

Climate Change Technology Transfer – Plan for Action 2010 – 2015

What is the purpose of this action plan?

New Zealand depends greatly on our climate and land resources, or ‘natural capital.’ The primary sectors generate wealth and also contribute greatly to social and cultural values. To sustain New Zealand’s economic prosperity and quality of life, the sectors recognise the need to adapt to climate change and mitigate greenhouse gases.

The expected impacts of climate change and associated climate warming and increased incidence of extreme weather events will expose many sectors of the economy (particularly the rural sectors) to increased risk and new opportunities. New Zealand farming and forestry practices will need to change to adapt to climate change. The right information will need to be packaged and delivered in the right way at the right time to help implement changes effectively at a national, regional, catchment, community and individual farm level.

To this end MAF has proposed a Climate Change Technology Transfer Plan for Action to provide land managers¹ with sufficient information, technologies and systems to enable and encourage the adoption of land management practices that help to:

- reduce total greenhouse gas emissions, improve the efficiency of resource use and minimise the liabilities;
- adapt to a changing climate; and
- take advantage of new business opportunities relating to climate change.

The defined purpose of the action plan is:

To promote more resilient land based businesses by supporting and co-ordinating sector and government initiatives and providing up to date, relevant information on climate change to land managers and their advisers.

Its goals are to:

- Ensure New Zealand land managers and their advisers have the necessary information and technologies to adapt to, manage or mitigate the impacts of climate change at both the farm and regional/community level.

¹ Throughout this document the term land managers have been used as a generic term that includes farmers, foresters, growers and agri-business advisors and Maori.

- Achieve demonstrable improvements in understanding and implementation of available technologies that address climate change and sustainability issues by the primary sector.
- Ensure that land based businesses can make informed decisions for their businesses that improve their financial viability and sustainability.
- Identify the drivers of change to increase uptake and ensure investment is well targeted.

How will the action plan achieve this purpose?

The primary sectors have seen the need to work collectively to achieve their climate change adaptation goals. This document outlines the sector's overarching action plan to address the impacts of climate change in the future. The action plan already builds on the specific initiatives of the various sub-sectors and will continue to look for opportunities to leverage existing activity as more specific actions and targets are developed.

The approach aims to achieve by:

- Undertaking a stock take of information and technology transfer activities funded by government on topics that relate to climate change.
- Reviewing extension activities being undertaken by sectors and other groups.
- Remaining aware of science projects and programmes that will deliver outcomes of value to farmers.
- Identifying the key needs of farmers and land managers.
- Developing information and technology plans to deliver these outcomes to farmers.
- Working in partnership with central and regional government.
- Providing active engagement with land managers so they can make better informed decisions.

What activities will be within the action plan's scope?

The action plan will cover all **land based** industries: dairy, sheep, beef, deer, arable, horticulture, forestry, farm forestry, pigs, poultry.

Activities of organisations that directly influence land owners (land based industry organisations, rural professionals & advisors, supply companies and processors and those that provide training for the rural sectors) are also within scope.

Greenhouse gas emissions and activities that are under direct control of land managers will be included in the plan's scope.

Excluded from scope are emissions and activities that are beyond the farm gate including processing of primary products, except when processing occurs on farm or is a vertically integrated operation (e.g. a horticultural pack house or winery).

How is the action plan being developed?

To help develop the action plan, MAF established a Climate Change Technology Transfer Sub-Group (CCTTSG) which represents the following sectors/organisations:

- Arable (Foundation for Arable Research)
- Dairy (Dairy NZ)
- Federated Farmers
- Forestry
- Fertiliser (Fertiliser Manufacturers Research Association)
- Horticulture (HortNZ) and NZ Winegrowers
- Sheep and Beef (Meat and Wool NZ)
- Iwi/Maori
- Local Government New Zealand
- Ministry of Agriculture and Forestry MAF

Other horticultural sectors and the Pork and Poultry Industries are not specifically represented on the CCTTSG but are still contributing to the development of this action plan.

The CCTTSG reports to MAF's Research, Innovation & Technology Transfer Working Group (RITTWG) which is part of a wider climate change programme.

In March 2008, a CCTTSG workshop started a process which determined a number of common (cross-sector) themes and targets for the action plan. The next stage is for the various primary industry sectors to examine these themes and determine sector-specific actions, targets and priorities. This will be done through a series of workshops and meetings between now and February 2010.

As sector/partner strategies are developed and the action plan gains momentum, the targets will be refreshed and updated. Sector specific actions and targets will be defined on a short-term (1 to 2 year) and long-term (5 year) basis. From the CCTTSG's perspective, priorities for short-term action are likely to be:

- Integrating climate change issues into existing extension and training programmes
- adapting existing tools to respond to climate change management options
- monitor, focus, demonstration farms and forests
- workshops, conferences, field days
- web based information and tools
- sector publications
- rural media
- individual farm plans eg Land Environment Plans and risk management plans
- DVDs, interactive games,
- case studies and fact sheets

CCTT Plan for Action: Themes and Targets

- Note some themes and targets may be more relevant to some sectors than others. Defining areas of relevance/focus will be part of the discussion that will take place at the workshops.

Theme 1: Capacity and capability	Targets
<p>Goals for climate change technology transfer are ambitious and will not be achieved with current capability. There is an urgent need for skills and experience to support land managers in moving toward more sustainable land use systems. These skills and experience are in short supply - they must be developed now. This requires a financial commitment to employ, educate and upskill the right people with the right skills.</p> <p>The technological solutions to management of climate change issues are limited in number and efficacy. It is critical that in a country the size of New Zealand all climate change technology transfer is aligned toward common goals. This includes primary sector and government funded programmes.</p>	<ul style="list-style-type: none"> • Develop the required capability to achieve the sector-specific targets by 2015. • Increase alignment of sector and public investment on extension to deliver the knowledge required to achieve the desired outcomes in climate change and sustainable land management. • In partnership with the sectors, develop a programme to upskill people so they can provide advice/support to advancing issues of adaptation and sustainability. • Have the right people trained in the right areas at the right time. • Have climate change integrated into tertiary and vocational land based courses by 2015. • Provide opportunities for land managers to upskill themselves on climate change and sustainability issues so they can increase their business resilience and profitability by 2015. • Provide learning opportunities specifically for Iwi/Maori to increase awareness, encourage the uptake of new knowledge and foster Maori innovation in climate change and sustainable land management.

Theme 2: Efficient use of resources	Targets
<p>Water</p>	
<p>Water efficiency is a key issue for New Zealand in areas where water is considered to be constrained in availability for the primary sector.</p> <p>These are mostly traditional summer dry areas such as the east coast of both islands. Availability of water has also become an important issue in areas such as the Waikato.</p> <p>As rainfall becomes increasingly variable, and temperatures and evapo-transpiration increase, water efficiency will need to improve just to maintain current levels of production. Improving water use efficiency benefits both the environment and the water user.</p>	<ul style="list-style-type: none"> • Ensure land managers have the necessary incentives, information and technologies to improve the efficiency of water use • Increase land managers’ resilience to drought by providing information about efficient use of rainfall and irrigation, case studies and decision-support tools. • Support water efficiency measures such as greater strategic development and use of water storage • Align relevant action plan targets with the target determined by the Primary Sector Water Partnership: i.e. 80 per cent of extracted water used by the sector will be under a self management approach to meet benchmarks² of water efficiency by 2016.
<p>Energy</p>	
<p>There is an opportunity for New Zealand’s land based businesses to reduce energy costs and related carbon emissions by adopting energy efficient practices and technologies (including on farm generation where appropriate). There is significant scope to make cost-effective efficiency improvements in irrigation, cultivation, harvesting, heating and cooling systems, transport, and processing of primary products when it occurs on-farm or in a vertically integrated operation (e.g. in a horticultural pack house or winery).</p> <p>To gain the best use of resources, the initial focus of this approach will be on energy intensive activities.</p>	<ul style="list-style-type: none"> • Ensure land managers have the necessary information and technologies to improve the efficiency of energy use. • Continue to develop and disseminate information about energy innovation choices, including case studies, decision-support tools and cost benefit analysis. • Demonstrate leading edge energy efficiency and renewable energy.

² Benchmarks set under the Primary Sector Water Partnership

<p>Theme 3: Nutrient management</p>	<p>Targets</p>
<p>Nutrient management is one of the key primary sector issues that must be addressed.</p> <p>Because nutrients have a catchment-scale effect, all of the sectors are interdependent. Within the climate change programme the objective is to reduce nitrous oxide emissions.</p> <p>Many of the management tools to reduce nitrous oxide are the same as those used to reduce nitrogen leaching and run off.</p>	<ul style="list-style-type: none"> • Provide information to 80% of land managers on nitrous oxide mitigation options and their costs and benefits by 2015. • Align action plan targets with those developed by the Primary Sector Water Partnership, i.e.: <ul style="list-style-type: none"> ○ 80 per cent of nutrients applied to land nationally are managed through quality assured³ nutrient budgets and nutrient management plans by 2013. ○ 1.7 million hectares⁴ of intensively farmed land will have implemented nutrient management plans, in the context of their wider farm management planning, to achieve improved environmental outcomes and reduce on-farm operating costs by 2016. • Ensure that nutrient management is integrated into the wider farm system through self management regimes. To gain the best use of resources, the initial focus of this approach will be on intensively farmed areas. Once achieved, the targets will ensure that not only are the majority of nutrients applied using nutrient management approaches, but also that land uses that contribute to approximately 2/3 of total nitrogen losses and 1/3 of total phosphorus losses are engaged in self management regimes to ensure best practice is achieved across the farm system.

³ The people undertaking and processes used will be subject to independent quality assurance

⁴ Land with dairy, arable and horticultural operations

<p>Theme 4: Greenhouse gases including methane</p>	<p>Targets</p>
<p>The CCTT Plan for Action requires land managers and those advising them to understand a new area – that of greenhouse gases (GHGs). This includes new terminology, where the greenhouse gases come from, how to estimate them for their farms, how to mitigate them to reduce cost and new benchmarks.</p> <p>Greenhouse gas emissions for agriculture can only be measured experimentally while emissions at farm, regional or national scale are estimated.</p> <p>Ruminants produce methane as part of their normal digestive process. As a greenhouse gas methane is 21 times more potent than carbon dioxide when you compare their heat-absorbing abilities over a hundred years.</p> <p>Technologies and practices to reduce emissions are likely to come out of research that:</p> <ul style="list-style-type: none"> • Deals with the quality and type of feed • Modifies the composition of the bugs that produce methane in the rumen • Modifies farm systems <p>We currently do not have the technologies available to extend to farmers to significantly reduce methane production. Initially the action plan will look at increasing farmers understanding of how increasing feed efficiency will decrease methane per unit of product and improve profitability.</p>	<ul style="list-style-type: none"> • Ensure the common language of GHGs is understood and widely used by land managers by 2015. • Provide information to 80% of land managers on greenhouse gases, where they come from and how to estimate them for their business by 2015. • Establish benchmarks for greenhouse gases for different farming systems by 2015. • Demonstrate GHG scenarios and options on focus, research and monitor farms and other properties providing industry leadership by 2012.

<p>Theme 5: Resilience to extreme weather events</p>	<p>Targets</p>
<p>Adaptation to climate change is likely to benefit from experience gained in reaction to extreme climate events, specifically by implementing proactive climate change risk management plans.</p> <p>Climate change in New Zealand will increase the frequency of extreme weather events, challenging the resilience of many of our land based businesses.</p>	<ul style="list-style-type: none"> • Provide tools, knowledge and skills so land managers can make well informed timely decisions. • Provide tools so that land managers can increase farm profitability and their resilience to the impacts of a changing climate. • Identify a suite of practices, technologies and tools to adapt to a changing climate and manage risk from extreme weather events by 2013. • Provide demonstrations of why increased resilience is needed and the benefits of increased resilience to the farming operation. • Increase investment analysis skills and tools to future proof major on-farm investments.



<p>Theme 6: Soil management</p>	<p>Targets</p>
<p>Soils underpin our land based systems. Soils physically anchor plants, support livestock, provide a source of water and nutrients and regulate emissions to air and water. They are supported by an extensive biological system that aerates the soil and cycles nutrients and organic matter.</p> <p>When soils are water logged, compacted, lack aeration, or contain too much nitrogen they are more likely to lose nitrogen to the atmosphere as nitrous oxide. Soils are both a source and store of carbon. Most soil carbon is locked up. However unless we alter our management practices, more of this carbon may be released into the atmosphere, as temperatures and mineralization rates increase.</p> <p>By increasing the amount of carbon locked in the soil, land managers can benefit from:</p> <ul style="list-style-type: none"> • Increased water holding capacity and infiltration rates • Improved soil structure, less erosion and more ability to cope with compaction • Improved nutrient cycling and cation exchange rates <p>With increased frequency of drought, high rainfall events and high wind the risk of soil loss increases in the arable, outdoor vegetable and pastoral sectors increases. Greater uptake by land managers of current best management practices would increase the resilience to extreme weather events and reduce soil loss. Forestry experiences major issues with soil/sediment loss during and immediately after harvest.</p>	<ul style="list-style-type: none"> • Implement changes in soil management to build more resilient rural businesses. • Increase the uptake by land managers of Code of Practices and best management practices. <p>Work on this theme links to a number of other programmes including the Forestry and Horticultural Code of Practices, Hill Country Erosion and Regional Council work.</p>

<p>Theme 7: Carbon sinks</p>	<p>Targets</p>
<p>There are increasing opportunities for forest owners and farmers with areas in trees to receive an income from carbon trading. Carbon forestry presents both opportunities and risks. Carbon stock forests have a different objective to commercial forests and may need to be managed differently</p> <p>There are market opportunities for businesses that undertake carbon foot printing, life cycle analysis.</p>	<ul style="list-style-type: none"> • Provide appropriate tools and information to support the uptake of business opportunities of carbon foot printing and life cycle analysis by 2011. These will be demonstrated to potential users (from TT strategy) • Provide an integrated programme to foresters and farm foresters on the impacts of a changing climate on forestry; the opportunities and management of risks of carbon farming.
<p>Theme 8: Emissions Trading Scheme (ETS) impacts</p>	<p>Targets</p>
<p>The ETS is the price-based mechanism for greenhouse gases and is a key part of overall climate change policy. It involves all significant greenhouse gases and all sectors.</p>	<ul style="list-style-type: none"> • All foresters and farm foresters able to make informed decisions on ETS by ? (date dependant on legislation) • Give all land managers the opportunity to be aware of ETS understand their obligations and make informed decisions by ?. (date dependant on legislation)

<p>Theme 9: Sustainable systems</p>	<p>Targets</p>
<p>Farming systems have changed enormously over the last 50 years and will continue to do so in the future. The average New Zealand land based business has increased in size, complexity and has to meet increased demands from markets and regulation.</p> <p>To adapt to a changing climate and/or to reduce greenhouse gas emissions our land managers will need to further upskill their management skills.</p> <p>To do this they will need good information on system options including integrating different land use options, changes in stock/crop policies, management systems and financial returns. This includes the interaction between soil, plants and animals in a system that is economically, environmentally and socially sustainable.</p>	<ul style="list-style-type: none"> • Provide appropriate tools and information to land managers so they can make informed decisions at a property or catchment level.