# Background information

## What is climate change?

The United Nations Framework Convention on Climate Change (UNFCCC) states that 'climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.'

## Greenhouse effect

The Earth's climate is driven by a continuous flow of energy from the sun. Heat energy from the sun passes through the Earth's atmosphere and warms the Earth's surface. As the temperature increases, the Earth sends heat energy back into the atmosphere. Some of this heat is absorbed by gases such as carbon dioxide ($CO_2$), water vapour, methane, etc. These gases, which are all naturally occurring, act as a blanket, trapping in the heat keeping the Earth's average temperature at about 15°C, warm enough to sustain all life. Without these gases, the average temperature would plummet and everything would freeze.[1]

## Human activities and climate change

The amount of naturally produced $CO_2$ is almost perfectly balanced by the amount naturally removed. Small changes in human activity can have a significant impact on this balance. Scientists have discovered that the rate of global warming is far beyond what can be explained by natural changes. Data from the World Resources Institute (WRI) shows that humans have added 2.3 trillion tonnes of $CO_2$ to the atmosphere in the last 200 years. Half of this amount was added in the last 30 years. The largest absolute increase in $CO_2$ emissions occurred in 2004, when burning fossil fuels alone added more than 28 billion tonnes to the atmosphere.[2]

## What are the impacts of climate change?

### Change in temperature

In 2007 the Intergovernmental Panel on Climate Change (IPCC), released a report on climate change. It found that:

- in the last 100 years the Earth has warmed by 0.74°C;
- eleven of the last 12 years (1995-2006) rank among the 12 warmest years since 1850; and
- there is a risk that by the end of the 21st century temperatures could rise by between 1.1 and 6.4°C.

Increased global temperatures are already associated with a reduction in polar ice, melting of glaciers and thawing of permanently frozen ground in high latitudes. At a regional or local scale, it is uncertain as to how much climate change will affect snowfall and the altitude of snowlines.[3]

## What's the difference between weather and climate?

The difference between weather and climate is a measure of time. **Weather** is a description of conditions over a short period of time – a 'snapshot' of the atmosphere at a particular time. **Climate**, on the other hand, is the sum or synthesis of all the weather recorded over a long period of time.

## Rising sea levels

The increase in ocean temperatures will not only melt polar ice and glaciers, it will also make the volume of water in oceans expand. Both of these processes contribute to rising sea levels.

1 http://wwf.panda.org/about_our_earth/aboutcc/how_cc_works/

2 WRI, Navigating the numbers, based on data from IEA, EIA, Marland et al, and BP.

3 Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis. Summary for Policymakers, Working Group I, Fourth Assessment Report, Geneva, 2007

The most vulnerable to sea level rises are low-lying oceanic islands, particularly island atolls, and river deltas, such as the Ganges delta in Bangladesh and the communities in the Pacific Islands. In these localities, rising sea levels are already causing groundwater contamination, and submergence during high tides is becoming more frequent. Concerns are now emerging that many island atolls will become uninhabitable, forcing migration of human populations and extinction of island fauna and flora.

## Nature at risk

Scientists predict that under a 2°C global temperature rise about 25% of the Earth's animals and plants will disappear, a 3°C rise would see 35% disappear. In Australia, at least 90 species are considered at risk. Global warming also stresses ecosystems through temperature rises, water shortages, increased fire threats, weed and pest invasions, intense storm damage and salt invasion, just to name a few.

## Humanity at risk

Despite the fact that climate change is being primarily caused by people in wealthy countries, people in developing countries will bear the brunt of the impacts.

**The Stern Report (2006) stated that:**

"The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation. The international community has an obligation to support them in adapting to climate change. Without such support there is a serious risk that development progress will be undermined."

### Water

Climate change will severely affect access to drinkable water supply in a variety of ways. Rainfall changes, combined with projected evaporation increases, are expected to result in reduced run-off across most of Australia. Whereas in many Pacific Island nations, drinkable water supply is at risk of contamination from rising sea levels.

### Agriculture

Climate change is likely to have a significant impact on the agricultural sector, although there is some potential for adaptation. Climate change may affect stock and crop production by increasing the heat stress, increasing outbreaks of pests and disease, and reducing the supply of water and feed.

The IPCC reports that, by 2020, productivity from agriculture in many African countries could be reduced by as much as 50%. These negative impacts on agriculture will compromise food security and increase cases of malnutrition.[3]

### Displacement

The year 1998 was not just the hottest year in a millennium; it was also the first in which more people fled disaster than war, according to the International Red Cross. Drought, floods, deforestation and poor agricultural prospects drove some 25 million environmental displaced persons off the land into already crowded shanty towns. That year, they represented 58% of the total refugee population worldwide.

Some countries, especially the world's small island nations, face obliteration due to climate change and rising sea levels. It is estimated that there will be 150 million climate refugees within 50 years and 75 million in the Asia-Pacific region alone.

## What is climate justice?

The United Nations Universal Declaration of Human Rights says: *Everyone has a right to life, liberty, and security of person*. If climate change leads to crop failures, loss of safe drinking water and civil strife then these rights will be jeopardised. With rights come responsibilities and in the case of climate change we individually and collectively have a duty to protect the Earth, its life forms and its resources for future generations.

Similarly industrialised countries whose economic growth over the last 200 years has been powered by burning large quantities of fossil fuels, resulting in the release of much of the $CO_2$, have a responsibility to support developing nations adapt practices to ensure that they do not follow in the same unsustainable polluting path to development.