
A CITIZEN'S HANDBOOK ON

CLIMATE CHANGE

BY

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ABOUT THIS HANDBOOK

The handbook provides a simplified information on climate change and the approaches, tools, and mechanisms for citizen engagement in the conversations and initiatives on climate change. It contains a systematic review of the relevant literature and sources on climate change and citizen engagement processes.

The handbook has reviewed documentation relating to climate change and citizen participation including existing laws and specifically Climate Change Act of 2016, Climate Policy, the National Climate Change Action Plan and highlight key information that the citizen should know as well as provisions relating to citizen involvement and participation.

The handbook has reviewed citizen engagement approaches by civil society organizations, development partners, government and other institutions as well as other stakeholders.

AKNOWLEDGEMENT

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We appreciate the generous support of Hanns Seidel Foundation that made the research and development of this handbook possible. We hope that the handbook will serve its purpose of empowering citizens to have a better understanding of climate change and play an active role in the fight against climate change challenges.

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CHAPTER 1

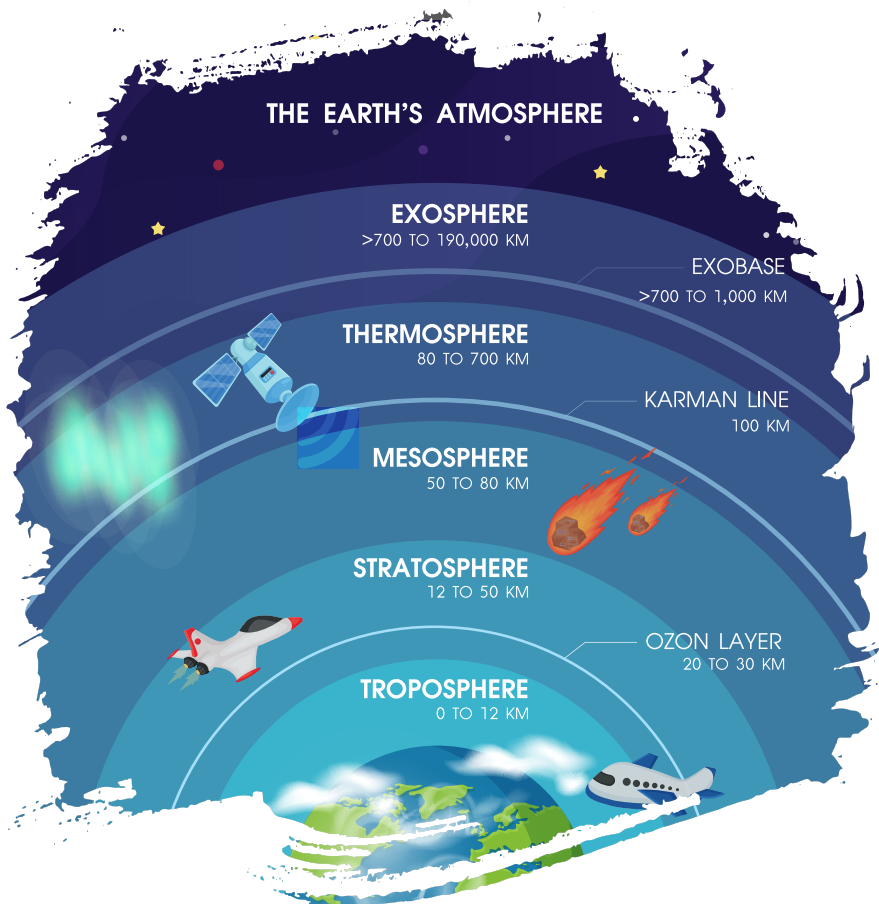
THE EARTH AND ITS CLIMATE

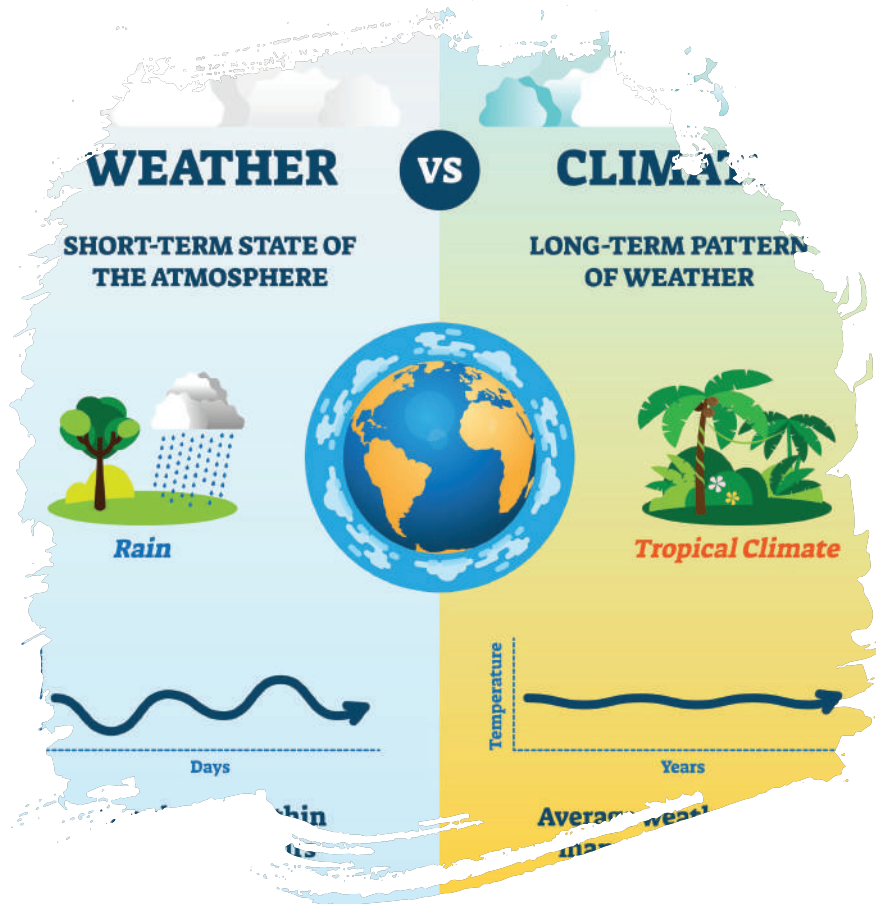
1.1 The atmosphere, what it is made up of and how it relates to the earth

The earth is a planet in which we live. It is one of the several planets that exist, namely; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Thousands more planets have been discovered beyond our solar system. Scientists call them exoplanets (exo means “from outside”).

Out of all the planets, it's only the earth that has life. One of the reasons for this is that the earth has an atmosphere. The **atmosphere** is the air that surrounds us. It covers hundreds of kilometers. The atmosphere has many natural and man-made gases in it. There is also a layer of gases called the **Ozone layer** which surrounds the earth. The Ozone layer is important. It helps to maintain life on earth.

Earth's global surface temperatures are rising at an unusually rapid rate. The past century has seen an average global increase of over 1oF (0.74oC). A degree may not seem large to us, but today's global temperatures are the highest of the past 500 years, perhaps even for the past millennium.





1.2 The difference between weather and climate

Weather refers to atmospheric conditions at a particular time in a particular location, including temperature, humidity, precipitation, cloudiness, wind, and visibility. Weather conditions do not happen in isolation, they have a ripple effect. The weather in one region will eventually affect the weather hundreds or thousands of kilometers away. It can be hot or cold, dry or wet, cloudy or clear. It could also be raining in the morning and sunny in the afternoon and cold in the evening.

Climate is the average of weather patterns in a specific area over a longer period of time, usually 30 or more years that represents the overall state of the climate system.

Human activity in the industrial age, and particularly during the last century, is significantly altering our planet's climate through the release of harmful greenhouse gases.

CHAPTER 2

PAST AND PRESENT CLIMATE

2.1 Introduction

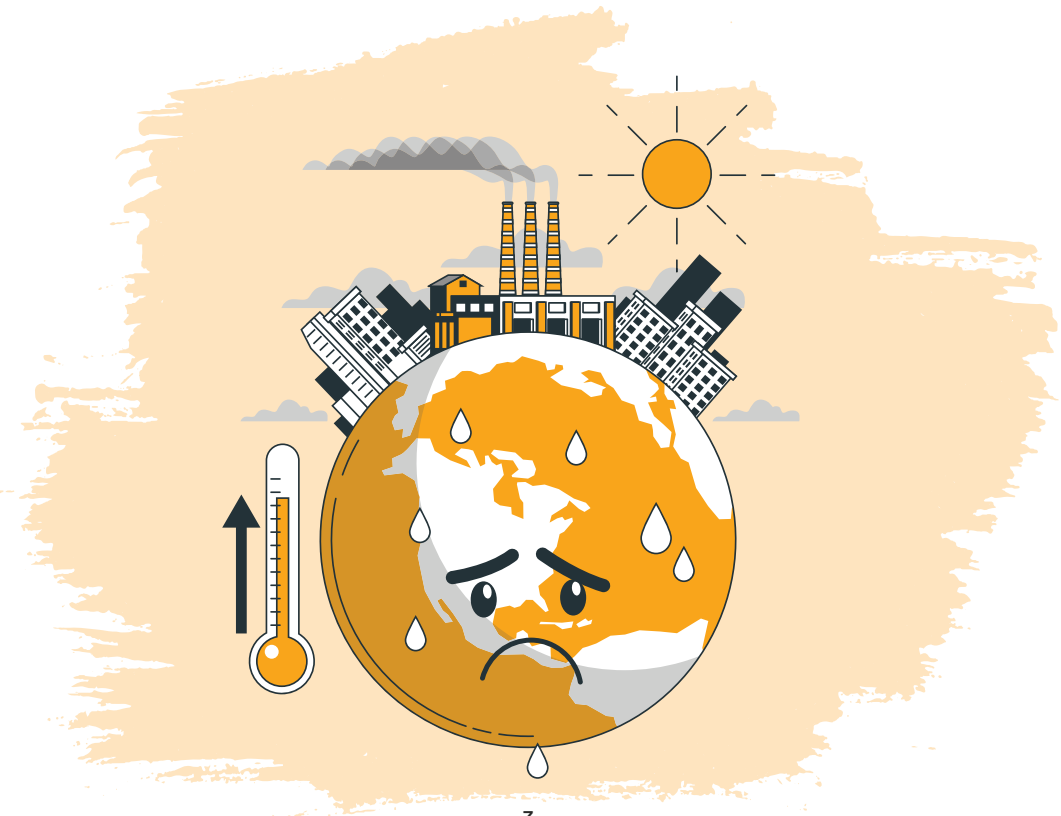
Earth is getting hotter.

Since 1900, the average surface air temperature has risen 1.8 degrees Fahrenheit (1 degree Celsius). The steepest rise began in the 1970s and continues today

This has been established by the measurements of temperature from weather stations. In some places, recorded temperature measurements go back to the 1880s.

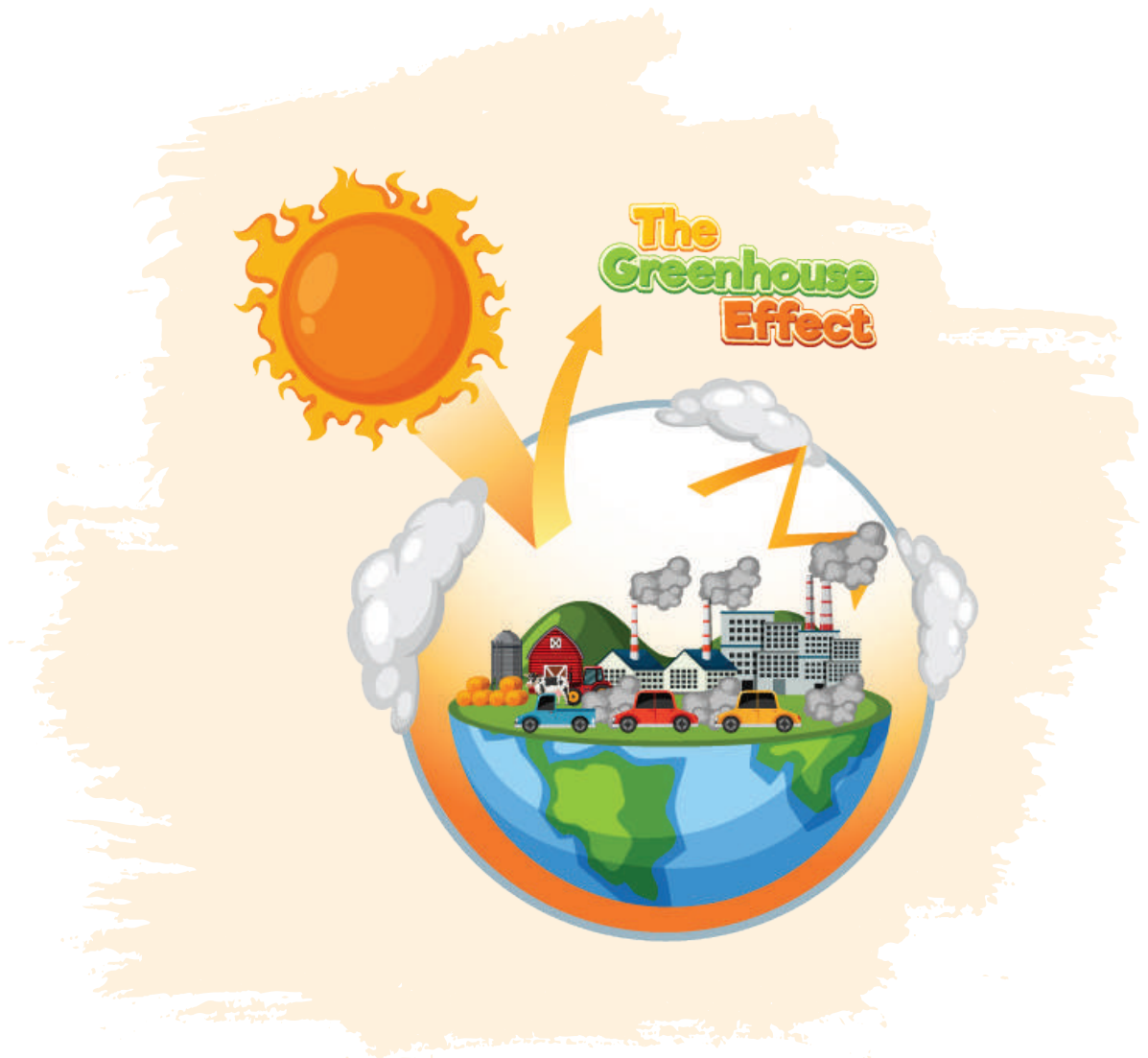
An increase of 1.8 degrees Fahrenheit may not sound like a lot. On average, Earth is only 7 to 9 degrees Fahrenheit warmer today than it was during the last ice age. The recent increase in average temperature of only a couple degrees is already leading to global changes in precipitation, snow and ice extent, and extreme weather, such as heavy rains, heat waves, and severe storms.

Today, Earth is warming at a much faster rate than it warmed over the 7,000 years since the last ice age. If the current rate of warming isn't slowed, Earth's temperature is on track to increase by an additional 7 degrees Fahrenheit or more by the year 2100. That means that Earth will get hotter over the course of a few decades rather than over a few thousand years.



2.2 The Greenhouse Effect

The greenhouse effect is the way in which heat is trapped close to Earth's surface by "greenhouse gases." Greenhouse gases include carbon dioxide, methane, nitrous oxides, and water vapor. (Water vapor, which responds physically or chemically to changes in temperature, is called a "feedback.") Greenhouse gases occur naturally and are part of our atmosphere's makeup where its conditions are not too hot and not too cold, but just right to allow life (including humans) to flourish.



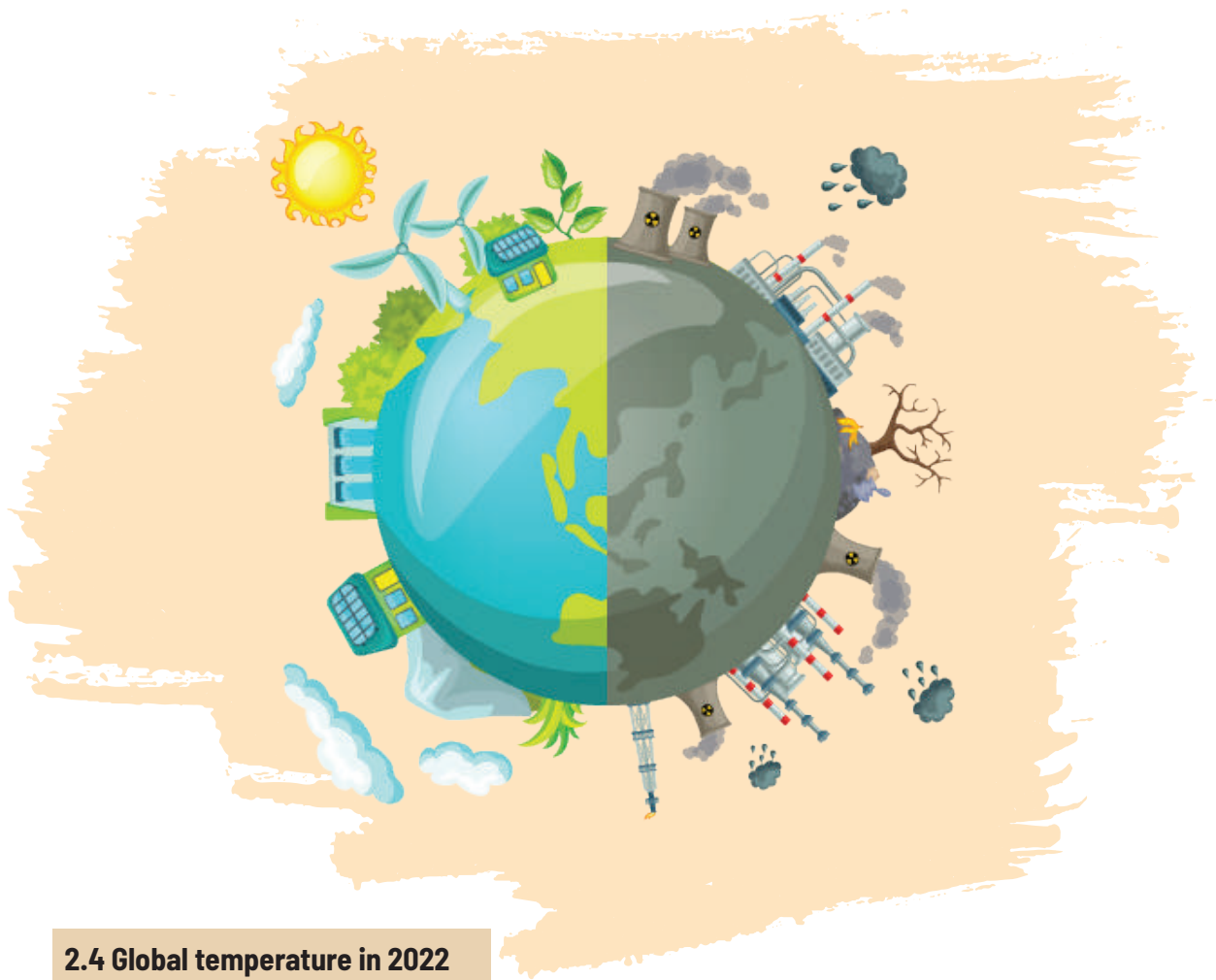
Part of what makes Earth so amenable is its natural greenhouse effect, which keeps the planet at a friendly 15 °C (59 °F) on average. But in the last century or so, humans have been interfering with the planet's energy balance, mainly through the burning of fossil fuels that add carbon dioxide to the air. The level of carbon dioxide in Earth's atmosphere has been rising consistently for decades and traps extra heat near Earth's surface, causing temperatures to rise.

2.3 What is the cause of the rise in temperatures?

The rapid warming we are experiencing today can only be explained by increasing amounts of carbon dioxide and other heat-trapping gases in the atmosphere. Measurements show that there is more carbon dioxide in the atmosphere today than at any other time in the past 1 million years—that is, since the dawn of humankind.

Human activities have increased the abundance of heat-trapping gases in the atmosphere. This increase is mostly due to burning fossil fuels, such as coal, oil, and natural gas. Carbon dioxide has increased from a pre-industrial level of 280 parts per million to more than 410 parts per million today. Most of the increase of carbon dioxide in the atmosphere has occurred since the late 1950s. In Earth's distant past, it would take between 5,000 to 20,000 years to see the amount of change in carbon dioxide levels that humans have caused in just the last 60 years.





2.4 Global temperature in 2022

According to the 2022 Global Climate Report from NOAA National Centers for Environmental Information, every month of 2022 ranked among the ten warmest for that month, despite the cooling influence from the La Niña climate pattern in the tropical Pacific. The “coolest” month was November, which was 1.35 °F (0.75 °C) warmer than average.

Though warming has not been uniform across the planet, the upward trend in the globally averaged temperature shows that more areas are warming than cooling. According to NOAA’s 2021 Annual Climate Report the combined land and ocean temperature has increased at an average rate of 0.14 degrees Fahrenheit (0.08 degrees Celsius) per decade since 1880; however, the average rate of increase since 1981 has been more than twice as fast: 0.32 °F (0.18 °C) per decade.

2.5 Comparing the past and present climatic conditions

2.4.1 Rain and Temperature

Past rainy seasons	Present rainy seasons
<ol style="list-style-type: none">1. The main rainy season began in April and ended in June.2. The short rainy season began from September and ended in October.	<ol style="list-style-type: none">1. Unreliable rainfall patterns.2. Little rain in a short period of time which sometimes come once in a year.3. Very harsh rains accompanied by thunderstorms and floods.

2.4.2 Temperatures

Past temperatures	Present temperatures
<p>Predictable temperatures. We could tell before hand what the temperature would be at a certain time in the year</p>	<ol style="list-style-type: none">1. Extreme temperatures2. Unpredictable temperatures

2.4.3 Water supply

<p>In the past, rainfall was enough to meet the needs of people and animals. Rivers flowed throughout the year. Lakes had water throughout the year.</p>	<p>Nowadays water for domestic and commercial use is a serious problem.</p>
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Livestock and wildlife are also affected.

2.4.5 Trees and vegetation cover

Past vegetation	Present vegetation
<p>In the past there were large forests with big and healthy trees.</p>	<ol style="list-style-type: none">1. There are more veld fires taking place in the country.2. There are more areas without vegetation cover nowadays.

Past Vegetation

By looking at the past and present conditions, we can see that there are changes in our climate. These changes are affecting our environment.

Question: What are some of the changes taking place where you live?

2.4.5 Food Harvests

In the past, people harvested more food than they do today in the same piece of land. Infact, some families are failing to harvest enough to tame them to the next harvest.

CHAPTER 3

GLOBAL WARMING

3.1 Introduction

Global warming is the slow increase in the average temperature of the earth's atmosphere because an increased amount of the energy (heat) striking the earth from the sun is being trapped in the atmosphere and not radiated out into space. Global warming is therefore the average increase in the earth's temperatures.

3.2 Causes of Global Warming

The major cause of global warming is the greenhouse gases. The build-up of these gases in the atmosphere changes the radioactive equilibrium in the atmosphere. Their overall effect is to warm the Earth's surface and the lower atmosphere because greenhouse gases absorb some of the outgoing radiation of Earth and re-radiate it back towards the surface.

There are two main causes of global warming:

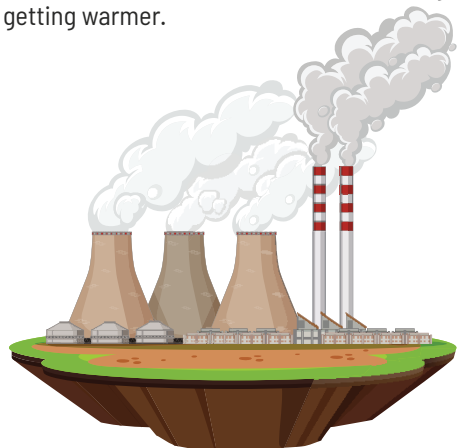
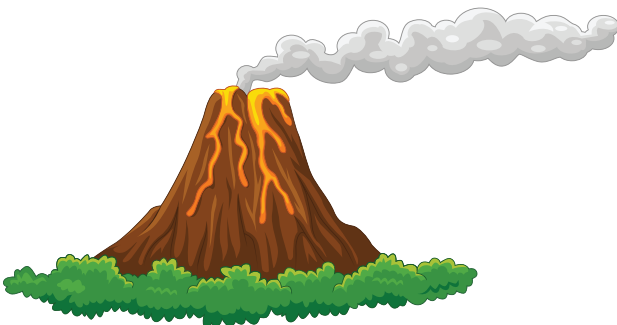
- a) Global warming from natural causes
- b) Global warming from human activities

Global warming from natural causes

Volcanic eruptions and natural fires are natural events which have always happened. They helped to keep the Earth warm.

Global warming from human activities

Human activities are the main cause of the increase in global warming. The industrial revolution which began in the 18th century resulted in the use of a lot of fossil fuels. Use of fossil fuels released a lot of gases into the atmosphere. As a result this has led to the Earth getting warmer.



3.3 How does adding gasses into the atmosphere result in global warming?

For us to understand global warming, we need to understand the Greenhouse gases, greenhouse effect and what Greenhouse gases are.

Greenhouse gases are found in the ozone layer. They are sometimes known as heat trapping gases. Examples of greenhouse gases are, water vapour, carbon dioxide, methane, nitrous oxide and flourinated gases.

Greenhouse gases are natural or manmade gases in the atmosphere. They act like a protective blanket around the Earth. They trap heat to keep the Earth warm and this process is known as the **greenhouse effect**. The greenhouses used by farmers help us to explain the greenhouse effect. Have you ever seen a green house? In some areas farmers build a plastic house to plant crops in. It is built so as to allow the sun's rays to enter. The purpose is to prevent the heat inside from going back into the atmosphere.

In a way the Earth is like this plastic house. The plastic on the greenhouse traps heat causing the temperature inside the greenhouse to increase. In the same way the greenhouse gases trap heat in the Earth's atmosphere causing the earth's temperature to increase. This increase in temperature is called **Global warming**.

Fact / Did you know:

Carbon dioxide is the leading cause of the global warming happening today. This gas is produced when people and animals breathe out and when certain fuels are burned. It is also used by plants for energy.



3.4 How are human activities the main cause of global warming?

When we burn fossil fuels, biomass and other harmful chemicals, greenhouse gases are released into the atmosphere. These gases add to the greenhouse effect causing additional warming to the earth.

The following contribute to global warming;

- i. Transport vessels: Aircraft, ships, vehicles, trains
- ii. Manufacturing
- iii. Oil drilling
- iv. Waste dumping
- v. Agriculture
- vi. Energy generation

What are some of the activities that add to global warming?

1. Deforestation

When we cut down trees to clear land for agriculture and other activities, we reduce the **carbon sink** available. Anything that acts to absorb carbon from the atmosphere is called a **carbon sink**.

Trees are the most common carbon sink. When they are cut down:

- a) Carbon dioxide increases in the air as it is no longer absorbed by trees.
- b) Air temperature rises as heat is no longer absorbed.

Trees are therefore very important and play a major role in supporting life.



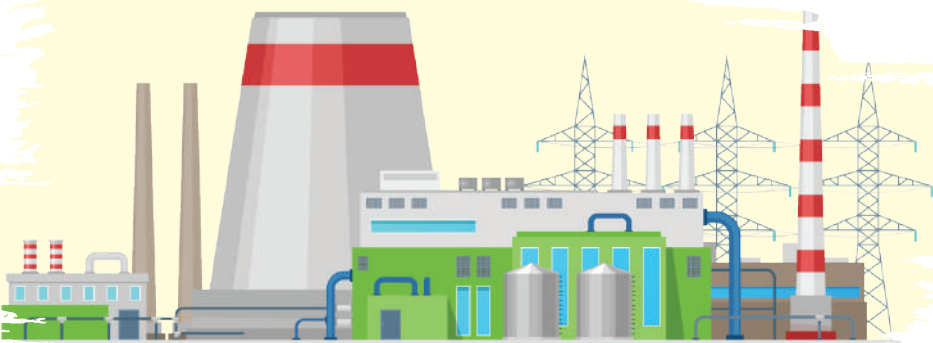
2. Industries

We add to global warming by buying goods which use a lot of energy to make and to use. Many industries are energy inefficient. They waste energy when manufacturing goods



3. Energy use

Some of our electricity comes from Power Stations which uses coal therefore when demand for electricity goes up more coal is burnt in order to generate more electricity. As a result, more greenhouse gases are being released into the atmosphere because of the high demand for electricity



4. Forest Fires

Forest fires and the use of wood for energy release carbon dioxide and other greenhouse gases back into the air. Forest fires also damage the carbon sink and the environment.



5. Open fires / cooking

Most people in Kenya cook on open fires using firewood. Burning wood on an open fire releases a lot of gases into the air as smoke. When we cook on open fires, a lot of heat is lost before it gets to the pot. It means we need more firewood to cook. This makes it an **energy inefficient** way of cooking.



6. Poor waste management

Dumping and burning waste add to global warming as green house gases are released into the atmosphere. A lot of waste that ends up in dumpsites is largely made up of plastics which is made from crude oil which is a fossil fuel. Burning this waste at low temperatures with little oxygen results in the release of green house gasses. This adds up to global warming.



CHAPTER 4

CLIMATE CHANGE

4.1 The link between global warming and climate change

Why is global warming a problem?

Global warming is a problem because it causes changes in our weather leading to climate variability and over a long time causes our climate to change. This is what is known as **climate change**. Climate change includes major changes in temperature, rainfall or wind patterns among other effects.

Small changes in the average temperature can result in big changes to the weather patterns and to the climate. As a result weather patterns are changing due to climate change leading to:

- increased temperatures;
- increased incidence of extreme natural events such as droughts and flooding;
- a gradual shifting of seasons;
- a changing of the worlds landscape. temperature, rainfall or wind patterns among other effects.



4.2 How is climate change affecting us in Kenya?

- Heavy rains in some parts of the country hence flooding
- No rains in other parts of the country thereby causing droughts
- Global warming causes more erratic weather patterns
- Melting of ice in mountains such as Mount Kenya
- Water levels are rising in large volumes thereby submerging low lying areas
- Less fish available in some lakes such as lake Victoria
- The Indian ocean is absorbing carbon dioxide therefore becoming more acidic and this affects the sea creatures and plants thereby affecting the ecosystem
- Coral reefs are bleaching, a sign that they are dying. They are a home and provide food for man of the ocean creatures.
- There's rising sea levels thereby affecting the coastal cities
- Low lying cities and towns are a threat to floods

4.3 Climate Change Impacts

Climate change affects many areas of our lives.

1. Agriculture

Due to the changes in weather patterns, climate change is affecting agriculture. This is because of the change in rainfall patterns. There are more frequent droughts and floods which are affecting farming activities. This leads to food shortages. The shortages lead to malnutrition which exposes people to diseases especially children. The food shortages also lead to conflict as people fight over the little available food.

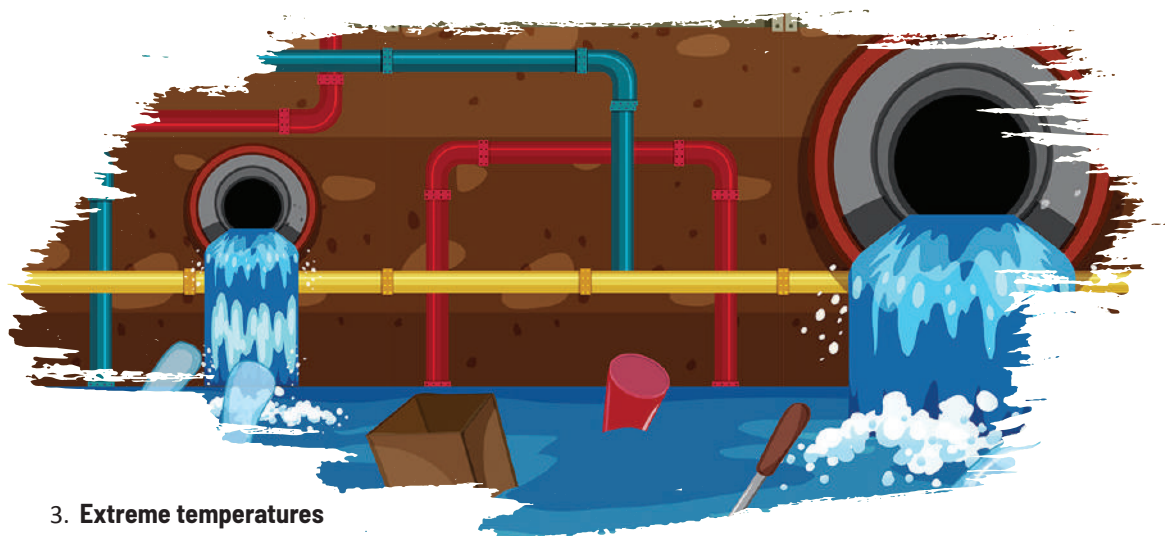
Climate change may aggravate erosion, decline in organic matter, salinisation, soil biodiversity loss, landslides, desertification and flooding. The effect of climate change on soil carbon storage can be related to changing atmospheric CO₂ concentrations, increased temperatures and changing precipitation patterns.



2. Water supply

There are changes in water resources that then have a big impact on our world and our lives. Climate change causes repeated droughts and flooding. Flooding damages water supply facilities resulting in less clean water available. Droughts mean less water is available meaning people turn to sources that are not safe. The lack of clean and adequate water affects the health of people. It leads to outbreak of water borne diseases such as cholera, typhoid, diarrhea and other diseases. Lack of water supply also causes conflicts within pastoralist communities as they fight for the little available water sources for their families and animals.

Water temperature is one of the central parameters that determine the overall health of aquatic ecosystems because aquatic organisms have a specific range of temperatures they can tolerate. The changes in climate have increased water temperatures of rivers and lakes, decreased ice cover, thereby affecting water quality and freshwater ecosystems.



3. Extreme temperatures

Climate change causes extreme temperatures which result in some of the following problems:

- a) Heat waves

Extreme temperatures result in repeated heat waves which affect our health. Heat waves are caused by very high temperatures. They make us suffer from heat exhaustion or tiredness, breathing difficulties, headaches, body rashes and other illnesses.

- b) Distribution of pests and disease changes

Extreme temperatures are causing the spread of pests and diseases. Pests such as mosquitoes, army worms and locusts are now being found in areas they were not seen before, leading to repeated disease outbreaks.

- c) More frequent and severe forest fires

People start veld fires. Due to extreme temperatures, veld fires become difficult to control. These are harmful to people, animals and property. People have lost their lives in veld fires, even children. They also lead to more climate change as they release stored carbon as greenhouse gases.

d) Food

Our food supply depends on climate and weather conditions. There is increased temperatures, drought and water stress, diseases, and weather extremes create challenges for the farmers who put food on our tables.

Additionally, farmers can suffer from heat-related health issues, like exhaustion, heatstroke, and heart attacks. Rising temperatures and heat stress can also harm livestock that we keep.

e) Human Health

Climate change is already impacting human health. Changes in weather and climate patterns can put lives at risk. The dry conditions that we are consistently witnessing can lead to more wildfires, which bring many health risks. Higher incidences of flooding can lead to the spread of waterborne diseases, injuries, and chemical hazards. As geographic ranges of mosquitoes and other insects expand and they can carry diseases to new locations.

The most vulnerable groups, including children, the elderly, people with preexisting health conditions and people with low income, are at an even higher risk because of the compounding factors from climate change.

f) The environment


Climate change will continue to have a significant impact on ecosystems and organisms, though they will be impacted differently. Some living things are able to respond to climate change; some plants are blooming earlier and some species may expand their geographic range. But these changes are happening too fast for many other plants and animals as increasing temperatures and changing precipitation patterns stress ecosystems. Direct impacts include changes in phenology (the behaviour and lifecycles of animal and plant species), species abundance and distribution, community composition, habitat structure and ecosystem processes.

The indirect impacts include: habitat fragmentation and loss; over-exploitation; pollution of air, water and soil; and the spread of invasive species. They will further reduce the resilience of ecosystems to climate change and their capacity to deliver essential services; such as climate regulation, food, clean air and water, and the control of floods or erosion.

Changes are also occurring in the ocean. The ocean absorbs about 30% of the carbon dioxide that is released into the atmosphere from the burning of fossil fuels. As a result, the water is becoming more acidic, affecting marine life. Sea levels are rising due to thermal expansion, in addition to melting ice sheets and glaciers, putting coastal areas at greater risk of erosion and storm surge.

g) Infrastructure

Physical infrastructure includes roads, bridges, ports, electrical grids, broadband internet, and other parts of our transportation and communication systems. It is often designed to be in use for years or decades, and many communities have infrastructure that was designed without future climate in mind. Extreme weather events that bring heavy rains, floods, wind, snow, or temperature changes can stress existing structures and facilities. Increased temperatures require more indoor cooling, which can put stress on an energy grid. Sudden heavy rainfall can lead to flooding that shuts down highways and major business areas.



A huge population of Kenyans lives in coastal counties, meaning millions of people will be impacted by sea level rise. Coastal infrastructures, such as roads, bridges, water supplies, and much more, are at risk. Sea level rise can also lead to coastal erosion and high-tide flooding.

h) Social impacts

i) Vulnerable population

- 1 People living in informal settlements and low-income urban areas with poor infrastructure, and, the population groups with lower incomes and assets, are more exposed to climate impacts but have less capacity to face them.
- 2 Women may be disproportionately impacted by climate change and are at a disadvantage when expensive adaptation measures are required.
- 3 Unemployed and socially marginalized people are among the most vulnerable to climate risks.
- 4 Kenya's ageing population, disproportionately affected by reduced mobility or health impediments, will result in a higher share of the population being vulnerable to climate change impacts.
- 5 Climate change has also already started to have an impact on displacement and migration. Although climate is only of several drivers of displacement and migration, many partner countries on their path towards sustainable development are among the most affected. People living there often depend heavily on their natural environment, and they have the least resources to cope with the changing climate

ii) Employment

Climate change may affect workforce availability due to a decrease in the health conditions of the population and additional occupational health constraints (higher temperature at work, more frequent and intense natural hazards keeping people from reaching their workplace).

Moreover, several economic sectors are highly vulnerable because of their dependence on regular climate conditions. Sectoral production shifts – in agriculture and tourism for instance – are expected as a consequence of climate change.

iii) Insurance

The frequency and intensity of most types of extreme events is expected to change significantly as a result of climate change. In the short term, as long as due allowance is made for the underlying trend, premiums would rise gradually and the insurance market would absorb such changes without disruption. In the longer term, particularly in most vulnerable sectors or areas, climate change could indirectly increase social disparities as insurance premiums become unaffordable for a fringe of the population.

iv) Tourism

The economic consequences of climate change for regions (such as the coast and masai mara) where tourism is important can be substantial.

V) Businesses

Climate change threatens all businesses, as all exist on Earth. However, some are more vulnerable than others. Impacts are expected to fall disproportionately on SMEs including disrupting business operations, property damage, disruption to supply chains and infrastructure, leading to increased costs of maintenance and materials, and higher prices.

vi) Effect on cities and urban areas

In previous years, increasing urban land take and urban population growth have in many places increased the exposure of Kenya towns and cities to different climate impacts such as heatwaves, flooding, and droughts. In the future, ongoing urban land take, growth and concentration of population in cities, as well as an aging population, will contribute to further increase the vulnerability of cities to climate change. Urban design, urban management and enhancing green infrastructure may partly address these effects.

4.4 Vulnerability and Resilience to Climate Change

The people of Kenya are vulnerable to climate change. This means that they suffer from whatever climate change brings.

Vulnerability

When people are vulnerable it means that they are not able to cope with the changes brought about by climate change. The people of Kenya need to become more resilient to climate change.

Resilience

Climate resilience is the ability of people, animals and plants to continue living a normal life even if there are problems like droughts, water shortages, heat waves and little or no rainfall. When people have resources which they can use to adapt to climate change they referred to as being climate resilient.



4.5 Fighting climate change

4.5.1 Why has it been so difficult to manage climate change?

Managing climate change difficulties arise from two, related reasons: climate change management is viewed as expensive and it poses what we call a collective action problem.

4.5.2 The different levels for fighting climate change

1. International level

Inter-governmental Panel on Climate Change (IPCC)

In 1989, the Intergovernmental Panel on Climate Change (IPCC) was established under the United Nations to provide a scientific view of climate change and its political and economic impacts.

The Kyoto Protocol

Government leaders began discussions to try and stem the outflow of greenhouse gas emissions to prevent the most dire predicted outcomes. The first global agreement to reduce greenhouse gases, the Kyoto Protocol, was adopted in 1997.

The protocol, which was signed by President Bill Clinton, called for reducing the emission of six greenhouse gases in 41 countries plus the European Union to 5.2 percent below 1990 levels during the target period of 2008 to 2012.

Paris Climate Agreement

The United States, under President Barack Obama, would sign onto another milestone treaty on climate change, the Paris Climate Agreement, in 2015. In that agreement, 197 countries pledged to set targets for their own greenhouse gas cuts and to report their progress.

The backbone of the Paris Climate Agreement was a declaration to prevent a global temperature rise of 2 degrees C (3.6 degrees F). Many experts considered 2 degrees C of warming to be a critical limit, which, if surpassed will lead to increasing risk of more deadly heat waves, droughts, storms and rising global sea levels.

The Sustainable Development Goals

The Sustainable Development Goals are another way the world is tackling climate change. They guide how countries should carry out development in their countries so as to meet development goals. Climate change is an important goal in the Sustainable Development Goals.

Goal number 13 says:

Ensure urgent action to combat climate change and its impacts.

2. National Level

How is Kenya fighting climate change?

Kenya has a robust policy environment with existing climate change related policies, plans, strategies, regulations and frameworks both at national and county level geared towards the fight against climate change.

First and foremost the provision for a clean environment and fight against climate change is enshrined in the constitution of Kenya, 2010. The Constitution of Kenya (2010) provides ground for the formulation of adaptation and mitigation legislation, policies and strategies through a number of relevant articles.

The following are the policies, plans, strategies, regulations and frameworks available in Kenya in its fight against climate change.

No	Policy / Framework	Role and description
1.	The constitution of Kenya (2010)	In Article 11 under Culture, the Constitution recognizes the <i>roles of science and indigenous technologies in the development of the nation</i> . Further, it provides that legislation will be enacted to <i>recognize and protect ownership of indigenous seeds and plant varieties and use by communities</i> . It goes further to guarantee the right to a clean and healthy environment under the Bill of Rights (Chapter 4, Article 42) which provides that <i>every Kenyan has a right to a clean and healthy environment</i> .
2.	Kenya vision 2030 (2008) and its medium term plans	<i>Kenya Vision 2030</i> , is the country's development blueprint. Its objective is to help transform Kenya into a "newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment."
3.	Kenya Climate Smart Agriculture Strategy (2017-2026)	CSA is defined as an agriculture that " <i>sustainably increases productivity, enhances resilience, reduces/removes greenhouse gas emissions, and enhances the achievement of national food security and development goals</i> " (FAO, 2010).
4.	National Climate Change Action Plan (2018-2022)	<i>NCCAP 2018-2022</i> furthers the achievement of Kenya's development goals by providing mechanisms to realize low carbon climate resilient development. It emphasizes sustainability, while prioritizing adaptation and enhanced climate resilience for vulnerable groups.
5.	National Climate Change Response Strategy (2010)	<i>Kenya's National Climate Change Response Strategy</i> was the first national policy document on climate change. It sought to advance the integration of climate change adaptation and mitigation into all government planning, budgeting, and development objectives.
6.	Climate Risk Management Framework (2017)	The Climate Risk Management Framework for Kenya integrates disaster risk reduction, climate change adaptation, and sustainable development, so that they are pursued as mutually supportive rather than stand-alone goals. It promotes an integrated climate risk management approach as a central part of policy and planning at National and County levels.

No	Policy / Framework	Role and description
7.	Kenya's Nationally Determined Contributions (NDC)(2016)	Kenya's NDC under the <i>Paris Agreement</i> of the <i>UNFCCC</i> includes mitigation and adaptation contributions. In regard to adaptation, "Kenya will ensure enhanced resilience to climate change towards the attainment of Vision 2030, by mainstreaming climate change into Medium Term Plans (MTPs), and implementing adaptation actions." The mitigation contribution "seeks to abate Kenya's GHG emissions by 30% by 2030, relative to the business as usual scenario of 143 MtCO ₂ eq."
8.	National Climate Finance Policy (2018)	The <i>National Climate Finance Policy</i> promotes the establishment of legal, institutional, and reporting frameworks for access to, and management of climate finance. The goal of the policy is to further Kenya's national development goals through enhanced mobilization of climate finance that contributes to low carbon climate resilient development goals.
9.	Climate Change Act (No. 11 of 2016)	The <i>Climate Change Act (No. 11 of 2016)</i> is the first comprehensive legal framework for climate change governance in Kenya. The objective of the Act is to "Enhance climate change resilience and low carbon development for sustainable development of Kenya." The Act establishes the National Climate Change Council (Section 5), Climate Change Directorate (Section 9), and Climate Change Fund (Section 25).
10.	Big Four Agenda (2018 - 2022)	The Government of Kenya's Big Four Agenda establishes priority areas for 2018 to 2022 of ensuring Food and Nutrition Security, Affordable Housing, Enhanced Manufacturing, and Universal Health Coverage.
11.	National Adaptation Plan (2015 - 2030)(NAP)	Kenya's <i>National Adaptation Plan 2015-2030 (NAP)</i> was submitted to the UNFCCC in 2017. The aim of NAP is to consolidate the country's vision on adaptation supported by macro-level adaptation actions that relate with the economic sectors and county level vulnerabilities to enhance long term resilience and adaptive capacity. This NAP presents adaptation actions that cover the timeframe 2015- 2030.
12.	National Climate Change Framework Policy (2018)	The <i>National Climate Change Framework Policy</i> aims at ensuring the integration of climate change considerations into planning, budgeting, implementation, and decision-making at the National and County levels, and across all sectors.
13.	The National Policy for the Sustainable Development of Northern Kenya and other Arid Lands	The goal of the policy is to facilitate and fast-track sustainable development in Northern Kenya and other arid lands by increasing investment in the region and ensuring that the use of those resources is fully reconciled with the realities of people's lives. It focuses on climate resilience requiring the government to find solutions to address climate challenges and to come up with measures to manage drought and strengthen livelihoods.
14.	Environmental Management and Coordination Act (EMCA 2015)	The Act is the principle instrument of Government for the management of the environment. The Environmental Management and Coordination Act (EMCA) 2015, embraces all environmental management issues in the country. The Act addresses the environmental concerns and safeguards against environmental degradation within and outside protected areas.

No	Policy / Framework	Role and description
15.	The Agricultural Sector Development Strategy (2010 – 2020)	This strategy is the overall national policy document for the agricultural sector in Kenya, which comprises crops, livestock, fisheries, land, water, cooperatives, environment, regional development and forestry. The sector also includes the development of arid and semi-arid lands. The policy recognizes that the development and growth of the agricultural sector is anchored in, among other areas, developing and managing key factors of production such as land, water, inputs, and financial resources.
16.	The County Governments Act 2012	The Act states that a county government shall plan within a framework that integrates economic, physical, social, environmental and spatial planning, protect and develop natural resources in a manner that aligns national and county government policies. Environment and climate change is a function of the national and county government and requires concurrent jurisdiction across both levels. Agriculture, water and environment are devolved functions and are the most critical to ensure food and nutrition security. County Integrated Development Plans (CIDPs) present an opportunity to identify climate change priorities and actions at the county level, and to integrate these actions in programmes and initiatives. Under the County Governments Act (2012), CIDPs must have clear outcomes, monitoring and evaluation, and reporting mechanisms.

3. Community level

How are communities taking action to fight climate change?

Communities have also come together to fight climate change in many ways. There are national NGOs, CBOs, CSOs and School environmental clubs which are actively involved in fighting climate change and spearheading environmental conservation initiatives.

4. Individual level

How are individuals involved in fighting climate change?

Individuals are also being encouraged to take action to fight climate change. That is because fighting climate change is everyone's responsibility including children.

There are two ways to deal with climate change. These are:

a) Adaptation

Adaptation is a way of coping or taking action to live with the changes it brings about. For example, adaptation to drought can be the growing of drought resistant crops and using irrigation farming.

b) Mitigation

Mitigation is any action taken to reduce or remove the causes of climate change. It involves action that

- i. removes greenhouse gases from the air or,
- ii. prevents more greenhouse gases from getting into the air.

Mitigation prevents further climate change from happening. One example of a mitigating action is the use of solar energy as a source of electricity in the home. This avoids the burning of fossil fuels for electricity generation hence preventing further climate change.

4.6 Citizen action to fight climate change

Here are some adaptation and mitigation ways of fighting climate change. As we have learned it is possible for us to take action against climate change. Let us look a bit more at some of these ways of fighting climate change and why they are important.

1. Planting Trees

We need to plant more trees than we cut down. Anyone can and should plant a tree. Even you!

Did you know:

Tree seedlings make very good presents and gifts to your loved ones.

Importance of trees:

- Trees are important because they help to cool the air. They do this by absorbing excess heat from the atmosphere. This lowers the temperature of the atmosphere.
- Trees absorb carbon dioxide and other gases during evapotranspiration. This reduces the amount of greenhouse gases in the atmosphere.
- Trees store carbon as they grow.
- Trees release oxygen into the atmosphere which is necessary for life.

2. Promoting the use of renewable energy

Renewable energy is made from clean sources that are replaced. Renewable energy does not release harmful greenhouse gases into the atmosphere. For example energy from the sun, wind and water is renewable clean energy.



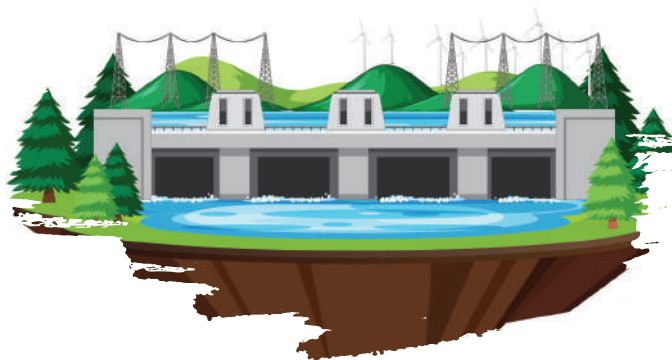
a) **Solar energy**

Energy from the sun is called solar energy. Solar energy can be changed to electricity and used to power many things that we use in our homes, schools or industries.



b) **Hydroelectricity**

Hydro electricity is energy made from the power of flowing water. For example, the Seven Forks Hydro Stations is a hydro-electricity power station used to generate electricity and to.



c) **Wind power**

Wind power can be used to generate electricity and to pump water.



d) **Energy efficient cooking**

There are many ways of saving the energy used for cooking.

Use more efficient stoves

Efficient stoves are built so that they get the most energy out of as little fuel as possible. They are also built so that energy is not lost during cooking. This means they use less fuel, they pollute less and cook longer.



Use cleaner fuels

Cleaner fuels are fuels that release less greenhouse gases during cooking. For example Liquid Petroleum Gas (LPG) is a clean fuel.

3. Fuel Saving

It is important to save the fuel used by machinery and industries as it is mostly coming from fossil fuels. This is very true for vehicles. Saving fuel can be done in many ways which include cycling, walking, sharing vehicles or travelling by bus.

Sharing vehicles also known as car-pooling reduces the number of cars on the road. When there are less cars on the road it means less fuel is being used. As a result this means less greenhouse gases are being released into the air. Less fuel is also used when people cycle or walk.

4. Save electricity

Make sure that all things that use electricity are switched off in all rooms before leaving. By saving electricity we reduce the demand for power coming from the power station. This means less fossil fuels are burned to generate electricity.

5. Correct Disposal of Waste

Correct waste disposal is important so as to reduce the amount of greenhouse gases released into the atmosphere. All waste from our homes, school or elsewhere must be thrown away correctly. This can be done in many ways depending on whether the waste is organic or inorganic.

(a) Compost organic waste

Organic waste is waste from once living material. Composting organic waste generates biogas. Biogas is a fuel produced by the breakdown of organic matter in the absence of oxygen. The solids that remain after biogas is produced can be used as manure.

Biogas is a renewable energy source that can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste.

(b) Reduce, Reuse and Recycle inorganic waste

Reducing, Reusing and recycling waste saves the amount of energy needed to make new goods. It also reduces pollution by making sure that the amount of waste being thrown away is reduced. You can reuse plastic bags or use a single bag for shopping

1. Save water

Saving water is important. We can do more things with less water. Saving water can be done in many ways. For example the water we rinse our plates with can be used to water our plants. Recycle and reuse water.

Remember, water is life and every drop counts! In a small way you too can save water.

2. Prevention of forest fires

Forest fires destroy large areas of vegetation. This reduces the carbon sink and prevents trees from growing. They must be prevented.

Landowners must have fireguards and communities must have firefighting committees.

Conclusion:

Fighting climate change presents opportunities for:

1. Strengthening the agricultural sector - using efficient farming technologies.

2. Reviving the local industry - less greenhouse gases.

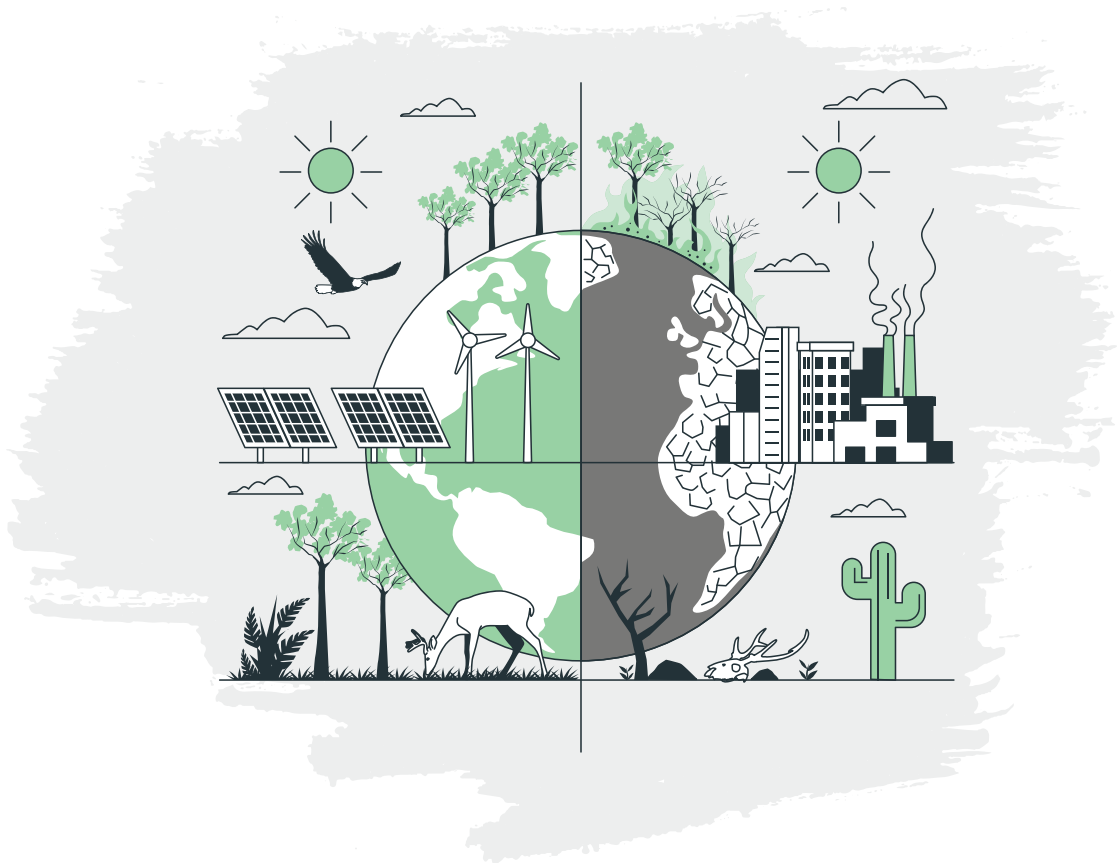
3. Creation of Green Jobs - these are jobs that contribute to preserving or restoring the quality of the environment. When communities take action to fight climate change, they reverse global warming and its bad effects. By reducing climate change, communities move closer to the goal of living in a **clean, safe and healthy environment**.

CHAPTER 5

WHY LEARN ABOUT CLIMATE CHANGE?

Human activities are “unequivocally” responsible for global climate change, according to a recent IPCC report. To minimize the effects of climate change, we must work diligently to reduce our carbon footprint. We must take immediate action to reduce carbon emissions and lower our dependence on fossil fuels. The best way to help change is to stay educated and informed about climate change.

Learning about climate change will help us understand why global temperatures continue to rise, how the climate affects us, and how we can tackle this challenge before things get much worse. If we can understand the magnitude of climate as a collective, perhaps we can be more open to a brighter future. Then we, as a whole, can start making changes geared to better serve our planet. Learning is the therefore first step toward stopping global warming. We have the power to make a difference. Education is the first step.



CHAPTER 6

WHERE TO GET INFORMATION?

We can get more information about climate change from the following:

1. Ministry of Environment and Forestry
2. The National Environment Management Authority (NEMA)
3. The United Nations Framework Convention on Climate Change (UNFCCC)
4. United Nations Environmental Programme (UNEP)
5. The United Nations Development programme (UNDP)
6. Kenya Meteorological Department
7. Intergovernmental Panel on Climate Change (IPCC)
8. IGAD Climate Prediction and Application Center (ICPAC)



CHAPTER 7

KEY TERMS, ACCRONYMS AND TERMINOLOGY ON CLIMATE CHANGE

ADAPTATION

Climate change adaptation refers to actions that help reduce vulnerability to the current or expected impacts of climate change like weather extremes and natural disasters, sea-level rise, biodiversity loss, or food and water insecurity.

Adaptation measures include planting crop varieties that are more resistant to drought and practicing regenerative agriculture, improving water storage and use, managing land to reduce wildfire risks, and building stronger defenses against extreme weather like floods and heat waves.

BLUE ECONOMY

The “blue economy” concept seeks to promote economic development, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas.

Blue economy has diverse components, including established traditional ocean industries such as fisheries, tourism, and maritime transport, but also new and emerging activities, such as off shore renewable energy, aquaculture, seabed extractive activities, and marine biotechnology.

CARBON FOOTPRINT

A carbon footprint is a measure of the greenhouse gas emissions released into the atmosphere by a particular person, organization, product, or activity. A bigger carbon footprint means more emissions of carbon dioxide and methane, and therefore a bigger contribution to the climate crisis.

Measuring a person’s or an organization’s carbon footprint entails looking at both the direct emissions resulting from the burning of fossil fuels for energy production, heating, and land and air travel, and indirect emissions resulting from the production and disposal of all food, manufactured goods, and services they consume.

CARBON SINK

A carbon sink is any process, activity, or mechanism that absorbs more carbon dioxide from the atmosphere than it releases. Forests, oceans, and soil are the world’s largest natural carbon sinks.

CIRCULAR ECONOMY

Circular economy refers to models of production and consumption that minimize waste and reduce pollution, promote sustainable uses of natural resources, and help regenerate nature.

CLIMATE CRISIS

The climate crisis refers to the serious problems that are being caused, or are likely to be caused, by changes in the planet's climate, including weather extremes and natural disasters, ocean acidification and sea-level rise, loss of biodiversity, food and water insecurity, health risks, economic disruption, displacement, and even violent conflict.

Since the 1800s, human activities have caused the Earth's average temperature to increase by about 1.2° C - with more than two-thirds of this warming occurring since 1975. This is already causing significant damage to human societies and natural ecosystems in many parts of the world. More than 3 billion people live in places that are very vulnerable to the climate crisis, with lower income countries being disproportionately affected.

Scientists expect that an increase beyond 1.5°C would begin to lead to a series of dangerous tipping points that would make many changes irreversible and pose a very serious threat to human civilization. This is why governments must act now to drastically reduce greenhouse gas emissions and chart a course for reaching net zero in the coming decades, invest in adaptation to the unavoidable impacts of climate change, and protect and restore natural ecosystems and biomes upon which the planet depends.

CLIMATE FINANCE

Climate finance refers to financial resources and instruments that are used to support action on climate change. Climate finance is critical to addressing climate change because of the large-scale investments that are needed to transition to a low-carbon global economy and to help societies build resilience and adapt to the impacts of climate change.

CLIMATE JUSTICE

Climate justice means putting equity and human rights at the core of decision-making and action on climate change.

One aspect of climate justice relates to the unequal historical responsibility that countries bear in relation to the climate crisis. The concept suggests that the countries, industries, and businesses that have become wealthy from activities that emitted the most greenhouse gas emissions have a responsibility to help mitigate the impacts of climate change on those affected, particularly the most vulnerable countries and communities, who often are the ones that have contributed the least to the crisis.

Another aspect of climate justice is the intergenerational one. Children and young people today have not contributed to the climate crisis in a significant way but will bear the full force of climate change impacts as they advance through life. Because their human rights are threatened by the decisions of previous generations, they must have a central role in all climate decision-making and action.

COP

The annual United Nations conference dedicated to climate change, called "the Conference of the Parties" or "COP," has been organized under the UN Framework Convention on Climate Change (UNFCCC) since 1995. At the 21st COP, or COP21, which took place in 2015, the Paris Agreement was signed.

The conference now brings together all nations who are parties to the Paris Agreement to discuss their next steps to combat climate change and further establish legally binding agreements to support climate action.

DECARBONIZATION

Decarbonization means reducing the amount of greenhouse gas emissions that a society produces, as well as increasing the amount that is being absorbed. It entails changing many, if not all, aspects of the economy, from how energy is generated, to how goods and services are produced and delivered, to how buildings are built and how lands are managed.

GLOBAL WARMING VS CLIMATE CHANGE

Global warming is an increase in the Earth's average surface temperature that occurs when the concentration of greenhouse gases in the atmosphere increases. These gases absorb more solar radiation and trap more heat, thus causing the planet to get hotter. Burning fossil fuels, cutting down forests, and farming livestock are some human activities that release greenhouse gases and contribute to global warming.

Climate change refers to the long-term changes in the Earth's climate that are warming the atmosphere, ocean and land. Climate change is affecting the balance of ecosystems that support life and biodiversity, and impacting health. It also causes more extreme weather events, such as more intense and/or frequent hurricanes, floods, heat waves, and droughts, and leads to sea level rise and coastal erosion as a result of ocean warming, melting of glaciers, and loss of ice sheets.

GREEN JOBS

Green jobs are decent jobs that contribute to protecting and restoring the environment and addressing climate change. Green jobs can be found in both the production of green products and services, such as renewable energy, and in environmentally friendly processes, such as recycling. Green jobs help improve energy and raw material efficiency, limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the impacts of climate change.

GREEN HOUSE GAS EMISSIONS


Greenhouse gases are gases that trap heat from the sun in our planet's atmosphere, keeping it warm. Since the industrial era began, human activities have led to the release of dangerous levels of greenhouse gases, causing global warming and climate change.

The main greenhouse gases released by human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases used for cooling and refrigeration. Carbon dioxide is the primary greenhouse gas resulting from human activities, particularly from burning fossil fuels, deforestation, and changing the way land is used. Our reliance on fossil fuels has led to a 50 percent increase in the concentrations of carbon dioxide in the atmosphere over the last 200 years. Methane is another important greenhouse gas that is responsible for 25 percent of global warming. Methane is released during the extraction and transport of coal, gas, and oil, and by waste landfills and agricultural practices.

To prevent catastrophic climate change, the world's governments must work together to significantly reduce greenhouse gas emissions now and in the coming decades and keep global warming below the dangerous threshold of 1.5°C.

GREEN WASHING

Greenwashing refers to situations where a company makes misleading claims about their positive environmental impact or the sustainability of their products and services to convince consumers that



they are acting on climate change. In some cases, greenwashing can be unintentional, because of lack of knowledge on environmental issues. However, it can also be carried out intentionally as a marketing and public relations exercise, exploiting public support towards environmental policies for profit.

IPCC

The Intergovernmental Panel on Climate Change (IPCC) is an independent body founded under the auspices of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).

The IPCC's main role is to assess the scientific literature and findings on climate change and provide vital scientific information and evidenced-based recommendations to policymakers and the public. It is widely recognized as the most credible source of information related to the science of climate change and its complex analysis of impacts, risks, and adaptation and mitigation options.

LOSS AND DAMAGE

Loss and damage refers to the unavoidable impacts of climate change that occur despite, or in the absence of, mitigation and adaptation. Importantly, it highlights that there are limits to what adaptation can accomplish; when tipping point thresholds are crossed, climate change impacts can become unavoidable.

Loss and damage can refer to both economic and non-economic losses. Economic loss and damage can include things like the costs of rebuilding infrastructure that has repeatedly been damaged due to cyclones or floods, or the loss of coastline land (and homes and businesses) due to sea-level rise and coastal erosion.

There is also the non-economic loss and damage include negative impacts that can't be easily assigned a monetary value. This can include things such as trauma from experiencing a climate-related natural disaster, loss of life, the displacement of communities, loss of history and culture or loss of biodiversity.

MITIGATION

Climate change mitigation refers to any action taken by governments, businesses, or people to reduce or prevent greenhouse gas emissions, or to enhance carbon sinks that remove these gases from the atmosphere.

To limit global warming to 1.5° C, which is the critical goal of the Paris Agreement, the world must implement climate change mitigation actions to reduce greenhouse gas emissions by 45 percent before 2030 and reach net-zero greenhouse gas emissions by mid-century.

NATIONALLY DETERMINED CONTRIBUTIONS

Nationally Determined Contributions (NDCs) are climate pledges and action plans that each country is required to develop in line with the Paris Agreement goal of limiting global warming to 1.5° C. NDCs represent short to medium-term plans that are updated every five years with higher ambition on climate.

NDCs outline mitigation and adaptation priorities a country will pursue to reduce greenhouse gas emissions, build resilience, and adapt to climate change, as well as financing strategies and monitoring and verification approaches. In 2023, the first in a series of global "stock takes" will conclude that assesses progress on the implementation of NDCs and Paris Agreement goals.

NATIONAL ADAPTATION PLANS

National Adaptation Plans (NAPs) help countries plan and implement actions to reduce vulnerability to the impacts of climate change and strengthen adaptive capacity and resilience. NAPs link to Nationally Determined Contributions (NDCs) and other national and sectoral policies and programmes.

NATURE BASED SOLUTIONS

Nature-based solutions are actions to protect, conserve, restore, and sustainably use and manage ecosystems to support climate change adaptation and mitigation efforts, preserve biodiversity, and enable sustainable livelihoods. They are actions that prioritize the importance of ecosystems and biodiversity and are designed and implemented with the full engagement and consent of local communities and Indigenous Peoples, who hold generational knowledge on protecting nature.

NET ZERO

Net zero means achieving a balance between the carbon emitted into the atmosphere, and the carbon removed from it.

PARIS AGREEMENT

The Paris Agreement is a landmark achievement in international cooperation on climate change because it is a binding agreement for all Parties to scale up efforts to combat climate change and adapt to its effects.

It is a legally binding international treaty aiming to limit global warming to well below 2° C, preferably to 1.5° C, compared to pre-industrial levels. It was adopted by 196 Parties in 2015 at COP21 in Paris and entered into force in 2016.

The Paris Agreement also provides the instruments for developed nations to assist developing nations in their climate mitigation and adaptation efforts, while creating a framework for transparent monitoring and reporting of results.

REAFFORESTATION AND AFFORESTATION

Forests provide immense benefits by removing carbon dioxide and pollutants from the atmosphere, preventing soil erosion, filtering water, and housing half of the world's land species of animals, plants and insects. Reforestation and afforestation are two of the most effective nature-based solutions in fighting climate change and limiting its impacts.

Reforestation is the process of replanting trees in areas that had recent tree cover but where forests were lost, due to wildfires, drought, disease, or human activity such as agricultural clearing.

Afforestation is the process of planting trees in areas that have not been forested in recent history. Afforestation helps restore abandoned and degraded agricultural lands, prevent desertification, create carbon sinks, and generate new economic opportunities for local communities.

REDD+

REDD stands for "Reducing Emissions from Deforestation and forest Degradation". The "+" signifies the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

REDD+ is a framework agreed by countries in the international climate negotiations that aims to curb climate change by reducing deforestation and forest degradation, and sustainably managing and conserving forests in developing countries.



RENEWABLE ENERGY

Renewable energy is energy derived from natural sources that are constantly being replenished, such as wind, sunlight, the flow of moving water, and geothermal heat. In contrast to energy sourced from fossil fuels like coal, oil, and gas, which accounts for 75 percent of the harmful greenhouse gas emissions that are causing climate change, energy from renewable sources is cheap, clean, sustainable, and generates more jobs.

Transitioning from fossil fuels to renewable energy in all sectors –power, heating and cooling, transportation, and industry – is key to addressing the climate crisis. To stay under 1.5°C of global warming, the world needs to immediately phase out fossil fuel use and undergo a profound transformation of the energy system through rapid electrification and sourcing energy from renewable sources.

RESILIENCE

Climate resilience is the capacity of a community or environment to anticipate and manage climate impacts, minimize their damage, and recover and transform as needed after the initial shock.

TIPPING POINT

A tipping point is a threshold after which certain changes caused by global warming and climate change become irreversible, even if future interventions are successful in driving down average global temperatures. These changes may lead to abrupt and dangerous impacts with very serious implications for the future of humanity and our planet.

UNFCCC

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty adopted in 1992 to combat dangerous human interference with the climate system. It entered into force in 1994 and enjoys near universal membership, having been signed by 198 parties. It is the parent treaty of both the Paris Agreement and the Kyoto Protocol.

The UNFCCC secretariat is the United Nations entity tasked with supporting the global response to the threat of climate change. The secretariat facilitates intergovernmental climate change negotiations by organizing between two and four negotiating sessions each year, the largest and most important of which is the Conference of the Parties (COP). It also provides technical expertise and assists in the analysis and review of climate change information and maintains the registry of Nationally Determined Contributions (NDC).

WEATHER VS CLIMATE

Weather refers to atmospheric conditions at a particular time in a particular location, including temperature, humidity, precipitation, cloudiness, wind, and visibility. Weather conditions do not happen in isolation, they have a ripple effect. The weather in one region will eventually affect the weather hundreds or thousands of kilometers away.

Climate is the average of weather patterns in a specific area over a longer period of time, usually 30 or more years that represents the overall state of the climate system.

Human activity in the industrial age, and particularly during the last century, is significantly altering our planet's climate through the release of harmful greenhouse gases.



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