

IMPACTS OF CLIMATE CHANGE

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Climate change is already affecting the environment and people around the world. We have seen changes in the air, in water, and in plants and animals. These impacts include things like warmer temperatures, sea-level rise, heavy rainfall and more intense storms. Hundreds of plants and animals on the land and in the ocean have been lost because of very hot temperatures. Climate change has also made it more difficult for many people to access food or water, and has caused some people to lose their ways of earning a living. Unfortunately, people who have contributed the least to climate change are experiencing the worst effects. This shows that the effects of climate change are not fair and that there are uneven impacts on different people and places. It is important for us to understand the impacts of climate change on the environment and people so that we can find ways to solve these problems.

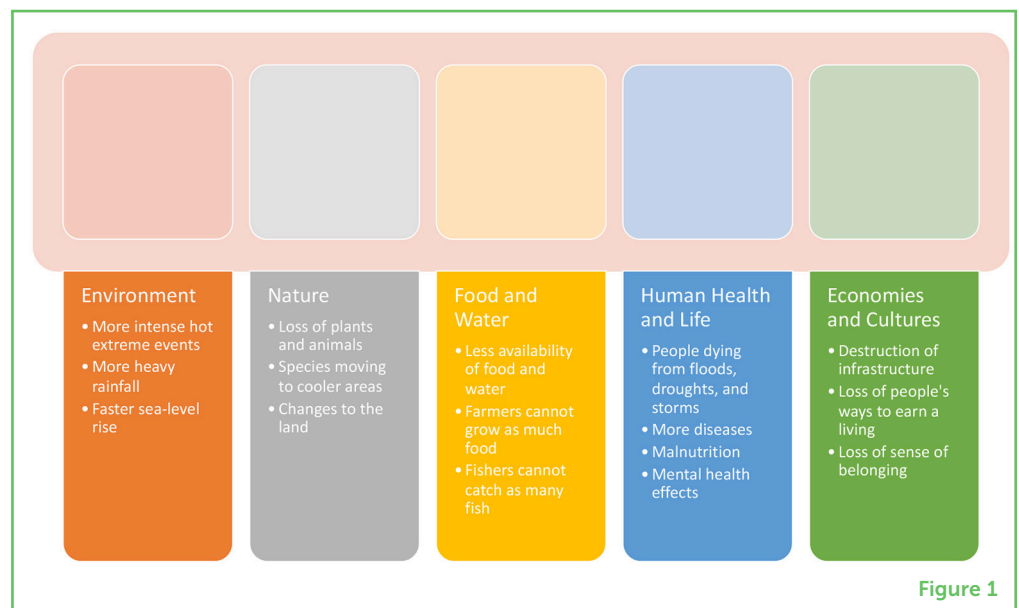
CLIMATE CHANGE HAS MANY IMPACTS

Climate change is already affecting the environment and people around the world. This article explores some of the many impacts of climate change, including warming air and oceans; melting ice; disruptions to plants, animals, and ecosystems; and negative impacts on people's health and the ways that people earn a living. However, while climate change is having impacts all over the world, it is important to recognize that the causes and consequences of climate change are not evenly distributed. People in places that have contributed the least to climate change are often the most negatively impacted.

While there are many impacts of climate change, as seen in [Figure 1](#), there are also many solutions that are available to reduce these impacts and to stop climate change from getting worse. It is really important to understand the impacts of climate change, to persuade governments and people of the need to act straight away to reduce these impacts.

Figure 1

Climate change has widespread impacts.



GREENHOUSE GASES

Gases in the atmosphere which can absorb heat and cause the planet to warm up. These occur naturally, such as carbon dioxide and water vapor, but human activity is putting more greenhouse gases into the air leading to the planet getting warmer.

IMPACTS ON THE ENVIRONMENT

Climate change has already caused widespread changes to the environment, and these changes are **happening quickly**. Human activities are responsible for releasing **greenhouse gases** such as carbon dioxide and methane. These greenhouse gases have resulted in an increase in the global surface temperature, which is the average temperature of the world over both the ocean and land. In the years 2011–2020, global surface temperature was around 1.1°C higher than it was in the years 1850–1900 [1]. Since 1970, global surface temperature has increased faster than in any other 50-year period over

at least the last 2,000 years. This is a really fast change to global surface temperature and something that we have not seen in the past!

The increase in the global surface temperature is absolutely due to the actions of people. However, different regions of the world have contributed more or less to the greenhouse gas emissions that are causing global warming. Historically, North America, Europe, and Eastern Asia have contributed the largest amount of carbon dioxide into the atmosphere. These regions have contributed over half of the greenhouse gases that are causing climate change. However, as you will see in the following sections, regions that have historically contributed *the least* to climate change are experiencing the worst impacts.

The higher global surface temperature has resulted in many **weather and climate extremes** being affected. For instance, heatwaves are happening more often and are more intense than they have been in the past. Since the 1950s, most regions of the world have seen an increase in heatwaves that are due to human-caused climate change. On the other hand, cold extremes, including cold waves, have become less frequent and less severe. So, overall, we are experiencing more hot extremes than cold extremes.

Since 1950, heavy precipitation events, such as heavy rainfall, have also increased—both in how often they are happening and how intense they are. **Droughts**, which are long periods of unusually dry weather with not enough rain, are also happening more often. We also see an increase in the percentage of very strong **tropical cyclones**, which are also called hurricanes or typhoons in certain parts of the world.

Climate change is also causing impacts in the ocean. Marine heatwaves, which is when the water becomes much hotter than usual, are becoming much more common [2]. Since the 1980s, there has been about a 50% increase in these very hot ocean conditions. Sea levels are also rising. Global mean sea level increased by 0.20 m between 1901 and 2018. On average, sea level rose 1.3 mm every year between 1901 and 1971. This increased to 1.9 mm every year between 1971 and 2006. Sea levels then further increased by 3.7 mm every year between 2006 and 2018. Human influence was very likely the main driver of these increases since at least 1971. So, we are seeing sea levels rising faster than we have experienced in the past.

IMPACTS ON NATURE

Climate change is also causing loss of **biodiversity** and damaging Earth's ecosystems. Large numbers of plants and animals have died because of the increasing temperatures. As a result, hundreds of species in numerous areas, both on land and in the ocean, have been

WEATHER AND CLIMATE EXTREMES

When the weather or climate is doing something very different from normal, such as very hot temperatures or very intense storms.

DROUGHT

When there is not enough rain for a long time, causing the ground to dry up and making it hard for people, plants, and animals to get the water they need.

TROPICAL CYCLONES

A big, spinning storm that forms over warm ocean waters. It has strong winds and lots of rain and can cause flooding and damage when it moves over land.

BIODIVERSITY

The variety of all life on Earth, including plants, animals, and the ecosystems that they live in.

lost [3] (For more information on how organisms respond to climate change, see [this article](#)).

As temperatures increase, organisms move their living areas to environments that suit them better. Due to warmer temperatures, about half of the species that have been studied have moved toward the north and south poles, to higher elevations, or to deeper waters where it is cooler. Warmer temperatures have also led many plants and animals to change the times when they perform important activities, such as flowering, migrating, and reproducing.

Glaciers are getting smaller and ecosystems in mountains and in the Arctic are being affected by the thawing of **permafrost**—land that was once permanently frozen. We have seen land become too dry to support life (called desertification) and we have also seen the loss of land (called land degradation). These processes are the worst in low-lying coastal areas, river deltas, drylands, and areas with permafrost. Nearly half of the world's coastal wetlands have been lost in the last 100 years, due in part to climate change.

IMPACTS ON FOOD AND WATER

These changes to the environment and to nature have had many impacts on people and societies. Increasing weather and climate extremes have caused millions of people to not have enough food to meet their basic needs. In areas with warmer temperatures, climate change is having negative impacts on farming. Some farmers cannot grow as much food as they could before. Changes to the ocean have negatively impacted **fisheries**. In some places, fishers are catching fewer fish than they used to. These impacts on farming and fisheries have contributed to the decreased food supply experienced by some people. Climate change also negatively impacts water availability. For at least some part of the year, about half of the world's population does not have access to enough water.

These impacts on food and water availability are most severe in places and communities that have historically contributed *the least* to climate change. These are regions such as Africa, Asia, Central and South America, and other countries that are the least developed, including small islands and the Arctic. Across the globe, we also see more severe impacts affecting Indigenous peoples, small-scale food producers, and low-income households.

IMPACTS ON HUMAN HEALTH AND LIFE

Climate change has also negatively affected human health and life. Between 2010 and 2020, deaths from floods, droughts, and storms were 15 times higher in highly vulnerable regions compared to regions

PERMAFROST

Ground that stays frozen all year round, even in the summer. It is found in very cold places like the Arctic.

FISHERIES

Places where people catch fish and other sea animals for food. They can be in the ocean, lakes, or rivers.

with very low vulnerability. Regions that are highly vulnerable are also those that have historically contributed the least to climate change. Around the world, we see that extreme heat events have resulted in deaths and negative impacts on people's health. Diseases including Lyme disease, malaria, and dengue have increased. Food safety has also been negatively impacted, with an increase in infections such as salmonella and an increase in toxins that are associated with cancer.

Climate change has also contributed to malnutrition, particularly for women, pregnant women, children, low-income households, Indigenous peoples, and minority groups. Mental health is also being affected. We see that people who have been exposed to disasters are experiencing trauma and distress. People, and particularly young people, are also experiencing mental health challenges when thinking about or anticipating the impacts of climate change. This shows why it is so important to learn not only about the impacts of climate change, but also about the solutions that can help to solve these problems!

IMPACTS ON ECONOMIES AND CULTURES

Climate change is also causing negative impacts on important parts of the **economy**, such as agriculture, forestry, fishery, energy, and tourism. Buildings, roads, and other types of infrastructure are being damaged or destroyed by floods and storms. This has resulted in high costs to repair or replace them. People are finding that their livelihoods, or ways of making a living, are being negatively affected due to impacts on farming, health, and even the destruction of their homes.

There are also impacts on people's culture due to climate change. In some cases, people have been forced to move because of climate change impacts. As you may imagine, being forced to move from their homes has had negative effects on people's sense of belonging to a particular place. For example, Indigenous peoples in coastal Alaska and in villages in the Solomon Islands and Fiji who have had to move because of climate change have experienced emotional distress and the loss of cultural and spiritual bonds to their homes.

CONCLUSION

To sum it up, climate change is causing negative impacts all over the world. The air and oceans are getting hotter, and it is changing where animals and plants live. Warming temperatures are making people sick and affecting how they make a living, and warming is also causing plants, animals, and people to die. The impacts of climate change are

ECONOMY

How money and resources are made, used, and shared in a place. It includes jobs, businesses, and trade.

not fair because the people who did the least to cause it are suffering the most.

But there is hope! There are lots of ways we can stop climate change from getting worse. We need to understand how big the problem is so that everyone, from governments down to regular people, can work together to fix it fast. It is super important for all of us to join hands and take strong actions to fight against climate change.

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YOUNG REVIEWERS

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Alissar is not only dedicated to her academic pursuits but also actively involved in various volunteer activities to kickstart net-zero and SkyZero team, aims at serving and enhancing the needs of the Syrian society. Her love for literature and knowledge speaks to her curiosity and intellectual vigor, which undoubtedly enriches her academic pursuits and personal development. She is also a remarkable individual who not only excels in her studies but also dedicates herself to making a positive impact in the community.



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