

Human Factors

Enhancing the Greenhouse Effect

Human activities contribute emissions of four principal greenhouse gases: carbon dioxide, methane, nitrous oxide and the halocarbons (a group of gases containing fluorine, chlorine and bromine).

Starting from the first industrial revolution in the 1880s, societies have consumed vast amounts of fossil fuels. Burning of fossil fuels emits carbon dioxide gases (main greenhouse gas), thereby raising the amount of CO₂ levels in the atmosphere.

Methane is released from human activities such as agriculture, natural gas distributions and landfills. Nitrous oxide is emitted from fertilizer usage and fossil fuel burning, too. Principal halocarbons, such as chlorofluorocarbons, were used intensively as refrigeration agents. Such chemicals cannot be broken down and consequently cause the depletion of the Earth's stratospheric ozone layer, a barrier that shields the Earth from excessive ultra-violet radiation from the Sun.



Figure 2: *Electricity generation is one of the biggest contributor to climate change (Global Warming).*

State of Global Warming

As a result of the Greenhouse Effect, the average global temperature has been climbing:

According to the World Meteorological Organization (WMO), the decade of 1998-2007 is the warmest on record. The global mean surface temperature for 2007 is currently estimated at 0.41°C/0.74°F above the 1961-1990 annual average of 14.00°C/57.20°F. - [Global Warming - Encyclopedia of Earth](#)

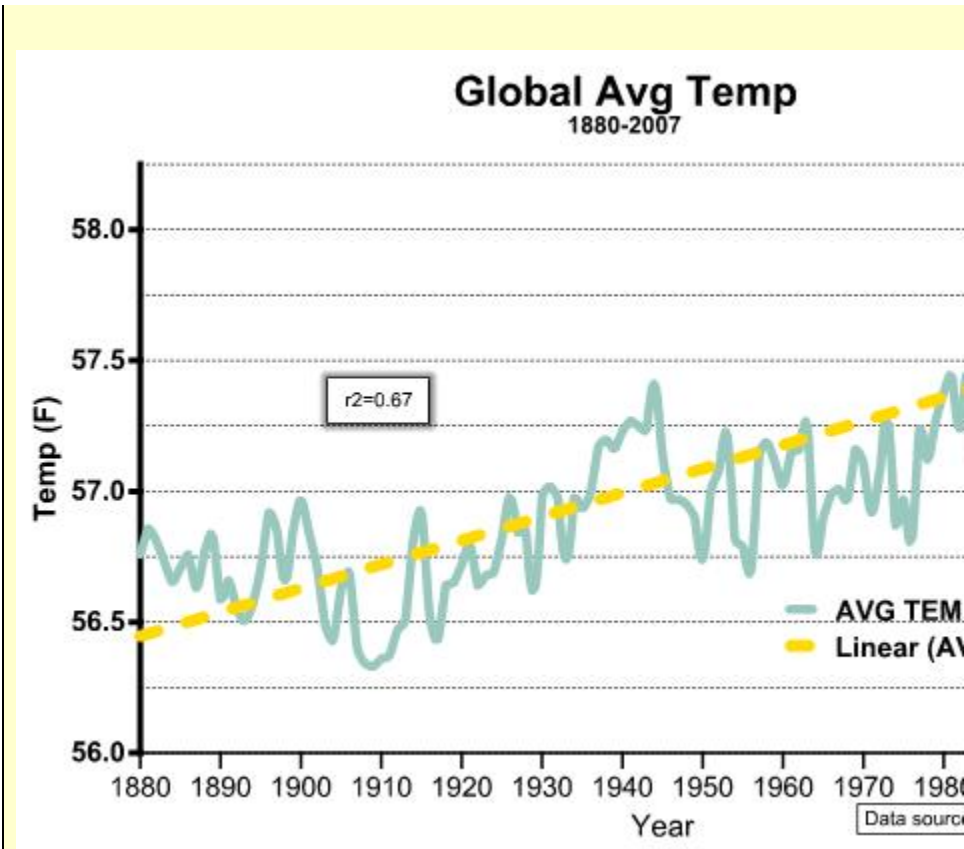


Figure 3: Global Mean Temperature over Land and Ocean (Jan-Dec). (Source: NCDC /NESDIS/NOAA)

Forms of Land Uses

Some scientists believe that land-use changes are as important as greenhouse emissions in terms of great influence on climate change. According to the scientists from the US space agency NASA, changes like deforestation, reconstruction of forests, irrigation and farming have a very strong influence on "regional surface temperature, precipitation and larger-scale atmospheric circulation". As a result, the atmospheric distribution of the Sun's energy differs. (BBC News, Alex Kirby, 2002)

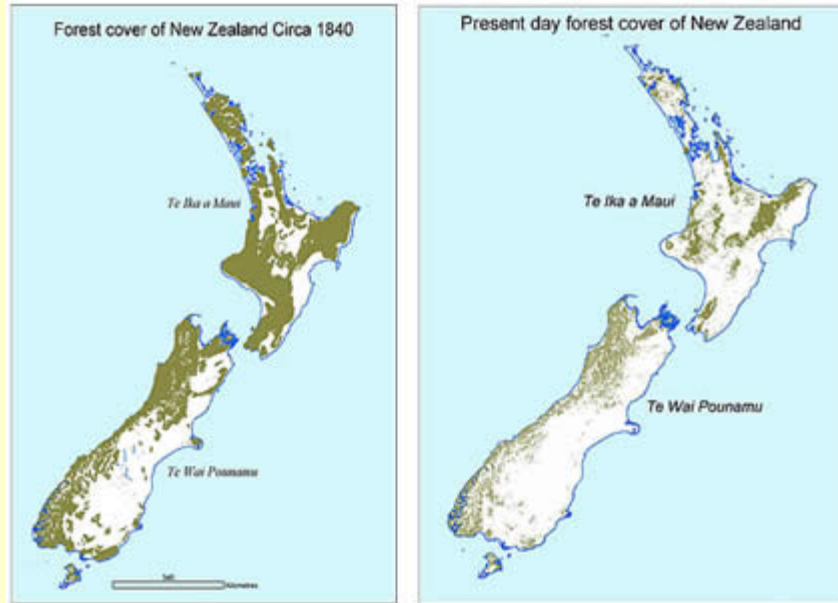


Figure 4 and 5: Substantial land use change in New Zealand since 1840s (Source: [New Zealand's Ministry for the Environment Website](#))

Deforestation

The ceaseless cutting down of forests has propagated the problems of climate change as well.

"Every year, 20 million hectares of rainforest - an area the size of England, Wales and Scotland combined - are cut down, releasing millions of tons of carbon emissions into the atmosphere." - [The Nature Conservancy](#)

Irrigation

A research was conducted in Southeastern Anatolia of Turkey. The research wanted to investigate the correlation between irrigation and climate change. Provided water potential in the area, people of the region began to irrigate for agriculture. After a year of observations, scientists found that the irrigation "increased humidity and decreased temperature mostly in summer months". Also, the albedo of the surface was reduced and resulted in more energy absorbed by the surface.

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References

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