

## Climate Change Factsheet

### What is Climate Change?



Climate change is a long-term shift in the climate of a specific location, region or planet. Climate change occurs when the climate of a specific area or planet is altered between two different periods of time. The shift is measured by changes in features associated with average weather conditions, such as temperature, wind and rainfall patterns.

Apart from natural causes, humans also cause climate to change by releasing greenhouse gases and aerosols into the atmosphere, by changing land surfaces, and by depleting the stratospheric ozone layer.

### Global Warming



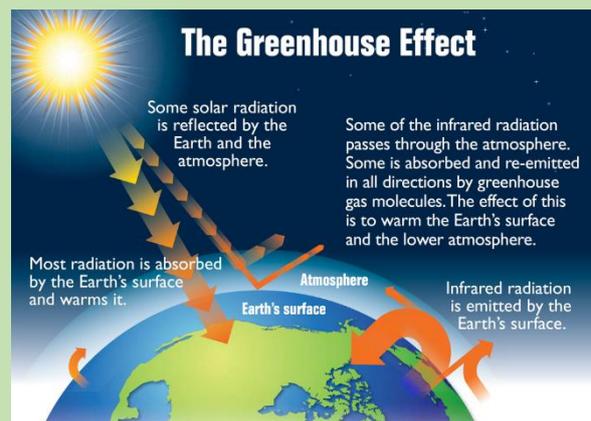
Global warming is probably the greatest environmental threat facing the planet Earth today. It refers to a gradual increase in the overall temperature of the earth's atmosphere generally attributed to the

greenhouse effect caused by increased levels of greenhouse gases and other pollutants.

Global warming is often misunderstood to imply that the world will warm uniformly. In fact, an increase in the average global temperature will also cause the circulation of the atmosphere to change, resulting in some areas of the world warming more, others less. Some areas can even cool.

The country's annual mean surface temperature has warmed by about 0.4°C from 1900 to 2000. The period from 1980 to date has been the warmest since Zimbabwe started recording its temperature.

### What is the Greenhouse Effect?



A natural process known as the “greenhouse effect” regulates temperature on the Earth's surface.

Earth is heated by energy from the sun. When this energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse gases. The absorbed energy warms the atmosphere and the surface of the Earth.

The problem we now face is that of human activities – particularly increased burning of fossil fuels (coal, oil and natural gas), agriculture and land use change – which are

increasing the concentrations of greenhouse gases in the atmosphere. The greenhouse gases trap extra heat, contributing to the warming of the Earth. This is called “Enhanced Greenhouse Effect.”

## What are Greenhouse Gases?



*Greenhouse gases are gases that trap heat in the atmosphere.*

**Water Vapour ( $H_2O$ )** - is the most common greenhouse gas.

**Carbon Dioxide ( $CO_2$ )** - most significant greenhouse gas released by human activities, mostly through the burning of fossil fuels. It is the main contributor to global warming which makes it the focus of many climate change initiatives.

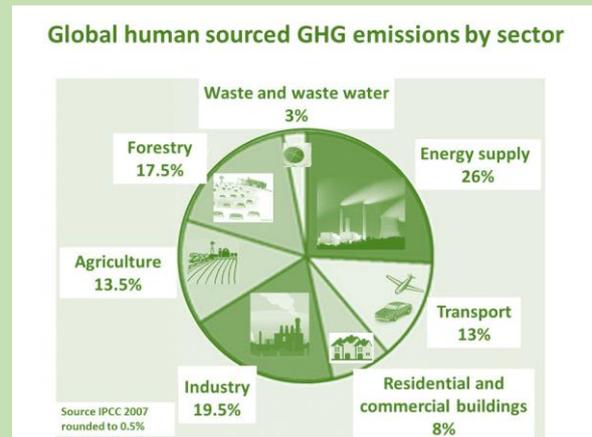
**Methane ( $CH_4$ )**- produced when vegetation is burned, digested or rotted with no oxygen present. Garbage dumps, rice paddies, and grazing cows and other livestock release lots of this gas.

**Nitrous Oxide ( $N_2O$ )** - this gas can be found naturally in the environment but human activities are increasing the amounts. Nitrous oxide is released when chemical fertilizers and manure are used in agriculture.

**Sulphur Hexafluoride ( $SF_6$ )** –this is the most potent greenhouse gas with a global warming potential 22,200 times that of  $CO_2$  over a 100 year period. It has an atmospheric lifetime of more than 1000 years

**Halocarbons** are family of chemicals that include chlorofluorocarbons (CFCs) which also damage the ozone layer, and other human-made chemicals that contain chlorine and fluorine.

The major sources of greenhouse gas emissions are Energy, Agriculture, Industrial Processes and Waste, among others.



Also reported are four indirect greenhouse gases: Nitrogen oxides ( $NO_x$ ), Carbon monoxide ( $CO$ ), Non-methane Volatile Organic Compounds (NMVOC) and Sulphur dioxide ( $SO_2$ ).

$NO_x$ ,  $CO$  and NMVOCs are included in the inventories because they can produce increases in tropospheric ozone concentrations and this increases radiative forcing (warming of the atmosphere). Sulphur dioxide is included because it contributes to aerosol formation which can either warm (through absorption of solar radiation on dark particles) or cool (from forming cloud droplets and reflecting radiation) the atmosphere.

Most greenhouse gases are extremely effective at absorbing heat escaping from the earth and keeping it trapped. In other words, it takes only small amounts of these gases to significantly change the properties of the atmosphere.

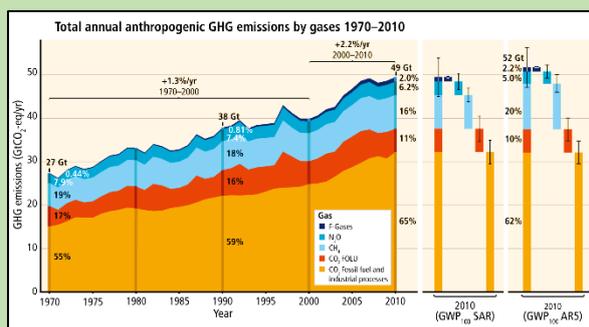
By comparison, the atmospheric greenhouse gases (GHGs) that cause the earth's natural greenhouse effect total less than 1% of the atmosphere. But that tiny amount increases the earth's average surface temperature from -19°C (with no greenhouse gases GHGs) to +14°C (with natural greenhouse gases GHGs) a difference of about 33°C.

### What causes Climate Change?

Earth's climate changes naturally. The changes in the intensity of sunlight reaching the earth cause cycles of warming and cooling that have been a regular feature of the Earth's climate history.

Other natural causes of climate change include variations in ocean currents (which can alter the distribution of heat from one area to another) and volcanic eruptions (dust particles released in an eruption can disrupt the atmosphere).

But today we are having problems keeping this natural balance. Because we burn fossil fuels to heat or homes, run our cars, produce electricity, and manufacture all sorts of products, we are adding more greenhouse gases to the atmosphere



By increasing the amount of these greenhouse gases we have enhanced the warming capability of the greenhouse effect. This has the potential to warm the planet at a rate that has never been experienced in human history.

### What are some of the observed changes in the climate system?

The atmosphere and ocean have warmed; Greenland and Antarctic ice sheets have been losing mass; glaciers have continued to shrink worldwide; sea level has risen. The atmospheric concentrations of greenhouse gases in the atmosphere have increased to unprecedented levels since the pre-industrial period and this has been attributed to human activities.

The globally averaged combined land and ocean surface temperature data as calculated by a linear trend, show a warming of 0.85°C, over the period 1880 to 2012.

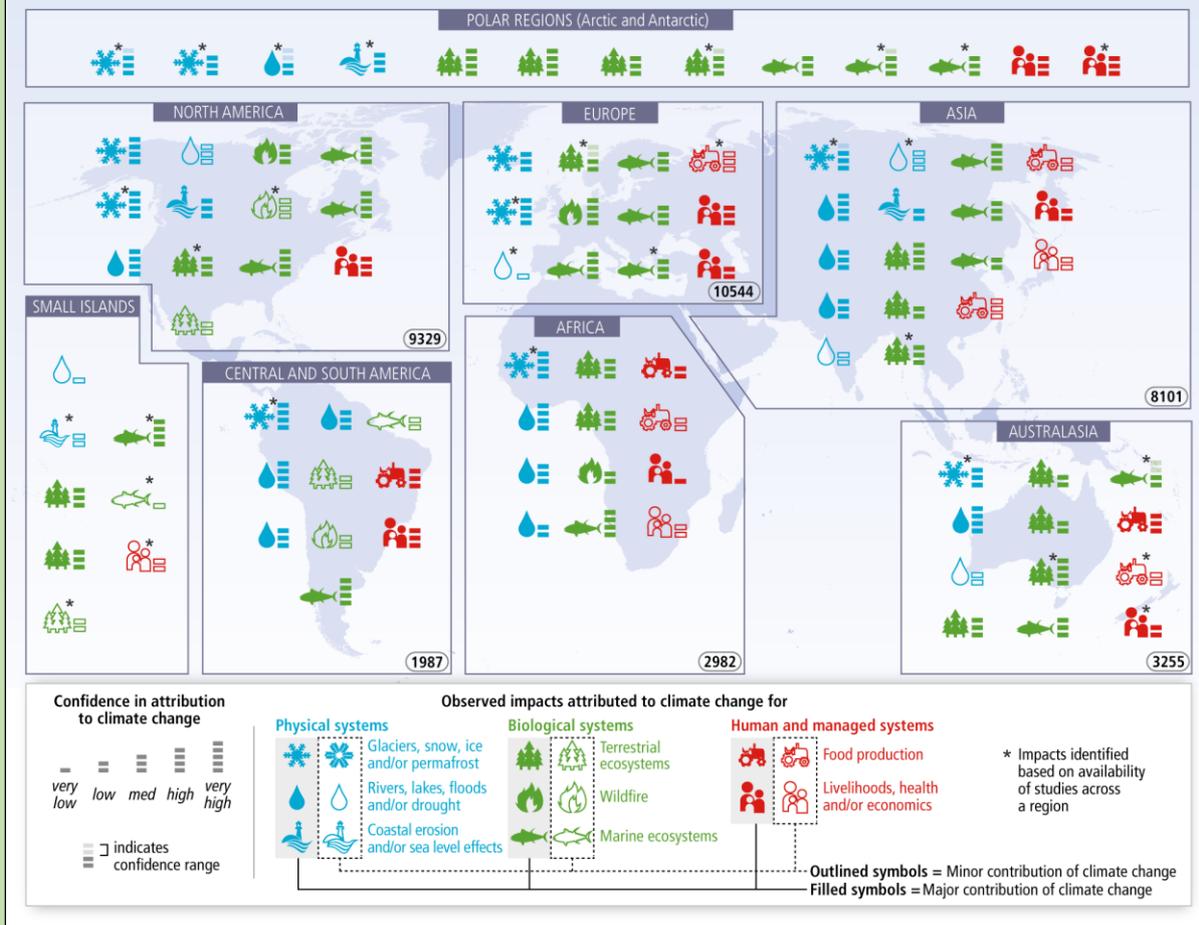
During 1901–2010, global average sea level rose by 0.19 m. Since the early 1970s, glacier mass loss and ocean thermal expansion from warming together explain about 75% of the observed sea level rise.

The number of cold days and nights has decreased and the number of warm days and nights has increased on the global scale. Precipitation distribution has been altered and there is increased occurrence of extreme climate and weather events such as droughts, floods and heat waves

### What are the Impacts of Climate Change?

Increasing temperature leads to changes in many aspects of weather, such as wind patterns, the amount and distribution of precipitation, and the types and frequency of severe and extreme weather events. Such climate change could have far-reaching and unpredictable environmental, social and economic consequences.

## Widespread impacts attributed to climate change based on the available scientific literature since the AR4



More variable rainfall patterns in Zimbabwe are likely to compromise the supply of fresh water. Runoff contributes over 90% to the country's water supply from dams and rivers. Globally, water scarcity already affects 4 out of 10 people. A lack of water and poor water quality can compromise hygiene and health. This increases the risk of diarrhoea, which kills approximately 2.2million people every year as well as trachoma (an eye infection that can lead to blindness) and other illnesses.

Many terrestrial, freshwater and marine species have shifted their geographic ranges, seasonal activities, migration patterns, abundances and species interactions in response to ongoing climate change.

Rising sea levels could damage coastal region through flooding and erosion. The climate of various regions could change too quickly for many plant and animal species to adjust. Harsh weather conditions, such as heat waves and droughts could also happen more often and more severely.

Climate change could also affect health and well-being. Many larger cities could experience a significant rise in the number of very hot days. Air pollution problems would increase, placing children, the elderly and people suffering from respiratory problems at greatest risk of health effects. Increases in moulds and pollen due to warmer temperature could also cause respiratory problems such as asthma for some people.

Developing countries are likely to suffer greatest risks from adverse impacts of climate change due to poor resource base, low institutional capacities as well as over reliance on climate-dependent and sensitive sectors such as agriculture and forestry

### **What is being done around the world?**

Climate change affects the entire globe. Developed and developing countries are working together to find solutions to climate change. In June 1992, the **United Nations Framework Convention on Climate Change** (UNFCCC) has 197 parties that agreed to stabilize greenhouse gases concentrations in the atmosphere at levels that would prevent dangerous anthropogenic interference with the climate system.

In December 1997, in Kyoto Japan, Parties to the UNFCCC adopted the **Kyoto Protocol** and industrialized nations committed themselves to reduce their greenhouse gas emissions and set internationally binding emission reduction targets. Targets can be achieved either by reducing emissions at source, or by enhancing their removal through 'sinks' such as forests. The protocol's first commitment period started in 2008 and ended in 2012. In 2012 the **Doha Amendment to the Kyoto Protocol** was adopted for the second commitment period from 2013 to December 2020.

In December 2015 in Paris France, the **Paris Agreement** was adopted by the UNFCCC Parties. The Agreement entered into force on the 4th of November 2016. The Agreement builds on the work undertaken under the UNFCCC and seeks to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement requires all parties to put forward their efforts through "Nationally Determined Contributions (NDCs).

### **What can we do about Climate Change?**

Our lives are connected to the climate. Human societies have adapted to the relatively stable climate. A warming climate will bring changes that can affect water supplies, agriculture, power generation, transportation systems, the natural environment and even our own health and safety.

While action now to reduce emissions is critical, the existing build-up of greenhouse gas concentrations means that some climate change in the coming decades is inevitable and planning must start now to climate-proof all socio-economic sectors and create climate-resilient societies.

Businesses can introduce clean energy technologies, improve energy efficiency and become carbon neutral. Innovations and investments in environmentally sound infrastructure and technologies can reduce GHG emissions and enhance resilience to climate change.



Improving institutions as well as enhancing coordination and cooperation in governance can help overcome regional constraints associated with mitigation adaptation and disaster risk reduction.

Increasing our capacity to adapt reduces our vulnerability to the effects of climate change. However, we must start planning our adaptive responses now; by doing so, we may

help lessen some of the environmental, economic and social costs of climate change.

You can take action. You can take steps at home, on the road and in your office to reduce greenhouse gas emissions and take the risks associated with climate change.

Many of these steps can save you money; some, such as walking or biking to work can even improve your health! You can also get involved on a local or state level to support energy efficiency, clean energy programs, or other climate programs.

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