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pour l'éducation,
la science et la culture

CLIMATE CHANGE MITIGATION AND ADAPTATION

Simple Guide to Schools in Africa

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This report is published by UNESCO to be used for STEM Camps in Africa to introduce Climate Change to Students.

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CLIMATE CHANGE MITIGATION AND ADAPTATION

SIMPLE GUIDE TO SCHOOLS IN AFRICA

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FOREWORD

Educators already face pressure from topic-packed curricula and are further pressured to teach students in a way that earns them the best test scores. In this context, it is easy to understand why some might be hesitant to teach climate change. The discussion on climate change is filled with a wide spectrum of viewpoints, some in direct opposition with one another. Even beyond that, deciding which aspects of climate change to address can be tricky—how do teachers choose between global warming, melting glaciers and ice-caps, drought, rising extinction rates, and pollution? Climate change education provides an important window into individual and societal responsibility. As educators, schools not only have an interest in teaching subjects that will prepare students for careers and earn them good test scores, but to teach them to be mindful and responsible citizens. Teaching on climate change means teaching on topics like environmental stewardship and collective responsibility—teaching students that they and those around them have a responsibility to something larger than themselves:

- How do their actions affect the environment?
- How do changes in the environment then affect others?
- Why should they care about recycling or sustainability?
- Climate change asks us to consider the world beyond ourselves. More than that, it asks that we consider a time beyond the present.

Teaching about climate change is by no means easy, but it is a challenge worth tackling for all those involved—communities, schools, teachers, and students alike. As an interdisciplinary issue, climate change can open young minds to deeper avenues of thought and reinforce learning in social science. More than that, real climate change education confers onto students an appreciation of the role they play in their environment—both their physical, changing environment, and their civic environments. Incorporating the topic into school curriculum only stands to bring students closer to their communities. Civic engagement, one of the most important lessons schools impart on their students, can be taught through student engagement with local institutions.

With the curricula as hectic as they are, and such a breadth of material to cover, UNESCO has compiled a small volume giving reference to Africa: Climate Change Mitigation and Adaptation Simple Guide to Schools in Africa which will be used in the STEM mentorship Camps for secondary schools to support efforts by educational institutions to impart knowledge on climate change to students in secondary level education. Its our hope that both students and teachers will find this simple information booklet interesting to read and an important source of information on the important topic of climate change.

Ms. Ann Therese Ndong-Jatta
Regional Director
UNESCO Regional Office for Eastern Africa

Part – 1
What is Happening

Is the climate in Earth really changing?

Yes! Earth has been getting warmer—and fast.

Global climate is the average climate over the entire planet. And the reason scientists and folks like you are concerned is that Earth's global climate is changing. The planet is warming up fast—faster than at any time scientists know about from their studies of Earth's entire history.

What is weather?

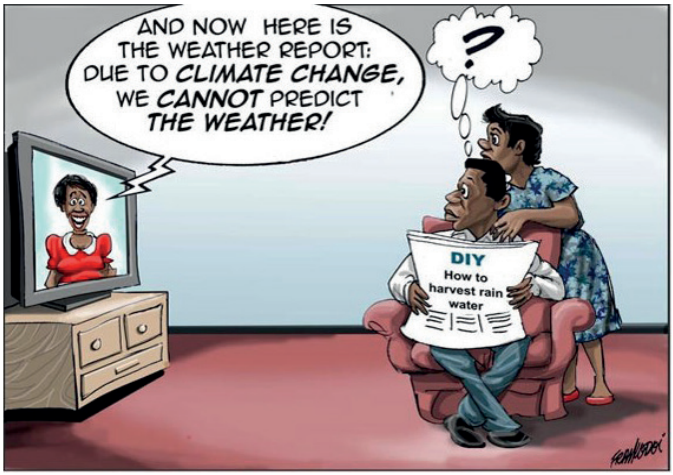
Weather is local and temporary. Weather happens at a particular time and place. Rain, snow, wind, cyclones, hurricanes, tornadoes—these are all weather events.

On our own Earth, we cannot control weather by turning a thermostat up to make it warmer or down to make it cooler. The best we can do is try to predict the weather. Weather scientists, called meteorologists, try to foresee what's going to happen next.

What is Climate?

"Climate" describes conditions over the long term and over an entire region.

Climate is the big picture. It is the big picture of temperatures, rainfall, wind and other conditions over a larger region and a longer time than weather. For example, the weather was rainy in Turkana County, Kenya last week. But this county usually gets only about 20 cm of rain each year. So the climate for Turkana is dry. Nairobi City has a subtropical highland climate, because it's with mild summers and noticeably cooler winters.



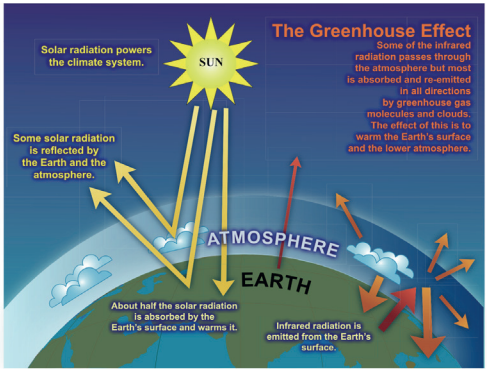
Basin for Comparison	Weather	Climate
Meaning	Weather is everyday atmospheric condition of a particular region, as regards temperature, humidity, wind speed, etc.	Climate alludes to standard pattern of weather of a particular place, taken over more than 25 years.
What is it?	Minute by minute state of atmosphere in an area.	Average weather in a region.
Represents	What are the condition of atmosphere in a geographical location, over short period.	In what way atmosphere acts over typically long period.
Variation	Varies constantly.	Does not vary constantly
Affected by	Temperature, humidity, air pressure, cloudiness, precipitation etc.	Temperature and Precipitation
Assessment	For short term	Over a long period
Study	Meteorology	Climatology

What is Climate Change?

Any process that causes adjustments to a climate system could be described as creating "climate change". These processes include volcanic eruption to a cyclical change in solar activity –The planet's climate has constantly been changing over geological time.

However, the current period of warming is occurring more rapidly than many past events. Scientists are concerned by the rapid human-induced warming because of the serious implications for the stability of the planet's climate.

Today, however, the phrase is most often used as shorthand for anthropogenic climate change – in other words, climate change caused by humans. The principal way in which humans are understood to be affecting the climate is through the release of heat-trapping greenhouse gases into the air.



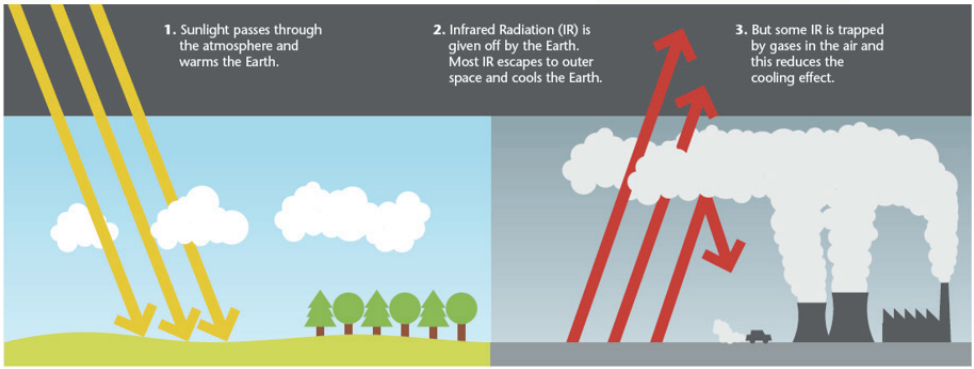
What is the "greenhouse effect"?

The greenhouse effect is one of the main factors determining the temperature of a planet. It's the phenomenon by which certain gases so-called greenhouse gases in the atmosphere trap heat that would otherwise escape to space, thereby keeping the planet warm.

The Earth's atmosphere has always contained greenhouse gases, such as CO_2,

and they have always caused warming. If there was no greenhouse effect, the planet would be uninhabitably cold – more than 3^0C colder than the hospitable current average of 15^0C.

However, humans are changing the strength of the greenhouse effect by increasing the proportion of greenhouse gases in the air. Although scientists are still researching many details of greenhouse warming, the basic principles of the greenhouse effect were discovered in the nineteenth century and are accepted by virtually all scientists.

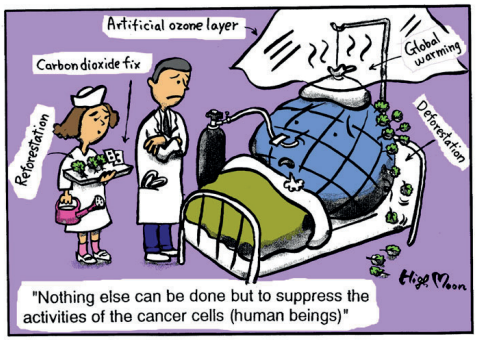


The greenhouse effect.

Greenhouse Gases:

Greenhouse gases are gases that can trap heat. They get their name from greenhouses. A greenhouse is full of windows that let in sunlight. That sunlight creates warmth. The big trick of a greenhouse is that it doesn't let that warmth escape.

That's exactly how greenhouse gases act. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. Overall, greenhouse gases are a good thing. Without them, our planet would be too cold, and life as we know it would not exist. But there can be too much of a good thing. Scientists are worried that human activities are adding too much of these gases to the atmosphere.



Water Vapour (H_2O): This is water in gas form, like steam above boiling pot. It forms clouds and rains back on earth. Water Vapour blocks heat from escaping, so it gets warmer. That makes even more water evaporate.

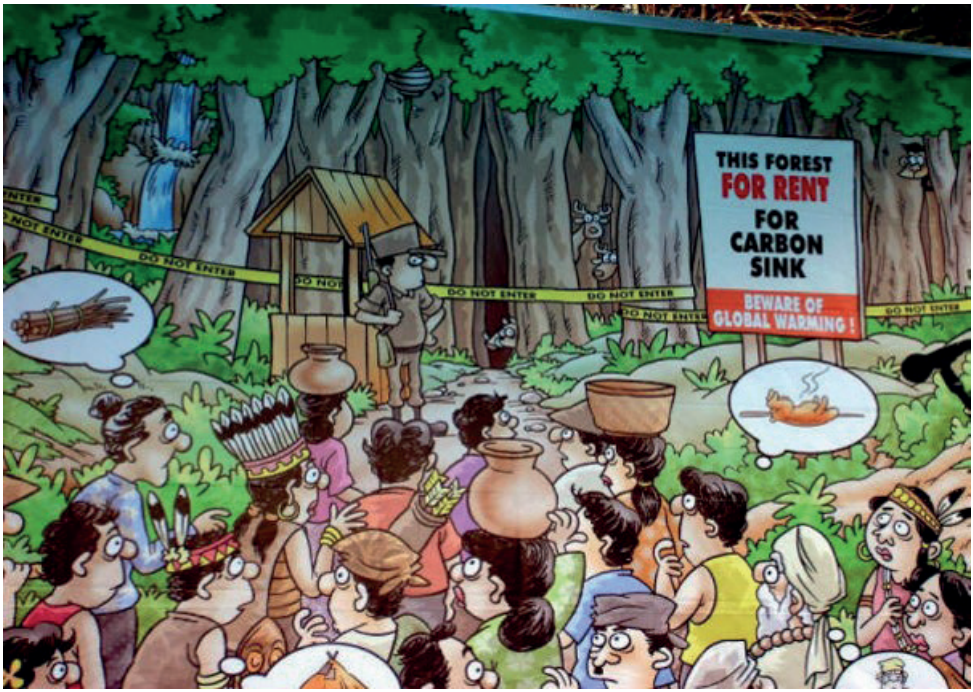
Carbon Dioxide (CO_2): Made up of carbon and oxygen, it comes from decaying and living organisms and several other sources. CO_2 is released when burning fossil fuels, coal and oil. It's the most important contributor to human-induced global warming.

Methane (CH_4): Methane made of carbon and hydrogen is a normal gas released from wetlands, growing rice, raising cattle, using natural gas and mining coal. It traps a lot of heat in the atmosphere, scientists consider it the second most important contributor to human-induced global warming of all the greenhouse gases.

Ozone (O_3): Up in the atmosphere where the aircrafts fly, the ozone layers block the sun's radiation, which protects us from the powerful radiation from the sun. Close to the ground ozone acts as a greenhouse gas and can be formed by burning gas in cars and factories.

Nitrous Oxide (N_2O): Nitrous Oxide is a natural part of the nitrogen cycle. Nitrous Oxide released by some of the factories, power plants and fertilizers. This N_2O damages the protective ozone layer.

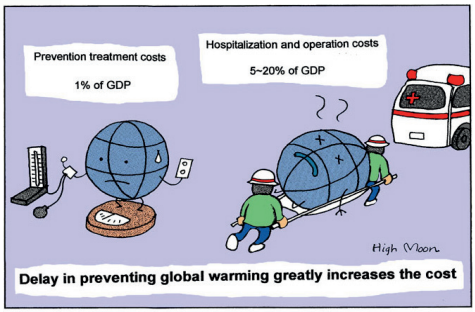
ChloroFluoroCarbons (CFCs): CFCs have no natural source but were entirely synthesized for such diverse uses as refrigerants, aerosol propellants and cleaning solvents. Their creation was in 1928 and since then concentrations of CFCs in the atmosphere have been rising.



Part - II
What Could Happen?

So, what if Earth gets a little bit warmer?

The sky is still blue. Trees are still green. Wind still blows. Clouds are still white and fluffy. Rain still pours from the sky. Snow falls and it still gets really cold sometimes in some places. Earth is still beautiful.



Note:A rise in mean temperature width exceeding 2℃ seriously damages the health

So, what is the problem? What is the fuss about climate change and global warming?

Well, after observing and making lots of measurements, using lots of satellites and special instruments around the world scientists see some alarming changes. These changes are happening fast—much faster than these kinds of changes have happened in Earth's long past.

All these satellites, plus a lot more, are studying Earth and all the changes happening with the air, ocean, land, and ice.

Global air temperatures near Earth's surface rose almost one and one-half degrees Fahrenheit in the last century. One and one-half degrees may not seem like much. But when we are talking about the average over the whole Earth, lots of things start to change.

How do we know what Earth was like long ago?

A big part of the answer is ice cores.

In Antarctica, scientists have drilled down three kilometres below the surface and brought up samples of the ice. These samples are called ice cores. It's like what you get if you plunge a drinking straw into a slushy drink and pull it out with your finger over the end of the straw. What you will have inside the straw is "slushy core" similar to an ice core.

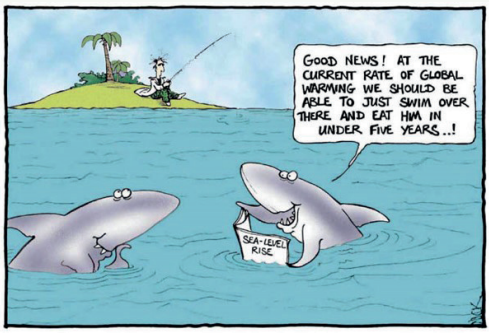
The layers in an Arctic ice core are frozen solid. They give clues about every year of Earth's history back to the time the deepest layer was formed. The ice contains bubbles of the air from each year. Scientists analyse the bubbles in each layer to see how much CO2 they contain. Scientists can also learn about the temperatures for each year by measuring relative amounts of different types of oxygen atoms in the water. (Remember, water contains two hydrogen atoms, and one oxygen atom (H_20).)

Other scientists study cores of sediment from the bottom of the ocean or lakes. Or they study tree rings and layers of rocks to give them clues about climate change throughout history. They compare all their findings to see if they agree. If they do, then their findings are accepted as most likely true. If they don't agree, they go back and figure out what is wrong with their methods. In the case of Earth's climate history, the facts agree from a lot of different kinds of studies.

How will climate change affect us?

There are varying degrees of uncertainty about the scale of potential impacts. But the changes could drive freshwater shortages, bring sweeping changes in food production conditions, and increase the number of deaths from floods, storms, heat waves and droughts. This is because climate change is expected to increase the frequency of extreme weather events - though linking any single event to global warming is complicated.

Scientists forecast more rainfall overall but say the risk of drought in inland areas during hot summers will increase. More flooding is expected from storms. There are, however, likely to be very strong regional variations in these patterns. Poorer countries, which are least equipped to deal with rapid change, could suffer the most.



Sea level is also rising:

Sea level rising because melting glaciers on land are adding more water to the oceans. Glaciers are large sheets of snow and ice that are found on land all year long. They are found in the western United States, Alaska, the mountains of Europe and Asia, and many other parts of the world. The giant ice sheets on Greenland and Antarctica are also considered glaciers. Warmer temperatures cause glaciers to melt faster than they can accumulate new snow. As giant ice sheets and smaller glaciers melt, they add more water into the ocean, which causes sea level to rise. Rising sea level is a threat to people who live near the ocean. Hundreds of millions of people around the world live in low-lying areas near the coast that could be flooded as sea level rises. Some low-lying areas will have more frequent flooding, and very low-lying land could be submerged completely.

Climate Change is already affecting Africa:

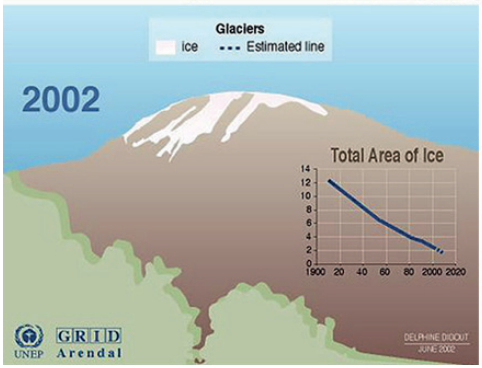
1. Weather patterns are changing

Flooding: Flooding is the most common disaster in North Africa, the second most common in East, South and Central Africa, and the third most common in West Africa. In Mozambique, the flood in the year 2000 (worsened by two cyclones) caused 800 deaths, affected almost 2 million people of which about 1 million needed food, 329,000 people were displaced and agricultural land was destroyed.

Drought: Between July 2011 and mid-2012, a severe drought affected the entire East Africa region and was said to be "the worst drought in 60 years."

2. Changes in Water Supply and Quality

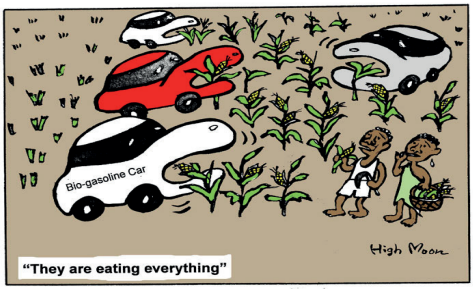
Observable effects of climate change on water resources in Africa include: flooding, drought, change in distribution of rainfall, drying-up of rivers, melting of glaciers and the receding of some lakes.



West Africa: Entire economies suffer when the water levels of Africa's huge rivers drop. Ghana, for example, has become totally reliant on the hydro-electric output of the Akosombo dam on the river Volta. Mali is dependent on the river Niger for food, water and transport. However, great stretches of the river are now facing environmental devastation as a result of climate change. In Nigeria, half the population has no access to clean water.

Mount Kilimanjaro and Mt Kenya Glaciers: The gradual yet dramatic disappearance of the glaciers on Mount Kilimanjaro is a result of climate change. The glaciers act as a water tower and several rivers are now drying up. It is estimated that 82% of the ice that capped Mt Kilimanjaro, when it was first recorded in 1912, is now gone.

3. Impacts on Agriculture and Food



Note: This is a time when even food is being turned into fuel.

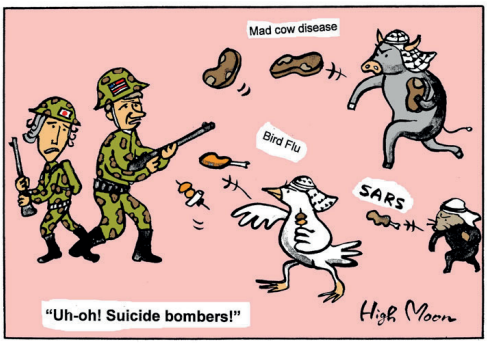
Across Africa the landscape is changing. Droughts, heat stress and flooding have led to a reduction in crop yields and livestock productivity. East Africa is facing the worst food crisis in the 21st century. According to Oxfam, 12 million people in Ethiopia, Kenya and Somalia are in dire need of food. Rainfall has been below average with 2010/2011 being the driest year since 1950/1951, a serious problem for a continent almost entirely dependent on rain for its agriculture.

4. Impacts on Human Health

Climate-sensitive diseases and health impacts can be high in poor countries that have minimal resources to treat and prevent illness. Examples of climate related health impacts include:

Frequent and severe heat stress linked to sustained increases in temperature.

The spread of Malaria may increase in areas projected to receive more precipitation and flooding. Increases in rainfall and temperature can cause spreading of dengue fever.



Note: Mankind alone can not control our ecosystem.

The reduction in air quality that often accompanies a heat wave can lead to breathing problems and worsen respiratory diseases. Impacts of climate change on agriculture and other food systems increases rates of malnutrition and contributes to poverty — "With one in four people still undernourished in sub-Saharan Africa, climate change impacts make it even more difficult for governments across the region to improve food security and help reduce tensions."

5. Impacts on Shelter

Severe flooding and intense droughts have led to the destruction of many homes, shelters and villages across Africa. Conflicts over resources also exacerbate these impacts and, in turn, contribute to the ongoing migration within and between countries in Africa. Extreme events displace large amounts of people, especially those who are unable to respond and rebuild after disasters, due to lack of resources.

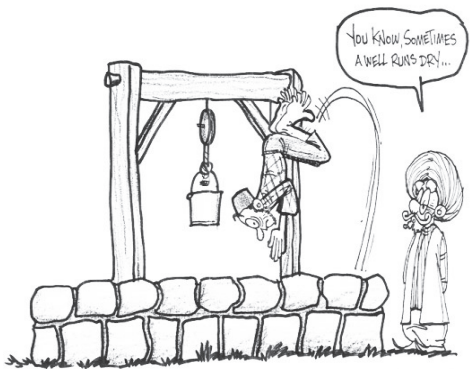
6. Impacts on Vulnerable Population

Women, children and the elderly are more vulnerable to climate change impacts across Africa. Women often experience additional duties as caregivers and as well as from societal responses to climate change after extreme weather events (eg, male migration).

The water scarcity places an additional burden on African women, who walk hours and sometimes even days, to fetch it.

Children and the elderly face graver risks due to susceptibility to infectious diseases, such as Malaria, limited mobility and reduced intake of food. The elderly face physical danger and even death due to droughts, heat stress and wildfires. Children often die from starvation, malnutrition, diarrheal diseases and flooding.

7. Impacts on ecosystems



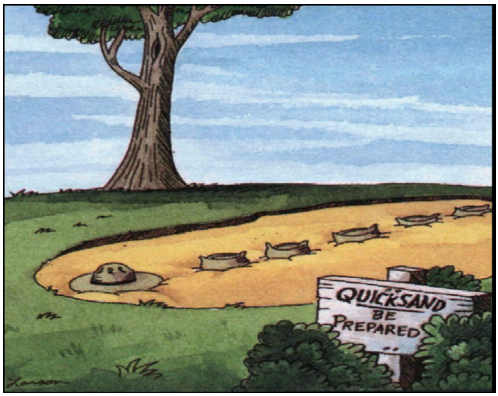
Climate change has already led to changes in freshwater and marine ecosystems in eastern and southern Africa, and terrestrial ecosystems in southern and western Africa. The extreme weather events have demonstrated the vulnerability of some of South Africa's ecosystems. The migration patterns, geographic range and seasonal activity of many terrestrial and marine species have shifted in response to climate change. The abundance and interaction among species have also changed.

Even though the African continent has contributed the least to anthropogenic factors causing climate change, Africa is the worst. Fifty-four African nations have adopted a unified position, calling for an agreement to limit warming to 1.5C above pre-industrial levels by the end of this century. It is a more ambitious target than the 2C previously favoured by many developed nations and which is generally regarded as the gateway to dangerous warming.

Africa is expected to be one of the continents hardest hit by climate change, with an increase in severe droughts, floods and storms expected to threaten the health of populations and economies alike. Part of that vulnerability is simply down to geography - already the hottest continent, Africa is expected to warm up to 1.5 times faster than the global average.

8. Impacts on National Security

Climate change impacts have the potential to exacerbate national security issues and increase the number of international conflicts. Conflicts often occur over the use of already limited natural resources, fertile ground and water. Access to consistent and dependable sources of water is greatly valued in many African regions. However, changes in the timing and intensity of rainfall have threatened water availability and are causing conflicts over this limited resource.



Part – III
What Can We Do?

Climate Change Mitigation and Adaptation:

You consider the pot as earth when it is getting heated up can you jump out and escape – "No, this is Climate Change",

When it comes to tackling climate change to prevent the impacts it causes in the different systems of the planet, the human being applies two types of measures: mitigation and adaptation.

Mitigation measures are those actions that are taken to reduce and curb greenhouse gas emissions. Adaptation measures are based on reducing vulnerability to the effects of climate change.

Mitigation, therefore, attends to the causes of climate change, while adaptation addresses its impacts.

Climate Change Mitigation:

These are some of the mitigation measures that can be taken to avoid the increase of pollutant emissions:

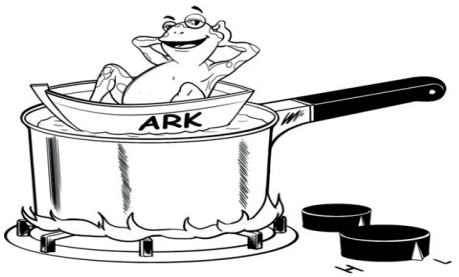
- Practice Energy efficiency
- Increase the use of renewable energy such as solar…
- Efficient means of transport implementation: electric public transport, bicycle, shared cars

Reduce the element which heats up the earth – Mitigation measures

Climate Change Adaptation:

In terms of adaptation measures, there are several actions that help reducing vulnerability to the consequences of climate change:

- More secure facility locations and infrastructures
- Landscape restoration (natural landscape) and reforestation
- Flexible and diverse cultivation to be prepared for natural catastrophes



Even after we mitigate we need to adapt ourselves with the ever increasing temperature – we need adaptation plans

- Using nature to build resilience to ….Conservation of natural ecosystem (biodiversity and water)
- Preventive and precautionary measures (evacuation plans, health issues, etc.)

Can you help nature to help everyone?

Yes! We can all take notice of our environment. We can learn how our planet works. We can learn how to live on it without making a mess of it. We can help to keep it magnificent for ourselves, our children and grandchildren, and other living things besides us.

Some of the ways you can help may have to wait until you are a little older—like choosing an energy-efficient car, installing solar panels on the roof of your house, or choosing a "green career."

But there are many important ways you can help right now. You can help by growing your own vegetables and fruits. You can help by planting a tree. Your new plants and trees will help to remove the greenhouse gas CO_2 from the air. If you grow some of your own food, you will also help to prevent more CO_2 from entering the air from the fossil-fuel-burning trucks, planes, and ships that transport your food to you from far away.

How can you reduce your "carbon footprint"?

Note: Like job hunting and marriage, environmental conservation activities require work.

Your carbon footprint is the amount of carbon dioxide released into the air because of your own energy needs. You need transportation, electricity, food, clothing, and other goods. Your choices can make a difference.

Swap old incandescent light bulbs for the new compact fluorescent lights (CFLs). They use only 25% as much electricity to give the same light. They last ten times longer. Turn off lights, TVs, computers, when you do not need them.

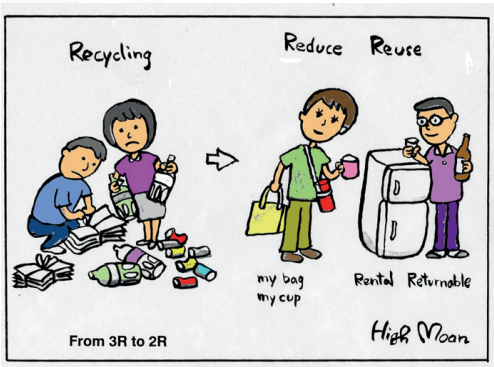
Unplug! Any electronic gadget you can turn on with a remote (TV, DVD player, Nintendo, Xbox) uses power even when it is "off." Appliances with a digital clock (like a coffee maker) or a power adapter (like a laptop computer) also suck power like a sneaky vampire. Plug these kinds of things into a surge protector or power strip that has an on/off switch. Then you can shut off all the power without unplugging each gadget.

Turn up the thermostat on the air conditioning when it's hot. Use fans if you're still hot. They use much less power. Turn down the thermostat on the heating when it's cold. Sweaters, blankets, and socks are good for you and better for the planet.

Walk or ride your bike instead of taking a car everywhere. Even a 3.5 km car trip puts 1 kg of CO_2 into the atmosphere! If you must ride, carpool.

Stay out of the drive thru! When you go to a fast-food place, ask your driver to park the car and let you walk inside, rather than sitting in a line of cars with the engine running and polluting.

How can you reduce your trash pile?



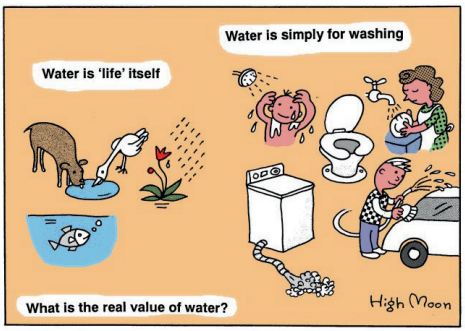
Ask your parents to buy reusable grocery bags. Help them to remember to get them out of the car and take them into the store. Recycle everything you can. If your city does not pick up recycled materials, find out who you can talk to about starting this service. You should be recycling paper, aluminium cans, cardboard, food cans, plastic, glass, newspapers, magazines, junk mail, phone books, and anything else made of paper.

Carry your drinking water in a reusable bottle. Plastic water bottles are an environmental disaster!

Do I need to save water too?

People and animals in many parts of the world do not have clean, safe water to drink. As many more regions are hit by drought, this problem will become even more serious. The sooner we start conserving water, the better off we all will be. Be aware of how much water you use.

Since 71% of the earth is covered in water, some people can't help but wonder: Why should we conserve?

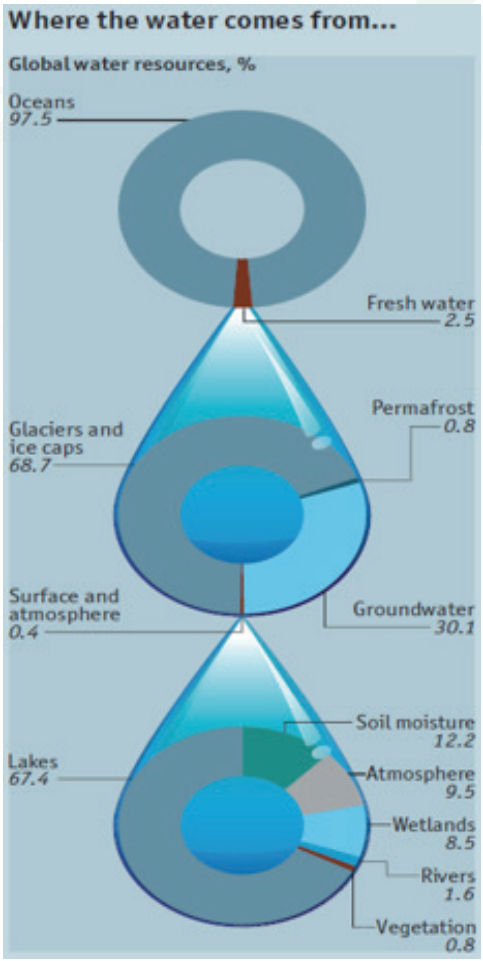


Note: Nowadays, each person in Japan uses 350 L of tap water daily. This figure is about double that of 35 years ago.

For your understanding the basic facts about water. 97% percent of all water on the earth is salt water, which is not suitable for drinking. Only 3% of water on Earth is fresh water, and only 0.5% is available for drinking. The other 2.5% of fresh water is locked in ice caps, glaciers, the atmosphere, soil, or under the earth's surface, or is too polluted for consumption.

With increasing population rates and such a small percentage of all the water on Earth fit for consumption, it only makes sense that we must preserve and conserve this precious resource. Water conservation means using our limited water supply wisely and caring for it properly. Since each of us depends on water to sustain life, it is our responsibility to learn more about water conservation and how we can help keep our sources pure and safe for generations to come.

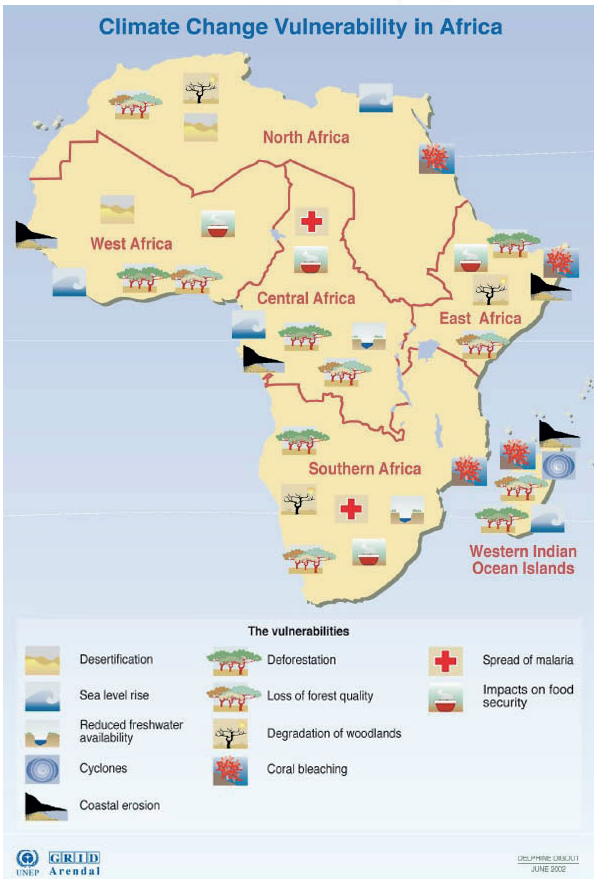
In other words, water conservation is not a job that is reserved for scientists, hydrologists, foresters, wildlife managers, city planners, farmers, or mine owners. Instead, it is up to each and every one of us to conserve water.



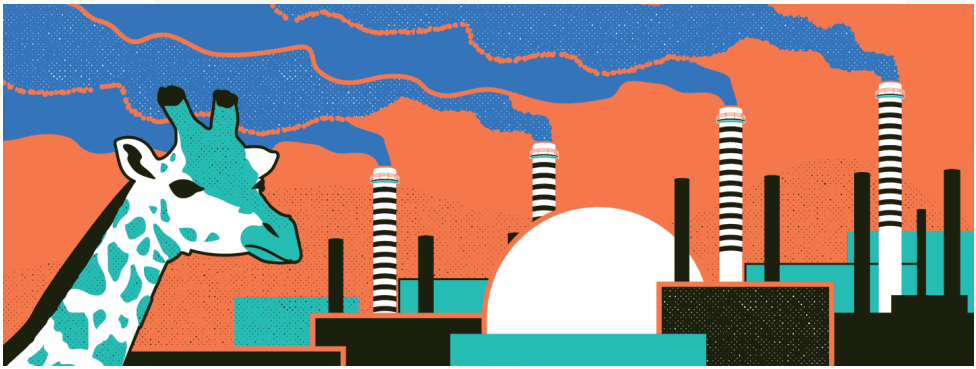
Part – IV
Role of Schools in Climate Change Mitigation and Adaptation

1. Vulnerability Assessment:

The students from the school form a team of Climate Change Crusaders (CCC) to carry out participatory climate change vulnerability assessment within their community. This is the process to identify the impacts of climate change in the area where school is located. In this process they should bring the community members, local stakeholders, teachers and government officials. Together they can discuss the impacts of climate change in their community and how to mitigate and adapt in future. This will help the schools to propose best plans for the community to adapt. Below is some of the basic information to be collected by CCC:



- The main hazards or dangers in your area?
- Events of drought, flood, conflict between various user community, changes in river course, human wild life conflict, water availability
- What are the main impacts of these hazards in community?
- Within your understanding what will be the future scenario of your area? (drought/flood forced migration)
- Who will be the most affected within the community?
- What will be the status of forests, grasslands, wetlands?
- What action do you suggest from your experience?



2. Climate Change Mitigation

Mitigation measures are those actions that are taken to reduce and curb greenhouse gas emissions.

Reforestation: The CCC need to organise reforestation campaigns with all relevant stakeholders in the community to reforest the degraded or deforested areas with native species. For the benefit of the community and generate livelihood from the regenerated forests in-between plant acacias which could be cut down to make charcoal, which could provide economic incentive to local community to protect the regenerated forests.

Around the natural habitat plan for a bio-fencing/Live Fencing. Bio-fences are lines of trees or shrubs planted on farm or field boundaries that provide protection against cattle and wildlife, act as windbreakers, enrich the soil, provide bee forage, provide shade, and control dust.

Plant fruit bearing or timber value trees within the school campus, which will reduce the pressure on natural forests for timber and fruits.

Discuss with local government departments for loan or subsidies for the community who will turn to renewable energy for their needs. This will reduce carbon di oxide in the country as a whole by cutting down in firewood and charcoal.

Discuss with the school authorities to install solar panels for energy use in school. Make mandatory for all homes and hotels to use solar water heater to cut down the electricity usage.

3. Climate Change Adaptation:

Climate Change education for students and public is an important adaptation measure, teaching the students and other main stakeholders the skills they need to adapt with changing climate. Adapting to climate change means changing the ways we do things; also adaptation is adjustment in ecological, social, and economic systems, through changes in processes, practices, and structures, in order to reduce the vulnerability of communities, regions, and activities to climatic change, variability, and extremes.

Rainwater Harvesting: However, rainwater harvesting is a sustainable strategy for adaptation to climate change, particularly for regions where water resources are fast depleting due to over extraction and/or increasing dryness of the climatic regime.

Enabling policies for rainwater uptake and implementation are a first step for increased adoption. Nevertheless, the biggest challenge is that rainwater-harvesting is not included in water policies of many countries where water resource management systems are based on surface and groundwater.

Local Solutions For Climate Change Adaptation

First call for a meeting with country or local government political/policy stakeholder to discuss with them the merit of the rainwater harvesting in adaptation for the local area. Within your school, look for facility for rainwater harvesting as well as discuss with school authorities for possible rainwater harvesting.

Protecting and restoring water catchment areas(Protecting and restoring wetlands): Wetlands store fresh water and release it slowly. Wetlands are important grazing areas during the dry season. Farmers also cultivate the shores of wetlands as they dry during the dry season. Schools can protect wetlands by planting native vegetation. It is also good to control access by livestock to reduce trampling.

Protecting and restoring riverbank/lakes: Riverbanks control flooding and are habitats for many special plants and animals. Protecting and restoring riverbanks / lake bunds help in water and soil conservation and provide a habitat for pollinators for our crops.

Prescribe crop variety and rotation: Discuss with farmers in your area and find out what are the crops they are planting. Suggest to farmers to plant a mixture of food crops and cash crops, traditional crops and new varieties. In this way, some of the crops are likely to survive drought or flood. Some of the traditional food crops are well adapted to dry seasons.

Planting trees at school and at home: Trees provide shade, hold the soil, clean the air and can later be used for wood. Planting alone is not enough, however; the young trees need to be cared for.

Selling livestock when they are fat, before a drought: Encourage herders to sell some livestock each season. This brings in income. A smaller livestock herd will need less food during the dry season. The animals are more likely to survive than those in a large herd.

Choose the most appropriate adaptation methods. Then prioritize which methods to employ first.

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