Local Communities: Planning for Climate Change

Minister's foreword

Climate change is a reality. It's up to all New Zealanders to help reduce the effects of climate change and keep our communities safe. Local authorities have an important role in ensuring community services and infrastructure adapt to cope with a changing climate.

The storms in the lower North Island earlier this year were a reminder of what climate change might look like. One of the major consequences expected from climate change is an increase in the frequency and severity of extreme weather events such as floods and droughts. Other likely impacts are increased average temperatures, higher sea levels and changes in rainfall patterns, with the east of New Zealand becoming drier and the west wetter.

Planning for these changes is vitally important. This booklet provides local authorities with guidance on what future climate effects could be, what can be done to address them, and where to obtain more information.

Hon Pete Hodgson
Convenor, Ministerial Group on Climate Change

Climate change is a reality

- **Communities can start planning for climate change right now.**
- **Information is available to help communities make informed choices about adapting to climate change.**

The time to start planning for climate change is now. Recent amendments to the Resource Management Act (March 2004) require councils to consider the effects of climate change in their day-to-day activities. Decisions your council makes today can affect how well your community adapts to the effects of climate change in the future.

Guidance material has been prepared to help councils and their communities take into account and adapt to the effects of climate change. This brochure provides background information on planning for climate change and indicates where more detailed guidance can be found.

The climate *is* changing

There is conclusive evidence that our climate is already changing. Rising sea levels, increasing weather extremes - more storms, floods and droughts - and resulting changes in water supply and quality will change how we live, work and play in this country.

Local authorities in New Zealand can play an important leadership role in helping communities adapt to climate change. By integrating future climate projections into regular planning processes, your council can save time and money and help contribute to a more sustainable future.

What causes climate change?

Greenhouse gases in our atmosphere (largely carbon dioxide, methane and nitrous oxide) trap the sun's heat and act like an invisible blanket around Earth that keeps the planet warm. However, human activity in the past 200 years (such as the burning of fossil fuels, transportation and agriculture) has significantly added to the amount of greenhouse gases in the atmosphere, causing Earth to warm at a faster rate. The resulting warmer temperatures in turn affect other aspects of the climate such as rainfall and sea level.

What are the impacts of climate change?

Most scientific experts support the assessment of the United Nations' Intergovernmental Panel on Climate Change (an independent body made up of the world's foremost climate scientists) that human activities have caused most of the warming of Earth's temperature in the past 50 years. Even under a 'best case scenario', the expected global rate of climate change is likely to be greater than any natural climate variations that have occurred over the past 10,000 years.

Climate observations and models tell us that:

- global temperatures have increased by about 0.6ºC since 1900
- the 1990s were the earth's warmest decade since records began

- average global temperatures are projected to increase between 1.4ºC and 5.8ºC if no efforts are made to reduce greenhouse gas emissions, while the global mean sea level could increase around 30 – 50 cm
- the effects of global warming may not be immediately obvious in the short-term, but in the longer-term significant impacts are likely and should be planned for to minimise negative impacts and maximise any opportunities
- greenhouse gas concentrations over the past century have already created changes to the climate that cannot be reversed – some degree of climate change is inevitable.

What changes are likely in New Zealand?
Climate change impacts are likely to have different effects in different parts of New Zealand. In general:

- **Sea levels** are most likely to rise 30-50 cm by 2100. Sea levels around New Zealand have already shown a rise (14–17cm in the 20th century). This rise is projected to accelerate exacerbating coastal erosion, inundation, flooding from storms, salinisation of freshwater and drainage problems.
- **Temperatures** are likely to continue to increase over the whole country. Average temperatures are projected to increase about 1ºC by the 2030s and about 2–3ºC by the 2080s. There are likely to be large decreases in the number of frost days in the lower North Island and the South Island, and a substantial increase in the number of hot days when temperatures exceed 25ºC, especially in the north of the North Island. New Zealand temperatures have already increased by 0.7ºC over the 20th century.
- More **rain** is likely to fall in the west of the country and less in the east.
- **Extreme weather events**are likely to become more frequent and intense:
    - **heavy rainfall** is likely to become more intense in all regions and flooding is expected to increase in frequency
    - **droughts** may become more common increasing the risk of water shortages and loss of productivity in parts of eastern New Zealand.
- **Westerly winds** are likely to become more prevalent with a greater risk of severe winds and storms.

What about natural climate variation? Natural weather cycles, such as the dry summers and autumns that occur during El Niño climate patterns, will continue to bring weather changes from year to year and decade to decade. Climate change is likely to add to this natural variation. What is currently an unusually hot or dry year is expected to become the norm by the 2030s while an unusually hot year in the 2030s is likely to be outside the range of temperatures we experience today.

These changes could result in both positive and negative effects, for example:

- **Agricultural productivity** is expected to increase in some areas and there will be the potential for commercialisation of new crops, but there is a risk of **drought** and **spreading pests and diseases** and there would be costs associated with changing land-use activities to suit a new climate.

- People are likely to enjoy the benefits of warmer winters with fewer frosts (and lower heating costs!) but hotter summers will bring increased risks of **heat stress** and **sub-tropical diseases.**
- **Forests and vegetation** may grow faster due to higher temperatures, but native ecosystems could be invaded by harmful **exotic species** and forest fires are likely to become an increasing risk.
- Drier conditions in some areas are likely to be coupled with rising sea levels which would likely increase the risk of **erosion of coastal land** and **saltwater intrusion**, increasing the need for coastal protection.
- Snowlines and glaciers are expected to retreat **changing water flows** in major South Island rivers.

Why plan for climate change?

The effects of climate change (such as rising sea levels and changes in rainfall) cannot be avoided over the next decade and beyond. International efforts to reduce greenhouse gas emissions will help reduce the rate of climate change, however, and make it easier for communities to adapt. The effects of climate change are reasonably predictable, but will vary from region to region throughout New Zealand. Decisions made today may affect how communities cope with these future changes. For local authorities, this means the effects of climate change should be factored into long-term emergency and hazard management planning, land-use planning, and whenever council is considering new infrastructure and assets with a lifetime of more than 30 years. Of particular importance are:

- stormwater system capacity and design
- water use rights and irrigation scheme placement and design
- development decisions relating to areas prone to river and sea flooding
- decisions relating to housing and infrastructure in areas prone to coastal erosion
- land-use decisions, including those affecting management options for native ecosystems.

The sooner the better

It's not too soon to start planning for climate change. Councils already consider climate variations and the likelihood of extreme weather events as they develops plans, mitigate risks and provide services to the community. Climate change can be considered as an integral part of all of these activities because it affects the range of weather extremes and climate variations that need to be managed. New processes are not expected to be needed – consideration of the effects of climate change can be built into existing processes whenever climate itself plays a role.

Being proactive about climate change may save your community money in the long run. Your community's resilience to present climate extremes such as floods or droughts can be improved and major costs avoided in future years if climate change is considered in investment and planning decisions. It is likely to cost significantly more if communities delay addressing climate change until the effects are felt. By adopting a proactive approach, you are also more likely to avoid locking your council into land-use decisions

that reduce flexibility to adapt to the effects of climate change. For example, existing use rights can make it difficult to respond to climate change effects and increase costs.

Important short-term benefits can also be gained from adaptation measures. For example, planning now for future reductions in water availability can help increase the resilience of your community to drought *right now*.

Acting now can minimise costs

Adapting to climate change may involve extra costs, but these are likely to be minimal compared with the costs that may arise from a weather-related emergency event or unscheduled/early maintenance or upgrade costs. Costs can be minimised if the effects of climate change are considered when:

- infrastructure is upgraded
- plans come up for review
- long-term community plans are under development.

Not all consideration of climate change effects will lead to increased project costs or amendments to existing plan provisions. For example, an assessment of future rainfall projections may show that current stormwater system capacity is adequate and no change is needed.

Legislation and climate change

Local authorities have a range of functions and responsibilities under the Local Government Act 2002, the Resource Management Act 1991 (RMA) and other legislation relevant to managing climate change effects.

The Local Government Act 2002 aims to ensure the sustainable development of communities, for example through long-term community planning. The goal of 10-year community plans is to describe community outcomes for a district or region and provide a long-term focus for community decisions *well beyond* the 10-year plan period.

The Civil Defence and Emergency Management Act 2002 provides a forward-looking approach for preventing or limiting emergencies. This includes natural disasters that may result from climate change, for example more intense tropical cyclones, storms and floods.

Resource Management (Energy and Climate Change) Amendment Act 2004

This Act came into force on 2 March 2004. It recognises the Government's preference for national coordination of controls on greenhouse gas emissions and gives greater emphasis to climate change and energy matters in RMA planning and decision making.

The Act makes explicit provisions within section 7 of the RMA for all persons exercising functions and powers under the Act to have particular regard to the:

- effects of climate change
- the efficiency of the end use of energy
- benefits to be derived from the use and development of renewable energy.

For more information on the Amendment Act 2004, visit http://www.mfe.govt.nz/laws/rma/energy-climate.html.

Issues to consider

As councillors and managers you are already addressing a wide range of climate issues in your plan development, asset management and regulatory roles. Actively planning for climate *change* will provide a flexible 'no regrets' approach to dealing with issues that may arise in your area in the future.

Issues to consider include:

- What are the likely effects of climate change in my region?
- Are adequate controls in place to consider the effect of climate change when amending or developing plans?
- How might asset and resource management decisions change to reflect the increasing risk of coastal erosion, flooding, salinisation of freshwater and drainage problems?
- Are the council's emergency and hazard management systems designed to cope with the increased risks of a changing climate?
- Will existing flood plain management decisions be adequate to cope with changing rainfall and a likelihood of increased storm events?
- Will the council's water allocation framework cope with future demands in a changing climate?
- Are my community's stormwater and drainage systems designed to cope with high intensity storms or rising sea levels?
- Are my region's lowland water supplies safe from increased salinisation?
- Will the community's water supply cope with future demands in a changing climate?
- Can vulnerable coastal roads continue to be maintained?
- What development is appropriate in areas that may be prone to more frequent river flooding?
- What degree of coastal property development is appropriate in my community, given higher likelihoods of coastal inundation and erosion?

Information for councils

A range of information materials have been developed by the Ministry for the Environment's Climate Change Office to help local authorities understand and plan for climate change effects. The materials include up-to-date national and regional

information on climate change prepared by scientists, planners and engineers in consultation with local government.

Climate Change Effects and Impacts Assessment provides information on future climate change effects around New Zealand, identifies the potential impacts of these changes, and suggests a framework for councils to prioritise local climate change risks when policy-making and planning.

Coastal Hazards and Climate Change provides councils with information on climate change-related coastal hazards and outlines a decision-making framework to respond to these.

You can access all documents (and a range of other climate change-related information relevant to councils) at: http://www.climatechange.govt.nz/resources/local-govt/index.html

Other climate change programmes

Adapting to climate change is only one of the actions your community can take. The New Zealand Climate Change Office is developing a range of programmes aimed at helping communities reduce greenhouse gas emissions and the effects of climate change. These include a voluntary greenhouse programme for councils ('Communities for Climate Protection' New Zealand), a work programme focused on assisting small and medium enterprises, and partnerships with other agencies in supporting national waste management initiatives, the National Energy Efficiency and Conservation Strategy and the New Zealand Land Transport Strategy.

For further information on these programmes, contact the New Zealand Climate Change Office on info@climatechange.govt.nz or visit our website: www.climatechange.govt.nz