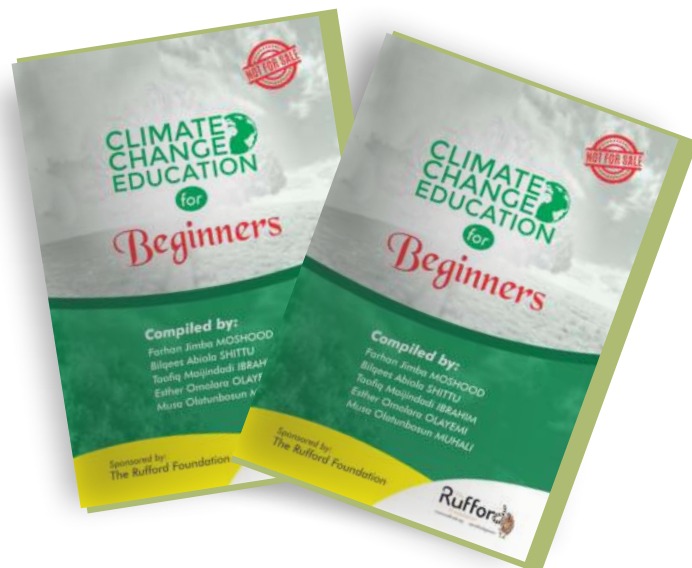




CLIMATE CHANGE EDUCATION

for

Beginners



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Sponsored by:
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Climate Change Education for Beginners

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FOREWORD

Nigeria is one of the most vulnerable countries to the effects of climate change owing to its geographical location within the sub-Saharan region of Africa, where temperatures are rising, and rainfall patterns have become erratic. The effects of climate change are particularly visible and felt in different sectors which have resulted in low crop yield, loss of biodiversity, increasing incidents of diseases, and flooding among others.

This book was developed as part of a programme/project titled “Catch Them Young: Climate Change Education in Primary Schools in Ilorin, Kwara State, Nigeria” which was funded by the Rufford Foundation, United Kingdom. Our decision to embark on the project stemmed from the fact that primary education in Nigeria does not have climate change education included in its curriculum which is a major setback for the country. We, therefore, resolved that educating children about climate change as early as possible is crucial so that they can understand the causes and consequences of the problem and take action to reduce their carbon footprint. For this reason, we titled the book “Climate Change Education for Beginners”.

The programme was carried out to increase climate literacy among school children in selected primary schools in Ilorin, Kwara State. The programme inculcated in the primary school children the science of climate change using relevant learning materials that enhanced their comprehension and made them appreciate the subject matter. The programme, as the name suggests (catch them young), was able to bridge the gap and drew the concept closer to the children at a tender age. Furthermore, the programme increased awareness, understanding, and engagement of children in climate-friendly behaviours and practices. It also created a network of climate-conscious children who can serve as ambassadors for climate change awareness and action in their community.

We express our sincere gratitude to the Rufford Foundation for funding this project. We equally express our gratitude to the management and staff of all the schools that partnered with us for the successful implementation of the programme.

Farhan Jimba MOSHOOD
Project Team Leader

PREFACE

Climate change has become one of the most pressing challenges of our time, affecting every corner of the globe, including Nigeria. Despite this fact, none of the schools in West Africa has climate change education included in its curriculum at the primary level of teaching. This is a major setback for the continent and the sub-region in particular. It is crucial to equip younger generations with the knowledge and understanding of this complex issue. This book, "Climate Change Education for Beginners", aims to bridge the knowledge gap by presenting climate change in an accessible and engaging manner specifically tailored for young minds.

As a multifaceted concept, understanding climate change demands an interplay between science, geography, and social issues. This nine-chapter book has been written to provide the children with a comprehensive understanding of climate change while considering their intellectual capacity and cultural context. By presenting the material in a simplified yet informative way, I believe it will empower children to become agents of change and develop a sense of responsibility towards the environment.

Filled with captivating illustrations, straightforward language, and relatable examples, the book explores fundamental aspects of climate change. It discusses the causes of climate change, including human activities such as deforestation, greenhouse gas emissions, and pollution, as well as natural factors like volcanic eruptions and solar radiation. Moreover, it delves into the consequences of climate change, ranging from rising global temperatures and extreme weather events to the depletion of resources and loss of biodiversity.

While providing a comprehensive understanding of the issue, the book also pointed out what the potential solutions are. It delves into sustainable practices, such as renewable energy sources, waste reduction, and conservation efforts that individuals, communities, and the nation can adopt. By exposing young readers to these solutions, I believe it will inspire them to take action and contribute positively to protecting our planet.

"Climate Change Education for Beginners" is meant to serve as an educational tool, complementing curricula in Nigerian primary schools. I hope that the book will become an integral part of classroom discussions, prompting teachers, parents, and students to engage in lively conversations about climate change and its implications for Nigeria's future and even beyond. More importantly, by equipping young minds with the knowledge and understanding of climate change, I believe we can nurture a generation that cherishes and protects our planet. With education as the catalyst for change, I am also confident that this book will contribute to building a sustainable future for all.

I congratulate everyone involved in making this book a reality. May it inspire a sense of wonder, curiosity, and responsibility in every reader.

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TABLE OF CONTENTS

CHAPTER ONE: Introduction.....	1
CHAPTER TWO: Importance of Understanding/ Studying Climate Change	4
CHAPTER THREE: Real-Life Examples and Stories on Climate Change	6
CHAPTER FOUR: Causes of Climate Change.....	8
CHAPTER FIVE: Real-Life Examples that explain the causes of Climate Change.....	10
CHAPTER SIX: Effects of Climate Change.....	12
CHAPTER SEVEN: Mitigation Measures.....	14
CHAPTER EIGHT: Adaptation Strategies.....	16
CHAPTER NINE: Roles of an Individual in Climate Action.....	18
PRACTICE QUESTIONS:	22
SOURCES OF IMAGES:	27

Chapter One

INTRODUCTION

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- explain in simple terms what climate change is;
- highlight some of the important terminologies used in climate change; and
- state the differences between weather and climate.

DEFINITION OF CLIMATE CHANGE

Climate change describes a change in the average weather conditions such as temperature and rainfall in a region over a long period of time. Climate change is about changing weather, but it happens over a long time, like many years. It is when the Earth's air gets a little bit warmer or colder. The warming is caused by things we do, like driving cars that make smoke or using too much energy from things like electricity and computers. When the Earth gets warmer, it can make the weather act differently. We might have more hot days, and some places might get more rain or snow.



Figure 1: Climate Change

IMPORTANT TERMINOLOGIES

- Weather:** This can be defined as the atmospheric condition of a given place at a particular time. Weather describes the conditions outside right now in a particular place. For example, if you see that it is raining outside right now, that is a way to describe today's weather. Rain, snow, wind, hurricanes, tornadoes are all weather events.

- Climate:** This can be defined as the average weather condition of a given place over a long period of time. The climate is more than just one or two rainy days. Climate describes the weather conditions that are expected in a region at a particular time of the year. Is it usually rainy or usually dry? Is it typically hot or typically cold? A region's climate is determined by observing its weather over a period of many years usually about 30 years or more.



Figure 2: Weather and Climate

- Greenhouses Gases:** This can be defined as gases in the atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. These are like invisible blankets in the air that help keep our planet warm. They trap some of the heat from the sun and keep it close to Earth. Some of these gases are good because they keep us warm, but too many can make the Earth too hot. Examples include Methane, Carbon dioxide and water vapour.

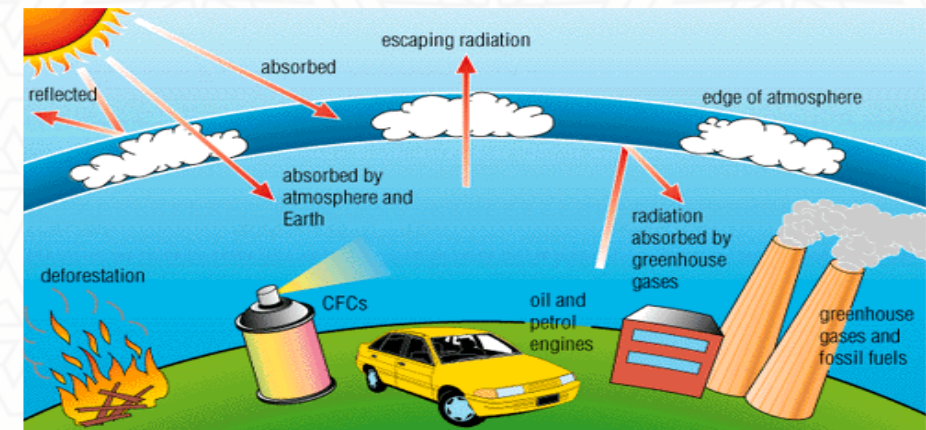


Figure 13: Sources of Greenhouse Gases

Chapter Two

IMPORTANCE OF UNDERSTANDING/STUDYING CLIMATE CHANGE

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to mention some of the importance of understanding/studying climate change.

IMPORTANCE OF UNDERSTANDING/STUDYING CLIMATE CHANGE

- **Protecting the Planet:** Learning about climate change helps us to understand how human actions can harm the environment. This knowledge encourages us to take actions that protect the Earth, such as reducing waste and conserving energy.
- **Caring for Nature:** It helps to develop a greater appreciation for nature and the importance of biodiversity. By learning how climate change can impact animals and plants, it motivates to support conservation efforts.
- **Sustainability:** It teaches us about sustainable living. This helps on how to use resources wisely, reduce pollution, and make choices that have a positive impact on the planet.
- **Preparing for the Future:** Climate change affects the world we will grow up in. Understanding it helps us prepare for potential challenges, such as extreme weather events, sea-level rise, and changes in agriculture.
- **Empowering Young Activists:** Young kids can become advocates for positive change. Learning about climate change empowers them to speak up, engage in environmental activism, and influence policies that address climate issues.
- **Science and Critical Thinking:** Studying climate change introduces people to scientific concepts and critical thinking skills. They learn to analyze data, ask questions, and make informed decisions based on evidence.
- **Global Awareness:** Climate change is a global issue that affects

- **Global Warming:** This can be defined as an unusually rapid increase in the Earth's average surface temperature. Imagine the Earth is like a big oven, and global warming is when it starts getting hotter. This happens when there are too many greenhouse gases in the air, like a lot of carbon dioxide. It can make our planet warmer and can cause problems like melting ice and strange weather.



Figure 4: Global Warming

- **Carbon Dioxide (CO₂):** This is a molecule that contains two oxygen atoms and one carbon atom. It is a gas that comes from things like cars, factories, and even when we breathe. It is important for plants because they use it to grow, but if there is too much of it in the air, it can make the Earth too warm. It is like having too much sugar in your favorite drink – a little is okay, but too much is not good for you.

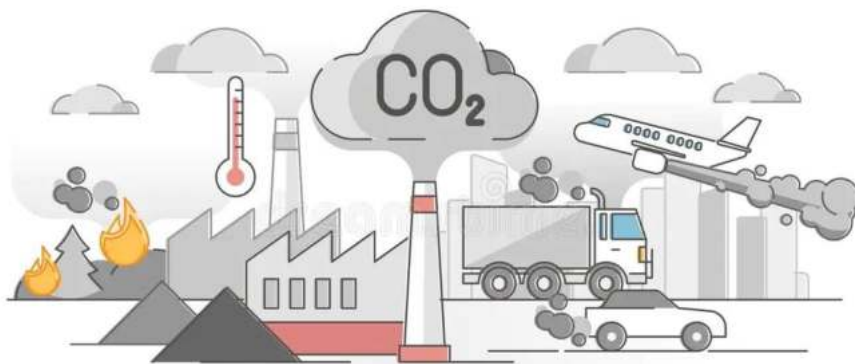


Figure 5: Sources of Carbon Dioxide

people all over the world. Learning about it promotes global awareness and empathy for those facing the most severe consequences.

- **Inspiration for Careers:** Some kids may discover a passion for environmental science or related fields through studying climate change, inspiring future careers in areas like climate research, conservation, or renewable energy.
- **Responsibility and Citizenship:** Understanding climate change teaches people about their responsibility as citizens of the planet. They learn that their actions can contribute to a more sustainable future.
- **Hope and Solutions:** While climate change is a serious issue, education can also inspire hope. Kids learn about solutions and innovations that can mitigate its effects, encouraging them to be part of positive change.



Figure 6: Importance of Understanding Climate Change

Chapter Three

REAL-LIFE EXAMPLES AND STORIES ON CLIMATE CHANGE

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- i. identify real-life examples of climate change;
- ii. connect personal experiences to the climate change stories; and
- iii. explain the human impact and solutions to the effects of climate change.

REAL-LIFE EXAMPLES AND STORIES ON CLIMATE CHANGE

1. Musa's Butterfly Adventure:

Meet Musa, a young boy who loved butterflies. He used to see so many colourful butterflies in his garden every year. But as the years went by, he noticed something strange. There were fewer butterflies visiting his garden. Musa decided to learn why this was happening. He found out that warmer temperatures and changes in the flowers they liked to eat were making it hard for the butterflies to survive.



Figure 7: Musa in the Butterfly Garden

This made him sad because he loved watching the butterflies flutter around. So, Musa decided to take action. He and his family planted lots of flowers that butterflies loved, and they used less energy at home to reduce their impact on the climate. Over time, Musa's garden became a haven for butterflies again, and he was so happy to see them return.

Chapter Four

CAUSES OF CLIMATE CHANGE

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- i. identify the natural causes of climate change; and
- ii. identify the human activities that causes climate change.

CAUSES OF CLIMATE CHANGE

1. Natural causes of climate change: natural causes of climate change can be explained as follows:

I. Volcanic Eruptions: a Volcano is a mountain or hill that has an opening through which gas, magma and ash can escape from deep inside the Earth. Sometimes, volcanoes erupt, and they can spew out a lot of ash and gases into the air. This can block sunlight and make the Earth cooler for a little while.



Figure 9: Volcanic Eruption

ii. Solar Activity: The Sun gives us heat and light. Sometimes, the Sun's activity changes a little bit, and it can affect our climate. When the Sun is more active, it can make the Earth a little warmer.

iii. Natural Greenhouse Gases: There are some gases in the air, like water vapor and methane, that trap heat from the Sun, just like a blanket. These gases are natural and have been in the atmosphere for a long time. They help keep the Earth warm.

iv. Ocean Currents: The oceans move around in big currents, like rivers in the sea. These currents can affect the climate by carrying warm or cold water to different places. For example, they can make some places cooler or warmer.

2. Precious and the Melted Snowman:

Precious lived in a place where it used to snow a lot in the winter, and she loved building snowmen with her friends. One winter, though, it did not snow as much as it used to. Precious noticed that the snowman they built did not last very long because it started melting much faster. She learnt from her teacher that the Earth was getting warmer because of too much carbon dioxide in the air. This made the winters milder, and there was less snow.



Figure 8: Precious and Her Friends

Precious did not want her snowmen to melt so quickly, so she decided to do something about it. Precious asked her family to use less energy and to walk or ride bikes instead of driving everywhere. She also joined a group at school that planted trees to help absorb carbon dioxide. Over time, her town started getting a little cooler in the winter, and they had more snow to build snowmen that lasted longer.

v. Natural Climate Cycles: The Earth has natural climate cycles that make the weather change over a long time. For example, there's a cycle called El Niño, which can make some years warmer and wetter, while other years are cooler and drier.

2. Human causes of climate change can be explained as follows:

i. Burning Fossil Fuels: People use things like cars, trucks, and factories that burn fossil fuels like gasoline, diesel, and coal. When we burn these fuels, they release a gas called carbon dioxide (CO_2) into the air. CO_2 acts like a blanket, trapping heat from the Sun and making the Earth warmer. This is called the "greenhouse effect".

ii. Deforestation: Cutting down trees in forests is another human activity that contributes to climate change. Trees help absorb carbon dioxide from the air. When we cut down too many trees, there are fewer of them to remove CO_2 , so more of it stays in the atmosphere.

iii. Waste and Landfills: When we throw away a lot of trash and it goes to landfills, it can produce a gas called methane (CH_4). Methane is another greenhouse gas that makes the Earth warmer when it is released into the air.

iv. Industrial Processes: Some industries make products and materials that release greenhouse gases as part of their processes. For example, making cement produces a lot of CO_2 .

v. Use of Electricity: Using electricity from power plants can also produce greenhouse gases, especially if the power plants burn fossil fuels. Using less energy or getting energy from clean sources like wind and solar power can help reduce this.

It is to be noted that the natural causes of climate change do not impact so much compared to human-induced causes.



Figure 10: Human Causes of Climate Change

Chapter Five

REAL-LIFE EXAMPLES THAT EXPLAIN THE CAUSES OF CLIMATE CHANGE

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- identify common everyday actions that contribute to climate change; and
- explain how deforestation, urbanization, and changes in land use affect climate change.

REAL-LIFE EXAMPLES THAT EXPLAIN THE CAUSES OF CLIMATE CHANGE

1. The Car's Tailpipe:

Imagine a car like the one your family might have. When this car runs, it uses gasoline or diesel fuel to go. But did you know that when the car's engine burns that fuel, it makes CO_2 ? CO_2 is like invisible smoke that goes into the air. Now, picture lots of cars, trucks, and buses all over the world, driving every day. All of them make CO_2 , and it goes up into the sky. This CO_2 acts like a big warm blanket around the Earth, trapping heat from the Sun. When there is too much of it, the Earth starts to get warmer, just like when you put on a sweater. So, one of the reasons for climate change is that we use so many cars and other things that burn fuel, and all that CO_2 they make is making our planet warmer.



Figure 11: Cars Tailpipe Emission

Chapter Six

EFFECTS OF CLIMATE CHANGE

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- i. identify local climate change impacts;
- ii. explain the effects of climate change on ecosystems and biodiversity; and
- iii. explain how climate change can lead to social and environmental challenges.

EFFECTS OF CLIMATE CHANGE

Some of the effects of climate change on our environment, communities, and individuals are:

i. Extreme Weather: Climate change can lead to more frequent and severe weather events like hurricanes, droughts, floods, and heatwaves. These events can damage homes, disrupt communities, and put people in danger.

ii. Rising Sea Levels: As the Earth warms, ice at the polar regions melt, causing sea levels to rise. This can lead to coastal erosion, flooding of coastal communities, and the displacement of people who live near the coast.

iii. Health Problems: Hotter temperatures can cause health problems for individuals, especially the elderly and young children. Heat-related illnesses can become more common. Additionally, climate change can spread diseases carried by insects like mosquitoes to new areas.

iv. Food and Water: Changes in temperature and precipitation patterns can affect crops and water supplies. This can lead to food shortages, higher prices, and even hunger in some communities.

v. Loss of Biodiversity: Some animals and plants may struggle to adapt to a changing climate or find suitable habitats. This can lead to a loss of biodiversity and even the extinction of some species.

vi. Altered Habitats: Climate change can change the places where animals and plants live. Some species may need to move to higher elevations or different regions to find the right conditions, which can disrupt ecosystems.

2. The Forest That Disappeared:

Think about a beautiful forest with lots of tall trees. These trees are like nature's vacuum cleaners because they suck up CO₂ from the air and give us fresh oxygen to breathe. But sometimes, people cut down these trees to use the wood or make space for buildings. When we cut down too many trees, there are fewer of them to take away the CO₂. So, it is like turning off the vacuum cleaner. Now, when we cut down forests, it is not just one or two trees; it is a lot of them, especially in places like the Amazon Rainforest. This means there is more CO₂ left in the air, and it makes the Earth warmer because there is less of nature's "cleaner" to help.

These examples show how things we do, like driving cars and cutting down forests, can make the Earth's climate change and get warmer. It is essential for us to use cars wisely and protect our forests to help keep our planet a comfortable place to live.



Figure 12: Deforestation

Chapter Seven

MITIGATION MEASURES

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- i. define mitigation as related to climate change;
- ii. highlight various actions that reduce greenhouse gas emissions; and
- iii. explain the importance of renewable energy sources.

MITIGATION MEASURES

Mitigation means making the impacts of climate change less severe by preventing or reducing the emission of greenhouse gases into the atmosphere. It can be achieved by reducing the sources of these gases.

Some mitigation measures:

1. Conserving Water:

Conserving water means using water wisely so that we don't waste it. We can do this by:

- taking shorter showers and turning off the faucet while brushing our teeth.
- fixing any leaks in our sinks or pipes.
- using a bucket or a watering can instead of a hose to water plants.
- collecting rainwater to water our gardens.

2. Planting Trees:

Planting trees is like giving a big hug to the Earth. Trees are like the lungs of our planet because they breathe in carbon dioxide (a gas that makes the Earth warmer) and give us fresh air to breathe. Trees also provide homes for animals and shade on hot days. So, by planting trees, we:

- help clean the air.
- give animals a place to live.
- make our neighbourhoods cooler and more beautiful.
- are giving a gift to the Earth and all its creatures.

3. Using Clean Energy:

Clean energy is like using super clean power that doesn't make the air dirty. We can do this by:

- using the sun's energy with solar panels on our roofs (i.e. using sunlight to power our homes).

vii. Migration Patterns: Many animals migrate to find food or suitable breeding grounds. Changes in climate can affect these patterns, leading to challenges for animals that rely on specific timing and locations for migration.

viii. Disruption of Food Chains: As some species move or adapt to changing conditions, it can disrupt the relationships between predators and prey in ecosystems. This can have cascading effects throughout the food chain.

ix. Ocean Acidification: Increased CO₂ in the atmosphere does not just affect the land; it also gets absorbed by the oceans, making them more acidic. This can harm coral reefs, shellfish, and other marine life.

x. Natural Resources: Climate change can impact natural resources like water, forests, and minerals. For example, changes in rainfall can affect the availability of freshwater, while wildfires and pests can damage forests.



Figure 13: Effects of Climate Change

- catching the wind's energy with big windmills (i.e. using the wind to make electricity).
- using energy-efficient appliances and light bulbs that use less energy.

Examples of local mitigation measures in Nigeria:

1. Renewable Energy Projects

- **Mitigation Measure:** Nigeria is investing in renewable energy sources like solar and wind power to reduce its reliance on fossil fuels, which release greenhouse gases that contribute to climate change.
- **Local Example:** The Kankia Solar Power Plant in Katsina State is one such example. It is a large solar farm that harnesses energy from the sun to generate electricity. By using clean energy from the sun, Nigeria reduces its carbon footprint and lowers its contribution to climate change.

2. Reforestation and Afforestation:

- **Mitigation Measure:** Planting trees and restoring forests can help absorb carbon dioxide from the atmosphere, acting as a "carbon sink" to mitigate climate change.
- **Local Example:** Nigeria's "Great Green Wall" initiative is a massive tree planting effort across several states in northern Nigeria, including Kebbi, Zamfara, and Yobe. The project aims to combat desertification and improve land productivity by planting trees and restoring degraded land.

3. Energy Efficiency Programs:

- **Mitigation Measure:** Improving energy efficiency reduces the amount of energy needed for various activities, lowering greenhouse gas emissions.
- **Local Example:** In Lagos, there are programmes to promote energy-efficient appliances and practices. For instance, initiatives encourage the use of energy-efficient light bulbs and appliances like refrigerators and air conditioners.

Chapter Eight

ADAPTATION STRATEGIES

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- define adaptation as it relates to climate change;
- mention local examples of climate change effects; and
- identify proper adaptation strategies to the effects of climate change.

ADAPTATION STRATEGIES

Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise.

Local examples of climate change effects and adaptation efforts

1. Flooding in Lagos

Climate Change Effect: Lagos, a coastal city in Nigeria, has been experiencing more frequent and severe flooding due to heavy rains and rising sea levels caused by climate change. This flooding damages homes, disrupts communities, and affects people's lives and businesses.

Adaptation Efforts: To adapt to this challenge, communities in Lagos are working on different strategies. They are building better drainage systems to prevent waterlogging, raising buildings above flood levels, and planting more trees and grasses to absorb excess rainwater. Additionally, education campaigns are raising awareness about flood risks and encouraging people to take safety measures.

2. Desertification in Northern Nigeria

Climate Change Effect: Northern regions of Nigeria, like Borno and Yobe are experiencing desertification, where once-fertile land turns into desert due to prolonged droughts and soil degradation, worsened by climate change. This affects farmers' ability to grow crops and raise livestock.

Adaptation Efforts: To adapt to desertification, communities are using techniques like water conservation, crop rotation, and reforestation (planting trees). They are also learning about drought-resistant crops and improving irrigation methods to make the most of available water.

These efforts help them maintain their livelihoods and protect the land.

3. Changing Rain Patterns in the Niger Delta:

Climate Change Effect: In the Niger Delta region, climate change has caused unpredictable and changing rain patterns. This affects farmers who rely on rain to grow crops. The irregular rains can lead to poor harvests and food shortages.

Adaptation Efforts: Farmers in the Niger Delta are adapting by exploring new planting techniques, such as using early-maturing crop varieties that need less rain or practicing rainwater harvesting. They are also getting support from organizations and the government to access better farming practices and tools to cope with the changing weather.

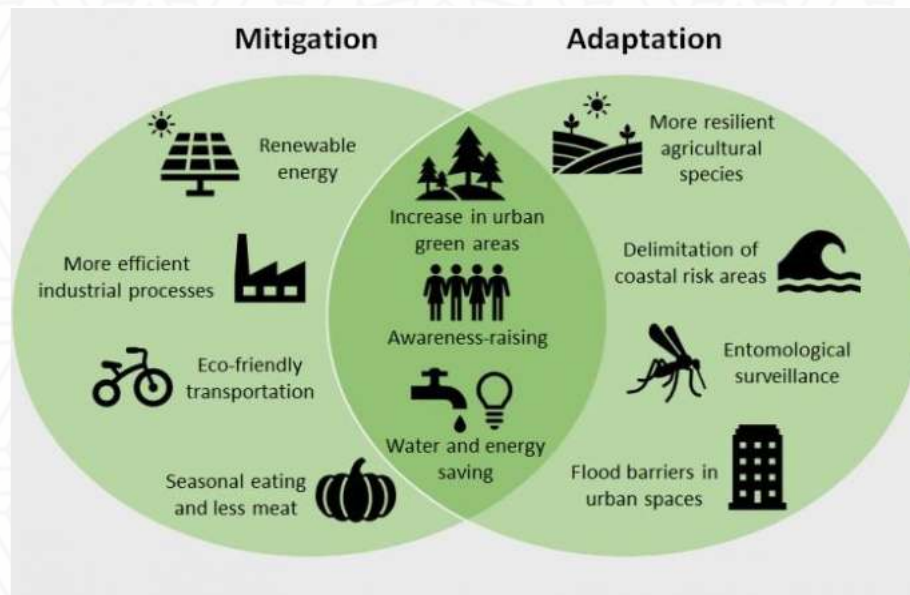


Figure 14 Mitigation and Adaptation of Climate Change Impacts

Chapter Nine

ROLES OF AN INDIVIDUAL IN CLIMATE ACTION

LEARNING OBJECTIVE(S):

At the end of this chapter, learners should be able to:

- highlight the roles of an individual in climate action; and
- mention the significance of the roles of an individual in climate action.

ROLES OF AN INDIVIDUAL IN CLIMATE ACTION

Some of the roles of an individual in climate action include:

1. Reduce Energy Use:

Significance: Using less energy reduces the greenhouse gases produced by power plants.

Individual Action: Turn off lights and appliances when not in use, use energy-efficient appliances, and use public transportation or carpool.

2. Save Water:

Significance: Conserving water reduces the energy needed to pump and treat water, lowering carbon emissions.

Individual Action: Fix leaks, take shorter showers, and use a bucket or watering can to water plants.

3. Reduce, Reuse and Recycle:

Significance: Recycling and reusing materials reduces the need for new production, which often requires energy and resources.

Individual Action: Sort and recycle materials, buy second-hand items, and avoid single-use products.

4. Plant Trees:

Significance: Trees absorb carbon dioxide, helping to combat climate change.

Individual Action: Participate in tree planting initiatives and care for trees in your area.

5. Conserve Resources:

Significance: Using resources wisely reduces environmental impact and lowers greenhouse gas emissions.

Individual Action: Avoid excessive consumption, buy durable products, and repair instead of replacing.

6. Limit Car Trips:

Significance: Less driving reduces fuel consumption and emissions.

Individual Action: Walk, bike, carpool, or use public transportation when possible.

7. Protect Wildlife:

Significance: Preserving habitats and ecosystems helps maintain biodiversity, which is essential for a balanced climate.

Individual Action: Support conservation efforts and avoid products that harm wildlife.

8. Educate Others:

Significance: Raising awareness and knowledge about climate change encourages collective action.

Individual Action: Share information, participate in community discussions, and engage in educational activities.

9. Reduce Plastic:

Significance: Plastic production and disposal contribute to greenhouse gas emissions.

Individual Action: Use reusable bags and containers, avoid single-use plastics, and recycle properly.

10. Support Renewable Energy:

Significance: Renewable energy sources like solar and wind produce clean energy, reducing reliance on fossil fuels.

Individual Action: Install solar panels, support renewable energy policies, and choose green energy providers.

11. Practice Sustainable Agriculture:

Significance: Sustainable farming methods reduce emissions and promote soil health.

Individual Action: Support local and sustainable agriculture.

12. Support Climate Policies:

Significance: Climate policies encourage action at the government level and address climate change on a broader scale.

Individual Action: Advocate for climate-friendly policies and support politicians who prioritize climate action.

13. Save the Oceans:

Significance: Oceans absorb carbon dioxide and play a crucial role in regulating the climate.

Individual Action: Reduce plastic waste, support marine conservation efforts, and make sustainable seafood choices.

14. Be Prepared:

Significance: Being ready for extreme weather events and disasters caused by climate change can save lives.

Individual Action: Create an emergency kit and develop a family disaster plan.

15. Reduce Food Waste:

Significance: Food production is resource-intensive, and wasted food emits greenhouse gases.

Individual Action: Plan meals, store food properly, and compost leftovers.

16. Lead by Example:

Significance: Setting a positive example encourages others to take action.

Individual Action: Practice sustainable habits and inspire friends and family to do the same.



Figure 15: Dos and Don'ts for Climate Change Adaptation and Mitigation



Figure 16: Role of an Individual in Climate Action

PRACTICE QUESTIONS

CHAPTER 1

1. What is climate change?

- (a) A sudden change in the weather
- (b) A long-term change in Earth's climate
- (c) A change in the season from winter to spring
- (d) A new type of cloud formation

2. What does "global warming" refer to?

- (a) The increase in temperatures in a single country
- (b) The warming of the entire planet over many years
- (c) Warming that only happens in the summer
- (d) A warming trend in a specific city

3. What are greenhouse gases?

- (a) Gases found in greenhouses used for growing plants
- (b) Gases that make the sky look green during a storm
- (c) Gases that trap heat from the sun in the Earth's atmosphere
- (d) Gases that are only found in green-coloured houses

4. What is the main difference between weather and climate?

- (a) Weather is what happens every day, and climate is what happens over years
- (b) Weather is the same as climate
- (c) Climate is about clouds, and weather is about wind
- (d) Weather is only about sunny days

CHAPTER 2

1. Why is it important to learn about climate change?

- (a) It's a fun topic to discuss with friends
- (b) It helps us understand how to make snowmen in winter
- (c) It can have a big impact on our lives and the world around us
- (d) Climate change doesn't affect us at all

2. How can climate change affect our lives directly?

- (a) By making summer vacations more enjoyable
- (b) By causing extreme weather events like hurricanes and floods
- (c) By making the sky look pretty with colorful clouds
- (d) It does not have any direct effects on our lives

3. Which of the following is one of the ways in which understanding climate change can help us take action?

- (a) By making us experts in cloud formations
- (b) By allowing us to predict the winning team in a baseball game
- (c) By helping us make choices that reduce the impact of climate change, like using less energy and creating less waste
- (d) By teaching us how to build sandcastles at the beach

4. Why should we study climate change?

- (a) To learn how to cook delicious meals
- (b) To help protect the environment and ensure a better future for us and future generations
- (c) To become famous climate scientists
- (d) It's not important at all

CHAPTER 3

1. Which of the following is a real-life example of climate change?

- (a) A sudden, temporary drop in temperature (b) An increase in the number of sunny days in summer (c) More frequent and severe hurricanes in coastal areas (d) A brief snowfall in winter.

2. What is a sign of climate change in the natural world?

- (a) Plants and animals thriving in their habitats (b) Decreased global temperatures during winter (c) Polar bears increasing in number (d) Coral reefs dying due to warmer ocean waters.

3. If you notice that your local river is drying up and it has been getting hotter in your area, how could you connect your personal experience to climate change?

- (a) These changes are entirely unrelated to climate change (b) The heat is probably just a coincidence (c) Warmer temperature may be causing evaporation and reducing the river's size (d) None of the above.

4. Why should you connect your personal experiences to climate change stories?

- (a) It's not important to do so (b) It can help you understand how weather works (c) It makes your stories more interesting (d) It helps you see the real-life effects of climate change and how it impacts your environment

CHAPTER 4

1. Which of the following is a natural cause of climate change?

- (a) Using fossil fuels for energy (b) Planting more trees (c) Volcanic eruptions (d) turning off lights when leaving a room

2. What is one way that solar activity can influence the climate?

- (a) Solar activity has no impact on the climate (b) It can cause unpredictable weather patterns (c) It can lead to changes in the amount of heat from the Sun, affecting the Earth's temperature (d) Solar variability only affects the Moon

3. How do human activities like burning fossil fuels contribute to climate change?

- (a) They cool down the Earth's atmosphere (b) They have no impact on climate (c) They release greenhouse gases, like carbon dioxide, into the atmosphere, which trap heat and lead to a warmer Earth (d) They create more forests, which reduce greenhouse gases

4. What is the primary source of greenhouse gases from transportation?

- (a) Walking and cycling (b) Using electric vehicles (c) Burning fossil fuels in cars, trucks, and planes (d) Taking public transportation

CHAPTER 5

1. Which of the following is an action that contributes to climate change by releasing greenhouse gases?

- (a) Riding a bicycle (b) Using energy-efficient light bulbs (c) Driving a car powered by gasoline (d) Turning off lights when not in use

2. Which of these is a product with high carbon footprint?

- (a) Reusable water bottles (b) Locally grown fruits and vegetables (c) Single-use plastic water bottles (d) Recycled paper

3. How does deforestation impact climate change?

- (a) It has no impact on climate change (b) It leads to an increase in the number of trees, which absorbs carbon dioxide (c) It releases stored carbon into the atmosphere, contributing to greenhouse gas emissions (d) It helps cool down the Earth's temperature

4. Which of these is one of the consequence of urbanization on climate change?

- (a) It reduces the number of buildings and roads (b) It helps protect natural landscapes from changes (c) It can increase heat in cities due to the urban heat island effect, which can contribute to local climate change (d) It has no impact on climate

CHAPTER 6

1. Which of the following is an example of a local climate change impact?

- (a) Building a new park in the neighborhood (b) An increase in the number of sunny days (c) More frequent and severe storms causing flooding in your area (d) A local bakery changing its bread recipe

2. What is an effect of climate change on weather patterns?

- (a) Weather patterns become more predictable (b) Weather patterns stay the same as always (c) More unpredictable and extreme weather events can occur, like stronger hurricanes or longer heatwaves (d) Weather patterns only change in big cities

3. How can rising temperatures affect plant and animal species?

- (a) Rising temperatures have no impact on ecosystems. (b) Rising temperatures can make plants and animals healthier and happier (c) It can lead to habitat loss, threatening many species and causing some to adapt or migrate (d) None of the above

4. What is one way changing ocean conditions can impact marine life?

- (a) Changing ocean conditions can lead to healthier and more diverse marine ecosystems (b) It doesn't impact marine life at all (c) Changing Ocean conditions can lead to coral reefs dying and fish populations declining (d) Fish thrive in any condition

CHAPTER 7

1. Which action can help reduce greenhouse gas emissions and combat climate change?

- (a) Leaving lights and electronic devices on when not in use
- (b) Using disposable plastic products
- (c) Conserving energy and turning off lights and appliances when not needed
- (d) Running the air conditioner at the lowest temperature possible

2. How can reducing waste contribute to reducing greenhouse gas emissions?

- (a) It has no impact on greenhouse gas emissions
- (b) By creating more landfills
- (c) By recycling and reusing items, which reduces the need for producing new products and the associated emissions
- (d) By using disposable products instead of reusable ones

3. Why are renewable energy sources like solar and wind power important in mitigating climate change?

- (a) They have no impact on climate change
- (b) They can lead to stronger hurricanes and more extreme weather
- (c) They reduce the reliance on fossil fuels, which release greenhouse gases when burned
- (d) They are less efficient than fossil fuels

4. How do renewable energy sources differ from fossil fuels in terms of greenhouse gas emissions?

- (a) Renewable energy sources release more greenhouse gases
- (b) Renewable energy sources have no impact on greenhouse gas emissions
- (c) Renewable energy sources release fewer or no greenhouse gases when generating electricity compared to fossil fuels
- (d) None of the above

CHAPTER 8

1. Which is an example of an adaptation strategy to prepare for climate change?

- (a) Installing more air conditioning units in buildings
- (b) Planting more trees in parks
- (c) Developing early warning systems for hurricanes and floods
- (d) Using more fossil fuels for energy

2. How can planting drought-resistant crops be an effective adaptation strategy for climate change?

- (a) Drought-resistant crops have no impact on climate change
- (b) They require more water and contribute to water scarcity
- (c) They are less affected by water shortages and can help ensure food availability during dry periods
- (d) Planting crops is not an adaptation strategy for climate change

3. What is an example of an action that contributes to community and individual preparedness for climate change impacts?

- (a) Using more energy and water to be comfortable at all times
- (b) Creating emergency kits with essential supplies, such as water, non-perishable food, and flashlights
- (c) Throwing away waste and not recycling
- (d) Ignoring local climate adaptation initiatives

4. How can supporting local climate adaptation initiatives help communities and individuals?

- (a) It has no impact on communities and individuals
- (b) It can promote waste production and pollution
- (c) It can provide resources and strategies to help communities and individuals adapt to climate change impacts
- (d) Local climate adaptation initiatives only benefit large cities

CHAPTER 9

1. Which of this is one of the ways an individual can contribute to climate action?

- (a) By ignoring environmental issues
- (b) By using more energy and resources
- (c) By taking steps to reduce their carbon footprint and advocate for sustainable practices
- (d) By avoiding discussions about climate change

2. How can individuals promote climate action within their communities?

- (a) By not discussing climate change with their friends and family
- (b) By ignoring local environmental initiatives
- (c) By engaging in discussions, educating others, and participating in community clean-up events and sustainability projects
- (d) By consuming as many disposable products as possible

3. Why is individual action important in addressing climate change?

- (a) It has no impact on addressing climate change
- (b) Only governments and large organizations can make a difference
- (c) Individuals collectively have the power to influence change and set an example for others
- (d) Climate change will resolve itself without any human intervention

4. How can children actively participate in climate action?

- (a) By consuming more fast food
- (b) By avoiding discussions about climate change
- (c) By encouraging their peers and family members to adopt sustainable practices and supporting climate education initiatives
- (d) By increasing their energy and water consumption

SOURCES OF IMAGES

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