What is Climate Change?

Climate change refers to alterations in normal weather conditions. Climates getting hotter - known as global warming, is an example of this, as is rainier and drier weather over sustained periods of time. While weather is naturally variable, we measure climate change based on trends that occur over decades. For example, if a place records higher temperatures year on year, it is considered climate change.

Large-scale floods, ruinous storms and dangerous heat are all examples of climate change events. Globally, the phenomenon affects poorer communities to a greater extent than it does wealthier ones. Nonetheless, we are all vulnerable to the affects of climate change and are likely to be impacted in one or another in the near future.

Here is a guide to the main causes of climate change, its impact in the UK and around the globe and the solutions we have at our fingertips to slow it down.

How do we measure climate change?

Climate is the average weather conditions of a geographical location. In the UK, for example, the climate is maritime, meaning it's moist and temperate with a modest annual temperature range. This signifies that, although we have distinct seasons, we don't see extremes in weather like heavy snowstorms, long periods of sub-zero temperatures or extreme tropical temperatures.

Today, weather and climate are monitored by earth-orbiting satellites, meteorological stations and ocean buoys with minute accuracy. When it comes to tracing the Earth's climate history, however, we use data collected from natural sources like tree rings, ocean sediments and corals. Amazingly, this research provides insight into the climate of different zones as far back as millennia ago, revealing ice ages, droughts and volcanic eruptions. This information can also be used in conjunction with data gathered today to predict future climate trends.

When discussing climate change, the **definition of global warming** is often discussed. While connected to climate change, the **meaning of global warming** is distinct: it refers to the climate change trend of rising global temperatures. It is therefore an example of climate change - and a worrying one.

Why is climate change happening?

The Earth's climate is dependent on a straight-forward formula. When energy from the sun reflects off the earth into space (by clouds and ice) or when the earth's atmosphere releases energy by other means, the earth cools. When the earth absorbs the sun's energy, on the other hand, or gases in the atmosphere are prevented from radiating into space (the greenhouse effect), the earth warms. The latter results in global warming.

Causes of climate change

The Earth has experienced natural warming and cooling phases throughout history, long before the advent of human civilisation. These can be attributed to changes in the sun's intensity, volcanic eruptions and variations in greenhouse gas concentrations. However, records demonstrate that the climate change we're seeing today (which began around the mid-20th century) is advancing at a far quicker rate than ever before. And this expedited rate cannot be attributed to natural causes alone. In effect, they can be seen to explain only a small part of today's climate change - the rest is linked to human activity.

Humans, or rather the greenhouse gas emissions that human activity precipitates, are culpable for the Earth's dramatically altering climate. Greenhouse gases have a vital role in maintaining the Earth at a high enough temperature to sustain life. But the quantity of these gases in our atmosphere has steeply increased in past decades. The amount of carbon dioxide, methane and

nitrous oxide currently present in our atmosphere far exceed what we've seen in the past 800,000 years. CO_2 especially is seen in far higher levels than pre-industrial times.

Burning fossil fuels such as coal, oil and gas are key players in advancing climate change. Electricity, heat and, to a large extent, transportation depend on fossil fuels, making it the number one way human activity contributes to global warming.

Deforestation also plays a huge role, as it releases stored carbon into the atmosphere. Logging, clearcutting, fires and other methods of deforestation release over 8 billion metric tons of CO_2 per year, which makes up over 20% of our total global CO_2 emissions.

Additional human activities that contribute to climate change include the use of fertiliser and industrial processes that release fluorinated gases. Examples of the latter include aerosols and refrigerators.

The earth has natural resources for absorbing greenhouse gases via plant photosynthesis, for example. However, this is a delicate balance and currently the buildup of greenhouse gases and emissions far outweigh the absorption capacity of these natural processes.

Impacts of climate change on planet earth

The impact of climate change is far-reaching. According to the World Economic Forum's Global Risks Report 2021, failing to address and alleviate climate change is the biggest risk facing humanity today, exceeding even nuclear warfare. This is due to it affecting every area of life, from the places we inhabit (that may become inhabitable) to the air we can safely breathe.

Here are some of the most concerning impacts and **examples of climate change**:

Extreme weather events

As the earth's atmosphere gets hotter, it retains and then releases more water. This drastically alters weather patterns, causing wet zones to become wetter and drier zones to get drier. Higher temperatures also lead to more disastrous weather events, like floods, intolerable heat waves, floods and droughts. These can have hugely harmful effects on communities, rendering parts of the world dangerous to live in, costing lives and destroying communities and infrastructure.

Air pollution

Air pollution is tied to climate change, with increases in the former exacerbating the latter - and vice versa. When temperatures get hotter, our air gets dirtier with smog and soot levels increasing too. It also becomes more saturated in allergenic pollutants, like mould and pollen.

Health risks

The World Health Organisation predicts that climate change will cause 250,000 excess deaths per year between 2030 and 2050. Indeed, as temperatures increase, so do the number of deaths and illnesses from climate-related factors, such as heatstroke. Respiratory health is also at risk of worsening due to increased pollution levels. This is especially true for asthma sufferers.

Additionally, more circulating pollen and mould takes it toll on hay fever sufferers while flooding and storms can contaminate water, making drinking water unsafe.

Displacement due to climate related events, such as flooding and storms also leads to a number of health risks, such as urban overcrowding, strained resources in areas hosting climate refugees and increases in the transmission of diseases. Warmer, wetter conditions also allow insect-borne diseases to thrive, such as Lyme disease.

Rising sea levels

The Arctic is disproportionately affected by climate change, and with ice sheets melting, our seas are rising. This is a threat to coastal ecosystems and land areas at sea level. Island nations are particularly at risk, as are some major cities such as New York City, Mumbai and Sydney.

Rise in temperature and acid levels in oceans

Our oceans absorb fossil fuel emissions and are consequently 30% more acidic than preindustrial periods. This affects marine life, and can have a devastating affect on fish, birds and mammals that subsist of off seafood.

Rising ocean temperatures also impact the populations of marine species and can lead to coral bleaching events whereby entire reefs and underwater ecosystems are wiped out.

Devastated ecosystems

Climate change is impacting flora and fauna and drastically altering habitats and ecosystems. Many species have begun migrating to cooler climates and higher altitudes, and these shifts have an effect on wider ecosystems as species are often interdependent. The result of this is extinction for many varieties of wildlife. Meanwhile, higher temperatures have helped other species to thrive, and their overpopulation can have detrimental effects too. Tree-killing insects, for example, have increased in number, posing a risk to forests already in peril due to deforestation.

Examples of climate change in the UK

Hearing about floods and extreme storms in far off lands, it may feel like climate change doesn't affect us close to home. However, this is far from the truth. The UK is, like everywhere in the world, experiencing major changes in climate. In fact, according to the Climate Change Committee, the average land temperature in Britain has risen by roughly 1.2°C from pre-industrial levels, UK sea levels are 16cm higher than in 1900 and extreme heat is occurring on a more frequent basis. Since 2018, we have also recorded 4,000 heat-related deaths.

The MetOffice predicts that by 2070, our winters will be between 1 and 4.5°C warmer and 30% wetter than in 1990, while our summers will be between 1 and 6°C warmer and up to 60% drier.

What is the future of climate change?

Climate change is likely to affect different parts of the globe to different extents. The UN climate body, the IPCC predicts that, if temperature rises cannot be kept to within 1.5°C, the following is likely to occur:

- The UK and Europe will experience more flooding due to extreme rainfall
- The Middle East will endure extreme heatwaves and devastating droughts
- Island nations in the Pacific region will be engulfed due to rising sea levels
- Many African countries will suffer droughts and extreme famine
- Western parts of the US will experience drought, while other parts will experience intense storms
- Australia will experience extreme heat and more wildfires

How can we fight climate change?

While current trends and predictions paint a bleak picture of the future, the global climate crises can be mitigated by severely decreasing pollution from burning fossil fuels.

The **Paris Agreement**, put into motion at the 2015 Paris Climate Change Conference, involved the majority of the world's countries, including the UK, committing to move away from relying on fossil fuels and developing cleaner, greener energy options. The UK and a number of other countries have pledged to achieve "net zero" by 2050. This involves reducing greenhouse gas emissions as much as possible, and offsetting remaining emissions by absorbing an equal amount from the atmosphere. The goal of these efforts is to keep global warming within 1.5°C.

The development of clean energy solutions will play a central role in combatting climate change. Renewable energy sources, such as wind and solar, can drastically reduce fossil fuel consumption. Likewise, electric and hybrid vehicles can reduce emissions.

Tackling climate change will depend on governments across the world making efforts to reduce fossil fuel burning. It will therefore involve the engagement of those in power and the cooperation of nations. However, individually we can also make a difference.

Making the following changes in our lives can reduce the impact we have on the climate:

- Avoid travelling by aeroplane, or take fewer flights
- Go car-free or invest in an electric car
- Reduce energy consumption
- Invest in energy-efficient appliances, such as washing machines
- Improve home insulation to rely less on electricity and gas
- Favour recyclable and reusable products and materials

As citizens, showing that the environment is an issue of importance and something we are ready to fight can help galvanise governments to take more action. Showing support for renewable energy and engaging in events geared towards raising awareness of climate change can have an impact on policy and put pressure on authorities to act.

Climate change is the biggest issue we face today. Making efforts to combat its effects and prevent its worsening is of vital importance if we are to continue to exist and thrive on planet earth.

What we do

Here at the National Trust we are dedicated to reducing emissions and protecting biodiversity. We are proud to have reached our target of generating 50% of our own energy from renewal sources. We've also installed 138 renewable energy projects in the past 9 years, including a hydroelectric facility in the Lake District.

We've made efforts to conserve nature and wildlife by creating and restoring habitats, including woodlands and peatlands. Our conservation strategies are informed by our knowledge of climate change and are targeted towards the most vulnerable species.

In order to protect our heritage buildings and landmarks, we've invested in building alterations to protect from flooding due to rising sea levels.

Additionally, we advocate to Government to adopt policies that will help us protect the places we cherish and our national heritage.

But this is not all, our environmental pledges include planting 20 million trees and achieving carbon net-zero by 2030 and creating and restoring 25,000 hectares of wildlife habitats as well as forming green corridors to encourage biodiversity in towns.