: Predicted emissions charge impacts on Māori and non-Māori employment by sector (assuming no free allocation of NZUs)**

| Sector | Māori employment change | Non-Māori employment change |
|---|---|---|
| Meat manufacturing | -3.5% to -2.5% | Sixth of Māori |
| Sheep and beef farming | -1.1% to -0.8% | Similar to Māori |
| Dairy farming | -0.9% to -0.5% | Similar to Māori |
| Cement | -0.7% to 0% | -0.2% to 0% |
| Fishing (et al) | -0.2% to -0.1% | Half of Māori |
| Horticulture | +0.3% to +1.5% | Similar to Māori |
| Wood and wood products | +0.2% to +0.8% | Half of Māori |
| Pulp and paper | +0.1% to +0.5% | Half of Māori |
| Logging | +0.1% to +0.4% | Fifth of Māori |
| Forestry | +0.1% to +0.3% | Less than third of Māori |
| Overall | -3% to -2.6% | -0.7% to -0.5% |

The sector predicted to experience both the highest fall in Māori employment, and the highest fall relative to non-Māori in the sector, is meat manufacturing. Conversely, Māori employment in the wood and wood products, and pulp and paper sectors, is predicted to rise at twice the rate for non-Māori, with even higher gains predicted for the logging and forestry sectors.

**Table 5.3: Regional employment impacts of emissions pricing**

| Areas predicted to experience employment fall of 4% or more | Areas predicted to experience employment rise of 0.7% or more |
|---|---|
| Kaipara | North Shore |
| Matamata-Piako | Waitakere |
| Otorohanga | Auckland |
| Stratford | Kawerau |
| South Taranaki | Porirua |
| Tararua | Upper Hutt |
| Hurunui | Lower Hutt |
| Waimate | Wellington |
| Clutha | Nelson |
| Southland | Christchurch |

Research by Motu adapts 2001 modelling work by ABARE to measure regional employment impacts from various climate change policy scenarios.[45] Based on the scenario most representative of the ETS (Scenario 4 per their Table 1) the greatest falls and rises in employment by region are as shown in Table 5.3 above. Note that the ABARE general equilibrium model predicts carbon prices of $49–$73, which are at the higher end of the range for similar such models, possibly therefore overstating emissions costs and sink credit returns.

[45] Kerr S, Hendy J, 2002, *Regional Employment Impacts of the Kyoto Protocol*, Document prepared for Ministry for the Environment, December.

## 5.9 Treaty settlement assets

The impact of the ETS on fisheries Treaty settlement assets has already been mentioned. In respect of settlement land assets, different ETS issues arise for past and future settlements.

Very clear issues arise in relation to Crown Forestry Licensed land, farm land and geothermal assets acquired under the settlements, whose value may be reduced under the ETS. This issue is of particular note for Ngai Tahu, given the iwi currently holds 84,000 hectares of Crown Forestry Licensed lands purchased under its 1998 settlement, 38,000 hectares of which it intends for conversion.[46] Similarly, Te Uri o Hau and Ngati Tuwharetoa (Bay of Plenty) paid highest and best-use values for the Crown Forestry Licensed lands they acquired under their respective settlements.[47] In Te Uri o Hau's case, this value included a premium for residential subdivision for its Mangawhai land block, and it has announced its intention to pursue such development on that block (but not yet undertaken it). In Ngati Tuwharetoa's case no conversion has occurred, but the Crown Forestry Licensed land is suitable for farming use, and the iwi has not ruled out wishing to pursue such an opportunity. Clearly any deforestation charges under the ETS could affect the value of these settlement lands by diminishing their conversion potential.

In respect of future settlements, there is greater capacity for claimants to factor into their transfer valuations for settlement assets any anticipated impacts of climate change policy. However, this ability is constrained by two factors. First is the inability of conventional valuation approaches to assess the value impact of deforestation charges contingent on uncertain future land-use decisions.[48] Second is the fact that considerable uncertainties about the shape of the ETS as it applies from 2008 remain, exposing claimants to considerable valuation risk.

The pending Te Arawa (KEC) settlement involves a formula that potentially sidesteps some of these issues. By covenanting to keep Crown Forestry Licensed lands in forestry for 28 years from their reversion to Te Arawa, the iwi was effectively able to conduct valuations on a "forestry only" basis which avoids consideration of highest and best-use valuations, and hence any impacts of deforestation liabilities. However, questions remain as to when and to what extent Te Arawa qualifies for any free allocation of NZUs as proposed in the ETS, given the 28-year covenants.

Other claimants will have the option of receiving a free allocation of NZUs in respect of Crown Forestry Licensed lands taken as part of their settlement, or foregoing such an allocation and paying correspondingly lower transfer values for the lands (with associated advantages under current government policy in terms of access to accumulated licence fees on such lands).[49] The ETS proposes no corresponding free allocation of NZUs in respect of any farm land or geothermal assets purchased by iwi under Treaty settlements.

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[46] Personal communication, Ngai Tahu Property. Resource consent applications exist for much of the conversion area.

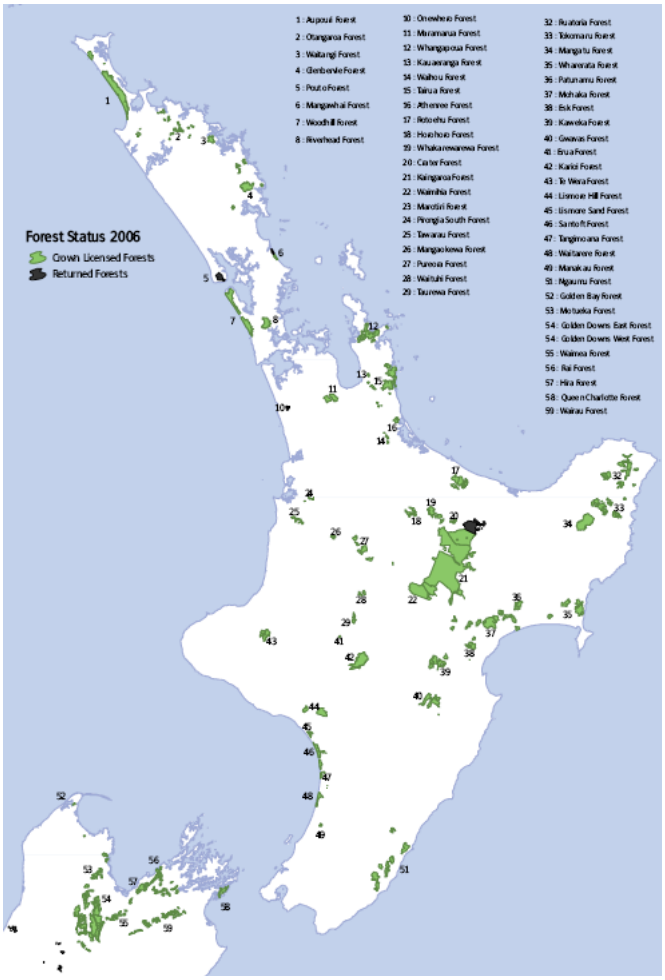
[47] Personal communications with representatives of the respective post-settlement governance entities.

[48] For a discussion see Meade R, 2006, "Valuing the Impact of Climate Change Policies on Forestry", *New Zealand Journal of Forestry* 51(1) May, 14–8.

[49] See p.29 of *Forestry in a New Zealand Emissions Trading Scheme: Engagement Document*, September 2007.

The extent of these possible issues in respect of pending Treaty settlements is illustrated in Figure 5.1, which describes the Crown Forestry Licensed lands administered by Land Information New Zealand that may ultimately be included in Treaty settlements (most of which are pre-1990 forest lands).[50] While this map also shows forest lands returned in respect of settled claims, it does not show the full extent of lower South Island Crown Forestry Licensed lands purchased by Ngai Tahu.

**Figure 5.1: Crown Forestry Licensed lands (mostly pre-1990) available for future Treaty settlements**




[50] Figure taken from the Crown Forestry Rental Trust's 2006 *Report to Appointers*.

# 6 Likely ETS Impacts on Māori – Relative to Non-Māori

## 6.1 Electricity and liquid fuel prices

Using 2004 household expenditure data from Statistics New Zealand, the relative expenditure of Māori and non-Māori households on electricity and fuels for road vehicles is as follows.[51]

**Table 6.1: Relative Māori and non-Māori weekly household energy expenditures**

| Household ethnicity | Weekly household expenditure | |
|---|---|---|
| | Electricity | Fuel for road vehicles |
| **Māori:** | | |
| Dollar spend | $25.90 | $33.90 |
| Proportion of total spend | 3.6% | 4.7% |
| **Non-Māori:** | | |
| Dollar spend | $24.30 | $30.30 |
| Proportion of total spend | 2.8% | 3.6% |

The total weekly dollar spend by Māori households for both energy sources is higher than for non-Māori – 7 per cent higher for electricity, and 12 per cent higher for liquid fuels. Similarly, the proportion of total weekly spend accounted for by each energy source is also higher, by around 30 per cent in each case (eg, 4.7 per cent versus 3.6 per cent for liquid fuels). The higher dollar spends on each type suggests – in a partial sense (ie, ignoring lower total Māori household expenditures overall) – that Māori household emissions from direct energy consumption are also higher than for non-Māori. Based on this argument Māori should expect to bear a higher absolute cost from energy emissions under the ETS. When considering the ETS's impact on energy prices in terms of total household expenditure shares, however, Māori households will bear relatively more of a cost than non-Māori, given the greater importance of energy spend in Māori household budgets.

When comparing Māori and non-Māori household expenditures on electricity at a more disaggregated level, some other patterns emerge. For example, Māori households that rent their property spend on average 20 per cent more per week than non-Māori renter households on electricity. Also, Māori households on low to middle incomes tend to spend materially more than non-Māori households (24 per cent more for households on $37,900–58,899), although this is not the case for those on the lowest household incomes, or those on higher incomes. However, no clear picture emerges for differences depending on household composition (ie, couples only, couples with children, one parent with children, and one person per household).

[51] These estimates are likely to be relatively imprecise due to cumulative sampling errors arising with each successive cross-tabulation from the original dataset.

When comparing Māori and non-Māori household expenditures on liquid fuels at a more disaggregated level, other patterns emerge. Fuel consumption for Māori households is 29 per cent higher for those in the highest income band, compared with non-Māori households in that band, but not otherwise apparently different based on household incomes. Similarly, liquid fuel expenditure by Māori households that are rent-free or owned without mortgage are respectively 44 per cent and 40 per cent higher than for non-Māori households in the same category, and 8 per cent higher for those households owning with a mortgage. Conversely, when looking at household composition, Māori households comprising one parent with children spend 44 per cent less on liquid fuels than like non-Māori households.

Superficially, these differences suggest there may be quite different drivers for Māori household expenditures on electricity and liquid fuels affecting their relativity when compared with non-Māori households. In terms of liquid fuels it appears that the relatively higher Māori consumption stems mainly from more affluent Māori households, perhaps reflecting a higher propensity to travel or drive larger cars than for similarly affluent non-Māori. Conversely, for electricity consumption the opposite is possibly the relevant driver – with less affluent Māori households spending more both absolutely and in terms of own-weekly total spend, perhaps due to having less ability to invest in energy efficiency (eg, due to greater renting rates and higher associated electricity spend).

These differences suggest that the targeting criteria for assistance to households to mitigate electricity price impacts from the ETS may need to recognise more than just household size, composition, income levels and tenure (ie, renting versus owning). If these ethnic differences arise for Māori, it can be speculated they will also arise for other ethnic groups (eg, Pacific Islanders), reflecting the overall socioeconomic position of each such ethnic group (ie, not just ethnicity).

## 6.2 Fishing

As discussed above, Māori have disproportionately high interests in the fishing sector compared with non-Māori. These interests relate to quota ownership, Māori interests in fishing companies such as Sealord (50 per cent), Ngai Tahu Fisheries, a range of other active Māori fishing companies (at the catching, processing and/or exporting levels), and Māori employment in catching and processing. Superficially, this suggests that Māori will bear a higher overall share of increased fishing sector costs from increased liquid fuel prices, and possibly also increased electricity prices (ie, for refrigeration and processing). Indeed, this greater share of emission costs should (all other things being equal) reflect a greater share of sectoral emissions from Māori-owned or operated fishing interests.

However, fishing assets comprise a greater share of the Māori asset base than they do for the non-Māori asset base (as discussed previously, agriculture, fishing and forestry account for around half of the Māori asset base, but only 11 per cent of the New Zealand business asset base overall). Hence, the relative value impact on Māori of such ETS-related cost increases will be higher than for non-Māori. The impact on Māori will also be higher due to the importance of the sector for Māori employment. Furthermore, requirements for Māori ownership of settlement quota assets under the Māori Fisheries Act give rise to institutional constraints similar to those under TTWM regarding land ownership, possibly amplifying the relative value impact of the ETS on Māori fishing interests. Additionally, while some Māori fishing concerns are owned as part of more diversified asset holdings (eg, Ngai Tahu and Tainui), fisheries settlement assets are for many iwi likely to be either their only significant assets, or a sizeable part of their asset base. Conversely, many major non-Māori fishing concerns are either owned

by investors with diversified asset portfolios (eg, Sanfords), or are themselves diversified organisations (eg, Talleys). For these reasons the impact of ETS-related energy price rises may affect the value of Māori-owned fishing assets more than for non-Māori. Finally, given the agriculture and forestry sectors are to enjoy transitional government support in the form of free NZU allocations, this suggests the fishing sector, and hence Māori fishing sector interests, will face a relatively higher burden from the ETS than those non-fishing sectors.

## 6.3 Agriculture and forestry

### 6.3.1 National level comparisons

Estimated relative interests of Māori and non-Māori in farming and forestry at a national level are illustrated below.[52]

**Table 6.2: Relative national-level Māori and non-Māori interests in forestry and farming**

| | Proportion of Māori land | Proportion of non-Māori land |
|---|---|---|
| **Raw Māori land information base data** | | |
| Beef, dairy, sheep, mixed sheep and beef | 66% | 59% |
| Forestry* | 19% | 8% |
| **Māori land information base data excluding native bush, and adding 97,000 ha for Māori-owned former Crown Forestry Licensed land** | | |
| Beef, dairy, sheep, mixed sheep and beef | 62% | 78% |
| Forestry* | 33% | 10% |

* Data limitations mean Māori forest land interests are understated, and hence Māori farming interests are overstated.

Care must be exercised when interpreting these figures. We have no detailed data indicating the extent to which Māori and non-Māori own combined farming and forestry operations, or combine farming types. Thus, it is not possible using this data to infer the overall balance of Māori and non-Māori interests in agriculture and forestry, and hence to determine any differences between these balances for Māori and non-Māori.

With these important limitations in mind, at a national level Māori on average have a greater interest in farming than in forestry, and to a greater degree than do non-Māori. Moreover, based on earlier figures, Māori are likely to have a greater existing interest in pre-1990 forestry than post-1989 forestry (whether pre-1990 indigenous forestry is included or excluded) than non-Māori. However, Māori may possibly have a relatively greater amount of land available for potential use in post-1990 forestry than non-Māori, particularly in the Gisborne/East Coast and Northland regions, given the extent of marginal sheep and beef farming in those regions.

[52] Using data derived from the Māori Land Information Base. As noted previously, this data underestimates the Māori interest in forest land, and is also likely to be significantly out of date.

Assuming each farm and forest type is separately owned, Māori farmers by hectare should prefer a relatively generous agriculture treatment and post-1989 forest treatment. They should further prefer a relatively generous allocation to low-intensity and lower-valued farming types like sheep and beef, and beef farming. They should also possibly prefer the early entry of pre-1990 forestry into the ETS, and the proposed area-based free allocation of NZUs rather than value-based allocation. These preferences flow from the greater Māori interest in farming than in forestry, and in beef and mixed sheep and beef farming rather than dairying, as well as in indigenous and exotic pre-1990 forestry on lands with potentially lower (or constrained – eg, by regulation) conversion potential.

Relative to non-Māori, Māori farmers should be less eager for a more generous treatment of agriculture relative to forestry, given the relatively lower Māori interest in the former. Māori owners of post-1989 forests should be at least as interested as non-Māori in the early entry of forestry into the ETS, so carbon credit opportunities can be maximised, particularly on less developed or more marginal Māori land. They should be more concerned than non-Māori about the early entry of pre-1990 forests into the ETS, given the relatively higher share of this sector in total Māori farm land (both exotic and indigenous), and large amount of pre-1990 Crown Forestry Licensed land likely to be returned to Māori under future Treaty settlements. Māori owning pre-1990 forest land as a consequence of settled Treaty claims should have a particular interest in the issue of land value losses caused by the entry of pre-1990 forestry into the ETS.

Table 6.3 below is drawn from Table 7.4 and other data in the document *The Framework for a New Zealand Emissions Trading Scheme*. It augments that table to illustrate the extent to which the Government would – under the indicative scenario provided in Table 7.4 – be assuming ultimate liability for sectoral emissions, on a per hectare basis, for 2008–2025. The Government assumes that liability by either allocating free NZUs to a sector or by not devolving that liability to the relevant sector. Accordingly this table enables an assessment, however simplified, of the relative government support for each sector, over that period.

The absolute value of units covered by the Government for each sector should be interpreted in the light of the relative value impact of the ETS on associated land uses. The impact on pre-1990 exotic forest land values is likely to be greater than that on farm land values, on average, and so a higher coverage is therefore warranted if proportionate value impacts across sectors are to be aligned. A lower-valued coverage for pre-1990 indigenous forestry than for exotic forestry may be warranted if the conversion options on such lands are also significantly lower, which may be the case given restrictions on the use of indigenous forests. This may not be the case, however, where particular Māori interests such as SILNA landowners have a greater potential to change land use for pre-1990 indigenous forests, in which case a low and area-based coverage may not be preferable. Using high-level data such as this may be useful for particular landowners to assess their likely balance of preference in the light of their specific mix of different land uses.

**Table 6.3: Relative sectoral support from the Government 2008–2025**

| | Units covered by the Government | | Hectares | Units/ha | | Unit value at $15/unit | |
|---|---|---|---|---|---|---|---|
| | CP1 | 2008–25 | | CP1 | 2008–25 | CP1 | 2008–25 |
| Pre-1990 exotic forestry | 21 Mt | 55 Mt | 1.2 m | 17.5 | 45.8 | $263/ha | $687/ha |
| Indigenous forestry* | 3.1 Mt | 8.1 Mt | 2.4 m | 1.3 | 3.4 | $20/ha | $51/ha |
| Farming | 203 Mt | 422 Mt** | 12.4 m | 16.4 | 36.0 | $246/ha | $510/ha |

* Assumes ETS covers indigenous forestry, and essentially all such forests are pre-1990.

** Assumes 90% of 37.45 Mt in 2013, and linear annual reduction in free allocation to nil by 2025. Areas from government papers and 2006 *New Zealand Official Yearbook.*

### 6.3.2 Regional level comparisons

Table 6.4 below identifies where Māori land in each of the main land-use types, as a proportion of total Māori land, is more or less than the comparable ratio for non-Māori land, for each of the six most significant regions in terms of total Māori land area.

Of the six most significant regions in terms of total hectares in Māori land, common interests are seen for four in terms of Māori having a greater share of land in beef and mixed sheep and beef than for non-Māori, with Hawke's Bay also having a shared interest regarding its relatively high Māori interest in beef farming. All other things being equal, Māori in all of these regions should be relatively more concerned than non-Māori regarding the ETS treatment of these farm types.

Four of these six most significant regions also have a higher Māori interest in forestry than non-Māori (which possibly also holds for Bay of Plenty, given the understatement in the Māori forestry statistics). All other things being equal, Māori in these regions should be more concerned than non-Māori regarding the ETS's treatment of forestry.

**Table 6.4: Relative Māori and non-Māori interests in each main farming type for regions with most significant overall Māori land interest by area**

| Region (Māori land area) | Māori proportion of Māori land versus non-Māori proportion of non-Māori land, for beef, dairy, forestry*, sheep and beef (S&B), and sheep | | | | |
|---|---|---|---|---|---|
| | Much less | Less | Same | More | Much more |
| Waikato (167,433 ha) | Dairy | | | Beef S&B | Forestry |
| Hawke's Bay (109,266 ha) | S&B | | | Forestry* | Beef |
| Gisborne (107,136 ha) | | Forestry* | | Beef S&B | |
| Manawatu-Wanganui (89,054 ha) | | Dairy | Beef S&B | Forestry* | |
| Bay of Plenty (66,118 ha) | | | Forestry* | Dairy S&B | Beef |
| Northland (56,887 ha) | | | | Forestry* | Beef S&B |

* Māori forestry interest understated as a proportion of Māori land, and relative to non-Māori proportion in forestry.

## 6.4 Geothermal energy

According to the Ministry of Economic Development June 2007 *Energy Data File*, Māori geothermal electricity generators (Tuaropaki [94 MW capacity] and Tai Tokerau Trust [10 MW capacity]) account for 24 per cent of the total 435 MW of geothermal electricity generation capacity in New Zealand. With Māori being relatively highly represented in this sector, they are therefore relatively well-placed to profit from ETS-related rises in wholesale electricity prices.

No data is readily available regarding the relative Māori and Non-Māori ownership or use of geothermal energy other than for electricity generation. However, given the importance of this energy source for the pulp and paper sector it can be speculated that non-Māori have a greater interest in this sector. Accordingly, non-Māori should be predicted to bear the relatively greater share of ETS-related emissions costs, unless targeted relief from industrial process emissions favours non-Māori over Māori (which may be the case given the 50,000 emission unit annual threshold proposed before such relief will be considered).

## 6.5 Employment

Relative Māori and non-Māori employment impacts from emissions charges were discussed in Section 5.8 (see Table 5.2 and associated caveats), drawing on analysis by researchers from Waikato University. Similar Māori and non-Māori employment impacts were predicted for sheep and beef farming, dairy farming and horticulture. However, Māori employment is predicted to suffer more than non-Māori employment overall, with particularly worse employment outcomes (relative to no emissions charges) predicted for the meat manufacturing, cement and fishing (et al) sectors. Conversely, relatively strong Māori employment gains were predicted for the wood and wood products, pulp and paper, logging and forestry sectors.

# 7 Summary of Findings

Relative to earlier New Zealand climate change policies, the proposed ETS policy framework provides far greater certainty for Māori interested in exploring possible economic development interests, especially in the primary sectors. While important ETS details remain unresolved, Māori can now investigate development options with greater confidence given this certainty, especially where such development may involve third parties.

The measures encouraging afforestation are seen as being positive for Māori with qualifying land by creating new land development options for such land that have to date been seen as unattractive to investors (eg, due to terrain characteristics or distance from connecting ports to offshore markets). Furthermore, these measures will enable the planting of alternative tree species including options around native tree species important to Māori.

Māori can be speculated to contribute a relatively low share of New Zealand's total greenhouse gas emissions, although this is not clearly so. Māori households also tend to spend more on electricity and liquid fuels than non-Māori, and also a greater share of their total weekly spend on such items. While a greater impact on Māori households can be predicted for ETS-related electricity price rises, this is possibly not the case in respect of liquid fuels, given more affluent Māori households tend to spend a relatively higher share of their weekly spend on fuels than do other Māori and similarly affluent non-Māori. This raises a possible case for greater targeting of support to households for ETS-related rises in electricity prices.

The ETS is predicted to have greater impacts on Māori than non-Māori in some sectors such as pre-1990 forestry and perhaps fishing, but also possibly in post-1989 forestry. While the former two represent possibly disproportionately negative impacts, the latter is possibly disproportionately positive. A disproportionately positive impact is also possible (but not assured) for Māori interests in geothermal energy (particularly for electricity generation, but not for industrial processes). The negative impact of the ETS on pre-1990 exotic forestry raises particular and differing issues in relation to past and future Treaty settlements.

Like non-Māori, Māori farmers should prefer a relatively generous treatment for agriculture relative to that of pre-1990 forestry, though not to the same degree as non-Māori farmers. However, the impact on Māori agriculture interests relative to non-Māori is hard to discern absent details of how free NZU allocations are to be made, and how emissions costs levied on agricultural processors are to be passed on to farmers. Given these important details remain unsettled, Māori will have a keen interest in the governance processes by which they are resolved. The risk for Māori is that free NZU allocations will favour intensive and high-emissions farming, constraining Māori moving out of less-intensive and low-emissions farming into higher-intensity farming, further exacerbating the relative under-development of Māori land.

The ability of Māori to mitigate any disproportionately negative impacts, or to take advantage of post-1989 forestry opportunities, will be constrained relative to non-Māori given transaction costs and constraints particularly related to the ownership and use of Māori land. Furthermore, compliance costs and ETS-related penalties, as well as ETS-related restrictions on land-use opportunities, could further constrain Māori land use, and raise the risk of land forfeiture.

These issues raise questions as to whether targeted information and support is required to better enable Māori to avoid adverse ETS impacts and to take full advantage of ETS-related opportunities. Where Māori are able to take advantage of ETS-related opportunities, this may enhance their ability to overcome other constraints in land use (eg, capital constraints leading to relative under-development), giving rise to spin-off benefits. Conversely, where ETS-related costs reduce development opportunities, they will give rise to spin-off disadvantages.

Currently institutional barriers exist preventing Māori fully and actively participating in targeted R&D towards both emission reduction technologies and new climate change related technologies. R&D has been identified by Te Puni Kokiri as being a key enabler of Māori economic development and indeed New Zealand's economic development. A more targeted structure for Māori R&D is needed.

An opportunity exists for Māori to differentiate carbon sink credits generated in New Zealand for added value. Such differentiation could include carbon credits being derived in accordance with Māori indigenous cultural values, and as a means to support Māori community development. Successful branding should result in premium value for properly accredited credits, but will likely require certification to an internationally acceptable standard for any such premium to be fully realised.

Determining where the overall Māori preference lies in relation to the ETS is both misdirected and impossible given available data. Since there is no unitary "Māori economy" it is not possible to discern a single Māori preference regarding the different features of the proposed ETS. Moreover, without knowing the precise mix of land and other interests of particular Māori organisations and individuals it is not possible to determine whether the ETS on balance helps or harms their net interests. There is a very real need and urgency around assembling detailed inventory and mapping of Māori forest land ownership and published data on Māori and non-Māori interests in pre-1990 and post-1989 forests to enable important development options for Māori.

Given the high and growing Māori participation in key sectors like forestry, farming and fishing and the identified exposure Māori have especially in terms of employment in these key sectors, continued Māori engagement and participation in the policy and related regulatory process will be essential to ensuring Māori do not bear a disproportionate burden from and post-ETS rollout.

Finally, Table 7.1 overleaf summarises outstanding ETS details with potential implications for Māori.

**Table 7.1: Outstanding ETS details with potential implications for Māori**

| ETS detail | Māori impact |
|---|---|
| Criteria for targeting support to low and middle income households to mitigate impact of higher electricity prices | Low-income Māori households may have a greater case for increased support, particularly given lower home ownership rates and hence less ability to take advantage of home efficiency support measures. |
| Eligibility criteria for industrial production free NZU allocations | Māori fishing and geothermal (industrial process) interests may prefer a lower annual emissions threshold (than 50,000 tonnes/year) in order to qualify for free allocations to mitigate impacts of increased electricity prices on fish processing. |
| ETS non-compliance penalties | Possibility of increased land forfeiture risk. |
| Inclusion of pre-1990 indigenous forestry | Strong Māori interest in indigenous forestry, and pre-1990 bias, suggest this is an important issue for Māori. If relevant land has low conversion potential then proposed pro rata NZU allocations may give rise to windfall gains, based on historical deforestation rates. Conversely, if land has significant non-forestry potential, or if future deforestation should be permitted and become more economic, appropriateness of proposed allocation is unclear. |
| Papakainga exemptions | Māori interested in developing papakainga housing on Māori-owned land will be interested in securing such exemptions. |
| Agriculture point of obligation | Possible governance issues for Māori, including ability to affect nature of subsequent devolution of emissions costs to farmers by processors/companies or sector bodies. If devolutions are averaged rather than emissions-based, relatively low-intensity Māori farmers may face disproportionate costs. Opportunities to create Māori sector bodies? |
| Agriculture NZU allocation level | Possible governance issues if free NZUs allocated to processors/ companies or sector bodies. Māori may benefit if allocations are averaged rather than emissions-based, but could be locked into lower-intensity farming if allocations are targeted according to emissions. |