



INTRODUCTION TO CLIMATE CHANGE: 6

Effects and impacts: Northland and Auckland

KEY EFFECTS

- Increased risk of longer dry periods.
- Extreme rainfall events may be greater in intensity.
- The greatest reduction in rainfall is likely in winter and spring, increasing the risk of early drought.
- Annual temperature increases of about 1.0°C by mid-century and more than 2.0°C by 2100.
- Most warming is likely in summer.

KEY CHANGES

- The greatest gains are likely to arise from increased opportunities to grow a greater diversity of sub-tropical, and possibly some tropical, fruit crops in Northland.
- Greatest losses could result from an increased incidence of invasive pests, affecting both pasture and horticultural crops.



Photo: Bob Zuur.

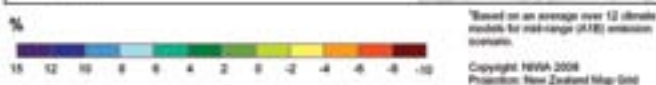
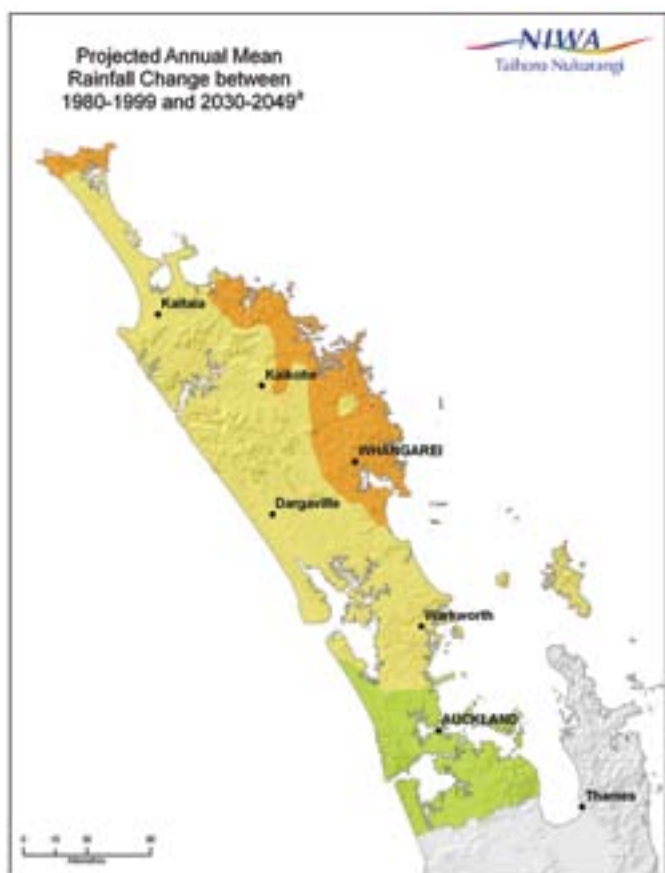
Overall, the climate of these regions could experience increasingly sub-tropical conditions as the century advances. Average annual rainfall is likely to decrease by up to four percent in Auckland and western Northland, and by 5–10 percent in the north and east of the region. With this comes a consequent increase in drought risk. The intensity of ex-tropical cyclones is likely to increase and when these occur there will be an increased risk of damage from heavy rain and strong winds.

LIKELY IMPACTS AND OPPORTUNITIES

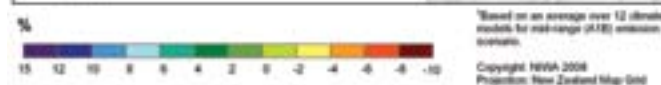
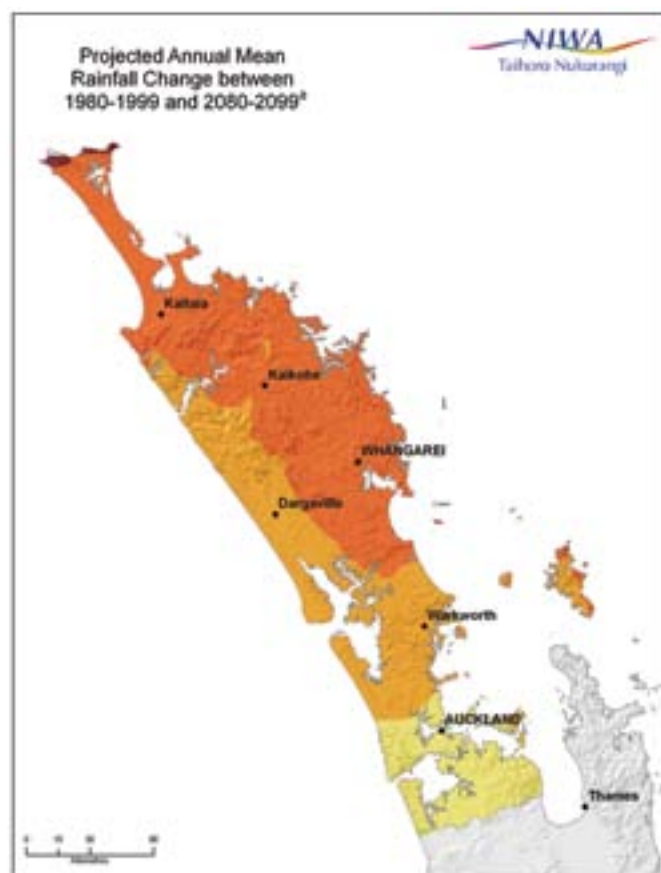
- Northland could experience increases in temperate pasture yield although high summer temperatures could become increasingly limiting over time. The extent to which any production gains are realised in pastoral systems will depend strongly on changes in pasture composition.
- Sub-tropical grasses such as kikuyu and paspalum are already widespread and will become more so.
- Animal health effects could include increased heat stress on cattle, and increased incidence of diseases such as facial eczema. Lower winter rainfall in eastern Northland could improve conditions for rearing young livestock during the cold months.
- Increased problems with insect pests are likely. Recent experiences in Northland with tropical grass webworm and guava moth are indicative of what could occur more often with climate change.
- Hayward kiwifruit production may become uneconomic in Northland over the next 50 years, due to a lack of winter chilling.
- Sub-tropical crops such as avocados and citrus will benefit from a trend towards warmer average conditions. Some tropical fruit crops can presently be grown in localised micro-climates in Northland but it is likely that opportunities for these crops will increase.
- More frequent, intense rainfall will require ongoing improvements in erosion control and better drainage particularly in the vegetable growing areas, such as Pukekohe where management systems may need to change.
- There could be increased pressure on water resources in drought periods, and greater flooding and erosion risk with any intensification and increased frequency of rainfall.
- Several pest plants, such as lantana, currently found in small or not very vigorous infestations in Northland, could become a serious pest through parts of northern New Zealand, if there were even a slight increase in temperature. Warming would not only increase the number of pest plants but would also shorten the time-span over which a plant becomes established and becomes a problem.
- 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 Northland is most affected with 4–6 percent less rainfall annually. Auckland rainfall decreases by just 2 percent or less.



2100: Eastern Northland rainfall is reduced by up to 8 percent. Auckland annual rainfall reduces by 2–4 percent.

RANGES OF UNCERTAINTY IN TEMPERATURE AND RAINFALL PROJECTIONS

The first number is a mid-range estimate of what the change will be, and the figures in brackets give the range within which the change could lie. Mean [lower, upper]. For example, the average summer temperature in Northland is likely to increase by 2.3 °C by 2090, but estimates of the expected temperature increase range between 0.8 and 6.6 °C.

| CHANGE IN TEMPERATURE °C | SUMMER | AUTUMN | WINTER | SPRING | ANNUAL |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|
| NORTHLAND | | | | | |
| 2040 | 1.1 [0.3, 2.7] | 1.0 [0.2, 2.9] | 0.9 [0.1, 2.4] | 0.8 [0.1, 2.2] | 0.9 [0.2, 2.6] |
| 2090 | 2.3 [0.8, 6.6] | 2.1 [0.6, 6.0] | 2.0 [0.5, 5.5] | 1.9 [0.4, 5.5] | 2.1 [0.6, 5.9] |
| AUCKLAND | | | | | |
| 2040 | 1.1 [0.3, 2.6] | 1.0 [0.2, 2.8] | 0.9 [0.2, 2.4] | 0.8 [0.1, 2.2] | 0.9 [0.2, 2.5] |
| 2090 | 2.3 [0.8, 6.5] | 2.1 [0.6, 5.9] | 2.0 [0.5, 5.5] | 1.9 [0.4, 5.4] | 2.1 [0.6, 5.8] |
| CHANGE IN RAINFALL % | | | | | |
| WHANGAREI | | | | | |
| 2040 | 1 [-14, 23] | 1 [-15, 33] | -9 [-38, -1] | -9 [-25, 3] | -4 [-16, 7] |
| 2090 | 0 [-20, 19] | 1 [-27, 26] | -12 [-45, -0] | -16 [-45, 1] | -7 [-28, 2] |
| MANGERE | | | | | |
| 2040 | [-17, 20] | 1 [-14, 17] | -1 [-10, 5] | -5 [-15, 10] | -1 [-10, 6] |
| 2090 | -1 [-33, 20] | -2 [-21, 12] | -1 [-12, 9] | -9 [-30, 11] | -3 [-13, 9] |

Source

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

SOURCES

MINISTRY OF AGRICULTURE AND FORESTRY

WWW.MAF.GOV.TZ

- *The EcoClimate report: Climate change and agricultural productions* (2008).
- Kenny, G (2008) *Adapting to climate change in the kiwifruit industry*.

MINISTRY FOR THE ENVIRONMENT

WWW.MFE.GOV.TZ

- *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.TZ
- *Adapting to climate change in eastern New Zealand* (2005). Published by Earth Limited.org 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.GOV.TZ
- For more information on climate change in New Zealand visit WWW.CLIMATECHANGE.GOV.TZ or the Ministry for the Environment's website WWW.MFE.GOV.TZ
- For information on animal health and insect and plant pests and diseases visit WWW.BIOSECURITY.GOV.TZ
- 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.GOV.TZ 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.TZ
- Fert Research WWW.FERTRESEARCH.ORG.TZ
- Foundation for Arable Research WWW.FAR.ORG.TZ
- Horticulture NZ WWW.HORTNZ.CO.TZ
- Beef + Lamb New Zealand WWW.MEATNZ.CO.TZ
- NZ Kiwifruitgrowers Inc. WWW.NZKGI.ORG.TZ
- NZ Forest Owners Association WWW.NZFOA.ORG.TZ
- Organics Aotearoa NZ WWW.OANZ.ORG.TZ
- Sustainable Winegrowing New Zealand WWW.NZWINE.COM

CROWN RESEARCH INSTITUTES

- AgResearch WWW.AGRESEARCH.CO.TZ
- GNS WWW.GNS.CRI.TZ
- Landcare Research WWW.LANDCARERESEARCH.CO.TZ
- NIWA WWW.NIWA.CO.TZ

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

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