Ministry for Primary Industries
Manatū Ahu Matua

Impacts of Climate Change on Land-based Sectors and Adaptation Options

Stakeholder Report July 2012

Communications Plan

Sustainable Land Management and Climate Change (SLMACC)

January 2013

New Zealand Government

Growing and Protecting New Zealand

Communications Plan for Climate Change Impacts Stakeholder Report

Background

A changing climate will generate challenges and opportunities for New Zealand's land based sectors. Adaptation is the process of responding and acting on those expected changes. MPI funded a four research programme to better understand what climate change means for key land based industries. Over the last four years, crown research institutes led by NIWA, have modelled impacts on production systems and a range of adaptation options. The work found that with action, farmers, growers and foresters are well-positioned to capture opportunities and meet the challenges ahead.

The key findings from this research work are presented in the recently completed stakeholder report, which is supported by a comprehensive technical report. The stakeholder report is aimed at the 'land management professional' to provide the latest information on the expected impacts from climate change and a range of options to manage those impacts.

The four-year project has a number of additional benefits, including developing close collaborative relationships between researchers from key crown research institutes. Scenarios and data are now available to run production models at the farm level. The production of the stakeholder report is also an excellent example of collaborative work between scientists, the Adaptation Technical Working Group and MPI.

Communications Objectives

This plan identifies:

- strategic and tactical approaches for getting the report to the right people
- key messages
- dissemination routes and opportunities
- roles and responsibilities

Strategic Approach

The Climate Change Adaptation Technical Working Group (ATWG) and MPI have important roles in ensuring the report and key messages reach the intended audience – 'land management professionals'. Each party will focus their efforts in the areas that will have the most impact, for instance, members of ATWG will lead in their sectors/organisations, whereas MPI will focus on government agencies and a wider more general audience.

The approach will focus on providing the report and supporting material to key stakeholders via existing communication channels, including websites, bulletins, media releases and presentations, as required. Communication within organisations will also be needed to make the most of opportunities to disseminate the report and answer any queries, for instance MPI regional staff and contact centre staff.

Key stakeholders include land based sectors, local government, Māori and central government agencies, including the Ministry for the Environment, as well as universities, banks, rural professionals and the media.

Tactics

The goal is to provide a communications package that can be used for multiple audiences by the ATWG and MPI with key messages consistent with the report and research findings.

Key resources are

- *"Impacts of Climate Change on Land Based Sectors and Adaptation Options"* Stakeholder Report (hard and electronic copies) & Technical Report (electronic only)
- Summary factsheet on the key findings (to be developed)
- Media release (to be developed)
- Powerpoint presentation (to be developed)

ATWG

Important channels for Beef & Lamb, CCILG, Federated Farmers, Fonterra, LGNZ, NZ Forest Owners will be organisations and boards via industry magazines/publications, websites, media/paper columns, email lists, sector group meetings etc

MPI

Within MPI key information sources will be MPI website, Kotahi and the Sustainable Forestry Bulletin and organisational channels e.g. SLT, PLT, and branch meetings. Ensuring central government agencies are aware of the report is important. The interagency climate change directors' forum and the natural resources sector will be targeted. Existing industry/sector channels will also be important for instance, Rural Support Trusts, Peak Group, and the Climate Change Technology Transfer Group.

Stakeholders

Sector/industry organisations

- Beef & Lamb
- Dairy NZ
- Federated Farmers
- Fonterra
- HortNZ
- LGNZ
- NZ Forest Owners

Media

- Grower magazine
- Rural economists
- Rural Report RNZ
- Chartered Accountants Journal
- VetScript

Banks and Universities (Lincoln, VUW, Massey, Waikato)

Local government, including LGNZ, Chief Executive Environment Forum (regional councils), Envirolink

MPI

- Minister/s
- Peak Group, Climate Change Tech Transfer Group, RITTWG, wider sector/industry organisations, Rural Support Trusts, general public
- Central government agencies - MfE, MBIE,
- SLT, PLT, MPSP, RMP, Policy Branch

Stakeholder audience	Key resources
Sector/industry organisations	Report, ATWG briefings, factsheet, presentation,media release
Sector media	Media release, circulation of report, website update/s, spokesperson available on request, summary factsheet
Ministers and opposition MPs	Briefing, report
Banks, Universities	Circulation of stakeholder report (hardcopy), speaking engagements (powerpoint presentation)
Cross Government, MPI parties,	Circulation of report (hardcopy), speaking engagements, cross agency meetings
Rural Support Trusts	Report, annual conference
MPI	Kotahi, circulation of report, presentation
Regions, MPSP, RMP	
Wider sectors	Sustainable forestry bulletin, website update/s (SHR and Technical Report), summary factsheet
General public	Website update/s (SHR and Technical Report), summary factsheet

Roles	Responsibilities
ATWG	• Brief member organisations/boards/analysts • Use existing media channels • Take any opportunities to discuss findings and raise awareness of issues with sector • Write to NIWA acknowledging work **Contact:** ATWG members
MPI	• Provide copies of report to Ministers, brief if necessary • Brief MPI and other government agencies • Use existing media channels, including Rural Report RNZ, economists, VetScript etc • Prepare factsheet, presentation, media release and provide to ATWG • Contact universities, banks, ITOs, other professional bodies (NZPI) and provide hard copies and links to e-copies • Take any opportunities to discuss findings and raise awareness of issues with government/ land based sectors/ local government **Contact:** Trecia Smith (894 0646) / Natalie Quirke (894 0141)

Key messages

Key messages are grouped in the following section by overarching messages about the report and climate change in general; key messages by sector and key messages relevant to all sectors.

Key messages: Overarching

- New Zealand's temperatures are warming and weather patterns shifting.
- Temperatures will continue to warm and with New Zealand's complex landscape there will be a range of effects, including seasonal changes and production variability.
- With action, farmers, growers and foresters are well-positioned to capture opportunities and meet the challenges ahead.
- In some seasons and years, yields will increase but in other years production downturns will be more pronounced. The impacts vary by sector and region.
- This report is a heads up. It does not provide the answer but it does look at the range of changes on production systems and practical solutions.
- More information on climate change is available on MPI's website
    - impacts – research, fact sheets and case studies
    - an adaptation toolbox to help land managers think about what it means for them
    - adverse events and how to cope with floods and droughts
- Help and information is available on planning for drought, floods, and getting the most out of production systems from Beef & Lamb, Federated Farmers, Dairy NZ, HortNZ, FAR and NZ Forest Owners

Key messages: Sector

<u>Dairy</u>

- Production impacts on pasture-based dairy systems from a more variable climate are well understood. Positive and negative impacts vary with season and region.
- A whole-farm systems approach, which considers multiple stressors, is critical to understanding of climate impacts, and when examining the benefits and risks of adaptation options.
- Existing tactical options – widely published in rural training literature – offer New Zealand dairy farmers moderate to high degrees of adaptive capacity, effective in the face of moderate climate change. A good example is the use of conservation paddocks to improve feeding flexibility.
- The diversity of current New Zealand dairy farming systems means operators have options around the level of exposure to climate change they are prepared to accept. Irrigation, new pasture species, milk platform infrastructure, and pasture renewal can all help to reduce vulnerability further while enhancing production. However, costs and benefits must be carefully considered.
- The cost and availability of supplementary feed will be an important determinant of the industries response to climate change

<u>Sheep and Beef</u>

- Current variation in pasture growth shows that hill country is sensitive to climatic effects.
- Changes in average annual pasture production by 2040 are likely to be modest and largely positive. However, changes in seasonality – mainly increased spring growth and reduced autumn and summer growth – are very likely, and will drive changes in current management.
- Continuing with current management will have different consequences for profitability, depending on location, but the examples shown here include reduced, unchanged and increased responses.

- Greater fluctuation in feed supply will require adaptation. Suitable responses will involve flexibility in stocking rates, conservation of feed, changed timing of reproduction and increased animal growth rates.
- In theory, existing strategic adaptation options will be sufficient to sustain or increase profitability. However, the extent of such changes as stock movements between farms and regions, or increased forage conservation, will provide substantial challenges

Broad acre Cropping

- Assuming adequate water and soil nutrient supply, potential yields of temperate cereal crops could increase by as much as 20 per cent under future temperature and CO2 concentrations.
- There are clear benefits in translating this potential into actualised profitable crop yields. This will require careful technological and managerial change, through adjustment in production timing and shifts in rotation, along with species selection and breeding to match the new environment.
- In some cases, yields of other crops, such as maize, peas and potatoes could slightly decrease, because high temperatures shorten the crop cycle and reduce the time available for sunlight interception and photosynthesis. These negative impacts can be minimised by adapting crop management.
- Summer crops may become increasingly difficult to grow in regions with diminishing water supplies. Improving irrigation practices and water use efficiency, as well as building drought resilient systems, are key strategic adaptation solutions. New crops, and new or improved irrigation infrastructure, are additional strategic adaptation options.
- An ongoing dilemma is how to meet local and global crop demand while avoiding further environmental impact.
- Climate change impacts on overseas markets and crop producers will affect broad acre farming in New Zealand through international trade

Horticulture

- The main impacts on apple, kiwifruit, and grape growers will be increases in vegetative biomass, pest/disease risks and changes in plant development.
- The sector has considerable adaptive capacity, in that growers can relocate and expand relatively rapidly, as exemplified by the recent spread of vineyards.
- Growers have a range of tactical adaptation options. A favoured approach is to shift harvest timetables, in combination with altered pruning regimes, to ensure yields and quality meet market demands.
- Strategic adaptation options, such as planting new, more climate change-tolerant varieties, can be considered.
- Climate change will exacerbate water demand, and irrigation management will probably need refinement, depending on soil type. New irrigation schemes are a key transformational change for the sector

Forestry

- Forestry has a different impact profile and planning horizon to the other land-based sectors, given its relatively slow biological response rate and long harvest cycle.
- The most certain direct impact of climate change is increased yield of radiata pine in many plantations.
- Under climate change, forestry also faces less predictable – but expected – increases in risk from indirect impacts, from pests and diseases, fire risks and extreme storms, which may reduce productivity and compromise wood quality

- Forest companies already manage those same risks over a long planning horizon through adaptive risk management, but climate change is expected to exacerbate existing problems.
- Foresters have a range of tactical management options – such as silviculture and site and species selection – or interventions, like spraying and ongoing monitoring. Once production forests are established, options and opportunities for adaptation to site-specific impacts are reduced.
- As the forest sector learns more about indirect impacts, strategic and transformational adaptation becomes increasingly focussed on adjusting management to cope with them

Key messages: All sectors

General

- While valuable, the sector-based approach does not cover the full suite of impacts or adaptation solutions available to land managers.
- A changing climate will also affect biological systems and environmental services that are important to the resilience of production systems.
- Secondary impacts should be expected: for instance infrastructure, changing demands for skills and labour, economic and social impacts in the wider community. These areas are not as well researched or developed as other work presented in this report.
- There are many examples of actions that can spread the direct and indirect impacts of climate change, for example basing a land-based sector business around multiple forms of production.
- A major challenge is adapting under multiple stressors and cumulative impacts as they are difficult to identify and anticipate. These limitations, along with scenarios of more severe climate change, mean that engaging with transformational change is important to meet challenges and capture benefits

Drought

- Enhancing resilience to drought now is a win-win strategy.
- Drought affects all primary production, but the arable and pastoral sectors (dairy, sheep and beef) are especially vulnerable to the relatively short, seasonal droughts typical of New Zealand
- Droughts are doubling, to well over a doubling, the number of major droughts in the most exposed regions by mid-century.
- Change is centred on the east coast, particularly Canterbury, but much of the North Island may also be affected.
- The main objective is to avoid as many direct impacts on production and income as possible, while better positioning a business for early and rapid recovery from drought
- More flexibility, building more buffers into farm systems, setting fall back positions, having a plan before a drought hits and continually learning from drought will help

Water Resources

- Water resource planning and decision making consider long planning horizons, so decisions made now need to take account of the future climate. For example, water consents can be issued for up to 35 years – well within the timeframe of climate change.
- Climate change is set to modify the average – and most importantly, the variability of – water availability in catchments. River flows across the country are more likely to decrease, or remain unchanged, with the exception of those sourced from the Southern Alps, which may show increases, particularly in winter and spring. More extreme floods are expected, particularly in the north, along with more drought, particularly in the east. Average temperatures will be higher, as will evaporation rates. It is less clear how change will affect lakes, aquifers and water quality.

- New Zealand catchments show significant variation, so these general impacts need to be considered alongside local hydrological properties. Water demand will increase, for both production and instream uses, which may be stressed by higher water temperatures.
- Increased erosion and sedimentation rates, along with more flooding, will have significant effects on infrastructure such as bridges and flood protection works. This brings additional maintenance and operation costs.
- Water and asset management planning can help address the effects of climate change. These processes can increase flexibility, and develop cost-effective responses to a changing climate, including future access to water.
- Transformational change in water resource management is not straightforward. Institutional barriers need to be addressed including planning processes. Collaborative processes that include land managers and communities are one way to begin addressing these barriers.
- Land-based sectors have many options for adapting to climate change. These include: getting involved in water resource decision-making, changing farm schedules and irrigation systems to make more efficient use of water; changing crop varieties or genotypes; conservation farming; water harvesting and storage; and more precise monitoring of plant water requirements.