FEDERAL MINISTRY OF EDUCATION

CLIMATE CHANGE EDUCATION

(Handbook for Schools in Nigeria)

Federal Ministry of Education (FME 2025)

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Contents

Foreword

It is with great pleasure that I introduce the Handbook on Climate Change Education (CCE) for Schools in Nigeria - a vital response to the natural and human-induced hazards outlined in the Minimum Standards for Safe Schools, which stem from the National Policy on Safety, Security, and Violence-Free Schools (NPSSVFS) developed by the Federal Ministry of Education. The Ministry remains firmly committed to ensuring that our education system prepares future generations with the knowledge, skills, and values needed to address the complex challenges posed by climate change.

This Handbook was developed in alignment with the Climate Change Act, 2021, which calls for proactive measures and safe practices to identify, respond to, and mitigate the impacts of climate change. It also seeks to ensure the continuity of education and livelihoods within safe and resilient environments.

Climate change is one of the most urgent issues of our time, with wide-ranging implications for our planet, economies, and societies. As the Ministry was tasked with implementing government education policies, we have a crucial role to play in empowering learners to understand the causes and effects of climate change, while guiding them to develop the motivation and capacity to take meaningful action. This Handbook was developed with sensitivity to the diverse climate conditions experienced across the globe.

Since Climate Change and Disaster Risk Reduction (DRR) are already embedded in the Nigerian education curriculum, this Handbook is designed to support educators in effectively integrating Climate Change Education (CCE) into their teaching practices. It presents a comprehensive framework for understanding climate change, its impacts, and the strategies for its mitigation and adaptation. Additionally, it offers practical guidance, resources, and classroom activities to help bring CCE to life. The inclusion of images and interactive links enhances accessibility and comprehension.

I want to extend my sincere appreciation to UNICEF and the Ministries, Departments, and Agencies (MDAs) whose expertise contributed to developing this Handbook. Their dedication to raising awareness about the intersection of climate change and educational safety has been invaluable.

I encourage all educators, policymakers, school communities, and stakeholders to utilize this Handbook and actively participate in advancing Climate Change Education. Together, we can empower future generations to become informed and responsible citizens equipped with the tools to tackle the climate crisis and build a more sustainable future for all.

Dr. Maruf Tunji Alausa
Honorable Minister of Education

Acknowledgments

The development of this Handbook on Climate Change Education (CCE) would not have been possible without the giant steps taken by the government of the Federal Republic of Nigeria in enacting the Climate Change Act 2021 under which the National Adaptation Plan urges the Federal Ministry of Education to ensure that teachers/facilitators and learners are empowered with the knowledge, skills, and values necessary to mitigate the impacts of Climate Change in our environment and create a sustainable future.

Our sincere appreciation goes to the Federal Ministry of Education Management, led by the Honorable Minister, Dr. Tunji Alausa, for the exceptional support, encouragement, and approvals given towards the successful development of the **Handbook on Climate Change Education for Schools in Nigeria.**

The commitment and invaluable support of several partner-members of the Climate Change Education National Technical Working Group (CCE-NTWG) deserve great commendation.
It is apposite to recognize the hard work and deep commitment of UNICEF and other development partners in the development of the initial handbooks that were later merged into one.

The immense contributions and very educational arguments presented and resolved during the development process of the handbook were led by representatives of the following ministries, departments, and agencies of the federal government:
Nigerian Educational Research Development Council (NERDC); Federal Ministry of Environment (FMEnv.); Universal Basic Education Commission (UBEC); National Commission for Mass Literacy, Adult and Non-Formal Education in Nigeria (NMEC); National Commission for Colleges of Education (NCCE); National Commission for Climate Change Secretariat (NCCCS); Federal Ministry of Education, Department of Education Support Services National and International Partnerships Division, Multilateral Branch. You are all greatly appreciated.

Indeed, all the members of the Climate Change Education National Technical Working Group (CCE-NTWG), led by the Federal Ministry of Education and co-led by UNICEF, are greatly appreciated for all their contributions that culminated in this Handbook on Climate Change Education for Schools in Nigeria.

Abel O. Enitan
Permanent Secretary,
Federal Ministry of Education

Introduction

Climate change is impacting human lives in a variety of ways. It threatens the essential ingredients of good health – clean air, safe drinking water, nutritious food supply, and safe shelter – and has the potential to prevent or disrupt learning in schools. Children and young people need to acquire the knowledge, attitudes, skills, and commitment needed to effect individual and collective action to mitigate and adapt to climate risks, eliminate unsustainable practices, and bring about a sustainable future as soon as possible. Educational institutions/schools need to play a critical role in creating awareness on climate change.
As the world grapples with the challenges of climate change, this handbook on Climate Change Education (CCE) becomes imperative to empower teachers/facilitators and learners with the knowledge, skills, and values necessary to mitigate its impacts and create a sustainable future.

This handbook is designed to support Nigerian educators in integrating CCE into their teaching practices, fostering a generation of climate-conscious leaders and change-makers.

In conclusion, learning about climate change, how and why it occurs will make it easier to communicate, act, and cope with changes in the environment.

Larai Nana Ahmed
Director, Education Support Services,
Federal Ministry of Education

Chapter One:
Weather and Climate

Definition of Weather and Climate

Weather refers to the temporary conditions of the atmosphere at a specific place and time, such as a sunny, rainy or windy weather. Weather can change within a day, shifting from warm to cold.

Climate is the average weather condition in a particular area over a long period of time. This determines whether a place is generally hot or cold. E.g., Lagos has a hot climate and Jos has a cool climate.

Climate Regions in Nigeria

Nigeria has a different range of climate regions determined by their location and influence by the Atlantic Ocean and other geographical factors. These climate regions influence agriculture, settlement patterns, and economic activities across Nigeria. The country is generally divided into the following climate regions:

Guinea Savannah (Tropical Wet and Dry). This covers most of central Nigeria, including states like Kwara, Kogi, and parts of Kaduna. The region is characterized by distinct wet and dry seasons. The moderate rainfall received in the area is about 1,000–1,500 mm annually.

Sudan Savannah (Tropical Dry). This is found in the northern part of Nigeria, including Sokoto, Kano, and Katsina states. The region receives little amount of rainfall of about 600–1,000 mm annually. It is characterized by high temperatures and sparse vegetation.

Sahel Savannah (Semi-Arid). This covers the extreme northern part of Nigeria, including Borno and Yobe states. It is characterized by very low rainfall of about 300–600 mm annually. It is characterized by hot and dry with desert-like features.

Mangrove and Freshwater Swamps (Coastal). It is found in the Niger Delta region, including Bayelsa, Rivers, and Delta states. It is characterized by high rainfall of over 2,500 mm annually. It has a hot and humid climate, with extensive river systems and wetlands.

Rainforest (Tropical Rainforest). This is located in the southern parts of Nigeria, including Lagos, Cross River, and parts of Edo with with heavy rainfall of over 2,000 mm annually. It is characterized by dense vegetation, high humidity, and warm temperatures.

Montane (Highland Climate). This is found in the Jos Plateau, Adamawa, and parts of Taraba with cooler temperatures due to higher altitudes. It is characterized by moderate rainfall, supporting unique vegetation.

Elements of Weather and Climate

These are the fundamental elements that define the atmospheric condition of a place.

i. **Temperature** - This means how hot or cold it feels in the atmosphere.
ii. **Humidity** - This refers to how much moisture is in the air.
iii. **Wind** - This simply means air in motion.
iv. **Air Pressure** - This refers to the force exerted by the weight of air over a given point.
v. **Cloud Cover** - This means the amount of sky covered by clouds
vi. **Sunshine** - It means the sun's light or direct rays
vii. **Precipitation** (rain, snow, sleet, hail etc.) - This means the water that falls from the sky like rain, snow and hail.

Instruments for Measuring Weather and Climate

INSTRUMENT		DESCRIPTION
Thermometer		measures temperature
Hygrometer		measures humidity - the amount of water vapour in the air
Barometer		measures atmospheric pressure
Anemometer		measures wind speed and direction
Rain Gauge		measures precipitation
Wind Vane		shows the direction of wind

Differences between Weather and Climate

Weather and climate are interconnected and aid understanding of atmospheric processes but vary as follows:

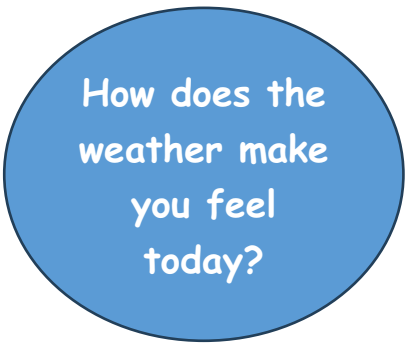
S/N	Weather	Climate
1	Weather refers to short-term changes in the atmospheric condition.	Climate refers to average weather conditions over a long time.
2	Weather changes quickly.	Climate changes slowly over decades.
3.	Weather changes frequently.	Climate does not change frequently.
4.	Weather describes the atmospheric condition of a particular place and time.	Climate describes the average atmospheric condition of a larger region over a longer period
5.	Elements of weather include sunshine, rain, cloud cover, winds etc.	Climate is the long-time average of condition of sunshine, rain, cloud cover, wind etc.

Exercise/Activity

a) Write True or False for each of the following questions:

1. Climate changes quickly. ( )
2. Climate refers to long-term changes. ( )
3. Weather is the atmospheric condition that occurs in a specific place and time. ( )
4. Elements of the weather include sunshine, rain, wind, etc. ( )
5. Climate changes frequently. ( )

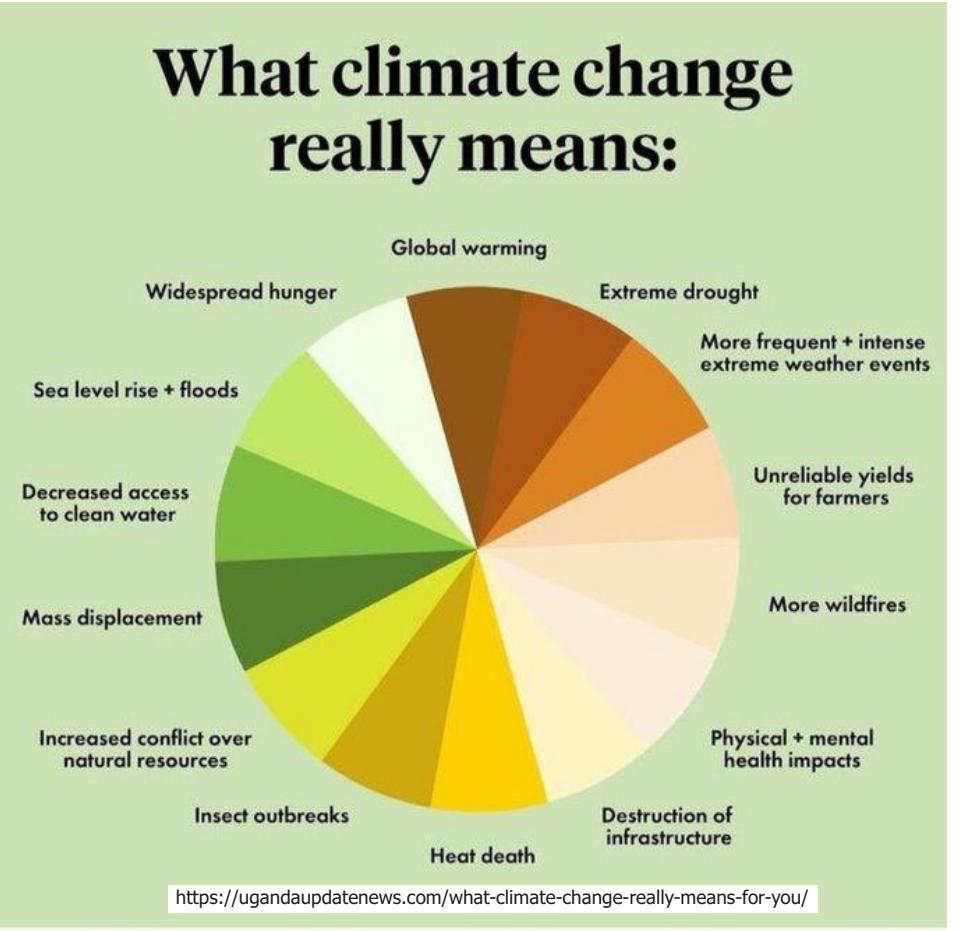
b) Observe and reflect on the weather.



Chapter Two:
What is Climate Change

Meaning of Climate Change

Climate change refers to long-term shifts in temperature and weather patterns over a long period of time. While some of these shifts may be natural, human activities have been the main contributors to climate change.



https://ugandaupdatenews.com/what-climate-change-really-means-for-you/

Causes of Climate Change

The following activities are the major causes of climate change:

Human Activities

i. Burning fossil fuels: e.g., firewood, oil and gas, coal, etc.
ii. Deforestation: e.g., cutting down trees.

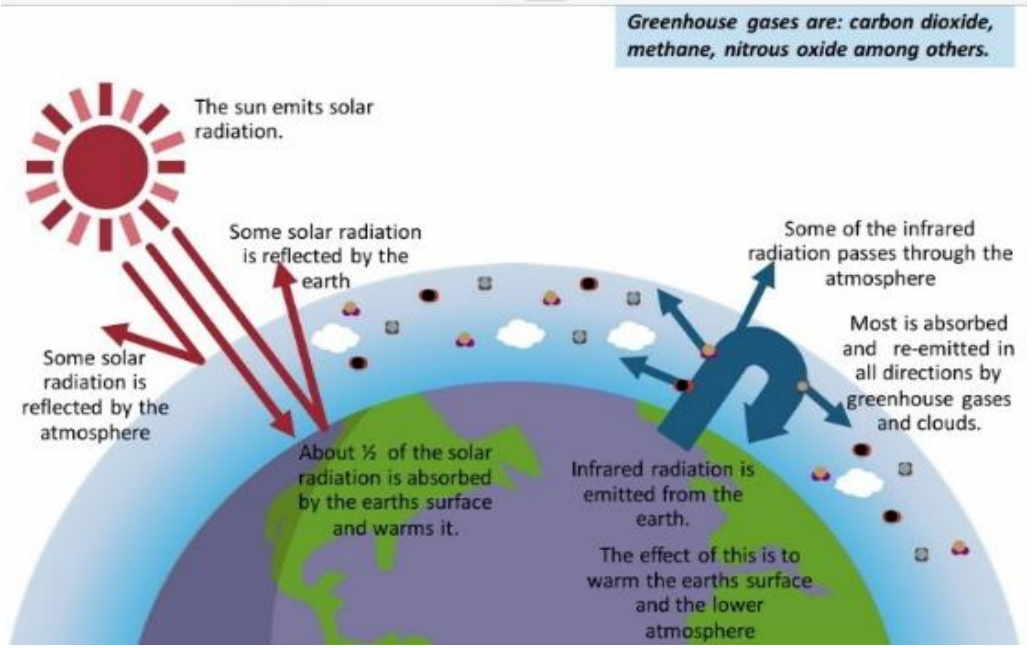
iii. Agricultural activities: e.g., bush burning, etc.
iv. Industrial processes: e.g., cement production, glass production, chemical production, etc.

v. Improper waste disposal: e.g., solid and liquid wastes.

vi. Land use changes: urbanization, transportation, agriculture etc.

Natural Processes

i. Volcanic eruptions
ii. Solar activities
iii. Greenhouse gasses effects: carbon dioxide, methane, etc.



Impacts of Climate Change

Climate change has far-reaching impacts on both humans and the environment. These include:

Impacts on Humans

a. **Health Impacts**
   i. **Heat-related Illnesses:** Increased frequency and severity of heatwaves that can lead to heat exhaustion, heat stroke, and even death.
   ii. **Respiratory Problems:** Warmer temperatures can increase respiratory conditions like asthma, and increased air pollution can worsen respiratory health.
   iii. **Vector-borne Diseases:** Changing climate conditions can alter the distribution and spread of disease-carrying insects like mosquitoes and ticks.
   iv. **Water-borne Diseases:** Floods and droughts can lead to contamination of water sources, leading to the spread of water-borne diseases like cholera and typhoid fever.

Social and Economic Impacts

i. **Displacement and Migration:** Rising sea levels, more frequent natural disasters (e.g. flood), and decreased livelihood opportunities can force people to migrate or be displaced.

ii. **Food Insecurity:** Climate-related disruptions to agriculture can lead to crop failures, reduced yields, and decreased access to nutritious food.
iii. **Economic Losses:** Climate-related disasters can result in significant economic losses, damage to infrastructure, loss of lives, and productivity.
iv. **Social Inequality:** Climate change can worsen existing social and economic inequalities, particularly for vulnerable populations like the poor, women, and children.

Psychological and Emotional Impacts

i. **Anxiety and Stress**: The threat of climate-related disasters and the uncertainty of climate change can cause significant anxiety and stress.
ii. **Trauma and PTSD:** Direct experiences of climate-related disasters can lead to trauma and post-traumatic stress disorder (PTSD).
iii. **Loss and Grief:** Climate-related changes can result in loss of livelihoods, homes, and communities, leading to feelings of grief and bereavement.
iv. **Mental Health:** Climate change can have significant impacts on mental health, particularly for vulnerable populations.

Impacts on the environment

a. Impacts on Temperature and Changes of Rainfall Patterns

i. **Rising Temperatures:** The manifestation of climate change, such as rising temperatures, brings about heatwaves that threaten livestock and causes heat stress which increases animals' vulnerability to diseases and reduces fertility and milk production.
ii. **Changing Rainfall Patterns:** Climate change alters rainfall patterns, causing droughts in some areas and floods in others, leading to soil erosion and landslides.

b. Impacts on Ecosystems and Biodiversity

i. **Loss of Biodiversity:** Climate change is projected to cause loss of up to 30% of species by 2050 due to habitat destruction and disruption of ecosystems.
ii. **Shifts in Species Distribution:** Climate change alters the distribution of plants and animals, disrupting ecosystems and potentially leading to extinctions.

c. Impacts on Natural Resources

i. **Water Scarcity:** Changes in precipitation patterns and increased evaporation due to warmer temperatures lead to water scarcity, affecting agriculture, industry, and human consumption.
ii. **Increased Risk of Natural Disasters:**

Climate change increases the risk of natural disasters like hurricanes, wildfires, and floods, causing damage to infrastructure and human settlements.

Activities

1. Humans are the dominant cause of climate change. True or False.
2. Climate change impacts help us to get more food. True or False.
3. Which of the following is an impact of climate change in Nigeria?
   A. Drought may increase in magnitude.
   B. Extreme weather, including floods, is more likely.
   C. Diseases such as malaria may increase.
   D. All of the above
4. What can you do to help fight climate change?
   A. Discourage the use of fossil fuels and use renewable energies instead.
   B. Plant trees on your birthdays, and reduce, reuse and recycle used items.
   C. Walk, ride a bicycle, or join public transport.
   D. All of the above

Chapter Three:
Climate Crisis in Nigeria

Climate crisis refers to the serious problems that are 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 conflicts.

Climate Crisis in Nigeria (https://humanglemedia.com/leveraging-cop-29-for-climate-actions-in-nigerias-frontline-communities/)

Climate crisis has devastating impacts on Nigeria, with various climate crises emerging across the country. Flooding is one of the most pressing issues. The 2022 floods affected around 2.8 million people, displaced about 1.4 million, and destroyed 70,566 hectares of farmland. These crises include:

i. **Desertification and Land Degradation:** These result from overgrazing, deforestation, and poor agricultural practices, leading to loss of arable land, reduced agricultural productivity, and heightened poverty.
ii. **Flooding:** This is caused by heavy rainfall, storm surges, and poor urban planning, leading to displacement of people, damage to infrastructure, and loss of livelihoods.
iii. **Drought:** This is triggered by erratic rainfall patterns, and inefficient water management, resulting in water scarcity, reduced agricultural productivity, and increased food insecurity.
iv. **Heatwaves:** These are caused by urbanization and poor urban planning, leading to heat-related illnesses, increased mortality, and decreased economic productivity.
v. **Water Scarcity:** This is compelled by population growth and inefficient water management, leading to reduced access to clean water, increased water-borne diseases, and decreased economic productivity.
vi. **Food Insecurity:** This is affected by poor agricultural practices, and inefficient food systems, leading to reduced access to nutritious food, increased malnutrition, and decreased economic productivity.

vii. **Migration and Displacement:** This is driven by poverty and conflict, leading to increased migration and displacement, social and economic disruption, and decreased economic productivity.
viii. **Health Impact:** This is caused by poor environmental health, and inadequate healthcare systems, leading to increased heat-related illnesses, water-borne diseases, and mental health impacts.

These climate crises have significantly impacted on Nigeria's economy. Addressing these crises requires a multi-faceted approach that involves government policies, community engagement, and individual actions.

Climate Justice

Climate justice refers to fair distribution of the benefits and burdens of climate change policies and actions. It seeks to address the disproportionate impacts of climate change on vulnerable populations, such as the poor, women, children, and indigenous communities. Climate justice is based on several key principles:

i. **Equity:** Recognizing that different countries and communities have contributed differently to greenhouse gas emissions and have different capacities to adapt to climate change.
ii. **Human Rights:** Ensuring that climate change policies and actions respect, protect, and promote human rights, including the right to life, health, and a safe environment.
iii. **Participation:** Involving vulnerable populations in decision-making processes related to climate change policies and actions.
iv. **Sustainable Development:** Promoting sustainable development and reducing poverty, while also addressing climate change.

Issues addressed by climate justice include:
i. Climate Migration: Relocating people affected by floods to a more habitable place by the government.

Activities

Outdoor Walk

- Move outside and observe the trees, water, and soil.
- Discussion: "What happens if there is too much heat, rain, or pollution?"
- Relate your observations to how climate change affects different communities.

Chapter Four:
Global Warming, Greenhouse Gas Emissions, and Climate Change Opportunities

Global Warming

Global warming is the increase in the Earth's average 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. These are some of the ways via which we increase greenhouse gases:

i. Burning fossil fuels (coal, oil, and gas)
ii. Deforestation (cutting down forest)
iii. Livestock farming (overgrazing)
iv. Urbanization

These activities lead to rising sea levels, hotter weather, floods, droughts, melting ice, and extreme weather events.

> Addressing climate change is a common and shared responsibility.
>
> - **President Bola Ahmed Tinubu**

Greenhouse Gasses (GHG)

Greenhouse gases trap heat from the sun in the atmosphere. Human activities release large amounts of these gases, contributing to global warming and climate change.

The main greenhouse gases released by human activities are:

i. carbon dioxide (C02)
ii. methane (CH4)
iii. nitrous oxide (N20)
iv. water vapor
v. fluorinated gasses (used for cooling and refrigeration)

Carbon dioxide emissions primarily come from burning fossil fuels, deforestation, and land-use changes. Methane is released from the extraction of coal, gas and oil, as well as from agricultural practices. Therefore, to prevent the negative impacts of climate change, we need to reduce the release of greenhouse gases.

Carbon Footprint

A carbon footprint is a measure of the GHG emission released into the atmosphere by a particular person, organization, product or activities. Measuring your carbon footprint includes burning of fossil fuel for energy production, heating, land and air travel, and indirect emission, resulting from production and disposal of all food, manufactured goods and services that you consume.

Climate Change Opportunities

Climate change is not bad all the times. there are lots of opportunities we can explore. We should equip ourselves with specific skills and education needed to bring solution to climate change. Examples of opportunities in climate change include:

1. Renewable Energy Revolution: Getting power from natural sources like the sun and wind, instead of oil and coal, which can help keep our air clean.
2. Circular Economy (Recycling and Upcycling): Finding creative ways to reuse old things, instead of throwing them away, like turning plastic bottles into new products.
3. Climate Smart Agriculture: Growing food in ways that use less water and protect the soil, helping farmers deal with changing weather patterns.
4. Urban and Infrastructure Redesign: Building cities and roads that are better for the environment, with more trees, bike paths, and energy-saving buildings.
5. Education and Workforce: Learning new skills to work in jobs that help protect the environment, like installing solar panels or designing eco-friendly products.
6. Green Finance: Using money to support projects and businesses that help the environment instead of harming it.
7. Biodiversity Conservation: Taking care of nature by protecting forests, oceans, and wildlife, so that they can help fight climate change naturally.

Activities:

Hands-on and Fun

1. **The Greenhouse Effect Jar:** Create a mini greenhouse using a jar, plastic wrap, and a thermometer. Compare the temperature inside the jar to the outside temperature.
2. **Carbon Footprint Calculation:** Calculate students' carbon footprints using a simple online calculator or a worksheet.
3. **Recycling Relay:** Divide students into teams for a recycling relay, sorting different materials into the correct bins.
4. **Rising Sea Levels:** Fill a container with water, ice cubes, and a small island (made of clay or paper). Demonstrate how melting ice causes sea levels to rise.

Chapter Five:
Climate Change Action

Introduction to Climate Change Action

Despite the impact of climate change, individuals, communities and nations can take actions to reduce its effects. These actions are known as Climate Change Actions, which fall into two categories: Climate Change Adaptation and Climate Change Mitigation.

Climate Change Adaptation

It is the process of adjusting to the effect of climate change, such as extreme weather, water and food insecurity and rising sea levels.

Climate Change Adaptation measures include:

- Climate-smart agriculture
- Afforestation
- Water conservation
- Planning to reduce climate change impacts.

To ensure climate change adaptation, consider these practices:

i. Building settlements in safe zones with infrastructure that can withstand storms, flooding and other climate-related disasters.
ii. Developing early warning systems
iii. Obtaining insurance coverage for life and property
iv. Wearing weather-appropriate clothing.
v. Promoting education and public awareness on climate change adaptation strategies (e.g., water conservation through rainwater harvesting).
vi. Improving the monitoring of livestock, water and weather.

Climate Change Mitigation

Climate change mitigation involves reducing greenhouse gas emissions that contribute to climate change in the atmosphere.

Climate change mitigation actions you can take include:

i. Engage in climate-smart agriculture.
ii. Use energy efficient appliances and save energy by turning off electrical appliances when not in use.
iii. Develop and utilize low energy technologies like electric cars, inverters, air conditions, and refrigerators.
iv. Use renewable sources of energy like solar, wind power and hydro energy sources.
v. Adopt natural ways of absorbing carbon dioxide like planting trees and having vegetations to absorb carbon dioxide.

"Mitigating against the adverse effect of climate change is essential for safeguarding our African communities and economies"

- President Bola Ahmed Tinubu

Difference between adaptation and mitigation: Adaptation deals with the effect of climate change while mitigation deals with prevention.

A. Climate Vulnerability

It is the extent to which people are at risk of suffering negative effects of climate change and extreme weather events. For instance, a farmer living in a flood prone area is said to be vulnerable to climate change. The components of climate vulnerability are exposure, sensitivity and adaptive capacity:

- Exposure is the direct physical contact with climate change impacts, such as experiencing extreme weather events like floods, droughts, heatwaves and sea level rise in a particular location.
- Sensitivity describes how likely a system is to the impacts of climate change once exposed. These are the effects on socio-economic conditions, infrastructure and ecosystem health.
- Adaptive capacity refers to the ability of a system or community to adjust to climate change impacts through actions like planning, mitigation strategies and access to resources.

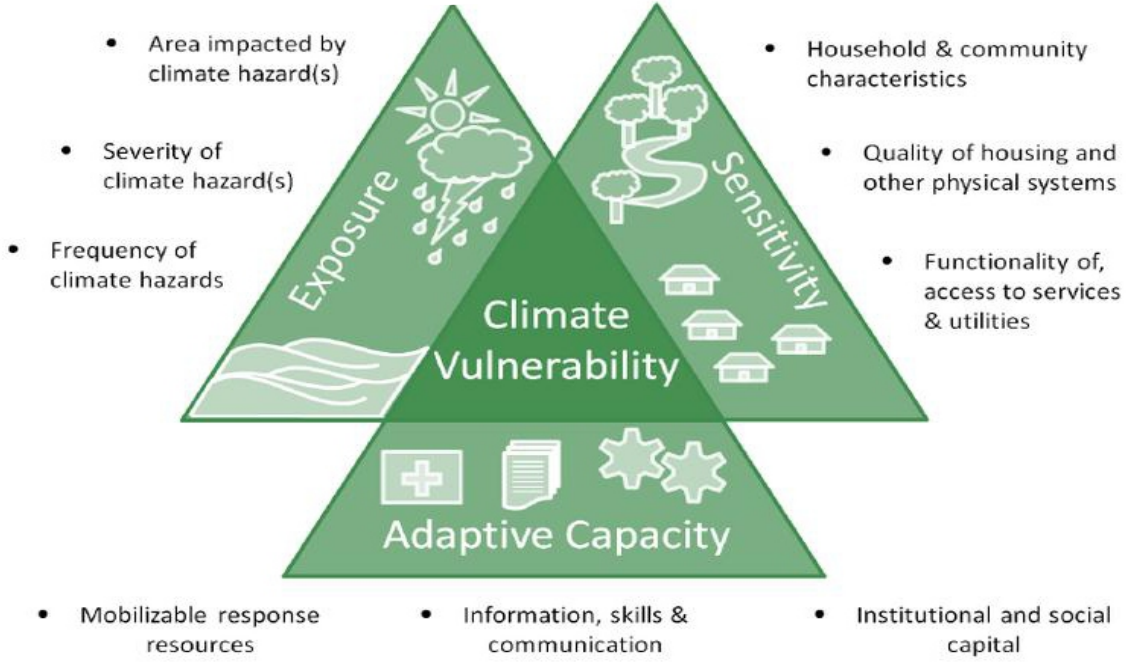


Figure 1- Component of Climate Vulnerability
(Source: https://www.researchgate.net/figure/Components-of-Climate-Vulnerability_fig13_283243489)

B. Climate Resilience

It is the ability to prepare for, recover from and adapt to the impacts of climate change. Climate resilience is the capacity of a community or an environment to anticipate and manage climate impacts, minimize their damage and recover/ transform after the initial shock.

A truly climate resilient community is a low-carbon community, reducing greenhouse gas emission. It is a society that is based on equity and climate justice which prioritizes support for people and communities most exposed to climate impacts or least able to cope with them.

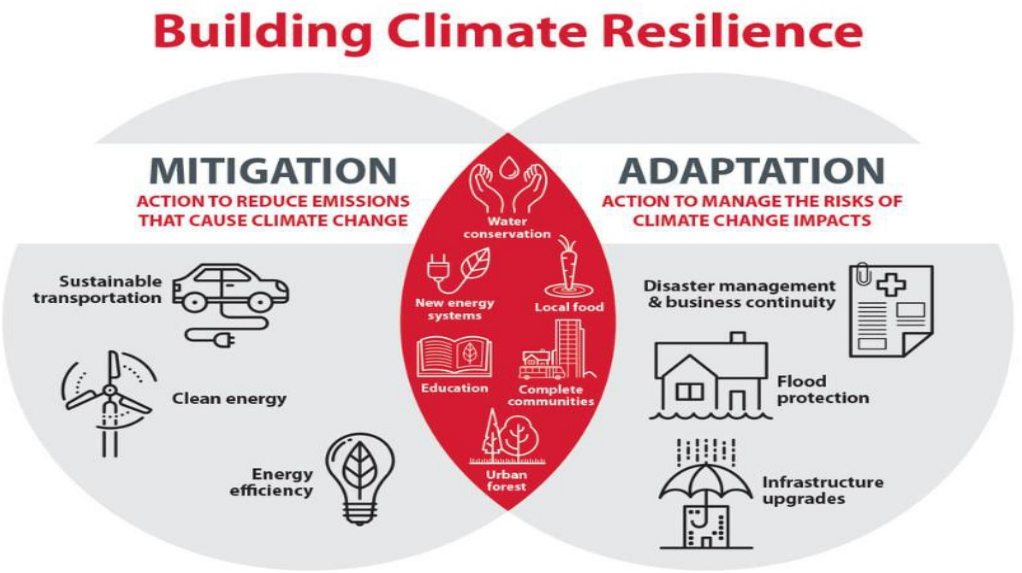


Figure 2- Building Climate Resilience

(Source: https://www.mrgscience.com/ess-topic-73-climate-change-ndash-mitigation-and-adaptation.html)

What can we do to reduce the effects of Climate Change?

1. Plant tree regularly.
2. Water harvesting and conservation.
3. Use bicycle, take public transportation and walk to reduce carbon footprint and emission by multiple cars
4. Turn off electricity supply when not required to reduce heat.
5. Stop felling of trees and bush burning.
6. Use energy-efficient household appliances.
7. Plant drought resistant seeds.
8. Reduce, reuse and recycle used items.
9. Use more of biodegradable materials.
10. Adopt climate smart agricultural practices.

Activities/Exercises

Activity1: Mention one way you can adapt to overcome the effects of the following climate change impacts?

1. Flooding: _____
2. Water shortage: _____
3. Extreme heat: _____

Activity 2: Read the following strategies to tackle climate change. Identify which of them belongs to adaptation or mitigation strategy.

- Designing facilities that use solar panels for energy
- Introducing and promoting clean transport policy
- Reducing, reusing and recycling of resources
- Developing an early warning system for malaria epidemic
- Investing in renewable energy
- Growing crops that can tolerate drought

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