



INTRODUCTION TO CLIMATE CHANGE: 10

Effects and impacts: Nelson and Marlborough

KEY EFFECTS

- A longer growing season and reduced frequency of frost.
- The possibility of more frequent hot, dry, summer conditions, more frequent heat waves and increased drought severity and intensity. This could occur even if conditions become wetter on average.
- Run-off decreases of around 40 percent could be experienced in eastern Marlborough, with the likelihood of decreases in other areas in the summer months.
- Depending on changes to weather patterns, there could also be the possibility of an increase in frequency and intensity of high rainfall events, which could lead to increased problems with erosion and flooding.

KEY CHANGES

- Horticultural crops, such as kiwifruit and wine grapes, are likely to show the greatest gains, benefiting from higher average temperatures.
- The greatest losses are likely to arise from the effects of possible decreases in water availability, increases in summer drought frequency and severity, and the possibility of increased flood risk.



Average annual temperatures are likely to increase by about 1.0°C by mid-century and by about 2.0°C by 2100. Most warming is likely in summer and autumn, with less warming in spring. Eastern Marlborough and the Kaikoura Coast are likely to become drier, while annual rainfall will increase in Nelson and Blenheim and the inland high country. However, summers may become drier.

LIKELY IMPACTS AND OPPORTUNITIES

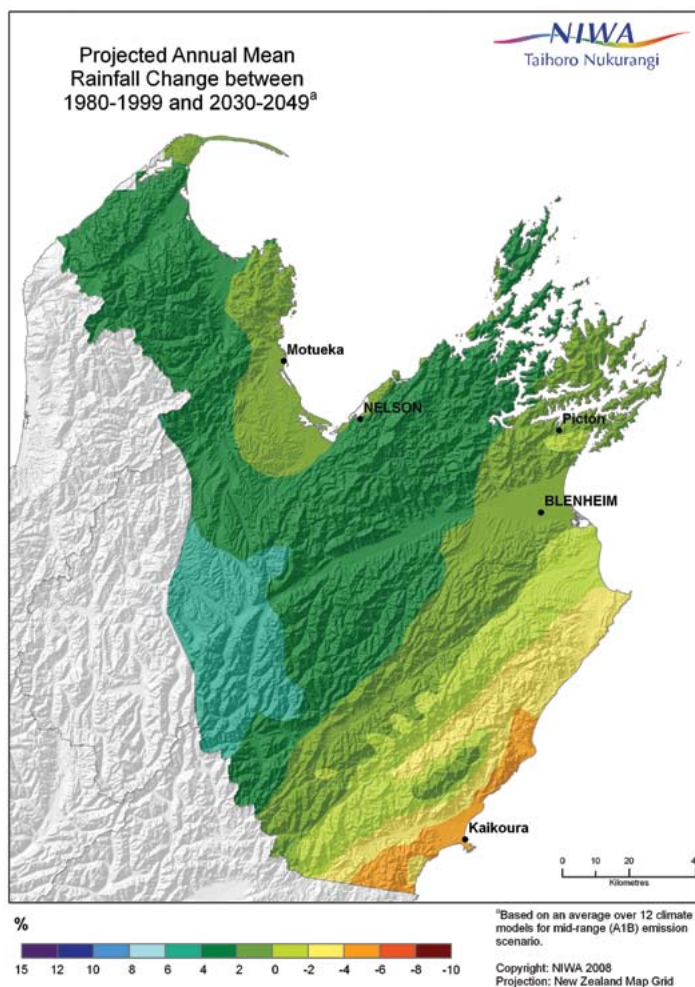
- There could be pasture productivity gains in wetter areas of Nelson. With increased drought frequency there could be a reduction in average summer pasture productivity in Marlborough.
- Changes in pasture composition are likely. A number of undesirable sub-tropical grass species are already present in parts of Nelson and Marlborough. Paspalum has already spread in parts of the eastern Nelson hills and is likely to become more widespread with warmer, wetter average conditions.
- There may be effects on animal health over time, such as increased risk of facial eczema. Any such changes are likely to lag behind changes in the North Island.
- The risk of fires in rural areas may also increase.
- Availability of water for irrigation is already a limiting factor for fruit production and will become increasingly so.
- Wine grapes will benefit greatly from warmer conditions. However, warmer conditions, combined with possible rainfall increases in summer and autumn could increase problems with diseases such as *botrytis*.
- Apples are unlikely to be greatly affected over the next 50 years although in hot dry summers there could be greater problems with watercore and sunburn.
- In Nelson a summerfruit industry could be re-established. This fruit type disappeared over the last 10 years due to unseasonal, late spring frosts. If Nelson's early spring remains moist and warmer than is typical, then fungal diseases may inhibit the growth of a strong summerfruit industry.
- Conditions will generally become increasingly suitable for kiwifruit production over the next 50 years. There will continue to be sufficient winter chilling for budbreak in Nelson over the next 100 years. Problems with low dry matter due to cool summers will become less important as conditions become warmer on average.
- The high alpha hop varieties suit the current coastal climate of Motueka and Riwaka, while the aroma varieties with low alpha acid suit the inland area of Tapawera. With climate change the high alpha varieties may suit both hop growing areas in the district in 50 years time.
- It is anticipated that pest and disease regimes for all fruit crops could change, particularly through warmer winters.

- Security of water supply is likely to be the greatest issue for Nelson and Marlborough even if the worst effects of climate change are not realised. Drier average summer conditions, together with growth in demand for water, is likely to place increasing pressure on available water resources.
- Changes in rainfall, with the possibility of more extremes of wet and dry, will have consequences for local and regional infrastructure including land drainage; flood protection; community water schemes; culverts and bridges; erosion control; farm dams; water reticulation, and irrigation.

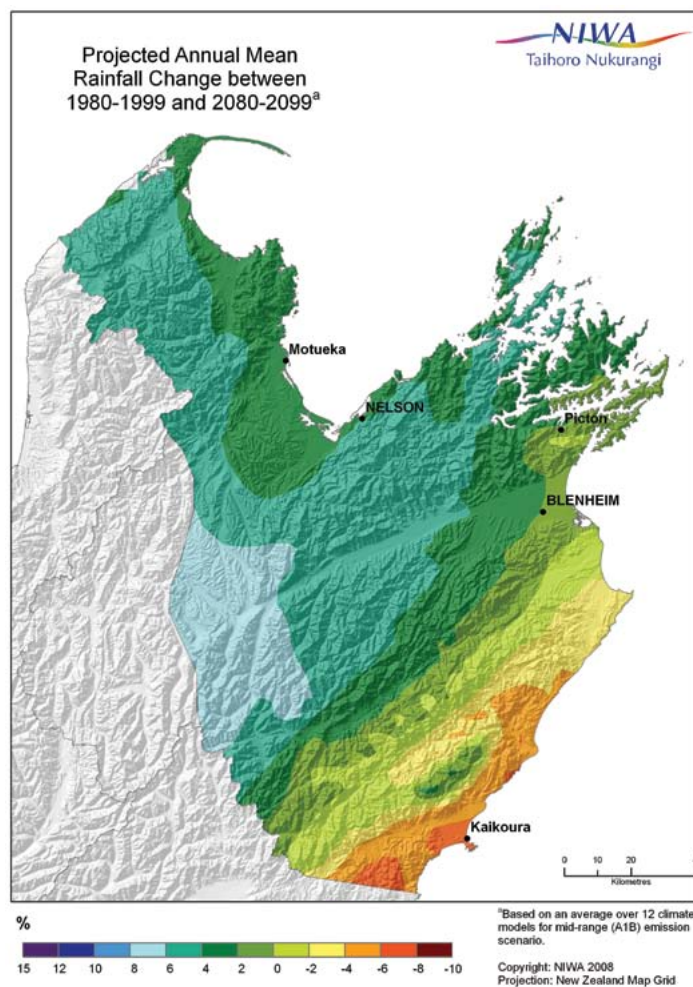


ANNUAL AVERAGE RAINFALL

The maps below show the projected trend in annual average rainfall that could be expected by 2050 and 2100, compared to the average for 1980–1999.



2050: Eastern Marlborough and Kaikoura become drier by mid-century, with less annual rainfall change in Blenheim and Nelson. Annual rainfalls may increase inland.



2100: Coastal Marlborough and Kaikoura annual rainfall decreases further, while inland rainfalls are very likely to increase. Seasonal changes in Blenheim and Nelson are less certain.

RANGES OF UNCERTAINTY IN TEMPERATURE AND RAINFALL PROJECTIONS

In the table below the first number shown is a mid-range estimate of what the change will be, and the figures in brackets give the modelled range within which the change could lie. Mean [lower, upper].

For example, the average summer temperature in Tasman-Nelson is likely to increase by 2.2 °C by 2090 but estimates of the expected temperature increase range between 0.9 and 5.6 °C.

CHANGE IN TEMPERATURE °C	SUMMER	AUTUMN	WINTER	SPRING	ANNUAL
TASMAN-NELSON					
2040	1.0 [0.2, 2.2]	1.0 [0.2, 2.3]	0.9 [0.2, 2.0]	0.7 [0.1, 1.8]	0.9 [0.2, 2.0]
2090	2.2 [0.9, 5.6]	2.1 [0.6, 5.1]	2.0 [0.5, 4.9]	1.7 [0.3, 4.6]	2.0 [0.6, 5.0]
MARLBOROUGH					
2040	1.0 [0.2, 2.1]	1.0 [0.2, 2.4]	0.9 [0.2, 2.0]	0.8 [0.1, 1.8]	0.9 [0.2, 2.1]
2090	2.1 [0.9, 5.6]	2.1 [0.6, 5.0]	2.1 [0.6, 5.0]	1.8 [0.3, 4.8]	2.0 [0.6, 5.1]
CHANGE IN RAINFALL %					
NELSON					
2040	4 [-14, 27]	5 [-2, 19]	1 [-4, 9]	0 [-8, 9]	2 [-3, 9]
2090	6 [-13, 30]	5 [-4, 18]	6 [-2, 19]	-1 [-20, 19]	4 [-3, 14]
BLLENHEIM					
2040	3 [-16, 25]	4 [-4, 24]	-1 [-10, 7]	-1 [-7, 10]	1 [-5, 9]
2090	5 [-15, 28]	5 [-5, 16]	1 [-14, 9]	-1 [-18, 20]	2 [-7, 13]

Source

Ministry for the Environment (2008). *Preparing for climate change: A guide for local government in New Zealand*.

THIS FACT SHEET IS ONE IN A SERIES CALLED INTRODUCTION TO CLIMATE CHANGE

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SOURCES

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WWW.MAF.GOV.TZ.NZ

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- Kenny, G (2008) *Adapting to climate change in the kiwifruit industry*.

MINISTRY FOR THE ENVIRONMENT

WWW.MFE.GOV.TZ.NZ

- *Preparing for Climate Change: A guide for local government* (2008). Ref: ME534
- *Climate Change: Impacts on New Zealand* (2001). Ref: ME396
- *Likely impacts on New Zealand agriculture* (2001). Ref: ME412

- *Regional summaries of climate change*.
- *Climate change effects and impacts assessment: A guidance manual for local government in New Zealand* (2008). Ref: ME870

OTHER

- *The International Global Change Institute's CLIMPACTS programme: Examining the sensitivity of the New Zealand Environment to Climate Variability and Change*. Available on the University of Waikato website www.waikato.ac.nz
- *Adapting to climate change in eastern New Zealand* (2005). Published by Earth Limited on their website www.earthlimited.org

FOR MORE INFORMATION

- For general information on climate change for land-based sectors visit the Ministry of Agriculture and Forestry website www.maf.govt.nz
- For more information on climate change in New Zealand visit www.climatechange.govt.nz or the Ministry for the Environment's website www.mfe.govt.nz
- For information on animal health and insect and plant pests and diseases visit www.biosecurity.govt.nz
- For a popular guide to the IPCC reports, visit the website of the United Nations Environment Programme www.grida.no
- Your local council may also have information on climate change. Visit www.localcouncils.govt.nz for a list of council websites.

The following websites provide a range of resources and publications related to climate change adaptation.

INDUSTRY

- Dairy NZ www.dairynz.co.nz
- Fert Research www.fertresearch.org.nz
- Foundation for Arable Research www.far.org.nz
- Horticulture NZ www.hortnz.co.nz
- Beef + Lamb New Zealand www.meatnz.co.nz
- NZ Kiwifruitgrowers Inc. www.nzkgi.org.nz
- NZ Forest Owners Association www.nzfoa.org.nz
- Organics Aotearoa NZ www.oanz.org.nz
- Sustainable Winegrowing New Zealand www.nzwine.com

CROWN RESEARCH INSTITUTES

- AgResearch www.agresearch.co.nz
- GNS www.gns.cri.nz
- Landcare Research www.landcareresearch.co.nz
- NIWA www.niwa.co.nz