



<climate change

OUR CLIMATE IS **CHANGING**,  
AND IT IS GOING TO KEEP **CHANGING**



# Climate Change

It's getting hotter.

Our climate is changing so you'd better get used to it.

It is changing because of what we humans do and the gases we have put into the atmosphere. We have already put so much gas into the atmosphere the climate will keep changing for a long, long time.

Some of the changes may be good (at least in the short-term) and some may be bad. But change is a near certainty.

We have known for 25 years that the atmosphere was changing. The most obvious sign was an increase in carbon dioxide, the gas we breathe out and the gas produced when we burn fossil fuels such as coal and petrol. This is the same gas that is absorbed by plants to make food.

Before 1900 the amount of carbon dioxide in the atmosphere was 270 to 280 parts per million. Now it has grown to 380 parts per million. In the same time, the world has become steadily hotter. 1998 and 2005 are the hottest years on record and five out of six of our hottest years have been in the last five years. The evidence linking the temperature changes to carbon dioxide is overwhelming.

## Not just hotter

Because the atmosphere is getting hotter it is also getting more energetic. This means that in some places it will be windier, in some places wetter, in some places drier. In some places it may even be cooler. That's why we talk about 'climate change' rather than 'global warming'. Although on average it will be warmer, it won't necessarily be warmer everywhere.

## Can we stop it?

No. We can slow it, but we can't stop it for a long, long time. We have already made the greenhouse gas emissions that will keep the atmosphere changing for decades to come. If we could keep the world's greenhouse gas emissions from growing, the temperature will continue to grow as fast as it is now. If we could cut emissions by half, the world would still keep getting hotter for a hundred plus years. But if we act soon, we can make sure the changes can be managed and kept to a minimum, and we can adapt to them.

Fact

### OUR CONTRIBUTION

< 0.2% of total global Greenhouse Gas emissions

< The United States of America (21%), China (15%) and European Union (14%) are the top 3 emitters

< New Zealand is 11th in the world per capita – Greenhouse Gas emissions (19 tonnes CO<sub>2</sub>e/person)

< New Zealand is 32nd in the world per capita – CO<sub>2</sub> emissions

< The difference between CO<sub>2</sub> and total Greenhouse Gas emissions is the large contribution of methane and nitrous oxide from agriculture.

Fact

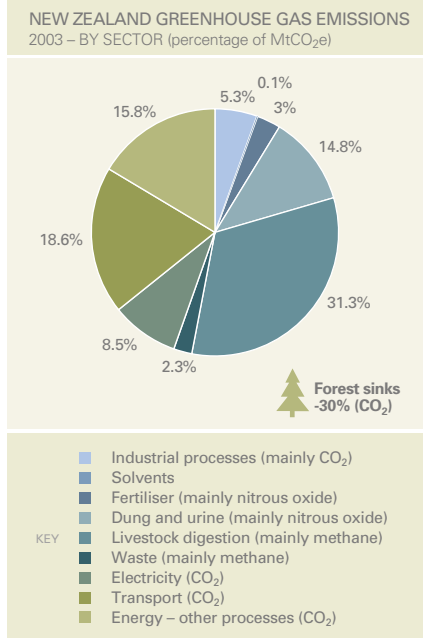
### THE GREENHOUSE GASES

OUR ACTIVITIES RELEASE GASES THAT CONTRIBUTE DIRECTLY TO CLIMATE CHANGE – key gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

We call these gases ‘greenhouse gases’ because of the warming they cause. Carbon dioxide has a bigger total effect than all the other gases we make put together. But methane matters in New Zealand too.

Because we use so much of it, most of the carbon dioxide is released when we burn fossil fuels like coal and petrol.

All these gases – the ones we produce, and the water vapour in the atmosphere – warm the Earth because they let the sun’s heat through but block some of the heat escaping back out to space.



WORLD EMITTERS

Countries (Annex I* in blue)	MtCO <sub>2</sub> equivalent	Percentage of world
United States of America	6933	20.6
China	4941	14.7
European Union (25)	4728	14.0
Russian Federation	1917	5.7
India	1885	5.6
Japan	1318	3.9
Germany	1010	3.0
Brazil	852	2.5
Canada	681	2.0
United Kingdom	654	1.9
Italy	531	1.6
Korea (South)	521	1.5
France	514	1.5
Mexico	512	1.5
Indonesia	503	1.5
Australia	491	1.5
New Zealand	73	0.2

\* Annex 1: Parties include the industrialised countries that were members of the Organisation for Economic Co-operation and Development in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

### What does this mean for New Zealand?

We are minnows in the climate change world. The 0.2 percent of global greenhouse gas emissions this country produces makes us a tiny player. But we will be just as affected by climate change as everyone else so we need to do our bit to slow it down. Just about every country wants to keep down its emissions whilst the world searches for a better response. We need to be a part of the global effort.

Half of New Zealand’s greenhouse gas emissions come from farming, about 18 percent from transport fuels, five percent from industry and eight percent from electricity production.

Between 1990 and 2003 we increased greenhouse gas emissions by about 13 million tonnes (including five million from transport and five million from agriculture). Between 1990 and 2000, the United States of America increased their greenhouse gas emissions by 895 million tonnes and China increased by 1188 million tonnes.



Fact

THE ROLE OF PINE PLANTATION FORESTS IN 2003, NEW ZEALAND’S TOTAL GREENHOUSE GAS EMISSIONS WERE 75 MILLION TONNES.

Balanced against what we sent up into the atmosphere, our plantation forests extracted and stored 24 million tonnes of carbon dioxide.

## What do we know about how climate change will affect New Zealand?

We know that New Zealand's climate is changing, though not as fast as some other places. Oceans warm up more slowly than land, so the oceans around New Zealand are likely to slow down our change.

Over the 80 years between 1920 and 2000, our average annual temperature rose by 0.6°C. A safe bet is that we will warm up by a further 1.6°C within the next 80 years.

Winters are expected to be warmer. The north in particular is likely to get warmer. That means an even bigger difference in average temperatures between Kaitiāia and Bluff.

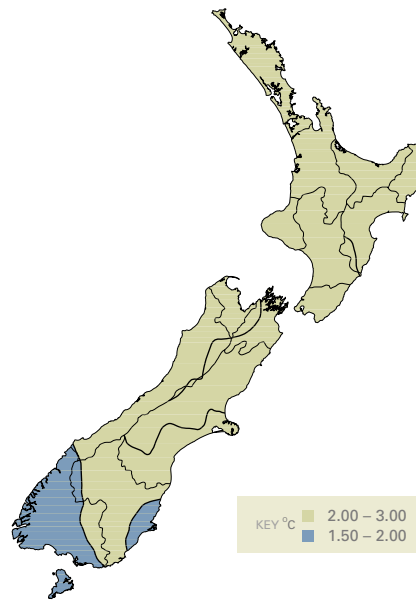
We're likely to get more days with what we would call extreme high temperatures.

Eastern parts of New Zealand are expected to get drier and have more droughts, while the west will get even wetter. We expect heavy rain to fall more often (even in areas getting more droughts), so there may be more floods.

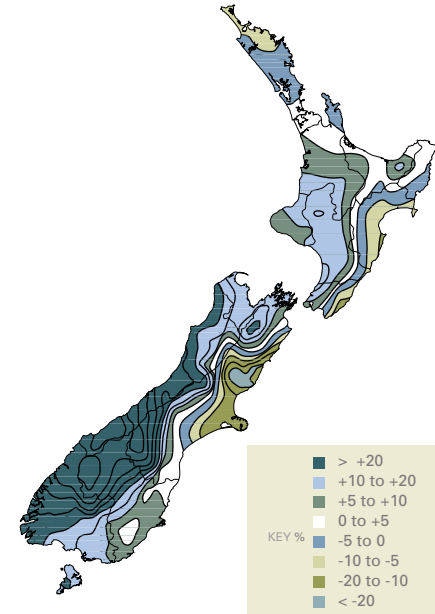
There are expected to be fewer frosts and less snow.

The sea level will continue to rise. It is already 160 millimetres higher now than it was in 1900.

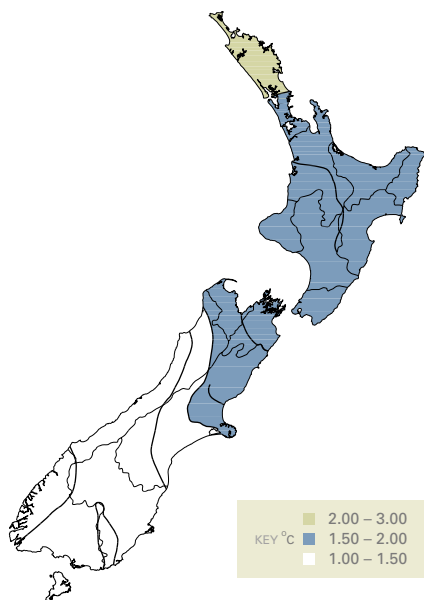
INCREASE IN AVERAGE WINTER TEMPERATURE OVER THE NEXT 80 YEARS



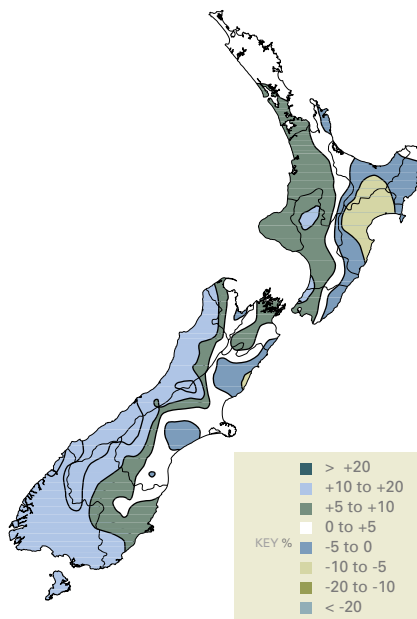
CHANGE IN AVERAGE WINTER RAIN (OR SNOW) FALL OVER THE NEXT 80 YEARS



INCREASE IN AVERAGE SUMMER TEMPERATURE OVER THE NEXT 80 YEARS



CHANGE IN AVERAGE SUMMER RAIN (OR SNOW) FALL OVER THE NEXT 80 YEARS



## The bottom line

It seems that the climate is changing and is going to keep changing. But if all the countries of the world act, and act soon, the risks from climate change can be reduced.

