



CLIMATE ACTION LEADERSHIP CHALLENGE

An Interactive Teaching-Learning Booklet





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This booklet has been developed as part of the Generation for Climate Action (GenCAN) initiative. Booklet is an interactive teaching-learning resource on climate change for schools. This resource is aimed at middle and secondary school students and teachers to encourage them to take climate action at school level. The booklet has been developed by the Centre for Environment Education (CEE) with the financial support from the HCL Foundation under the Harit initiative focusing on environment and sustainability education for schools.

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Foreword

At HCL Foundation, we believe in the power of young people. In their love for the planet and all life on it, in their dream for a hopeful future, in their ability to take tough decisions and lead from the front. And as the consequences of climate change unfold before us, fickle weather patterns, melting ice caps, rising sea levels, droughts and floods, young people are becoming vocal. Cognizant of the high stakes, they are raising their voice for climate justice. Demanding action, they are calling for sustainable patterns of consumption. Yes, they are a critical ally in the fight against climate change. For it is they, more than anyone else, who will face the brunt of the global warming and climate change.

To amplify their voices and hone their leadership skills, we are delighted to launch the Generation for Climate Action (GenCAN) initiative in collaboration with the Centre for Environment Education. Rolled out in partnership with schools, the initiative will equip students with the knowledge, skills, and values to become 'Climate Leaders' - to nurture the planet and protect all life on it. Through our flagship green initiative- HCL Harit, we are committed to responding to the looming threat of climate change, environmental degradation, and biodiversity loss; and this initiative is a further step in readying the next generation of climate leaders who will be given skills, values and attitudes that lead to more sustainable and climate-resilient societies.

It is my hope that each child in every school in India will champion the cause of climate action. With a vision and fortitude to script a better tomorrow, they will encourage all around them to make ecologically conscious choices. This initiative is a step in that direction.

The time to act is now! The young will show the way.

Dr. Nidhi Pundhir

Vice President

Global CSR

HCL Foundation





Preface

Today, children and youth are increasingly aware of the unprecedented environmental challenges before humankind. These are challenges that their generation has not created, but whose impacts they will have to face. Of these, Climate Change is one of the most impactful. While they see political leaders, decision-makers, planners, economists, business leaders, and scientists trying to find ways to deal with this, the question of adequacy remains. Children and youth want to act and act now. It is therefore imperative that we orient education in a way that young people can effectively contribute with handprint action toward both climate change mitigation and adaptation.

A large part of the world's population consists of young people under 15 years of age. Nearly 60 percent of the world's total youth population, lives in Asia-Pacific. India is soon to become the most populated country in the world and over 50 percent of its population is below 25 years of age. With compulsory environmental education introduced in the early 1990s, building on this base with climate change education poses a great opportunity to be able to prepare young children to understand climate change and to adapt and mitigate climate change impacts enabling them to create a safer future for themselves and the world. The need and challenge is to provide high-quality and effective climate change education throughout our formal system and through informal and non formal means.

Understanding this need, the HCL Foundation and the Centre for Environment Education (CEE) have joined hands with a mission to support and equip schools, teachers, and students to address today's climate challenges. The initiative has begun at the right time when the role of sustainability and climate change education has been recognized at the national level in its education policy and other government initiatives.

This booklet has been developed for teachers and students to help them build climate awareness in the classroom and the entire school, assess their school's carbon footprint, implement an action plan, and document their climate action journey.

We are very sure schools will take up this exciting climate action leadership challenge with a team of enthusiastic teachers and students to become role models. All of us look forward to inspiring work from participating schools.

Let us all work together to meet this challenge!

Kartikeya Sarabhai

Director, CEE



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What is Climate Change?



Climate change crops up in our conversations often these days.

What is all the talk about?

Isn't this something that scientists and meteorologists should worry about?

How does it concern you and me?

Let us try finding the answers to all our questions here.

To understand climate change, it is important to recognize the difference between **weather** and **climate**.



Weather vs Climate

It is said that “climate is what you expect; weather is what you get”. What does that mean? Are these terms the same or do they mean different phenomena? Let us dwell on this a bit!

Weather is what is reported every day in the newspaper and on TV. You can also get weather updates on your mobile. Weather is the temperature, precipitation (rain, hail, sleet and snow) and wind, which change hour by hour and day by day. On the other hand, **climate** describes a place's weather occurring over a longer time period of time.

In simple words, **weather** is a short-term condition which occurs in the lower atmosphere. It could be sunny, cloudy, rainy, foggy, cold, hot, humid, windy, etc. We experience weather every day and even moment-to-moment. We make our everyday decisions of what to wear, whether to take an umbrella or a raincoat, whether to wear a sweater etc. depending on the weather.

Weather Forecast of New Delhi

Day	Weather	Max. Day (°C)	Min Night (°C)	Wind (km/h)	Humidity Visibility
Thur	Partly Cloudy 	30	14	14	35% 8 km
Fri	Clear Sky 	31	15	9	50% 5 km

CLIMATE change

What is common in all these points?

- Buying apples imported from New Zealand, from a centrally air-conditioned supermarket
- Cherrapunji in Meghalaya recorded 97 cm of rainfall in June 2022 over 24 hours, the third-highest rainfall recorded there in the last 122 years-
- Attractive advertisements for fancy products
- More than 20,000 people died during the heatwave of 2022 summer in Europe
- More and more people are being affected by malaria or dengue

These are in some way or the other, connected to climate change.



Climate refers to the average weather conditions such as precipitation, temperature, humidity, sunshine, wind velocity etc. that occur over a long period in a particular place. Climatologists generally consider 30 years as the time needed to find out the **climate** of a place.

For example, many parts of Rajasthan experience a hot and arid climate, whereas places such as Mumbai or Chennai have a humid climate.

The Change in Climate

Weather can change in a short time... it may rain for an hour and then the sun may come out. Climate can change too but over a much longer time. The geological records show that the earth's climate has been changing due to natural factors and for millions of years, the earth has experienced cycles of warming and cooling. The cycles lasted approximately 100,000 years each. The Ice Ages of the past are examples of such climate change.

In the past few years, the rate of change is faster. This increase in the rate of change in climate is said to be due to human activity. Such an increase has been observed especially since the early 1900s due to which the earth is getting warmer. These changes in climate are now impacting the entire earth and its beings. The global phenomenon of climatic changes like changes in temperature, change in precipitation, change in wind patterns, etc. is known as **Climate Change**.

The impacts of climate change are global in scope and unprecedented in scale. *The United Nations has recognized climate change as one of the most urgent global issues impacting the planet.*

Climate of Delhi

Subtropical (Humid and Dry Winter)

Monsoon rainfall mainly from late June to late September, 750 millimeters (29.5 inches) per year, but it rains very rarely from October to May.

Temperatures range from a low of around 7.5 °C (45.5 °F) on a winter's night, to a high of around 40 °C (104 °F) on a summer's day. In the cooler months (November to March) the average temperature is 20.6 °C (69 °F).



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 is called climate change.

United Nations Framework Convention on Climate Change



Study of Past Climate

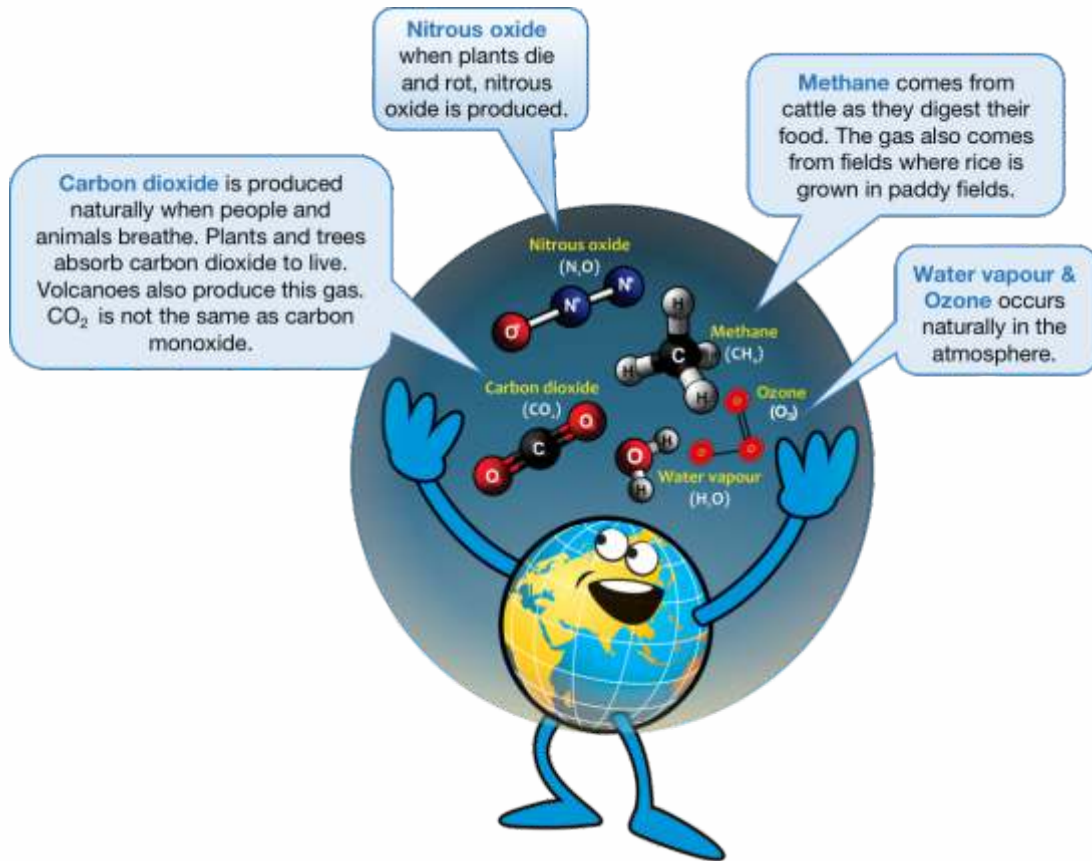
Do you know that glaciers or ice sheets are formed due to the accumulation of snowfall, which without melting for millions of years hold a lot of climate clues?

The air bubbles and dust trapped in the yearly layers of glaciers are analyzed by **Paleoclimatologists** (those who study past climates) to understand the climate process of the past. Tree rings are another good source of information as the rings formed during warm years are wider, but those formed during cold years are narrower. See this image here. The shells of marine and freshwater molluscs are another good way of knowing climate in the past.

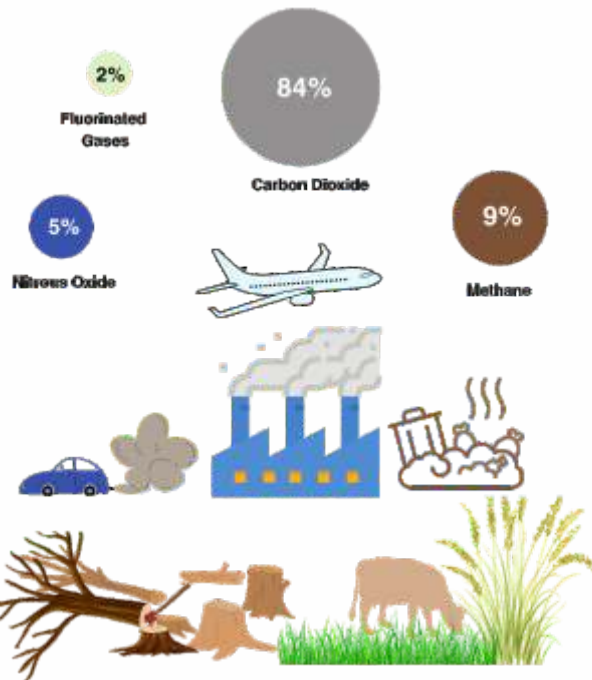
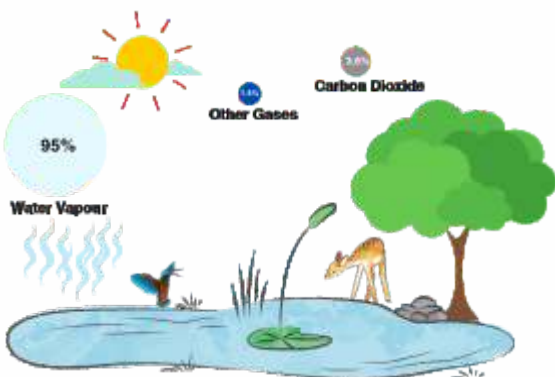


Earth's atmosphere: Greenhouse Gases

We all know that the Earth is wrapped in a blanket of air called the 'atmosphere', which is made up of several layers of gases. These gases are predominantly made up of nitrogen (78%) and oxygen (21%). The atmosphere has a number of gases, often in tiny amounts, which trap the heat given out by the Earth. These are called Greenhouse Gases (GHGs).



The earth is suitably warm for life to exist because of the GHGs present in the atmosphere. If it were not for the greenhouse gas effect, Earth's average temperature would be a chilly **-18 °C**. See greenhouse gases percentage in below images (left image shows naturally occurring GHGs and right image shows GHGs due to human activities).



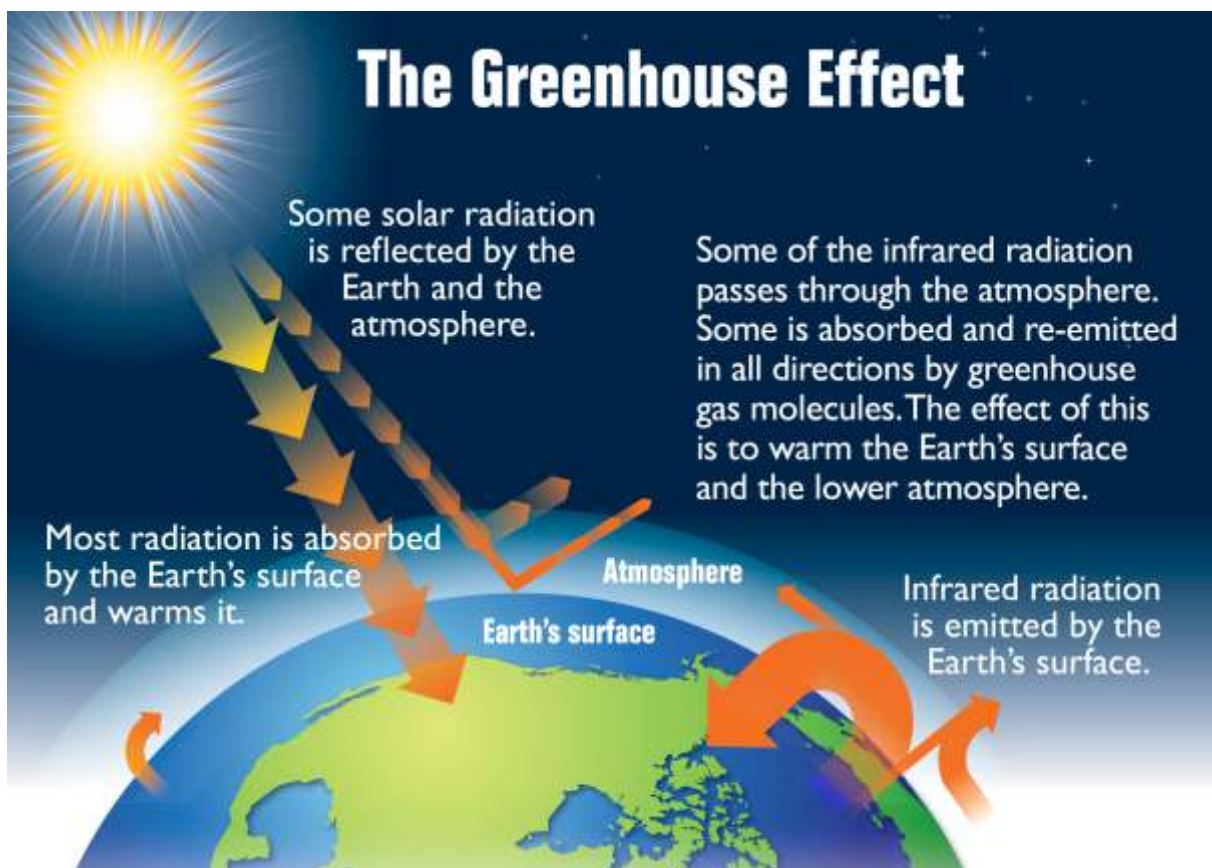
Greenhouse Effect

The sun is much hotter than the Earth and it gives off rays of heat (radiation) that travel through the atmosphere and reach the Earth. The rays of the sun warm the Earth, and heat from the Earth then travels back into the atmosphere. The GHGs present in the atmosphere stop some of this heat escaping into space. This natural process between the sun, the atmosphere and the Earth is called the '**Greenhouse Effect**', because it works the same way as a greenhouse. The windows of a greenhouse play the same role as the gases in the atmosphere, keeping some of the heat inside the greenhouse. This is a natural phenomenon which has existed for millions of years.

Due to human activities the composition of greenhouse gases is changing. The amount of carbon dioxide is increasing leading to a warmer earth.

Without GHGs, the earth would have been sizzling hot by the day and freezing cold during the night. But too much of GHGs can create problems. As their quantity increases more heat is retained on the earth's surface. This causes **Global Warming**. This warming of the earth is leading to a change in the climate.

Rapid global warming is the long-term heating of Earth's surface observed since the industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere.



Source: Environment Protection Agency (EPA), US

How warm is warm?

We have all experienced a few “really hot” days every summer. That does happen. It is like having a fever for 2-3 days. But if the fever does not come down and persists over many days or weeks, it is a matter of concern. Similarly, if the temperature on the earth continues to rise by even a small degree over a long period of time, then the effects will be felt.



Reflection

Let us recap our learning after knowing about climate change, discuss and share viewpoints on following questions:

- How do we differentiate between weather and climate?
- Where do we hear about weather and how is it connected to our day to day life?
- What is the season and does it have any linkage with weather and climate?
- Why does life exist only on earth when Venus and Mars also have an atmosphere?
- Why is the increase in greenhouse gases a matter of concern, if they are found naturally in the atmosphere?
- What is the correlation between carbon dioxide and temperature rise?
- In what way, humans responsible for global warming? How does it lead to climate change?
- Was there a greenhouse effect in the past? How was it caused?
- Did you come across any examples of rise in temperature in your own area?

Why Climate is Changing?



As we now know, natural factors have been contributing to the warming and cooling of the earth long before human beings came. These factors include the sun's intensity, volcanic eruptions, and changes in naturally occurring greenhouse gas concentrations. This kind of change takes centuries and is a slow process enabling natural earth systems to adapt themselves to the changing climate. While human activities are bringing changes in the climate at a much faster pace. Let's look at how natural and man-made factors are responsible for variations in climate.

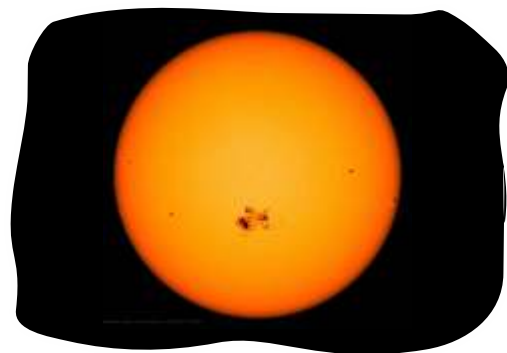


Natural Factors

Once, all climate change occurred naturally. This happened due to natural periodic temperature fluctuations over decades by changes in solar activity, volcanic eruptions and processes occurring in the world's oceans.

Changes in Solar Radiation

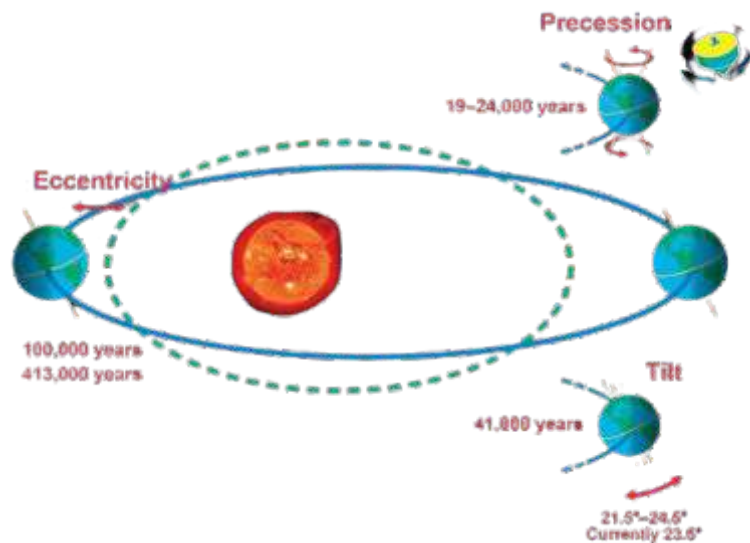
The amount of radiation or energy reaching the Earth from the sun plays a large role in the Earth's climate and it keeps on changing all the time. The change in solar radiation is related to the number of **sunspots** - cooler spots on the sun's surface that are associated with higher solar radiation. While more sunspots may contribute to a warmer global climate, fewer sunspots appear to be associated with a cooler global climate.



Source: NASA

Changes in Earth's Orbit

The shape of Earth's orbit (its eccentricity), the angle that the Earth's axis is tilted with respect to Earth's orbital plane (its obliquity), and the direction in which the Earth's spin axis is pointed (its precession) are collectively called **Milankovitch cycles**. These three cycles are said to combine to affect the amount of solar heat reaching the Earth's surface and subsequently influence climatic patterns, including periods of glaciation (ice ages).



Source: <https://www.universetoday.com/>

Plate Tectonics and Volcanic Eruptions

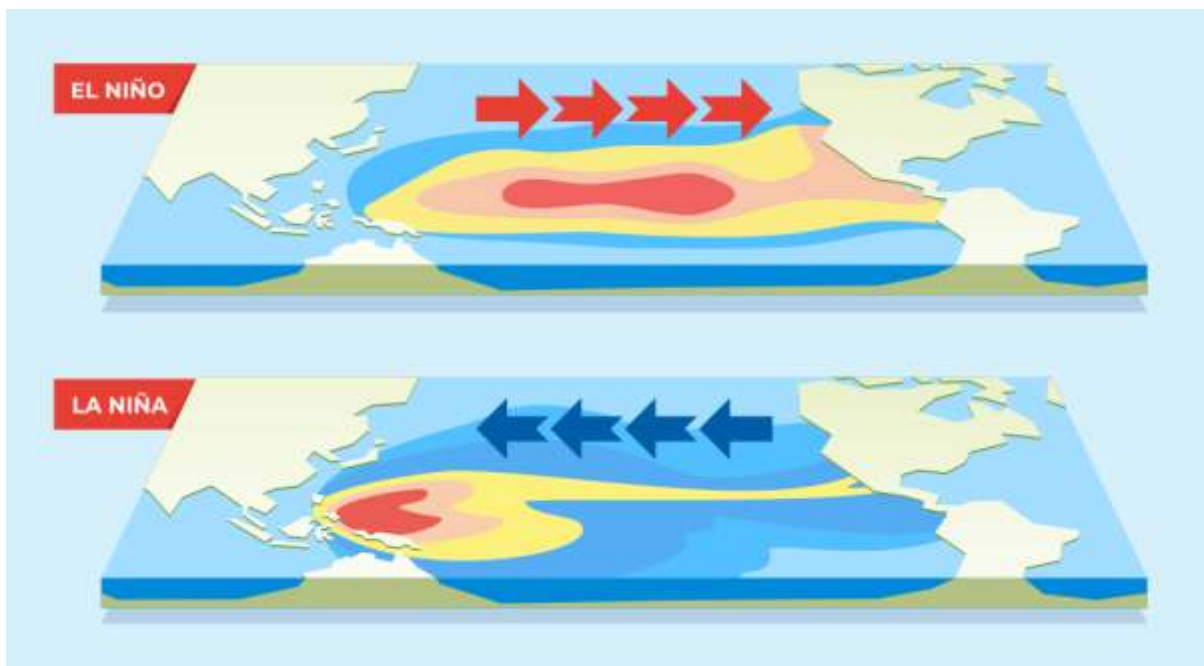
Over very long periods of time, plate tectonic processes cause continents to move to different positions on the Earth. The movement of the plates can influence the circulation of air around the globe and consequently influence the climate. Most of us will think that volcanoes heat up the Earth's atmosphere. Yes, the temperature gets raised near the volcano, however, it has no impact on the climate. The main reason for its impact on climate is due to volcanic ash which reaches into the stratosphere (10–15 km) where it stays for a long time. This ash blocks out some of the sun's rays, as a result of which the whole planet gets colder.



Source: Britannica

Changes in ocean currents- El Niño - La Niña

El Niño is a natural phenomenon that happens when the waters in the Pacific Ocean near the equator become unusually warm and changes the rain and wind patterns around the world. The opposite condition, called *La Niña*, is when the waters in the Pacific Ocean become colder than usual. Both *El Niño* and *La Niña* cause periodic warming and cooling of sea surface temperature across the Pacific Ocean causing variations in the climate. Such climatic variations adversely affect the Indian monsoon and hence, agriculture in India.



Source: <https://thecolumn.ahacentre.org/S>

Human-Induced Factors

Current rapid changes in the climate are not due to natural causes but are a result of human activities. During the Industrial Revolution period, factories came up and things began to be made in bulk, using machines. Machines need the energy to run. Most of this energy comes from coal and oil which are known as fossil fuels. When these fossil fuels are burnt, the emission of greenhouse gases like carbon dioxide, methane and nitrous oxide increases, which keeps temperatures very high in the lower atmosphere, enabling less heat to escape. This phenomenon is known as the *Human-Induced Greenhouse Effect*.

GHGs emitted from man-made sources have led to a global temperature rise of +0.85°C in the past 132 years. These changes have taken place over a very short period of time and have led to significant changes in average weather conditions across the globe. Globally, the primary sources of greenhouse gas emissions are coming from various sectors. A large share, about three-quarters of the increase of CO₂ from human activity over the past 20 years, is that of air pollution due to the burning of fossil fuels.

Deforestation, construction activity and other fossil fuel-based activities contribute to the remaining increase.

India is experiencing the impacts of a warming climate which are turning out to be potentially long-term devastating effects. Let us now understand why India is experiencing Climate Change.

Increased fossil fuel combustion and Air Pollution

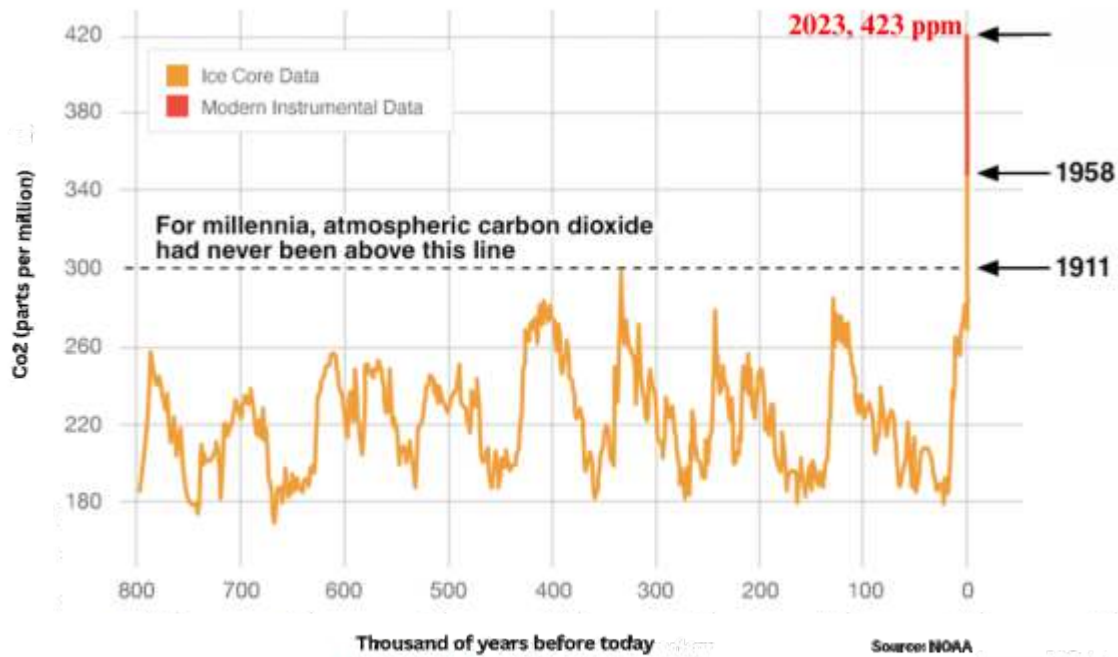
Fossil fuels, such as coal, oil, natural gas, crude oil, petroleum products, and non-renewable wastes, are carbon-based raw materials used to generate energy. When these fossil fuels are burned, they release gases such as carbon dioxide (CO₂), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and tiny particles known as PM2.5 into the air. Burning fossil fuels not only emits greenhouse gases like CO₂ but also releases harmful pollutants such as carbon monoxide (CO) and volatile organic compounds. This contributes to air pollution, adversely affecting both human health and the environment.

The graph shows how much carbon dioxide (CO₂) was in the air during the last three times the Earth went through icy periods. Before humans started using machines and factories in the 1700s, the amount of CO₂ was lower. But since then, human activities have made it go up by 50%. Currently, our atmosphere is having 150% more CO₂ ranging at 423 parts per million (ppm) than it was in 1750. The data tells us that humans are making a big impact on how much CO₂ is in the air, which affects the Earth's climate.

About Carbon dioxide

Carbon dioxide (CO₂) is both a pollutant and a natural part of the atmosphere. Presently, it accounts for 420 molecules for every million molecules in the air (420 ppm). The emissions are increasing by 1 per cent every year. The amount of CO₂ before the Industrial Revolution was 270-280 ppm. CO₂ produced by human activities is responsible for 80 per cent of current global warming. This could raise the earth's average temperature by about 5° - 8°C by 2050. This rise may not sound like a lot, but the consequences will be devastating!





Air Pollution

Vehicular pollution is one of the major causes of air pollution. Other fossil fuel-based industries, including power plants that use diesel and coal, contribute to air pollution. The number of registered motor vehicles in India is continuously increasing. It is estimated that the number of four-wheelers in India will increase three times by the year 2030.



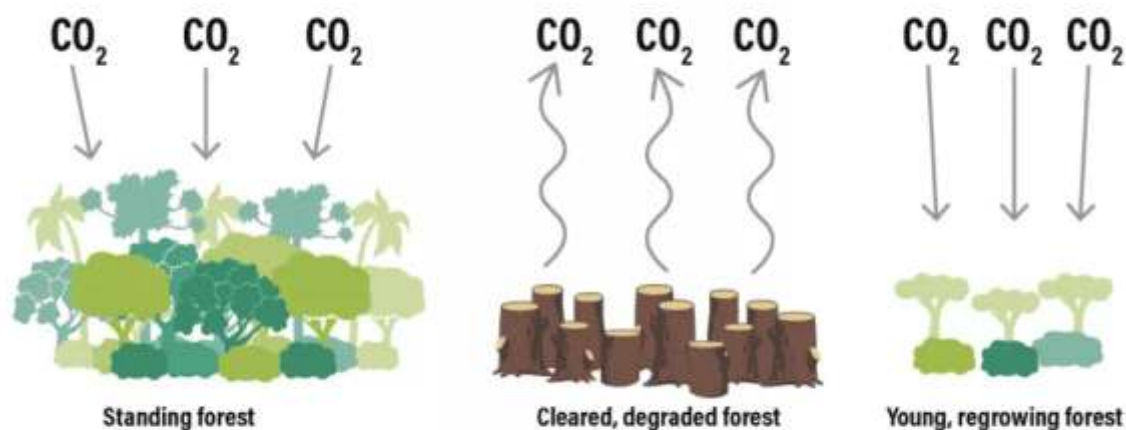
Mining

The mining of petroleum and coal also allows the release of methane into the atmosphere. It is estimated that up to 8 per cent of methane emissions could be from coal and petroleum mining. Mining also contributes to deforestation and the resultant loss of biodiversity and carbon sinks.

Deforestation

Forests play the vital role of absorbing carbon dioxide from the atmosphere and retaining carbon in the form of various organic substances. They greatly regulate the local climate through various important biochemical phenomena such as photosynthesis, respiration, transpiration, precipitation, etc. Forests and grasslands are major carbon sinks, having a large amount of carbon-storing capacity.

Forests Act As Both a Source and Sink For Carbon



Source: Global Forest Watch
2019.01.21



WORLD RESOURCES INSTITUTE

Over the years, forests have been cut, degraded or burnt by human beings for a number of reasons such as clearing the land for agriculture and livestock production, building roads, constructing and developing cities, large-scale mining, etc. Deforestation causes loss of habitat and biodiversity and also releases large amounts of carbon dioxide otherwise stored in the trees, into the atmosphere.

Agricultural Practices

According to the Intergovernmental Panel on Climate Change (IPCC, 2013), agriculture, forestry and the change in land use account for as much as 25 per cent of human-induced GHG emissions. Agriculture is one of the main sources of emitted methane and nitrous oxide. Besides its contribution to global warming, farming has other detrimental effects on the environment. Agriculture is often the reason for deforestation and a change in land use, from natural ecosystems that take up and store CO_2 from the atmosphere to farmland. These activities cannot be viewed independently.



Livestock

Livestock farming creates a huge carbon footprint and has a very high global warming potential. The main sources of emissions are livestock feed production and processing, and methane from ruminants' digestion. Raising livestock generates 14.5 per cent of global greenhouse gas emissions that are bad for the environment. *About 92 per cent of the freshwater is used for farming purposes, and 1/3rd of it is used for rearing livestock and manufacturing animal products.*



Construction

Emissions from buildings and construction contribute to a great extent to the increase in global warming. Together, building operations and construction now account for nearly 40 per cent of global energy-related CO₂ emissions. Another key factor is the growing energy demand for cooling as air-conditioner ownership rises with worsening extreme heat.

Consumption patterns

The world's consumption and production processes have been dependent on the use of the natural environment and resources, having a destructive impact on the planet.

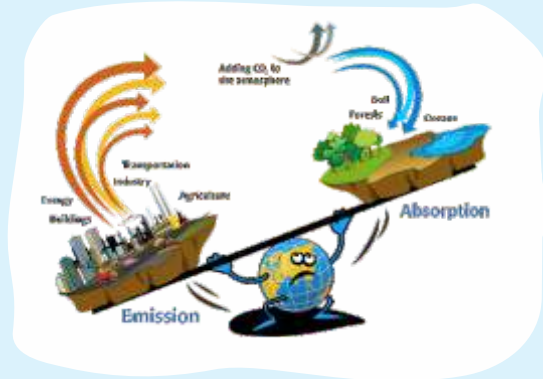
Overconsumption, over-extraction of natural resources, inefficient use and wastage, along with an increasing population all contribute to the increase in GHG emissions.

Should the global population reach 9.6 billion by 2050, the equivalent of almost three planets could be required to provide the natural resources needed to sustain current lifestyles.



Balance is disturbed!

Carbon plays a crucial role in regulating the earth's temperature through continuous exchange between living organisms, the oceans, the atmosphere, and the earth's crust. During this exchange, various carbon compounds such as carbon dioxide (CO_2), methane (CH_4), calcium carbonate (CaCO_3), and hydrocarbons (H_xC_y) are continuously created, destroyed, and stored. However, this carbon is also disturbing the balance of the Earth. Since, industrial revolution it has been constantly added by humans through the **burning of fossil fuels, unbalancing it's** concentration in the atmosphere and raising the temperature.



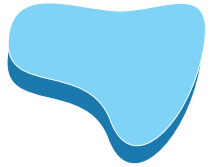
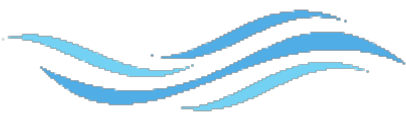
Reflection

Let us recap our learning after knowing about what is causing climate change:

- What are the natural factors that are responsible for climate change?
- Natural climate change takes centuries, then what man-made activities have increased the process of climate change?
- How is air pollution linked to the greenhouse effect?
- How is earth balance disturbed?
- How are our consumption patterns and lifestyle choices leading to an increase in carbon emissions? Share a few examples.
- How do the carbon cycle, climate and environment influence each other?

A photograph showing two men standing in a field of dry brush and trash. The man on the left is wearing a blue uniform with a pink scarf and a dark beret. The man on the right is wearing a yellow jacket. The ground is covered with various pieces of trash, including plastic bags and papers. The background consists of dry brush and some green foliage.

**What are the impacts of
Changing Climate?**



Everything in nature is interconnected. Even a small change in one part of the natural world leads to changes in many other parts. So, as the temperature on the planet rises, we are seeing a large number of other, related changes. The level of the world's oceans is rising, glaciers and permafrost are melting, and the frequency and power of extreme weather events (heat waves, hurricanes, storms, floods and droughts) are increasing year by year. New and dangerous infectious diseases and various pests are appearing in places where they were unknown before now. These and other effects of climate change are dangerous to plants and animals, which cannot adapt quickly to such drastic changes. They also cause enormous economic damage and present a threat to human health and even human life.

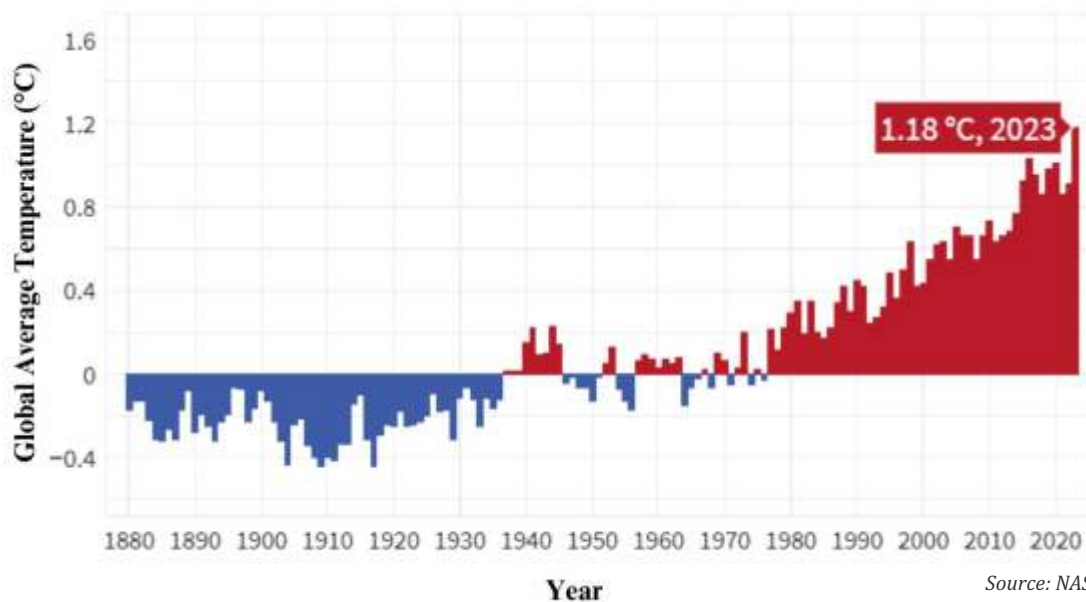


Temperature Alert!

Our climate is changing in many ways. One of the clearest signs is that the world is warming. The Earth's temperature has been increasing by 0.11°C every decade since 1850, resulting in a total rise of approximately 0.6°C. And it is observed through scientific data that global temperature is projected to warm by about 1.5 °C (2.7°C) by 2050 and 2-4°C (3.6-7.2 °C) by 2100. The year-to-year increase in atmospheric CO₂ value studied through **Keeling's Curve**. The current global average temperature has recorded 1.18°C as shown in the graph (Source-NOAA).

Keeling's Curve

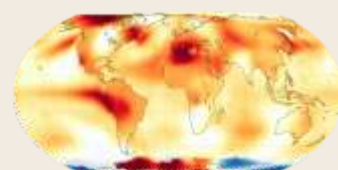
The Keeling Curve refers to a graph that plots the ongoing change in concentration of carbon dioxide (CO₂) in Earth's atmosphere over time. It's named after Charles David Keeling, an American scientist who began collecting atmospheric CO₂ data at the Mauna Loa Observatory in Hawaii in 1958.



Year 2023: Hottest Ever!: In 2023, Earth experienced scorching temperatures, making it the hottest year since 1850, with an average temperature surpassing 1.18°C. The 2023 Global Climate Report from NOAA (National Centers for Environmental Information) revealed that in July, August, and September, temperatures were unusually high, with September reaching a record-breaking 1.44°C (2.59°F) above normal - the highest ever recorded for a single month.



Pre-Industrialization (1880 - 1884)

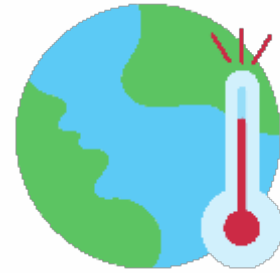


Post-Industrialization (2023)

Source: NASA

What is the 1.5 °C Target?

The Paris Agreement, adopted in 2015, is an international treaty aiming to combat climate change by limiting global warming to well below 2°C, preferably to 1.5°C. It was signed by 196 countries. However, according to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), temperature might surpass the 1.5°C mark between 2021 and 2040.



Last September 2023, the temperature came to 1.44°C, very close to reaching 1.5°C, going beyond the goals set in the Paris Agreement. The temperature limit is not some random statistic but rather an indicator of the point at which climate impacts will become increasingly harmful for people and indeed the entire planet.

IPCC is a body of the United Nations which looks at the impact of climate change on the global community was established in 1988 with its headquarters in Geneva, Switzerland. IPCC has released six assessment reports since 1990.

How will climate change impact India?

Climate Change is predicted to impact India's natural resource base, including water resources, forestry and agriculture. According to the *Global Climate Risk Index*, India was the seventh most climate-affected country in the world in 2019 (Germanwatch, 2021). Changes in precipitation, temperatures, monsoon timings, and extreme events are likely to have great implications on the livelihoods, health, and biodiversity of the country. The impacts felt by India are as follows:

Glaciers are Retreating

Glaciers are sensitive indicators of climate change. They are retreating almost everywhere around the world. Glaciers in the Himalayas feed the country's big rivers in the northern region. The health of the glaciers has impacts on agriculture and livelihoods of the region. It is like an alarm of changing water cycle, precipitation patterns, increased floods as well as an increased scarcity of water in the future in the states across the Himalayas. In recent decades, the retreat of the Gangotri Glacier of the Himalayas shows that it is retreating to 10 meters (33 feet) per year, at which rate it will last 3,000 years.



Rise in Sea Level

India has the world's seventh-largest coastline measuring over 7,500 km. The coastline is unique not only in its diversity of habitat and ecology but also in its history and geography. One-quarter of the Indian population lives along the country's coasts and is largely dependent on coastal livelihoods. Climate Change is predicted to increase the mean sea level, as well as possible increases in the frequency and intensity of coastal surges and cyclones that already cause significant damage to coastal populations. These predicted changes threaten life, livelihoods and infrastructure.

A tale of Satabhaya Village!

This story belongs to Satabhaya, a cluster of seven villages from Kendrapara district, Odisha, India located in the coastal region. Once it was home to over 700 families, now showing no sign of life. Global warming and rising sea levels have caused the village to submerge leaving a 6 metre tall hand pump as a testimony to a life that existed earlier and as a warning of the growing wrath of the sea.



Source: scroll.in

Ocean Acidification

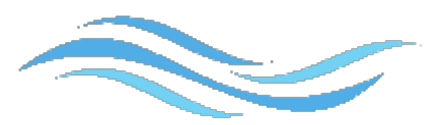
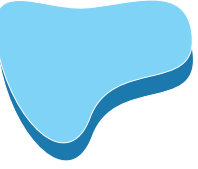
As we all know, oceans are basic or alkaline in nature with pH 8.1 approximately and they act as carbon sinks by absorbing extra carbon dioxide (CO₂) and also act as big sponges. When CO₂ is combined with salt water it produces carbonic acid – H₂CO₃. This decreases the pH making oceans acidic which hampers the survival of plants and animals.

Coral Bleaching @ Andaman

Corals are one of the rarest ecosystems on Earth and are a source of food and shelter for at least 25 per cent of marine species. When water is warm, corals expel algae living in their tissues and they turn completely white as shown in the image and this phenomenon is known as coral bleaching. The change in ocean temperature due to an increase in global temperature is leading to coral bleaching. The scientists at the Zoological Survey of India found out that there is massive coral bleaching in the Andaman sea coastal areas. The bleaching is between 83.6 - 91.5 per cent in the Andaman region.



Source: The Logical Indian



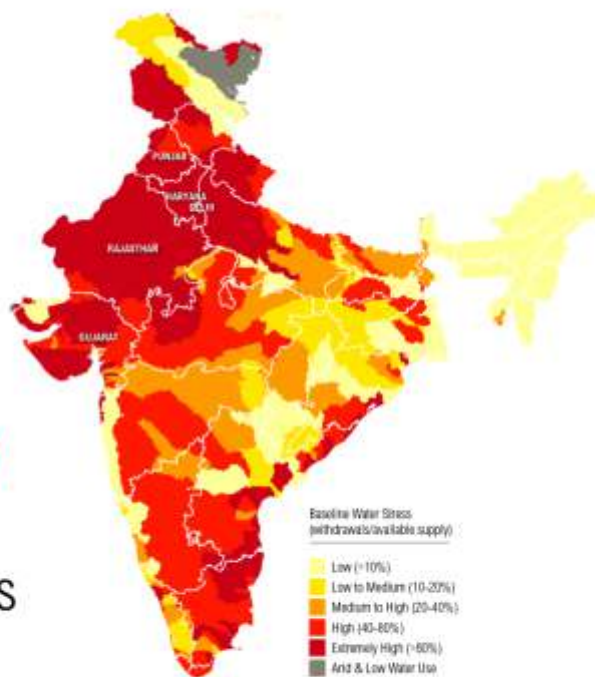
Energy Demand

Rise in temperature will lead to increased energy demand. For example, increases in average temperature can result in the need for space cooling for buildings, and variability in precipitation can impact irrigation needs and consequent demand for energy from groundwater pumping.

Water Stress

While India has about 16 per cent of the global population, it only has 4 per cent of total freshwater resources, and many parts of India already face water scarcity. Water is very important not only for basic human needs but also for agriculture and other sectors. It is also important for economic development. Water is a core component of climate and is greatly affected by climate change. It can have important implications for freshwater supply for drinking water, rainfed agriculture, groundwater supply, forestry, biodiversity, and sea level.

54%
of India
Faces
**High to
Extremely
High
Water Stress**



www.indiawatertool.in

WORLD RESOURCES INSTITUTE

Impact on Agriculture and Food Production

Agriculture represents a core part of the Indian economy and provides food and livelihood activities to much of the Indian population. While the magnitude of impact varies greatly by region, climate change is expected to impact agricultural productivity and shifting crop patterns. The implications are wide-reaching and could affect food security, trade policy, livelihood activities and water conservation issues, impacting large portions of the population.



Ecosystems and Biodiversity at Risk

Biodiversity is highly vulnerable to changes in natural conditions like changes in temperature, forest fires, melting of glaciers, etc. Extreme weather events pose a heavy risk to terrestrial, freshwater, coastal and marine ecosystems. Evidence shows that climate-related stresses are already affecting mangrove forests (Sundarbans and the Andamans and Nicobar Islands). India has lost 12 per cent of its wild mammals, 45.8 per cent of reptiles, 55.8 per cent of amphibians and 4.5 per cent of birds due to the loss of their natural habitats in extreme events due to climate change.



Vulnerability to Human Health

Predicted impacts on human health due to climate change includes increase in temperature-related illnesses, vector-borne diseases, extreme weather events and food insecurity. An increase in precipitation and temperature rise will aggravate vector-borne diseases such as malaria and dengue. According to WHO (2021), between 2030 and 2050, climate change is expected to cause approximately 2,50,000 additional deaths per year from malnutrition, malaria, diarrhoea and heat stress alone.

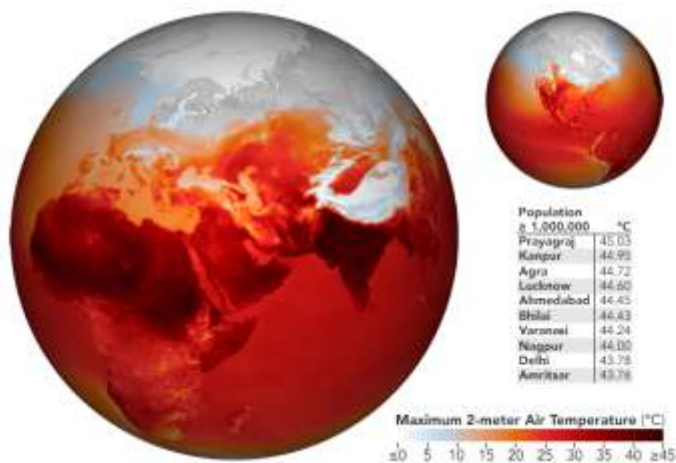
Extreme Weather Events and Disasters

Climate hazards are natural events in weather cycles. We have always had hurricanes, droughts and wildfires, flooding and high winds, and heat waves. However, we are currently witnessing a scale of destruction and devastation that is new and terrifying. The spike in global temperatures is fueling climate disasters and extreme events such as *cyclones, floods, droughts, heat waves, and irregular rainfall*. The frequency and intensity of extreme events in India have increased by almost 200% since 2005.



These are a cause for the huge loss of life and livelihood, and damage to property and the economy. According to the report from the Centre for Science and Environment, climate change-induced natural disasters killed almost 3,000 people and 70,000 livestock and destroyed around 4.1 lakh houses in just 9 months of the year 2022.

A **'heat wave'** is a period of at least five days, during which the average daily temperature is at least 5 °C higher than what is normal for these days of the year.



Source: April 2022, NASA

Change in seasonal cycles

The seasons are shifting on a global level. Spring is arriving earlier; winters are shorter and summers are longer with the number of days with extreme temperatures increasing. These changes affect the timing of many life cycles in our ecosystems such as when flowers will bloom or when pollinators will emerge or when birds will migrate and the misalignment of species that rely on each other. The change in growing season leads to invasive species and pests which affects crop production.



Frequency of cyclones

In the last two decades between 2001 and 2019, there is a 52 per cent rise in the frequency of cyclones in the Arabian Sea. There is an 8 per cent decrease over the Bay of Bengal between 1982 and 2002. The state of Odisha has experienced over 10 Cyclones in the last 22 years.



Endangered Rice cultivation

Haryana's Bithimara village faces untimely and continual rainfall in early August this year which destroyed the paddy crops of the farmers. They are compelled to leave farming as the cost of rice farming is much more than the money earned from it due to unpredictable seasonal shifts. The farmers and traders have also noticed a decrease in the quality of rice.

Hope Story: Community-based flood awareness system

Climate change is gradually increasing the frequency and magnitude of extreme weather events in the Hindu Kush Himalayan region. It is leading to the formation of meltwater lakes on the lower sections of glaciers and because of its instability, there are chances of disastrous flooding in the valley. Scientists have formulated an adaptation strategy where an ICT enabled Community based Flood Early warning system has been developed to detect and respond to flood emergencies.



Source: unfccc.int

Dangerous Tipping Point: The point of no return!

A 'tipping point' point in the climate system is a critical threshold point when exceeded, leads to large and often irreversible changes in the state of the climate system. For example, imagine a glass of water slowly tipping over: at first, as it starts tipping, nothing happens. But once it passes its tipping point, the glass suddenly falls over and all the water spills out. Once that happens, there's no way to get the water back in the glass. For example, the Amazon rainforest could become a grassland if the global temperature rises by about 3°C.



Reflection

Let us recap our learning after knowing about what are the impacts of climate change:

- Why increase in the temperature by 2 °C is a matter of concern when the temperature during the day fluctuates between 10-15 °C?
- How are humans directly and indirectly affected by climate change?
- Which extreme weather event have you experienced in your area and how it has impacted your life?
- Apart from humans, what all gets badly affected due to extreme weather events?
- How can the availability of idli in your breakfast be impacted by climate change?
- Glaciers are retreating in the Himalayas so how does it impact someone who stays in the plains of Punjab?
- Why should we worry about coral bleaching? How does it affect us?
- How increase in temperature is leading to an increase in vector-borne diseases like malaria, dengue etc.?



How to Act to Reduce Climate Change Impacts?

Climate Change is real and requires urgent attention from all of us. Climate Change is one of the most complex issues we are facing in recent times. It involves many dimensions – science, economics, society, politics, moral and ethical questions – and is a global problem, felt on local scales, that will be around for thousands of years. Then the question comes:

How do we cope with this issue?

What should be our approach to fight Climate Change?



Responding to climate change is a two-way approach: **Mitigation and Adaptation**

Mitigation: Restoring Nature's Balance

Mitigation refers to the action of reducing or preventing further greenhouse gases from being released into the atmosphere. Through this approach, we are not completely eliminating the problem (some change will still occur), but we are making it less severe and more manageable. For example, switching to renewable energy sources, recycling, making more cycle paths and walkways, changing our consumption habits etc.

Conserving Carbon Sinks

In the fight against climate change, not only humans, but 'Nature' itself has its own ways to keep the average temperature of the planet from increasing by absorbing excess carbon in carbon sinks. A carbon sink absorbs more carbon from the atmosphere than it releases. **Oceans, Forests and Soils** perform this function. Oceans are the largest carbon sink on the planet and the carbon captured by coastal and marine ecosystems is known as **Blue Carbon**. Grasslands and wetlands also play key roles in absorbing carbon. Conservation of carbon sinks is helpful in mitigation.



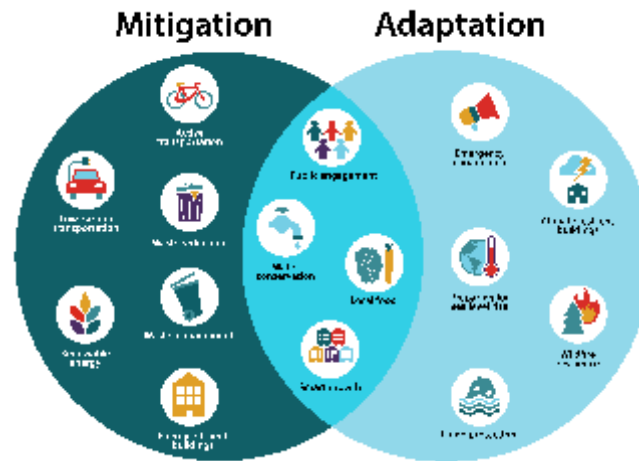
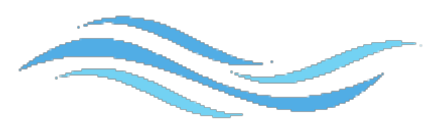
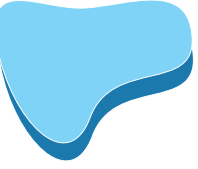
Adaptation: Adjustment to changed situations to reduce the effects of Climate Change

Regardless of the choices we make, some warming will still occur. Thus, we will have to find ways to adapt ourselves to reduce the risks posed by climate change. Adaptation becomes important especially to improve resilience and reduce the risks and impact of climate change on poor and vulnerable communities.

Adaptation measures can include increasing access to education and health facilities and changing behaviour such as individuals using less water, and farmers planting crops that are better suited to the changing climate. On a larger scale, these may include putting in place better infrastructure to reduce flooding for example or ensuring good quality roads to withstand hotter temperatures.

IPCC defines adaptation as “adjustment in the natural and human system in response to actual or expected climatic stimuli or their effects that moderates harm and exploits benefits opportunities “and”...a process by which individuals, communities, countries seek to cope with the consequences of climate change including variability”

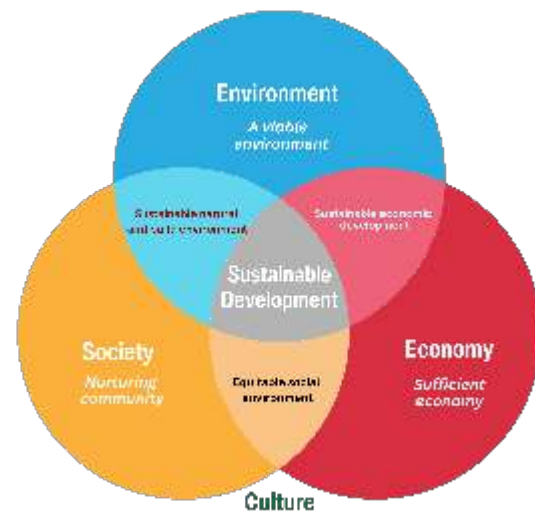
Source: IPCC, 2007



Connection between Sustainability and Climate Change

The World Commission on Environment and Development held in 1987 described Sustainable Development as *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*.

Sustainability is key to dealing with climate change impacts. It involves taking action now to protect the environment for both present and future living conditions. To achieve sustainability, it is essential to balance three pillars - society, environment and economy.



What is Agenda 2030?

Addressing global environmental issues with international collaboration has led to the idea and implementation of the 2030 Agenda, which comprises **17 interlinked Sustainable Development Goals (SDGs)**, adopted by the United Nations Sustainable Development Summit, in 2015. There are 169 targets to guide policymakers and all stakeholders in achieving these goals.



Goal 13 on Climate Action

This goal's aim is to 'Take urgent action to combat climate change and its impacts'. This goal has 5 targets of which target 13.3 emphasizes the role of education stating that, *"Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning."* Climate change concerns are connected to several SDGs which require understanding interconnections and taking climate action.



India's efforts on Climate Change!

Government has a key role in climate change mitigation and adaptation. The Government of India stands committed to combat climate change through its several programmes and schemes including the National Action Plan on Climate Change (NAPCC) which comprises 8 missions in specific areas of alternative energy and energy efficiency, water management, sustainable agriculture, greening, health, etc. Knowledge building is one of the key missions which highlights the need to engage citizens of the country in climate action.

Do I have a role in carbon emissions?

Yes, climate change is closely linked to the consumption of resources and your lifestyle. Reducing carbon emission levels or carbon footprint on a daily basis is an important call to action, towards climate change.

What is Carbon Footprint?

A carbon footprint is the total amount of greenhouse gases that are generated by our actions. It includes direct emissions from the combustion of fossil fuels in manufacturing, heating, and transportation, as well as emissions required to produce the electricity associated with the goods and services consumed. It is usually expressed as a measure of weight, as in tonnes of CO₂ or CO₂ equivalent per year.

Calculate your own Carbon Footprint

Use any of the online carbon footprint calculator links to estimate your footprint. Use your results to reflect on making planet-friendly lifestyle choices.

<https://www.lifestylecalculator.com/unfccc>

<https://www.footprintcalculator.org/>

<https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/?redirect=https-301>



What action can I take?

We cannot reduce our individual carbon footprint overnight. We need to bring about small changes in our lifestyles, our choices and gradually make our efforts count. The Handprint is a symbol of positive action, commitment, collaboration and care. It represents the belief that we can make a difference through individual and collective actions to solve environmental problems.



This was launched in 2007 by the Centre for Environment Education (CEE) at UNESCO's 4th International Conference on Environmental Education held in Ahmedabad, India. For example, using reusable steel water bottles, watering plants through leftover water in a water bottle, using cloth bags for shopping etc.

The Government of India launched the Mission LiFE initiative to bring individual behaviours to the forefront of the global climate action narrative, encouraging citizens to bring about meaningful lifestyle changes.

"Today, there is a need for all of us to come together and take Lifestyle For Environment (LiFE) forward as a campaign. This can become a mass movement towards an environmentally conscious lifestyle."



- *Shri Narendra Modi*
Hon. Prime Minister of India

Every little contribution towards reducing our footprint and increasing our Handprint is important. Our consumption is linked with our lifestyles: what we buy, how we use our energy resources, how much waste we generate, which transportation we choose and how we live. There are many different and interesting ways in which individuals today have begun reducing, reusing, recycling, and repairing products to minimize waste and to reduce pressure on natural resources in a move towards a circular economy, therefore supporting efforts at reducing the impact of climate change.

Circular Economy

In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste - the process is linear. In a circular economy, we stop waste from being produced in the first place.

It follows three basic principles:

- eliminate waste and pollution
- circulate products and materials (highest value)
- regenerate nature



What can each of us do?

Adopting sustainable lifestyles and practices individually, at home, school and community levels will help in reducing risks to the environment and our communities. This can be done through:

- reducing direct and indirect greenhouse gas emissions
- conserving energy by increasing energy efficiency and use of renewable energy
- conserving water through efficiency, reuse, and stormwater management
- reducing and managing waste, preventing pollution, and increasing recycling
- finding ways to encourage walking, cycling and public transport
- creating and maintaining green cover
- encouraging environment-friendly practices, purchase of materials and products
- designing, constructing or retrofitting, maintenance and operation of infrastructure
- raising awareness and encouraging each individual to take climate action.



Bureau of Energy Efficiency (BEE) star ratings

The number of stars on a BEE label is determined by how much energy a product uses compared to similar products that use the same amount of energy. The stars are assigned using a scale of 1 to 5, with 5 being the most efficient. You will find star-rating labels on the following appliances - ceiling fans, room air conditioners, refrigerators, LED lamps, TV, computers etc.



Use Energy Wisely and Smartly!

Whenever we use electricity, we put GHGs into the air. Reduce consumption of energy as much as possible by turning off lights and electrical appliances after use. Also, make a smart choice while purchasing new electrical appliances. Choose those with BEE five-star ratings.



Is using electric vehicles better than one running on petrol or diesel?

It is always good to think about the choices one makes. Electric vehicles that need to be charged with electricity which is produced using fossil fuel (coal, diesel) are not necessarily better than petrol-fueled vehicles. This is just the displacement of the energy source.

Drive Less and Switch to Walk, Cycle or Public Transport!

Transportation is one of the major contributors to carbon footprint levels. More cars on the road mean more GHG emissions. Opt to walk or bike for small distances, take public transport when possible, and carpool with friends instead of driving alone.



Be a Local Consumer!

We all like eating those exotic fruits from across the world, when available in the nearby shop. But have we thought about how it is reaching there? Is it still nutritious after travelling miles? Is our locally available seasonal fruit better than that? The use of locally produced seasonal food products helps reduce greenhouse gas emissions and contributes to improving our carbon footprint. It also benefits our local economy! Starting a kitchen garden in your backyard or balcony is also a great way to begin thinking local and using local as much as possible.



Save and Plant a Tree!

Trees are great for absorbing carbon dioxide, a greenhouse gas from the air and increasing oxygen levels through the process of *photosynthesis*. We all need to work towards increasing the green cover around us by planting more trees. Choosing local species, those which can also attract insects and birds can add to the biodiversity of the area. See if you and your classmates can adopt a nearby open space to create your own little forest. Plant, nurture and enjoy the benefits of the green space.



Urban Heat Island effect

The **Urban Heat Island effect** is formed when the green vegetation is replaced by concrete buildings, asphalt for roads and other structures necessary to accommodate growing populations. These surfaces absorb the sun's heat, causing surface temperatures and overall ambient temperatures to rise.



Do you know how it feels?

Recall an experience of visiting a farm or a green area with lots of trees. You'll probably find that it is cooler there than in your city. It is because most of the region is covered with plants, grasses, trees, and farmlands with crops as far as the eye can see. The transpiration process in plants cools temperatures down. They *act as nature's air conditioner*. If you have a small patch at home or in your school, growing vegetables or medicinal plant gardens would be a great way to get local produce as well as learn about them.

Be Water Wise!

Judicious use of water each day can help you to conserve this precious resource. Take short showers, fix leaky taps and conserve rainwater through harvesting methods. Wherever it is possible, at home or in school, a rainwater harvesting system would help reduce pressure on the piped water supply.



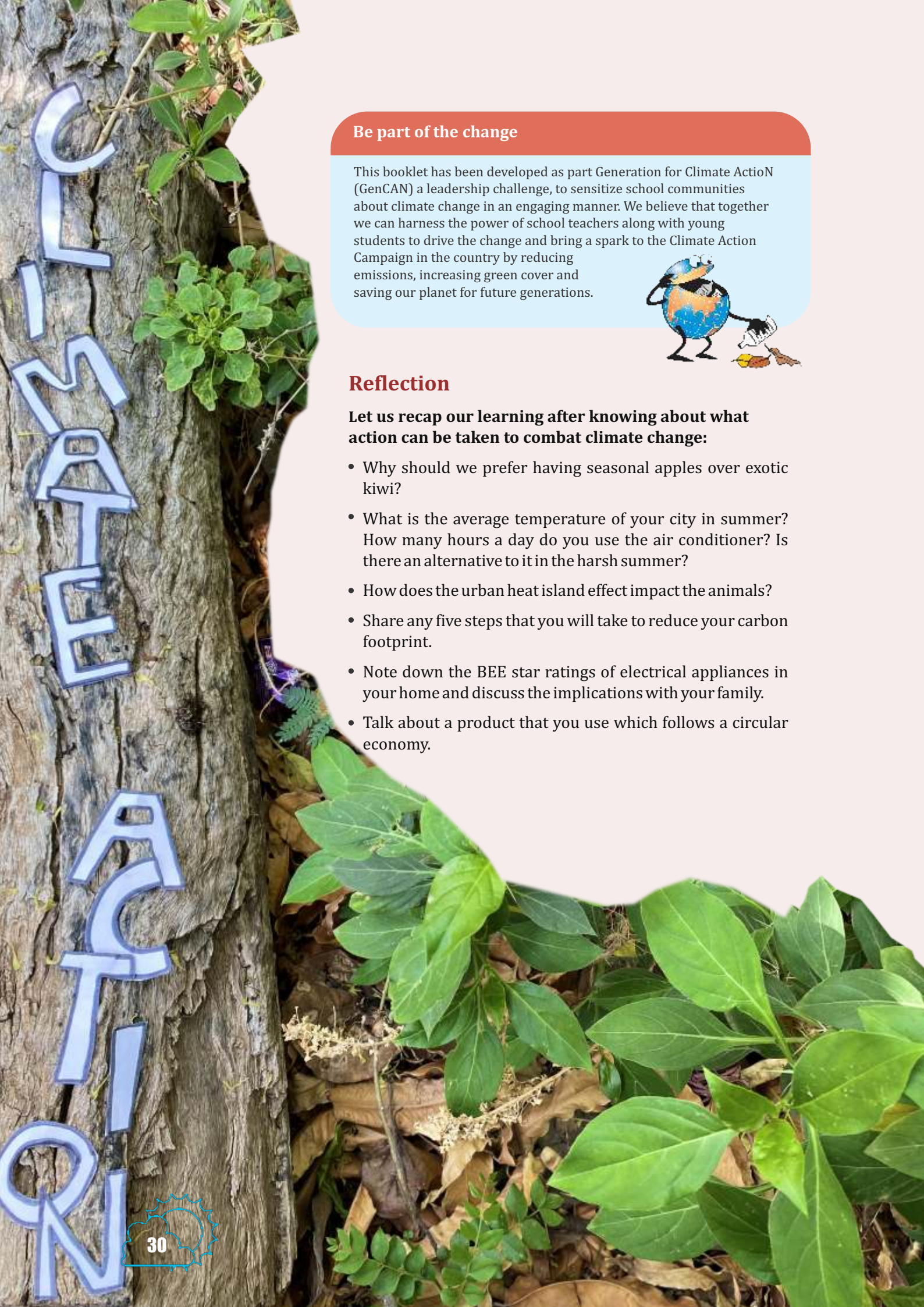
Influence!

You might think you can't make a difference, but studies have shown that if you take action, then your peers are more likely to take action too.

Let's join hands

Let's find simple solutions

Let's act now.



Be part of the change

This booklet has been developed as part Generation for Climate Action (GenCAN) a leadership challenge, to sensitize school communities about climate change in an engaging manner. We believe that together we can harness the power of school teachers along with young students to drive the change and bring a spark to the Climate Action Campaign in the country by reducing emissions, increasing green cover and saving our planet for future generations.



Reflection

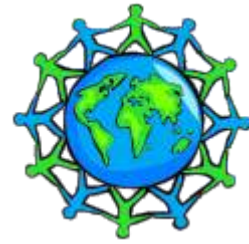
Let us recap our learning after knowing about what action can be taken to combat climate change:

- Why should we prefer having seasonal apples over exotic kiwi?
- What is the average temperature of your city in summer? How many hours a day do you use the air conditioner? Is there an alternative to it in the harsh summer?
- How does the urban heat island effect impact the animals?
- Share any five steps that you will take to reduce your carbon footprint.
- Note down the BEE star ratings of electrical appliances in your home and discuss the implications with your family.
- Talk about a product that you use which follows a circular economy.

Take the Climate Action Leadership Challenge



Giving students time and space to discuss all aspects of climate change is critical to help them understand the many challenges this issue presents. But it is equally important to provide students an opportunity to address climate change by taking action.



The Generation for Climate Action (GenCAN) is an annual leadership challenge programme for schools to build the climate literacy and leadership skills of young children for taking and promoting climate action.

The challenge has been designed to engage teachers and students of ages 11-18 years to collaborate, cooperate and complete the climate action challenge by understanding issues, exploring the causes and effects of climate change, developing solutions, and taking climate action at the school level.

By joining the challenge, your school will be part of a national movement for creating a cadre of young climate leaders to take local-level actions and inspire others in society.

What is Leadership?

Leadership is the ability to lead a team and be capable of effective team management in relation to real-world challenges. It is a personal quality and skill such as perseverance, being committed and responsible, resilience and self-confidence and how to foster a commitment to life-long learning.

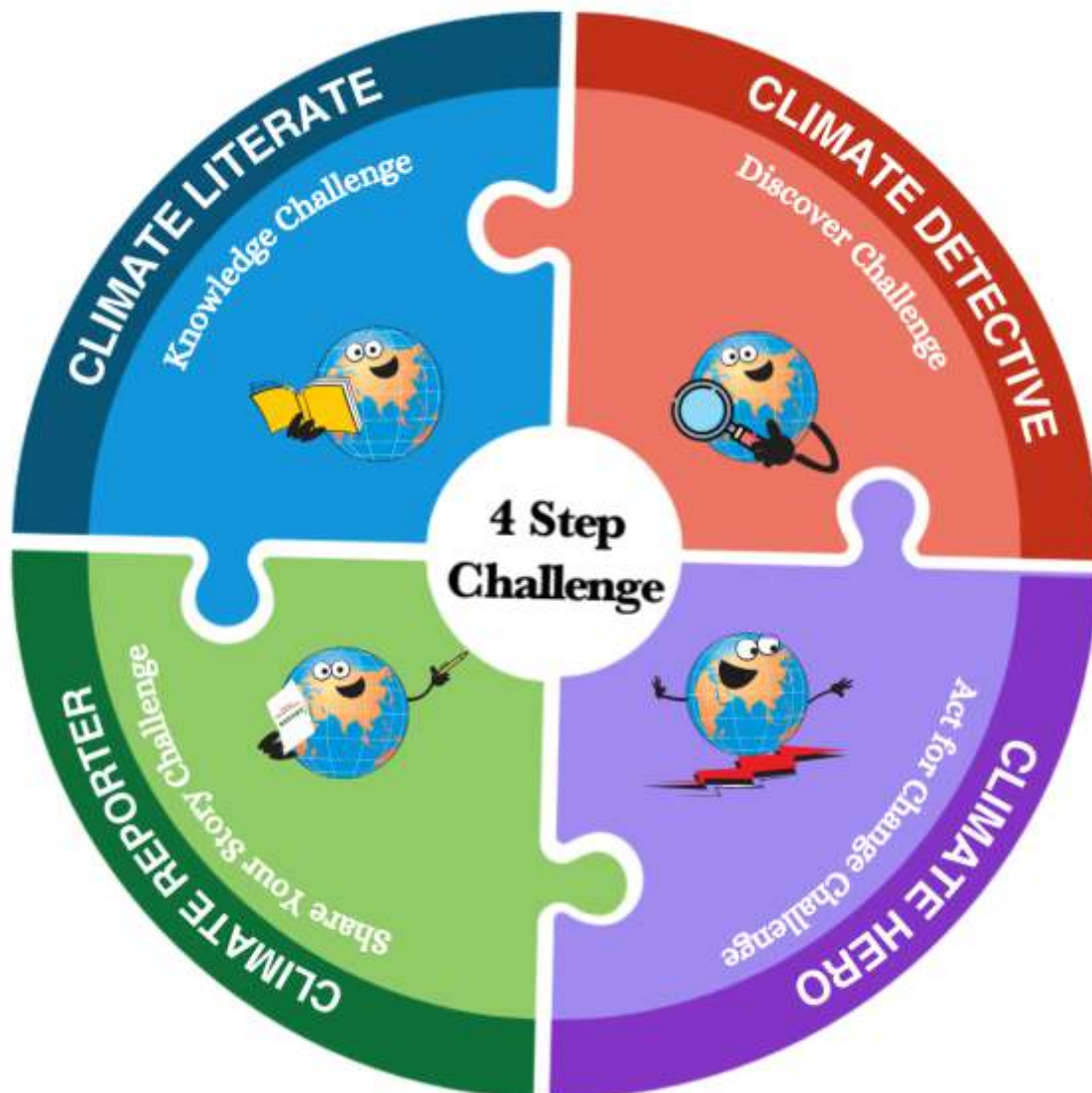
Developing young students with leadership skills, especially in the context of climate action is for preparing them to deal with future challenges. Thus, a climate action leader is someone who has a vision, and positive attitude, is an inspirer, good communicator with the ability to engage in real-life experiences of planning, implementing, problem-solving, working as a team, etc.

Young Climate Action Leaders are....



About the Challenge

This is a four-step challenge.



Participation in the Challenge

Register your school on the website (www.gen4climateaction.org). Fill out details of your school. After review of the registration form, shortlisted schools will receive login details. Download the challenge booklet and also refer to the resources section. To start with challenge activities, use the dashboard to know more about activity guidelines and reporting formats. The mentor teacher nominated by the school, will get an opportunity to attend an online course on climate change education and facilitation of the challenge.

To participate in the challenge, a mentor teacher needs to select a team of a minimum of 5 and a maximum of 8 students from any of the classes 6-12 (11-18 yrs). Students can be selected based on their interest in climate change concerns and enthusiasm to take up the challenge. Once the student climate action leaders team is formed, use the booklet for conducting orientation on climate change and participation in the challenge.



Let's START

Challenge 1 - Climate Literate

This step of the challenge is aimed to build students' understanding, knowledge and attitude towards climate change science and concerns.

Preparation: Use teaching resources - booklet, presentations, videos, games and a poster for the purpose. Do share the climate action leadership challenge booklet with the students for their continued knowledge exploration about climate change. Refer to the guidelines for conducting activities for this challenge.



Activities: Challenge 1 requires the participation of the student team members in the climate literacy quiz and also to work towards spreading climate awareness among the rest of the school. Student leaders are required to take part in the online national-level Climate Literacy Quiz. The quiz will be based on the booklet available on the website.

Encourage students to use their knowledge and conduct a climate awareness campaign in the school. Ask students to brainstorm to plan the campaign, you can act as an observer. Students may use morning assemblies, bulletin boards, exhibitions, etc. for the campaign in the school.

Time Required: 3-4 Weeks

Reporting: Once the challenge is complete, the mentor teacher needs to report on the following aspects on the school's login page -

- Total number of students who participated in the orientation session by mentor teacher
- Method used for orientation (booklet, video screening, interactive session through PowerPoint presentation, activities/games, assignments etc.)
- Total number of students covered through awareness activities by student leaders
- Approach used by Climate Leaders for spreading climate awareness in schools (morning assembly, bulletin board, exhibition, interactive session in classes, quiz and others)
- Reflections of activities (50 words) by mentor teacher
- Reflections from Climate leader students (Share 2-3 quotes with student's name)
- Any other information related to the challenge activity



Upload 3-4 photos of orientation sessions, climate awareness activities and others with captions. This knowledge building will help in the completion of the next steps of challenge activities.

Challenge 2 - Climate Detective

After having found out about Climate Change and its impacts, in this step students will go on a discovery trail to find out about carbon emissions of their own school campus.

Preparation: Refer to guidelines for conducting activities for this challenge. Download survey formats and share them with students. You may include aspects which are specific to your school. Facilitate orientation sessions for students prior to the data collection. You may invite other subject discipline teachers and support staff for the planning of the survey.

Activities: Challenge 2 requires students to collect data for estimating their school's carbon emission in the areas of *Electricity, Transport, Water, and Waste*. A survey in all four areas is mandatory. This challenge would require a climate team from classrooms to survey and discover the carbon emissions from these areas. Teachers can form theme-wise teams and assign them survey-related tasks. After the survey, students need to collate all the data gathered by students for the use of electricity, transport, water and generation of waste in the school. You need to enter the collected data by login into your school profile on our website. After entering the data, you will get the School Carbon Footprint calculation for your school.

Time Required: 2-3 weeks

Reporting: Once the challenge is complete, the mentor teacher needs to report on the following aspects on the school's login page

- Enter survey data for all 4 areas - Electricity, Transport, Water and Waste for calculation of school carbon footprint
- A total number of students involved in data collection
- Which school members were involved in data collection (School management, teachers caretaker, guard, transport/electricity/water supply in charge, cleaning staff etc.)
- Number of school members involved in this challenge activities
- Reflections of activities (50 words) by mentor teacher
- Reflections from Climate leader students (Share 2-3 quotes with student's name)
- Any other information related to the challenge

Upload 3-4 photos under each category for the data collection process (survey, interviews etc.) with captions.

Now the student team knows about the carbon emission of their own school. They are ready to go to the next step of challenge activities.



Challenge 3 - Climate Hero

After knowing your school's carbon footprint now it's time to move to the next step of the challenge to reduce carbon emissions.

Preparation: Refer to guidelines for conducting activities for this challenge. Share the document with students to start thinking about preparing short-term project and long-term climate action plans for the school.

Activities: Challenge 3 requires students to prepare two strategies: a short-term climate action project and a long-term school climate action plan. Short term project is a trial pilot plan where the team will identify one area of action which can be done in 1-2 months' time. The team can decide on what changes they want to see as a result of this implementation. In the long-term plan, the team can develop a phase-wise plan for the school campus to become a Climate Friendly School.

Time Required: 2 months

Reporting: Once the challenge is complete, the mentor teacher needs to report on the following aspects on the school's login page:

- Provide data on existing climate action taken up by school
 - Solar Power Plant (Capacity in kWp)
 - Rain Water Harvesting System (Quantity of water harvested in kilolitres)
 - Composting (Quantity of wet waste used for composting in Kg)
 - Green Space (Number of big size trees (up to 10 yrs old))
- Enter data for short term action taken in the any one of the selected among four areas
- Total number of students involved in implementation of action plan
- Which school members were involved in climate action related activities
- Upload long term school climate action plan (pdf/word document)
- Reflections of activities (50 words) by mentor teacher
- Reflections from Climate leader students (Share 2-3 quotes with student's name)
- Any other information related to challenge

Upload 2-3 photos of existing climate action in school and 3-4 photos on climate action taken up as part of this challenge. Do caption these photos.

Working on a solution-based action project in this challenge builds the foundation of the long-term climate action planning not only in their schools but also in their homes. Congratulations you are at the final step of the challenge!



Challenge 4 - Climate Reporter

Starting from understanding climate concerns, finding out about carbon emissions of your own school campus and then taking up the climate action project, you have come a long way in this challenge. It is time now to consolidate your experiences and learning.

Preparation: Refer to the guidelines to document your experience with this challenge. Discuss with students to select method/s of documentation for the climate action leadership journey.

Activities: Challenge 4 requires students to document and showcase the transformation of all the actions into writing format. The mentor teacher can encourage a few students from the team from step 1 onwards to keep documentation of the discussion, observations and highlights of efforts. Let students choose a format of documentation, make sure they use their creativity and become a climate reporter. Mentor teacher needs to share his/her journey of being a climate action leader teacher through this challenge.

Time Required: 2 weeks

Reporting: Once the challenge is complete, the mentor teacher needs to report on the following aspects on the school's login page:

- Upload a report sharing the student's climate action journey (refer to reporting template in the guidelines - word/pdf/scanned report as well as short video clip can be uploaded)
- Upload report by mentor teacher on climate action journey
- Upload group photo of the entire student climate action team
- Upload 2-3 photos reflecting how your school has adopted the motto of becoming a carbon-friendly school.

This challenge is to showcase your journey which can inspire many schools. Your work done in this entire challenge and your journey story will be evaluated by a panel of experts.



Climate Action Leaders Inspire through social media

Use school-related social media platforms to promote activities taken up by the school as part of this challenge. You can tag us in your posts on

@HCLFoundation; @HCLTechnologies; @HCLHarit;

@ceeindia; @CEEparyavaranmitra;

Hashtag #GenCAN

#ClimateChallenge #hclfoundation #hclharit #ceeindia #SDG13 #ClimateAction #missionLiFE
#ClimateChampions #Climateleader #paryavaranmitra #environmenteducation #ESD2030 #SDG4
#UNESCO



Climate Change Vocabulary

Climatology: The scientific study of climate, defined as weather conditions averaged over a long period of time.

Climate Abatement: Refers to reducing the degree or intensity of greenhouse gas emissions.

Climate Adaptation: The actions that are taken to help in reducing the effects of climate change.

Carbon Footprint: The total amount of carbon dioxide you are responsible for releasing into the atmosphere, directly (through driving a car), and indirectly (through the things you use and/or purchase).

Carbon Finance: Climate finance refers to local, national, or transnational financing drawn from public, private, and alternative sources of financing. It supports mitigation and adaptation actions that address climate change.

Carbon Offset: A reduction in emissions of carbon dioxide or greenhouse gasses made in order to compensate for an emission made elsewhere. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gasses.

Carbon Sinks: A forest, ocean, land, or soil that absorbs more carbon dioxide than it emits.

Carbon Sequestration: The process of capturing and storing atmospheric carbon dioxide.

Carbon Credit: A carbon credit is a term used for a tradable certificate or permit representing the right to emit one ton of carbon dioxide (or the equivalent of another greenhouse gas).

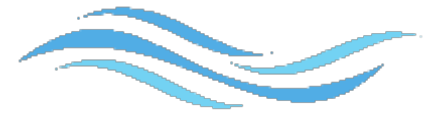
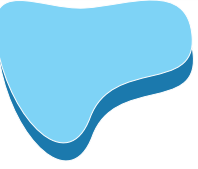
Climate Change: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Circular Economy: In a circular economy, things are made and consumed in a way that minimizes our use of the world's resources, cuts waste and reduces carbon emissions.

Climate Mitigation: It addresses the cause of climate change and is the action taken to reduce GHG concentrations.

Climate Resilience: Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.

Climate Crisis: A term used to show a sense of emergency and urgency about climate change.



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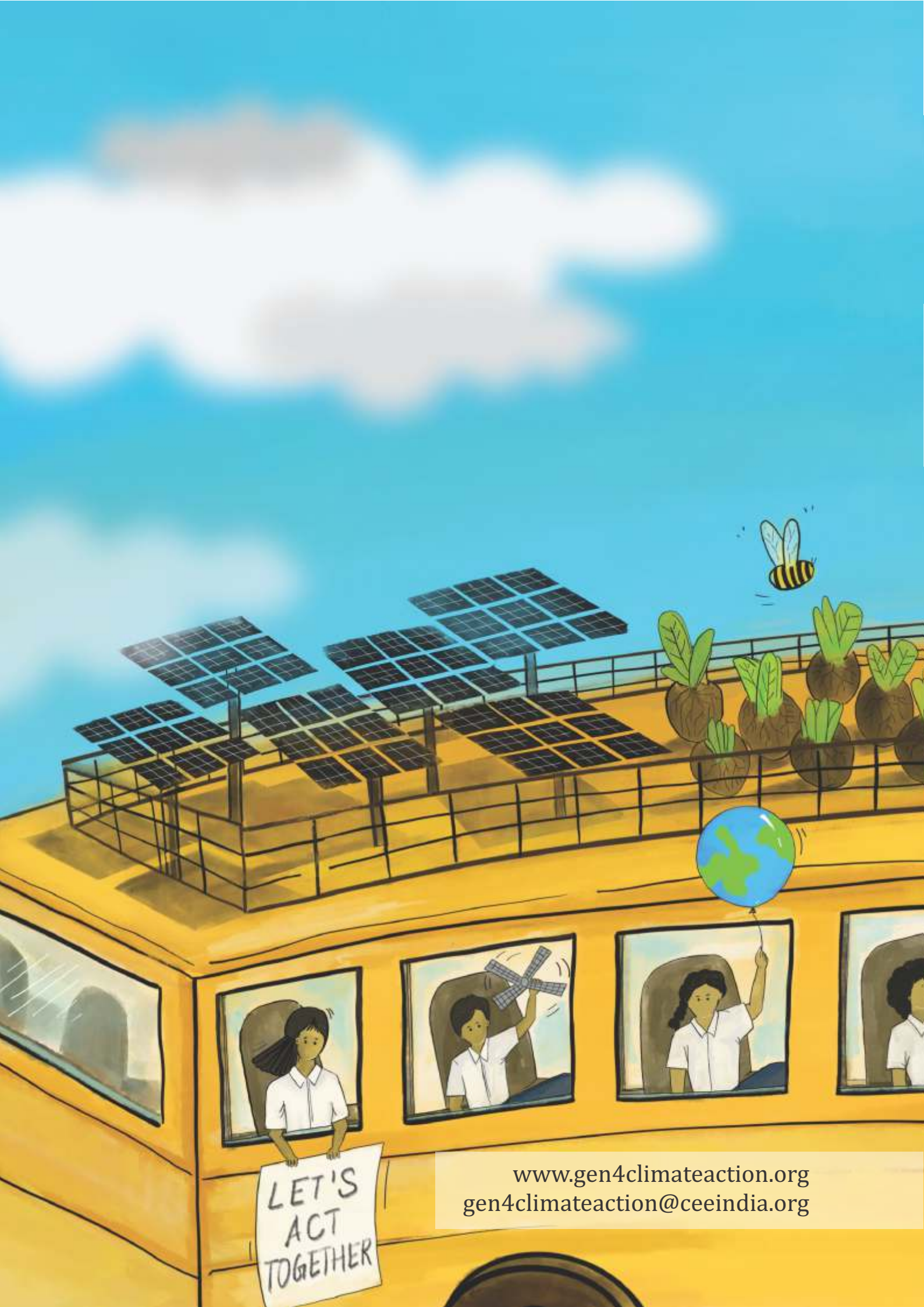
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