




Methodological support module for **Climate Change Adaptation**

 **ALIANZA POR LA RESILIENCIA**

 **Cruz Roja Guatemala**



**Climate
Centre**



INTRODUCTION

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Vulnerability to the effects of Climate Change affects a large number of countries around the world. Each year, many countries face more severe and more frequent disasters, ranging from drought to floods, which usually cause the poorest communities to suffer the most. Environmental degradation, often produced by humans, also makes us more vulnerable.

To address this situation, Partners for Resilience works to strengthen communities. This is best achieved when Disaster Risk Reduction (DRR) is combined with Climate Change Adaptation (CCA) and Ecosystem Management and Restoration (EMR). We believe that resilient communities are necessary to build the resilience of countries. A resilient community is one that has the capacity to resist, absorb, adapt and recover; one that anticipates risk, responds when disaster strikes, adapts to risks and changing livelihoods, and transforms itself to address the causes of the risk.

We are pleased to present you with these **Methodological Support Modules** which are part of the efforts made by

Partners for Resilience Guatemala and were developed as a result of the invaluable interest and support of the Ministry of Education (MINEDUC), Ministry of the Environment and Natural Resources (MARN), National Coordinator for Disaster Reduction (CONRED) and National Protected Area Council (CONAP).

We hope that these Methodological Support Modules become a tool for implementing actions and learning about resilience in our countries, since the construction of resilient communities depends on such actions.

We decided to include in these Modules challenging topics which are usually addressed individually: Climate Change Adaptation, Ecosystem Management and Restoration, Disaster Risk Reduction, and an inclusive approach to Resilience. The thematic content and each of the activities presented in the four Modules are designed to help people reflect and change their attitude by using an attractive and dynamic system to support them in becoming part of the solution while living in harmony with their environment and ensuring their own well-being in the long term.

This Module for Climate Change Adaptation provides the most relevant theoretical and conceptual aspects in the first section. Subsequently, the second section describes activities to be carried out with different audiences in order to reinforce knowledge with materials and resources easily available in the local setting.

We invite you to explore these Modules and put them into practice, hoping that they will serve as a guide and at the same time facilitate your educational activities. Like you, we are committed to education in Integrated Risk Management as a fundamental component of integral development and we hope that this small contribution will help you with the important mission of promoting a better future in our countries.

Since 2016, Partners for Resilience Guatemala has been promoting dialogue to address complementary work areas related to Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA) and Ecosystem Management and Restoration (ERM) through the Integrated Risk Management approach in order to strengthen Community Resilience in the country.



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Module guide

Dear educators

These materials are part of an educational kit made up of four modules: Climate Change Adaptation, Disaster Risk Reduction, Ecosystem Management and Restoration, and lastly, Resilience, which integrates the knowledge of the three previous modules.

The first three modules are independent and can be used in the order considered most appropriate. To better understand and take advantage of the Resilience module, the first three modules should be worked through first.

The current **Climate Change Adaptation Module** seeks to be a useful tool to be implemented at the regional level by teachers, community facilitators and people interested in the subject.

The first section of this module develops the most important basic concepts of Climate Change, aiming at providing general knowledge about the subject. The second section provides activities to develop and complement the theoretical content through practical exercises, which will provide methodological support to the facilitator.

The subject should be explained before carrying out each activity and time must be provided for conducting research in order for participants to have a better understanding of the topic and be able to share

knowledge and experiences. The activities may be developed in different scenarios, according to the participants' context and the resources available.

To the extent possible, the activities and research assigned to the participants should be conducted based on their level of knowledge and context, taking into account both the location and the materials to be used.

The purpose of connecting these contents to the participants' experiences is to improve the understanding of Climate Change, as well as to suggest specific actions that may be implemented to contribute to the reduction of its consequences while increasing adaptation to such consequences.

We hope that these materials will be useful and enrich your experience, as well as provide participants with significant knowledge that will allow them to better understand this environmental problem and at the same time motivate them to actively participate in the efforts to adapt to Climate Change and mitigate its effects at a global level.

Basic CONCEPTS

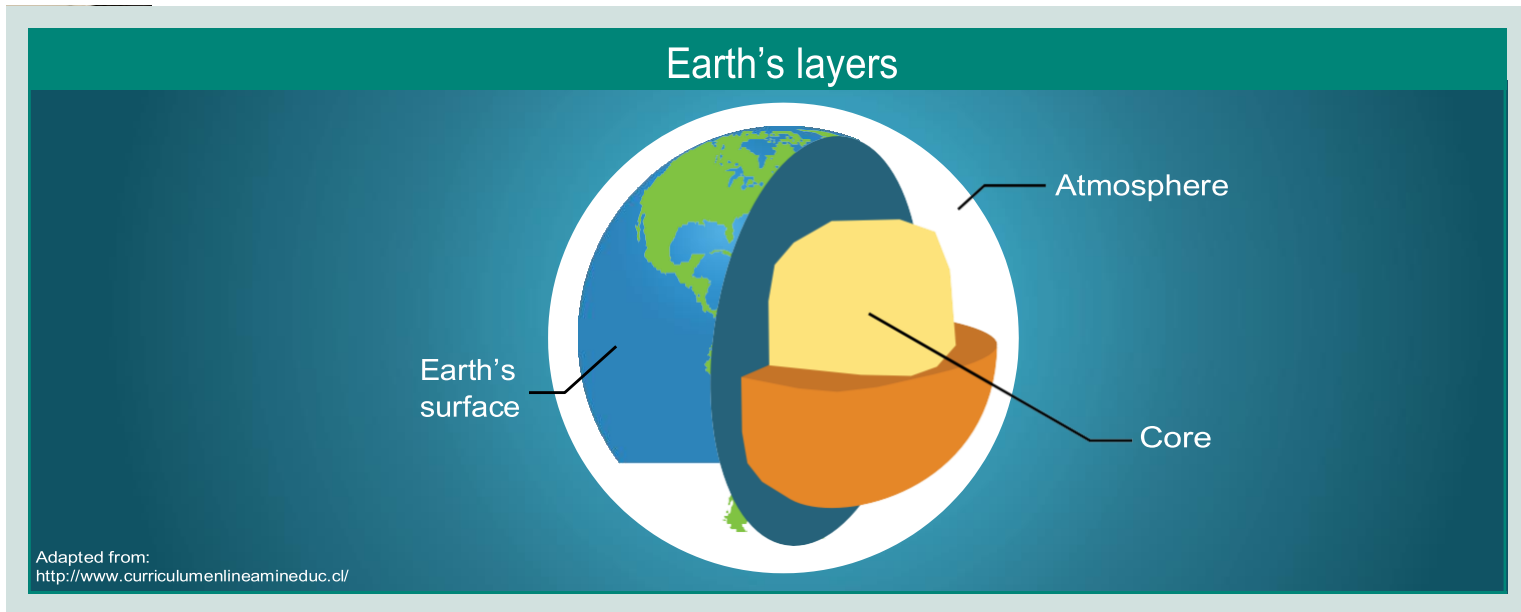


Planet Earth

To understand Climate Change and other related concepts it is necessary to consider certain aspects regarding the Earth's structure and the conditions that enable life on this planet.

The Earth is made up of different layers, which are distributed from the center to its surface. In general, the planet can be divided into three sections: 1) the **core**, located at its center; 2) the **earth's surface**, made up of oceans, mountains, lakes, rivers and glaciers; and 3) the **atmosphere**, which is the gaseous envelope that surrounds Earth.

Our planet is constantly going through changes, some of which occur naturally, such as the movement of the Earth's tectonic plates, and others which are the result of human actions, like deforestation and pollution. However, global warming in recent decades cannot be attributed solely to natural causes. According to scientists, human activities, such as the burning of fossil fuels, deforestation and changes in agricultural practices are contributing to Climate Change.



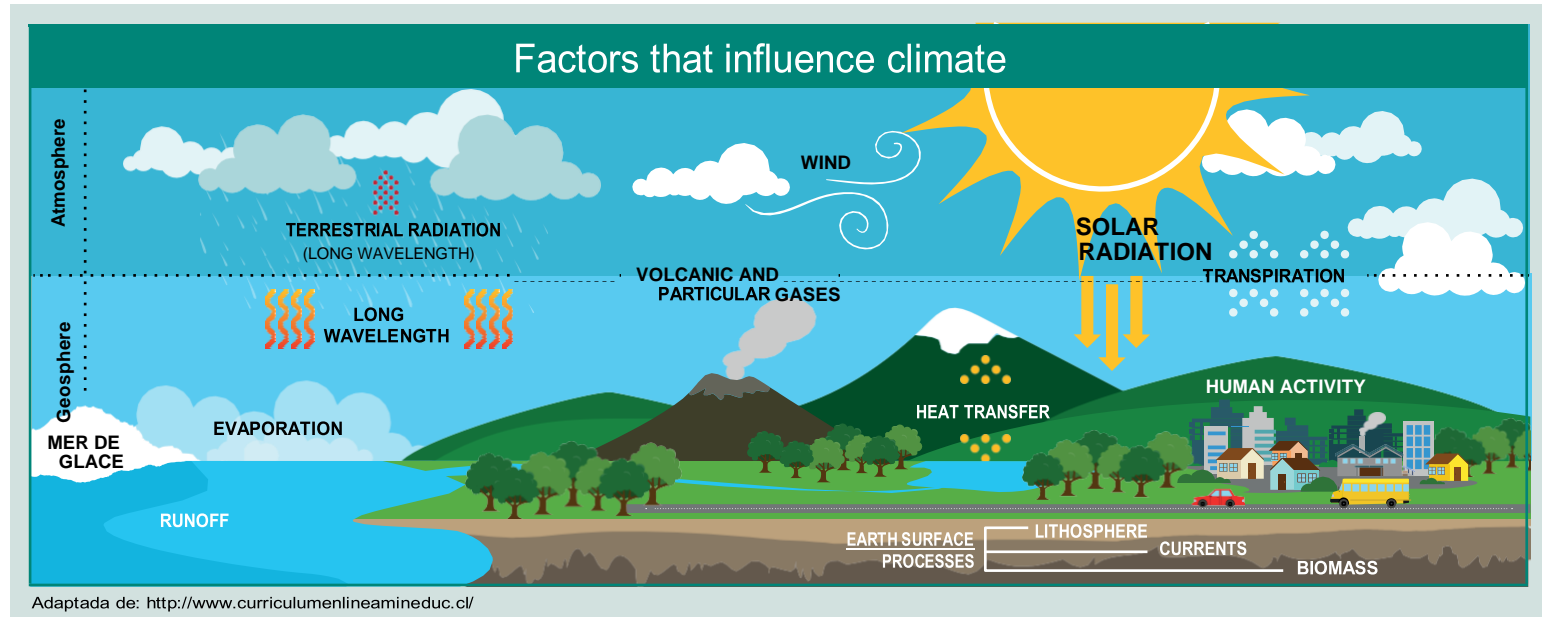
Weather is not the same as climate

When we talk about the **weather** (meteorological weather), we are referring to the temperature, the wind, the rain, humidity and other factors that occur in a specific place and time, such as a day or a season. For example, the dry or the rainy season that can last for a particular number of months, depending on each country.

Furthermore, **climate** refers to the average weather conditions over a long period of time (at least thirty years). Therefore, the particular weather characteristics of each day

are not taken into account, because it is the average conditions over time which are considered.

Various natural factors influence the climate, including the solar energy received on Earth, the gases that make up the atmosphere, the oceans' currents (the movement of water on the oceans' surfaces), ice or snow, and even volcanic eruptions. However, human actions can also influence both weather and climate, as will be discussed further on.



Did you know that...

Extreme weather events refer to those phenomena that exceed normal parameters in relatively short periods of time. Examples: cold fronts, droughts, tropical storms or hurricanes, tornadoes, heavy rains, etc.

Fact!

If compared with the grades obtained in a class, the **WEATHER** would be the result of each test on a given subject, while the **CLIMATE** would represent the average of all the grades obtained by the end of the course.

Greenhouse effect

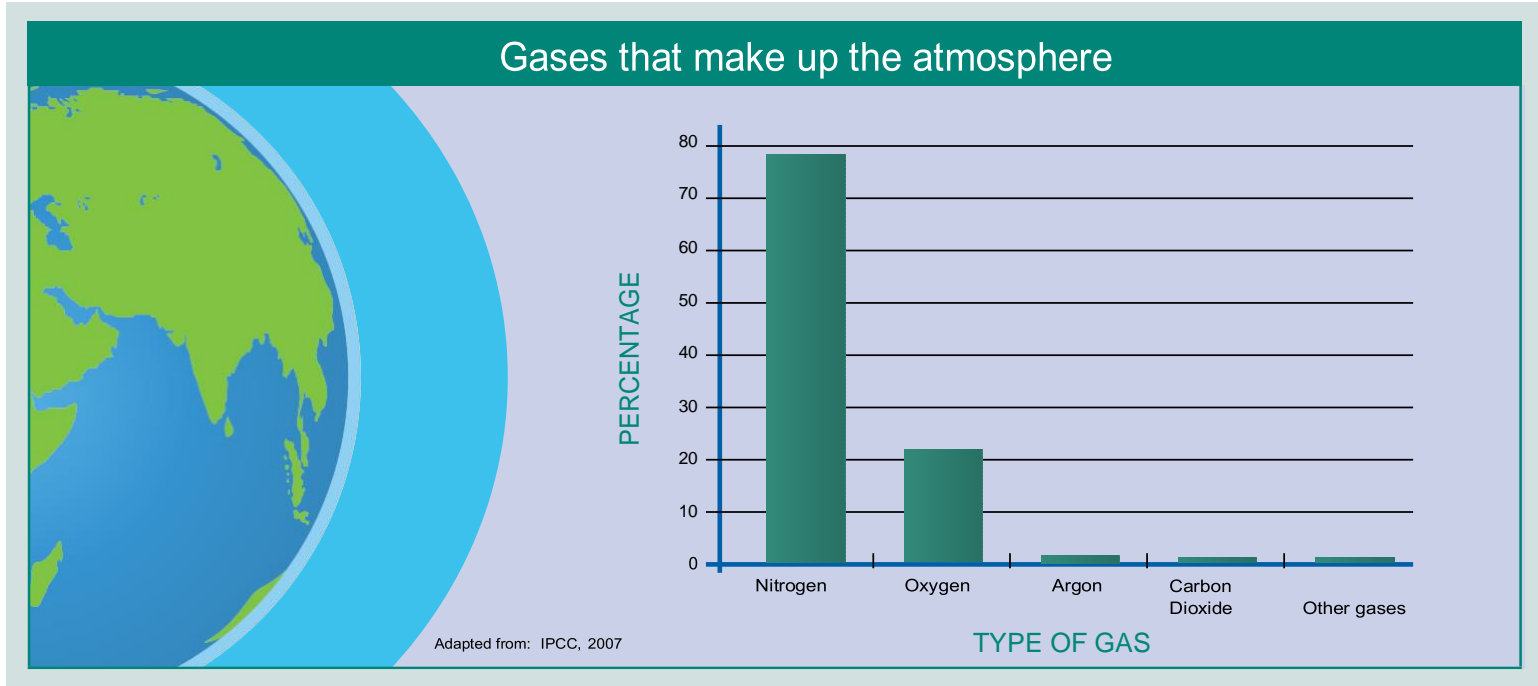
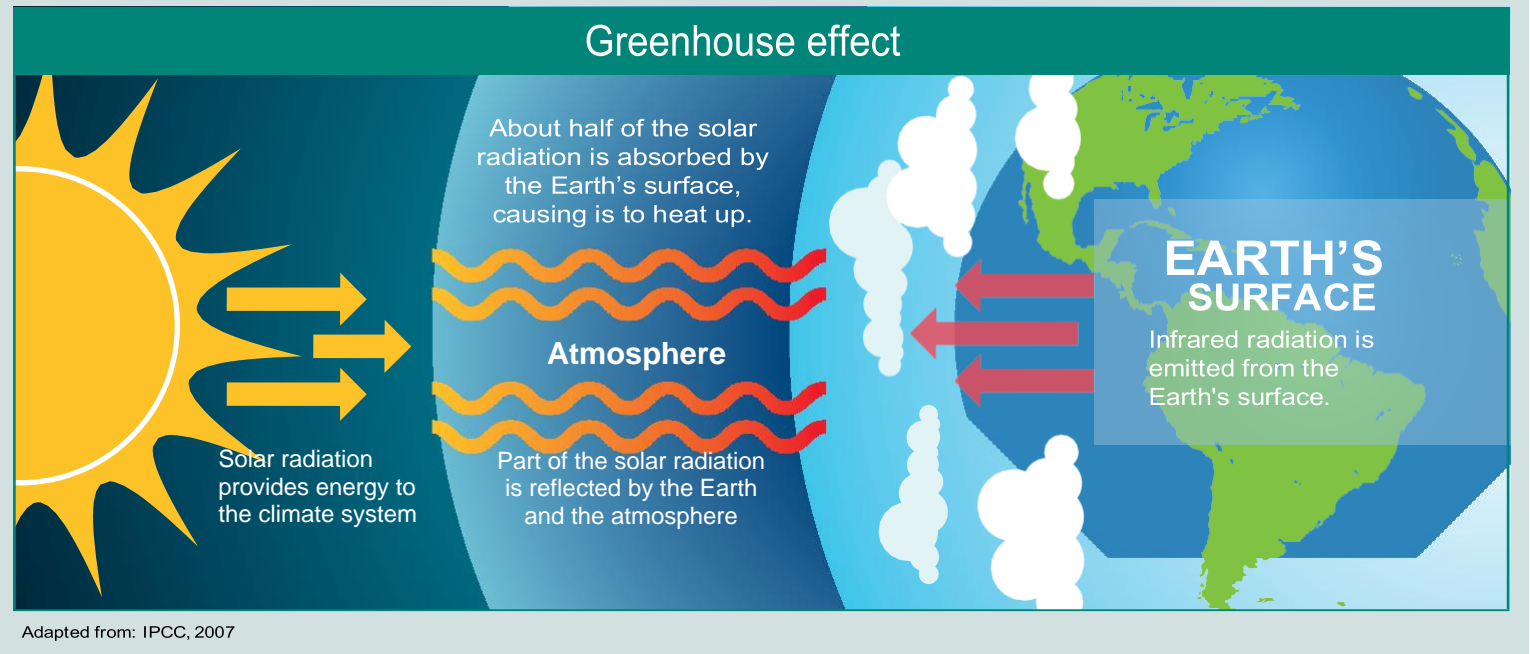
To understand this phenomenon, it is first necessary to be clear about what a **greenhouse** is and how it works. A greenhouse is a structure that has walls and a ceiling and is made of materials that allow the rays of the sun to pass through (glass, plastic, mesh fabric, etc.), while retaining heat and letting the plants inside survive extreme heat or cold due to the temperatures being more consistent.

However, at a global level the **greenhouse effect** takes place when the sun's rays penetrate the atmosphere (as in a greenhouse) and are reflected as energy towards the Earth's surface. A part of this energy is returned to space and another is trapped in the atmosphere's layer which is closest to the Earth's surface due to the gases it is comprised of.

Did you know that...

The greenhouse effect is a natural process that occurs in the atmosphere, but human activities are altering such process.

Between 1970 and 2004, global emissions of greenhouse gases (GHGs) increased by 70%. (IUCN-2009).



It is important to clarify that the greenhouse effect is a natural phenomenon that has existed for billions of years. Without it, the average temperature on the planet would be too low, approximately -18°C (about 33°C lower than it is today), drastically reducing the possibility of life on Earth.

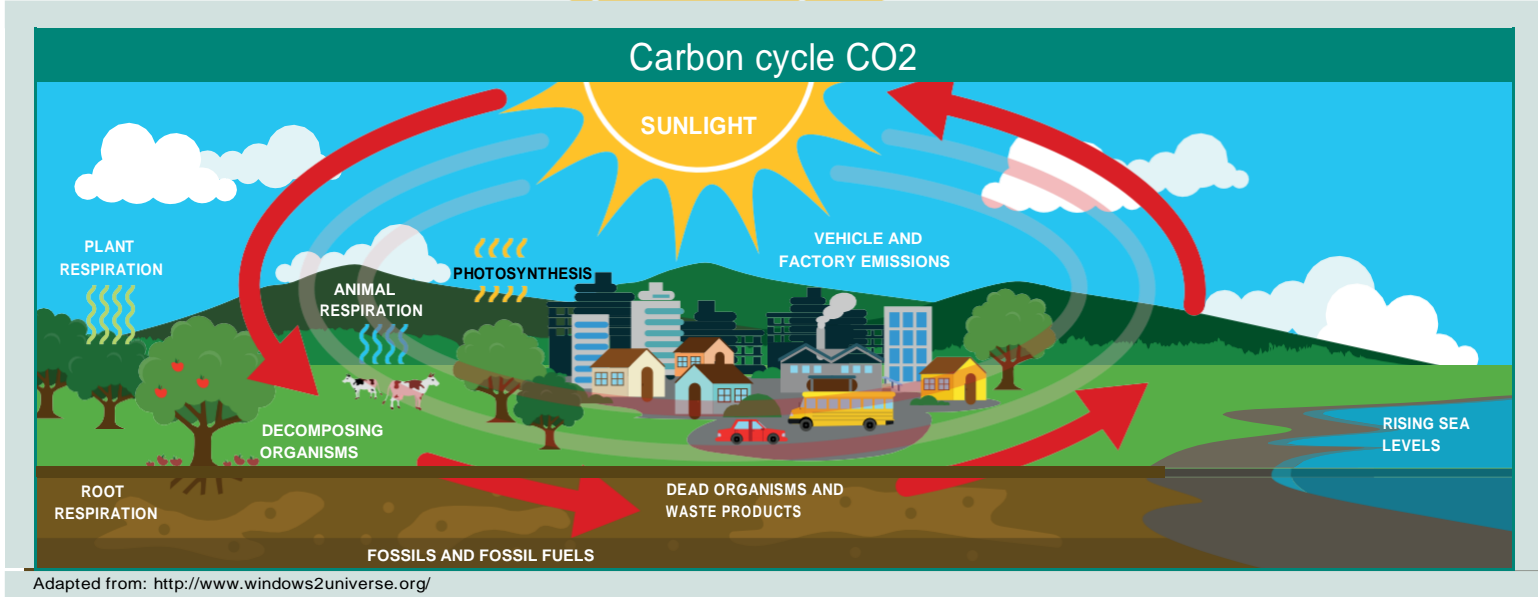
The energy that enters and exits the Earth is a result of the balance among the gases that make up the atmosphere, that is, the air we breathe. These gases are divided as follows: 78% nitrogen, 21% oxygen, 0.9% argon, 0.03%

carbon dioxide and 0.07% which corresponds to other gases, including ozone.

However, when the quantities or concentrations of these gases are modified and increased, they tend to trap more energy; therefore, the amount of energy being sent to space is lower than under normal conditions. As a consequence, there is an increase in temperature at the local level, which directly influences the increase in average global temperature.

!

Many of the activities that take place on a daily basis result in the production of large amounts of greenhouse gases, for example: the improper handling of solid waste, the burning of fossil fuels, the use of certain chemicals such as aerosols and chlorine, the felling of trees and even our breathing.



Carbon is fundamental to life and is one of the most abundant elements on Earth. Carbon is naturally found in molecules that are necessary for living organisms to develop and reproduce. This element is present in almost everything that surrounds us and is found in trees, fruits, lime, diamonds, wood, plastic and carbon dioxide (CO2).

The amount of carbon that exists on Earth has always been the same (just like water) and is part of the **carbon cycle**, a system in which carbon moves through the atmosphere, the Earth's biosphere and the oceans. This cycle occurs when plants absorb CO2 from the atmosphere and, with the help of the sun, use the carbon to develop their tissues and grow.

When animals eat plants (or other animals), the carbon in their bodies becomes part of them; when they breathe, both plants and animals release CO2 and return it to the atmosphere. Carbon can be stored for a long time in trees, wood products, fossil fuels, etc.; therefore, when dying or being burned, these elements release carbon, which starts the cycle once again.

Many human actions release large amounts of CO2 into the environment; for example, the use of fuels such as oil or gas, deforestation, forest fires and land use change.

Greenhouse Gases (GHG)

These gases are part of the atmosphere and are generated both naturally and by human activities. They absorb and release the energy reflected by the Earth's surface, the atmosphere and the clouds and, as a whole, they contribute to the greenhouse effect.

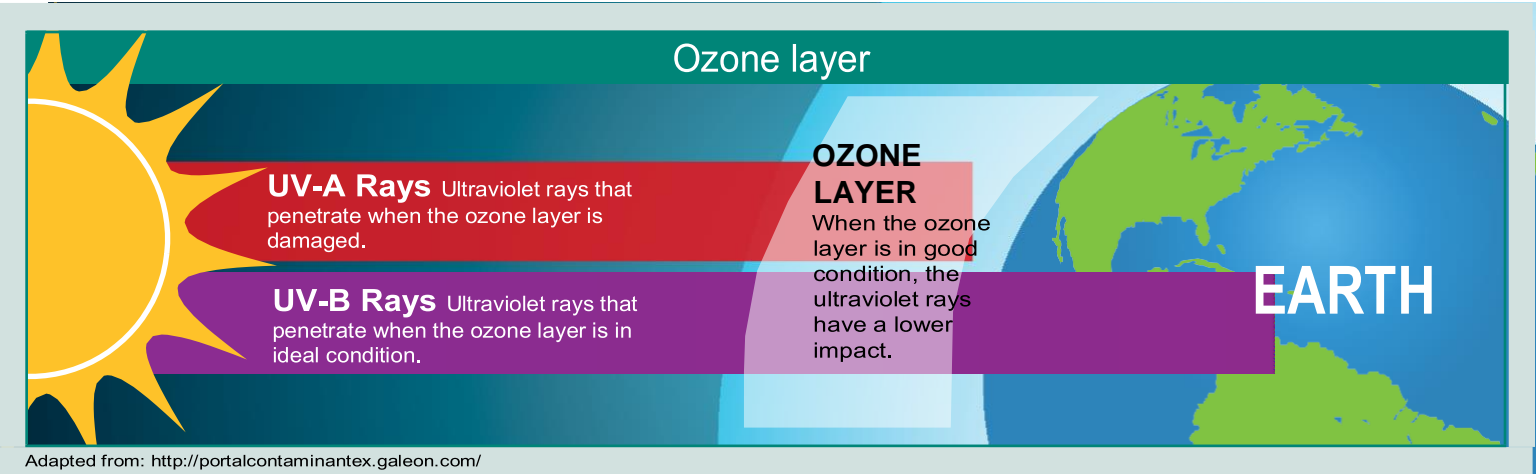
Greenhouse gases generated by human activities that contribute the most to global warming include carbon dioxide (CO2) and methane (CH4). Since the end of the industrial revolution, CO2 concentrations have increased by more than 30%, while methane concentrations have almost doubled.

This layer of gases is very important since it functions as a large umbrella that provides protection from the ultraviolet radiation reflected on the planet by the sun.

Unfortunately, it is being damaged by the use of certain products, such as chlorofluorocarbons, which are currently used in refrigeration, air conditioning systems, cleaning products, aerosols, etc. When these products are released into the environment and reach the ozone layer, they weaken it.

Some studies have even demonstrated the presence of holes in the ozone layer, which increases the amount of ultraviolet rays that reach the Earth and can directly affect human health and the environment.

Although not directly related to Climate Change, the ozone layer is affected by some greenhouse gases.



Did you know that...

Carbon Dioxide (CO2) is the gas with the highest concentration in the atmosphere, representing 66% of the total amount of gases (70% produced by the burning of fossil fuels and 30% by the burning of forests or other land use changes), followed by methane (CH4), with a concentration of 15% (produced by agriculture, farming, garbage, deforestation, etc.), chlorofluorocarbons and nitrous oxide (N2O), as well as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and Sulfur Hexafluoride (SF6), with a concentration of 8%. (IUCN-2009)

The following include the most significant greenhouse gases:

Gas	Description	Natural source	Artificial source
Water vapor (H2O)	Main greenhouse gas, as it is part of the hydrological cycle.	It is obtained from evaporation and transpiration among plants and animals.	Human activities do not generate more water vapor; however, heated air does help retain more moisture, thus intensifying Climate Change.
Carbon dioxide (CO2)	It is one of the gases that contribute most to the greenhouse effect and one of the main causes of Climate Change.	Plant and animal respiration.	Deforestation and burning of fossil fuels (oil and natural gas) and natural resources (firewood and forest fires) are the main emission sources of this gas.
Methane (CH4)	It is generated by bacteria that feed on organic matter when there is no oxygen.	Mangroves, swamps and animal waste.	Mining, burning of fossil fuels, rice farming and garbage dumps.
Nitrous oxide (N2O)	It is produced by soil bacteria.	It is naturally produced by some plants.	Use of certain fertilizers and burning of certain plants.
Ozone (O ₃)	It is composed of three oxygen atoms and helps block out a great deal of solar radiation.	It is found naturally in the atmosphere.	It is produced by certain industrial processes.
Chlorofluorocarbons (CFCs)	These are the only artificially made compounds which are derived from man-made saturated hydrocarbons.	They are not produced naturally.	Refrigerating liquids, aerosols and part of the contents in fire extinguishers.

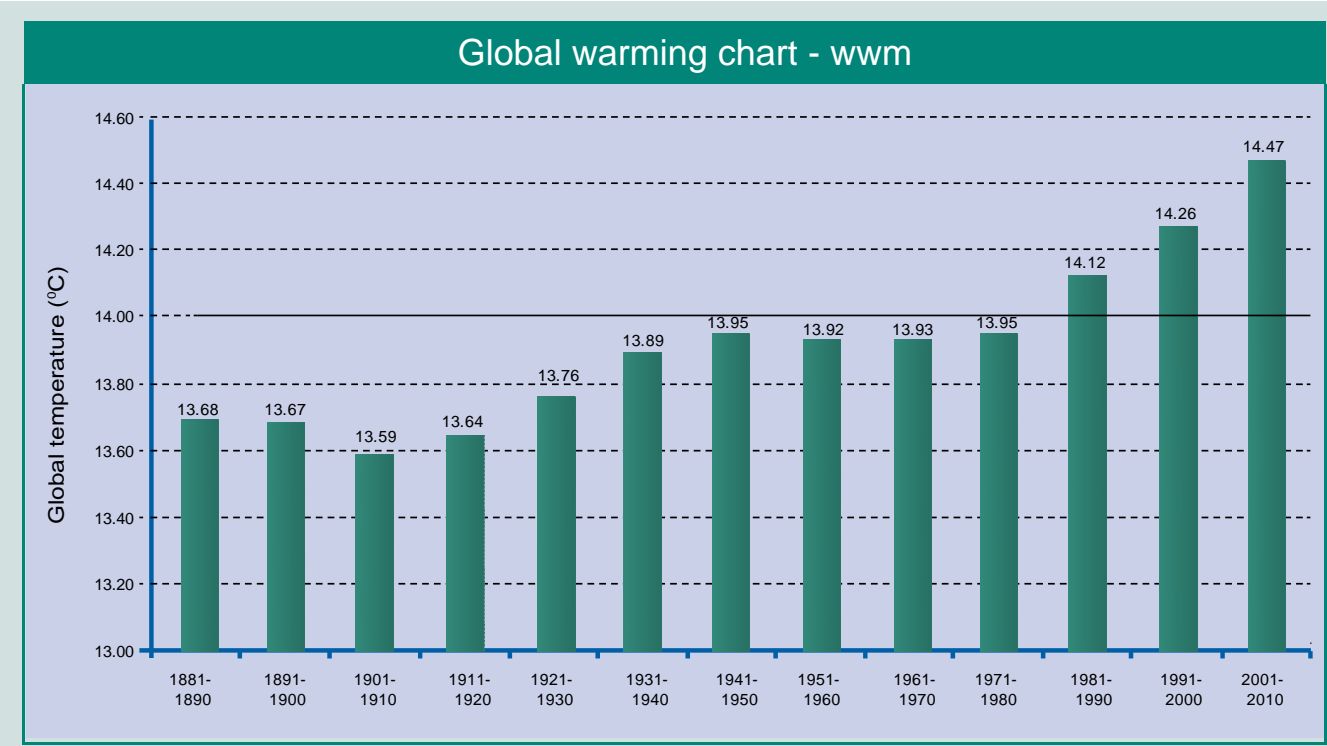
Global warming

Global warming is the observed or projected increase in the average temperature at a global level, which is produced by greenhouse gases as a result of human activities.

This phenomenon has been observed over the last 100 years and shows an accelerated increase in the temperature of the Earth’s atmosphere and oceans.

According to the Intergovernmental Panel on Climate Change (IPCC), the scenarios generated show that the average temperature will continue to rise in the future.

Global warming can have an impact on the weather and climate, in some cases leading to more extreme events.



A temperature increase of more than 3°C would affect agricultural productivity in most regions of the planet. Heat waves would be more intense and recurrent, as would droughts and fires. The increase in temperature causes drastic changes in the water cycle, increasing floods and extending droughts, seriously affecting our ability to produce food and threatening the existence of human populations, ecosystems, plants and animals. (IUCN-2009)

Climate Change

Climate Change is defined as a change in the climate that can be identified and maintained for extended periods of time, usually more than ten years. It may be due to natural climate variability over comparable periods of time; however, it is clear that there is human influence on the climate system. Evidence shows that human activities have been the main cause of the global warming that has been occurring since the middle of the 20th

century, which is due to changes in atmospheric gas concentrations (as a result of human activities).

The average temperature on Earth has been increasing over the last 100 years and as a consequence, various changes have been observed which positively or negatively affect living organisms.

Did you know that...

According to the 2016 State of the Region Report, consumption per person in Central America exceeds the amount of available resources by 18.2%, based on the territory's production capacity and natural regeneration rate.

Extreme consequences of climate change



Photo: <http://www.freebievectors.com/>



Nueva Concepción, Escuintla, 2013

Photo: <https://www.flickr.com/people/conred/>

Glaciers melting at one of the Poles and snowfalls in tropical areas



Photo: <https://es.123rf.com/>

Snowfall in
Ixchiguán, San
Marcos,
Guatemala

January
2013



Photo: <https://www.cesarperemendez.com/>

Many of the changes in recent decades have been unusual, for example:

- Some of the glaciers in the Poles have melted, causing a rise in the sea level. It is estimated that in the last 100 years the sea level has risen by approximately 15 centimeters, endangering cities, as well as animal and plant species, due to changes in water characteristics.

- Extreme events are observed more frequently at a global level, such as marked changes in precipitation (rainfall). While in some places there are droughts, in others there is intense rainfall; both can cause crop losses, death of animals and plants, and floods.
- Sudden changes in temperature have been observed, making places hotter or colder, damaging crops and causing people and animals to migrate to other places with better conditions.

Mitigation and adaptation

Mitigation refers to actions that seek to reduce the amount of greenhouse gases which are released into or are already in the atmosphere as a result of human activities, such as industrial or agricultural activities, etc.

The purpose is for daily actions to become more environmentally friendly, for example, by consuming fewer fossil fuels (gasoline, natural gas) and using alternative energies, such as those produced by the force of water, sunlight or wind. Another way is to look for alternatives that help to capture greenhouse gases temporarily or permanently, as in the case of reforestation.

Adaptation refers to people, communities and countries implementing actions that will allow them to progress and adapt to the changes that are taking place.

It is also important to consider that scientific information and the experiences, knowledge and environmentally friendly ancestral practices of the peoples or communities can contribute to identifying measures that adjust to the needs of each context and that allow them to adapt to current and future changes.

Examples of this include home gardens and planting local species that adapt to the conditions of each area; raising birds, rabbits and bees; establishing energy forests; and developing agroforestry systems that combine planting grains with trees for fodder or other uses.

It should be emphasized that there must be a certain degree of organization at the various levels in order to implement these activities, whether at the family, work, school or community level.



Sololá

Community organization and participation contributes to adaptation.

Photo: Partners for Resilience Guatemala

Did you know that...

All activities that involve **protection, reinforcement, rehabilitation or reconstruction** are mitigation actions.

Therefore, it is important that you are aware of the vulnerabilities to climate change among your family, at work, at school and within the community in order to begin implementing adaptation activities.

Community members implement actions in light of Climate Change



El Estor, Izabal

Mitigation and adaptation are very important. Mitigation seeks to reduce greenhouse gas emissions in order to minimize the consequences of global warming that affect the environment and people. Adaptation refers to people implementing actions that will allow them to better handle the impacts

of Climate Change. These actions are necessary for the region, given the existing geographical, social and environmental conditions that increase vulnerability to the effects of Climate Change.

Forests contribute to mitigation

When trees perform photosynthesis they sequester the carbon dissolved in the environment and store it in their structures. By preserving forests, we are maintaining carbon deposits, therefore preventing carbon from being released into the environment and forming CO₂.

Since forests are important carbon reservoirs, when they are destroyed or burned down, carbon is released into the environment, thus contributing to the formation of CO₂. Between 12% and 17% of the CO₂ released into the atmosphere as a result of human activities, comes from forest destruction.

Carbon sequestration through forests

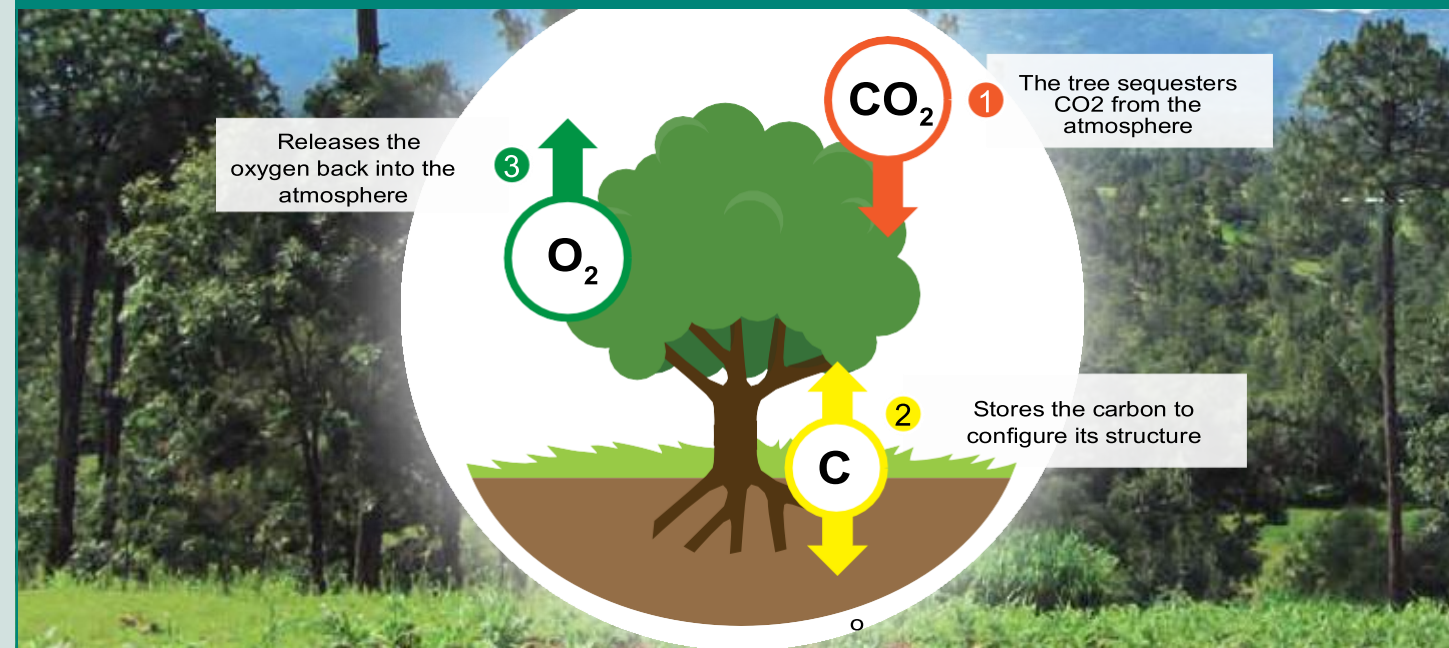


Photo: Partners for Resilience Guatemala

Adapted from: Ministry of the Environment and Ministry of Agriculture, 2011

What to do about Climate Change?

- Reduce the amount of waste we produce, prepare it for reuse and, finally, separate recoverable waste to facilitate recycling (3Rs). For example, reject unnecessary plastic bags and, if possible, carry a cloth bag or basket for shopping.
- Avoid the use of fossil fuels, walk as much as possible and use transportation means such as bicycles or practice carpooling.
- Use energy-saving light bulbs.
- Reduce consumption of drinks in plastic packaging, preferably using returnable glass containers.
- Make adequate use of resources, such as water and electricity, so as not to waste them.
- Disconnect all electrical devices that are not in use.
- If possible, consume locally produced and seasonal fruits and vegetables.
- Buy energy-efficient appliances which are also more environmentally friendly.



Photos: Partners for Resilience Guatemala | <http://es.123rf.com/>

What actions are implemented in the region to counteract Climate Change?

Due to the concerns about Climate Change, several countries have combined efforts to seek and implement measures that will help reduce its impacts.

Therefore, in 1994 the **United Nations Framework Convention on Climate Change (UNFCCC)** came into force, bringing together its member states in order to design action plans, such as policies to help increase Climate Change adaptation and mitigation.

The following include some of the most relevant achievements of the UNFCCC's Conferences of the Parties (COP):

- The Kyoto Protocol was adopted in 1997, which is an agreement reached by the countries to implement actions in order to reduce greenhouse gas emissions.
- The Bali Action Plan was adopted in 2007, which sets forth a new negotiation process to address Climate Change. This Plan is divided into five main categories: a shared vision for long-term actions

against Climate Change and the implementation of actions for mitigation, adaptation, technology and financing. Therefore, the Plan seeks the reduction of vulnerabilities and disaster risks, as well as the strengthening of sustainable development.

- The Cancun Agreements were approved in 2010, which provide for the creation of a Green Climate Fund, further reductions of greenhouse gas emissions, etc.
- In 2011 in Durban, a roadmap for a global treaty was developed, the Green Climate Fund was launched and the Kyoto Protocol was extended.
- The Doha Climate Gateway agreement was reached in 2012. One of the main issues taken into consideration was the future impact of Climate Change in developing countries; therefore, an international mechanism to compensate for losses and damages was proposed and the Kyoto Protocol was extended once again until 2020.

- The Paris Agreement was reached in 2015, whereby financial, geopolitical, energy and social measures were proposed for reducing the impact of human activities on the planet in order to slow down global warming which has become a hazard for everyone, including the great powers.
- Furthermore, the 2030 United Nations Agenda, "Transforming Our World: The 2030 Agenda for Sustainable Development", includes 17 Sustainable Development Goals (SDG) with 169 targets, which promote actions in support of the planet, such as Climate Change adaptation, while integrating the economic, social and environmental dimensions.

Central America and the Caribbean is a region of high vulnerability to extreme climate events. A record of 248 events that occurred between 1930 and 2008 shows that the most common incidents are hydrometeorological events (floods, tropical storms, landslides and alluviums), 85% of which are extreme events, 9% droughts, 4% forest fires and 2% extreme temperature changes, mainly low temperatures.

Each country is different and has its own environmental, economic, social and cultural settings; therefore, the context, policies, variables and economic and social consequences must be considered.

The aim is for all communities to be taken into account and to give them the opportunity to have an active role in decision-making processes.

For example, in Guatemala the National Policy on Climate Change was approved in 2009 and the Framework Law to Regulate Vulnerability Reduction, Mandatory Adaptation to the Effects of Climate Change and Greenhouse Gas Mitigation was passed in 2013. Their objective was for the State to adopt practices to prevent risks, reduce vulnerability, improve adaptation and contribute to the reduction of greenhouse gas emissions through the central government, municipalities and organized civil society.

Likewise, Costa Rica has implemented measures such as the use of solar panels, BAE and Carbon Neutral certifications, etc.

The implementation of various types of actions is important, since the seasonality (frequency) and magnitude (strength) of hydrometeorological phenomena, such as storms and droughts, can affect the population in many ways, as follows:

- Reduction of water availability in the required quantity and quality and at the appropriate time.
- Migration of pests, vectors, predators and diseases (such as coffee rust and mosquitoes carrying malaria and dengue) to new geographical areas.
- Food chain variations and interruptions in terrestrial and coastal marine systems.
- Increase in forest fires due to drought.
- Loss of both old and new infrastructure, such as roads, pathways, bridges, schools, hospitals, health posts, drainage systems, etc.
- Increased food insecurity due to lost or damaged crops.
- Destruction of natural areas and habitats.
- Impacts on all sources of human livelihood.
- Reduction in soil quality.





Putting it into
PRACTICE

Activity

1

Understanding the greenhouse effect

Purpose of this activity

Through this activity participants will:

- Understand the greenhouse effect.
- Identify the relationship between greenhouse gas emissions and global warming.



Materials

- Chalk (to mark the floor) or a stick (to mark the soil)
- Different colored sheets of paper (or colored balls, if available)

Instructions

1. Make balls from the sheets of scrap paper, if possible use different colors.
2. Use the chalk to draw a large circle on the floor, which should be about 1.5 meters in diameter.
3. Draw a second circle around the first one, which will be three meters in diameter.
4. Explain to participants that the small circle will represent the Earth and the large circle will be the atmosphere.
5. A group of three or four people will represent humans, animals, plants, water, forests, etc., in the small circle (Earth). You should take note of the members in each group and of what each group represents, as this will be used for the final reflection.
6. In the large circle, four people will be assigned to represent the gases that make up the atmosphere.
7. Outside both circles, there will also be a group of four people who will prepare to send radiation to Earth by using the paper balls.
8. When the paper balls reach Earth, the people on Earth will throw them back out, but the participants in the atmosphere will try to block the balls from getting through.
9. For every four balls that enter the Earth, a new member will be added to the atmosphere (they will represent the greenhouse gases that are trapped in the atmosphere, as well as help the balls reach the Earth and avoid them from getting out). In addition, one participant will leave Earth to represent the effects of global warming.
10. As more balls are trapped, more heat will accumulate on Earth.
11. Allow participants to play for 5-10 minutes, assuming that by then they will have all joined the game.

Reflection



Participants should sit in a circle and discuss the game. Recall what the participants who were in the circle (Earth) represented and talk about how the change in temperature can affect them. Some of the questions they can ask are: Why were there more and more greenhouse gases? Is the same thing happening on our planet? What can we do to help reduce these gases? Etc.

Suggestions

A variation of the game may be for participants to illustrate and explain the impact of chlorofluorocarbons (CFCs) on the ozone layer and talk about how they destroy it. The participants depicting the ozone layer should make up the largest group and be in the outer circle. For every three balls that come in, a CFC will be created, and for every 5 CFCs that are created, a part of the ozone layer will be destroyed, which means that a player will be removed from this layer.

As a complement to the activity, we suggest visiting a greenhouse or conducting an experiment that allows participants to visualize how greenhouses operate.

Activity

2

During the times of the azacuanes¹

Purpose of this activity

Through this activity participants will:

- Recognize climate changes that have taken place over time.
- Use the data obtained to develop a comparison chart about climate variations in their community.



Materials

- Survey sheet (Annex 1)
- 4 sheets of paperboard, manila paper or white newspaper (a blackboard may be used)

Instructions

1. This activity should be implemented over the course of several days. On the first day, take at least 30 minutes to talk about the climate. You could start by asking: What is the climate like in the community? What time of year does it rain? What time of year is it hottest?
2. Tell participants that they will be doing research on how the weather has changed in the community. They can use the historical profile tool. They can also use the survey, but they must consider the characteristics and ages of the people they will be surveying (parents, aunts and uncles, grandparents, and other adults in the community), as well as the number of surveys each of them will need to conduct.
3. Participants must review the suggested survey sheet and include the questions considered necessary.
4. When all participants have developed their survey, agree on how many older people you will be surveying (a good number could be 3 per participant) and the date when you will be conducting the interviews.
5. After the surveys have been conducted, the participants should discuss the results in groups. In order to do this, they can develop a chart on the blackboard for each of the survey questions and compile the information collected by each group. We suggest separating the years into decades on the vertical axis and placing the months on the horizontal axis. Marking the answers obtained during the surveys will result in a comparison chart.

Reflection

When they have finished the comparison charts for each of the questions they have asked, they can start a discussion with questions such as: What differences do you see in the events? When did it used to rain the most? Have things changed recently? Has the number of harvests per year changed? How might these changes affect the community? Etc.

Suggestions

This is a good time to reinforce the climate concept and to once again discuss how the temperature has gradually been changing. You could ask participants to write an essay about how drastic effects on climate (droughts, increased incidence of heavy rains, floods, etc.) can affect the community, work, people's lives, health, etc. You can also develop a historical profile of the community, which would be based on the climate.

⁽¹⁾ Group of several species of migrating birds (mainly sparrow hawks, falcons, buzzards) that mark the beginning and the end of the rainy season in the countryside. There used to be so many of them that, when they arrived, it seemed as if there were black "trails" or "clouds" in the sky.

Activity 3

Weather and climate presentations

Purpose of this activity

Through this activity participants will:

- Understand the difference between climate and weather.
- Develop a weather report.



Materials

- The materials will depend on the participants' creativity and on the items they require to present their report
- Notebook
- Pen or pencil

Instructions

1. Before beginning the art activity, take about 15 minutes to talk about the weather, the climate and their components. Together, you should come up with examples and when you are certain they have understood the difference, divide them into groups of three to five participants.
2. Next, give them 15 minutes to agree on how to prepare a theatrical performance about the weather or the climate, according to the topic each group was randomly assigned.

It is important to tell them that they will have a maximum of three minutes for their performance.

3. Participants should use their creativity and the materials available to prepare their performance.
4. After the established time for group work, the groups will randomly present their performance about the weather or the climate one by one.

Reflection

When all groups have performed, take a moment to talk about the importance of climate and weather and how they may be affected by global warming.

Suggestions

A variation of this activity may be for participants to write a weather report.



Activity 4

Testing memory

Purpose of this activity

Through this activity participants will:

- Recognize various actions they can implement to contribute to Climate Change mitigation.
- Be able to use the knowledge acquired for decision making regarding more environmentally friendly actions.



Materials

- 16 half letter size sheets of thick paper or cards to prevent the ink from passing through to the other side of the paper
- Crayons or markers

Instructions

1. Tell participants that they will play a memory game about the different actions people can implement to contribute to Climate Change mitigation.
2. Next, divide participants into eight groups, according to the advice given in the learning guide (page 19).
3. Give them two sheets of paper per group and ask them to fold them in half in order to make half letter size cards (to avoid them from being visible when playing).
4. On the first sheet, they should write down the piece of advice they will have been given randomly and on the second sheet they should draw a picture that exemplifies that piece of advice.
5. When they have all finished, collect the cards, mix them up and lay them out on the floor face down in an orderly fashion.
6. Participants should form a circle around the cards and play in pairs.
7. Remember that each team must take turns to pick up two cards. If they match, they must keep them for the duration of the game and if they do not match, they must turn them back over for the next team to take their turn.

Reflection

Each time a team succeeds in finding a match, they should take a moment to talk about the advice being given.

Encourage them to tell you how they would implement it in their home, community or school. At the end of the game, show each piece of advice once again and ask them who is willing to implement it.

Suggestions

This memory game, which was prepared by all participants together, can become part of the educational materials to be used in different settings, according to the needs of participants of different ages.



Activity
5

Addressing global warming

Purpose of this activity

Through this activity participants will:

- Identify the impact of global warming on different aspects of their lives.
- Seek alternatives to prevent or mitigate the impact of global warming on their life, community or home.



Materials

- Waste materials such as cardboard or plastic lids of the same size
- Paints, watercolors or crayons
- Glue
- Scissors

Instructions

1. Participants should be divided into two groups.
2. During the first stage of the activity each group will meet and discuss the effects of global warming in different settings. Participants should agree on a topic for each group to work on.
3. The groups will have to discuss how global warming could have an impact on issues related to their topic, while thinking about the actions they can implement to minimize its effects.
4. During the second stage, participants should take one hour to work on the game cards (15 for each team) which will be made from waste materials. To ensure that all cards are the same size, use a cup or container of the appropriate diameter to cut them out. Additionally, make sure they all have the same color or design on top.
5. On the bottom, participants should write down the different ways that global warming can have an impact.
6. Use chalk (if on the floor) or a stick (if on the soil) to outline a board, such as the one used for playing Chinese checkers (eight columns and eight rows with alternating filled and blank squares) (Annex 2).
7. Each team member will place their feet on both ends of the board, making sure to use only the filled or blank squares depending on which team they belong to, but not both.
8. Participants must decide which team goes first and each team will take turns to move their counters, one square at a time, trying to move as many as possible to the other end of the board. They will only be allowed to move them diagonally.
9. If a team's counter is faced with a counter of the opposing team, they will be entitled to capture it by jumping over it. To do this, they must first turn the counter over and read its contents. The opposing team will have the opportunity to defend themselves by mentioning an action that helps to minimize the impact. If the answer is not the most appropriate response, the counter can be captured. If the response is appropriate, the counter cannot be captured and the game must continue.
10. The winner will be the team which moves all of its counters to the other end first and has the least number of counters captured.

Reflection

At the end of the game, participants should take a moment to comment on the consequences of global warming and the measures that can be taken to help mitigate it, as well as the positive results that we can achieve by implementing concrete actions. Compare this to the parts of the game when they answered appropriately and prevented the counters from being captured.

Suggestions

The game can become part of the educational materials, according to the needs required for different ages. The activity, in addition to being fun, lends itself to evaluating participants' knowledge and attitudes after teaching the section on global warming.



Activity
6

Which story do you prefer?

Purpose of this activity

Through this activity participants will:

- Understand the importance of implementing changes that help counteract the effects of global warming.
- Analyze the importance of decisions made regarding global warming and the consequences of these decisions.



Materials

- Sheets of paper or notebook
- Pen or pencil

Instructions

1. Thinking about the consequences of global warming, ask participants to write a story that reflects the problems that occur as a result of this phenomenon: heavy rains, floods, droughts, loss of crops, proliferation of diseases that were previously not a problem, etc.
2. When participants have finished writing the story, talk about it for a moment and about the endings they gave it.
3. Next, ask them to rewrite the story, but this time ask them to emphasize on the things that can be implemented or changed to lessen the impact of global warming in order to make for a more positive ending.
4. When they have finished, talk again about the importance of making changes that will help minimize the effects of global warming.

Reflection

When participants have finished writing their story, take a moment to comment on how they changed the endings of their story when they decided to take other actions. Can this happen in real life? Do we need to implement changes in our daily actions to help lessen the consequences of global warming? Can it affect all of us? What can we do? Etc.

Suggestions

Reading spaces can be created for people to read the stories in different areas of the module implementation facility. One example would be to hang all the stories on a clothesline for people to read them.



Activity 7

How do forests help us?

Purpose of this activity

Through this activity participants will:

- Identify the importance of forests in contributing to reducing greenhouse gases.
- Analyze how greenhouse gases can affect and contribute to global warming.
- Reflect on how human activities contribute to greenhouse gas emission.
- Establish actions that will help to reduce greenhouse gas emission.



Materials

- 3 sheets of orange tissue paper and 3 sheets of blue tissue paper (another cheaper option would be to use seeds, pebbles, sticks, etc., but you must ensure that they are not too small)
- Paper sheets or cards with actions such as: burning wood releases 3 carbons per tree, planting trees adds 1 tree and 2 oxygens to each tree, felling trees releases 5 carbons, forest fires release all the carbon and remove the oxygen, creating a protected area adds 2 trees (you can make 2 of each)

Instructions

1. You should prepare the materials and if you are going to work with tissue paper, you should cut it into pieces to make relatively large balls (the size of your fist) of both colors. If you are using natural materials, such as seeds, they should all be different from one another.
2. Separate the materials into a bag, container or waste box.
3. The orange balls will represent the carbon and the blue balls will be the oxygen. If you are using seeds, it should be clear which ones represent the carbon and which ones represent the oxygen.
4. Tell participants that they will be carrying out an activity to understand how forests help us reduce the impact of greenhouse gases. It is important that before starting, people understand the photosynthesis process.
5. Next, ask for five volunteers to represent the trees who will stand at the center of a circle that will be formed by another group of participants.
6. Give the trees two orange balls and a blue ball or their equivalent in seeds.

They should return the oxygen (blue), while looking for a way to store the carbon (orange) in their hands.

7. Participants will take turns to give trees some CO₂ (one carbon ball and two oxygen balls) in pairs. Participants will also receive some O₂ (two oxygen balls) from the trees in pairs.
8. When three people have taken turns, the next person will randomly pick out a card with a message and read it to the others. After having read it, they will have to follow the instructions. For example, if it is about a forest fire, they must consider that when trees are burned, oxygen is consumed and carbon is released. Therefore, the trees should throw around the carbon balls mentioned on the card. If it says that reforestation was carried out, a participant will be added as a tree and help with the carbon sequestration process.
9. When they have understood the dynamics of the game and it is flowing, let everyone play for eight more minutes, and then conclude the activity.



Reflection

After the game, make a circle and spend some time analyzing the activity. You can ask questions such as: Do trees help us reduce greenhouse gas emissions? What happens when we burn or cut down trees? Is there anything we can do? Invite them to think about what other actions humans carry out that produce greenhouse gases. Discuss actions to help mitigate them.

Suggestions

To supplement this activity, participants should design a plan to plant trees that are native to the location and/or region in the community, educational center or other areas, as well as to take care of the ones they already have.

Activity 8

Adaptation and mitigation competition

Purpose of this activity

Through this activity participants will:

- Understand the difference between adaptation and mitigation to Climate Change.
- Differentiate between activities corresponding to mitigation and adaptation.



Materials

- Cards with different Climate Change adaptation and mitigation activities (2 of each)
- 4 reusable boxes or bags identified as follows: 2 for adaptation and 2 for mitigation

Instructions

1. In addition to discussing the meaning of mitigation and adaptation (according to the definitions in the theoretical section of this module), provide participants with a couple of days to research concrete actions being taken for mitigation and adaptation to Climate Change in their community or nearby areas.
2. Then, list those actions and use them to prepare the cards for the game. Make sure that there are enough cards for everyone to participate (at least half of the group).
3. Separate the cards, leaving one set of cards in a bag, ensuring that you have two sets of cards in total.
4. Divide the participants into two groups and explain that they will have a competition.
5. Mark the start line and then, mark the finish line at a distance of about 10 or 15 meters for each team. At the finish line there will be an adaptation box and a mitigation box for each group.
6. At the start line, each team will stand in a line and, at the signal, the first participant of each team must take a card from their bag, read the activity, run to the finish line to place the card in the corresponding box and return.
7. When the participant has returned, it will be the next person in line's turn and the game will continue until the cards have run out.
8. The team that finishes first will receive 3 extra points and for each card that was placed in the appropriate box, they will receive one additional point.
9. After having counted each team's points, determine which is the winning team.

Reflection

Take a moment to answer questions, especially regarding those cards that were placed in the wrong box. You could ask them if they think they were correctly placed and give them a chance to explain. Discuss the importance of establishing mitigation and adaptation measures and talk about how these measures can make a difference with respect to the consequences of Climate Change.

Suggestions

Transform the activity into a relay race with stations for card classification.

Activity
9

Redeeming positive actions to face the crisis

Purpose of this activity

Through this activity participants will:

- Understand the importance of adapting to the consequences of Climate Change.
- Identify practices that the community is already implementing to face the effects of Climate Change.



Materials

- Participants will decide which materials to use for this activity

Instructions

1. This activity requires several days for implementation. Ask participants to research the meaning of the word adaptation. On the day participants are supposed to bring the meaning of this word to class, take 10 minutes to talk about it and how it applies to our lives.
2. After reading the paragraph on Climate Change Adaptation, take another 10-15 minutes to talk about the changes that are taking place and how they affect harvest seasons, human health, nearby forests, water sources and their availability, as well as work opportunities. Then, discuss the importance of adapting to such changes.
3. For the next part of the activity, divide participants into five groups. Using slips of paper, randomly assign the topic that each group will research over the next few days.
4. Each group should collect information on the actions that people are implementing in the community to adapt to the changes. For example, regarding water sources, people have observed more droughts, which in turn affect water availability. What are they doing to avoid this from affecting them or from affecting them as much as it does?
5. We recommend giving participants at least 15 days to think about how Climate Change can affect various sectors and what people are doing to adapt to these changes or to the problems caused by such changes.
6. Participants should investigate the following topics: water sources, agriculture as a food source, human health, surrounding forests and job availability.

Reflection

At the end of the research period, each group should present the results and the good practices currently being implemented. Take some time to discuss the importance of adapting to the changes and ask them which of these actions they would be willing to implement in their homes or in their daily lives.

Suggestions

As a follow up to the activity, you could analyze how the community, families, education and/or work centers could be affected and jointly decide to implement some changes in order to adapt.



Activity
10

Our book on traditional medicine

Purpose of this activity

Through this activity participants will:

- Identify the importance of disease prevention, specifically those related to the impacts of Climate Change.
- Apply preventive care and traditional medicine in the community to these diseases.
- Materialize their knowledge into a book on natural medicine.



Materials

- Notebook
- Sheets of paper
- Pens and pencils
- Crayons
- Scissors
- Paper fastener/wool and large, strong needle with a sharp point
- Glue
- Cardboard (you should make good use of all materials)

Instructions

1. Take time to talk about the effects that Climate Change could have on human health. Next, make a list of possible new diseases or of those which, due to certain circumstances, could become more prevalent; for example in a flood, diseases such as cholera, amoebas, skin infections, etc., are more likely to increase.
2. When you have made a list of all these diseases, separate into groups of five and randomly assign the diseases on the list to each group.
3. For each disease, participants should research the symptoms: What causes them? How can they be prevented? And most importantly, what are the natural medicines used in the community to treat or to relieve the symptoms? It is important that for each medicine they find, they verify its authenticity and the exact way in which it is prepared or used.
4. After giving them at least two weeks to carry out their research, ask them to take the information in their notebook to class.
5. On the day assigned to make the book, participants should work on the information regarding the diseases in groups, agreeing on one format for all pages. Each group will write down facts about each disease on a sheet of paper, including its symptoms, tips for prevention, medicines they have found are used to treat it, etc.
6. When the groups have finished working on the materials, put the sheets together and arrange them according to a single format; for example, in alphabetical order or according to the type of condition (disease).
7. Next, join the sheets of paper, either by stitching them together or by using a paper fastener and, lastly, make the book cover.

Reflection

When the book has been finished, participants can reflect on how health can be affected by Climate Change, and on the things that can be done to prevent these diseases as well as talk about the traditional medicines they discovered, while appreciating the importance of preserving traditional knowledge.

Suggestions

- Encourage them to interview elders, midwives and other people in their community during their research to complement the technical and/or scientific information they have found.
- This book can be shared with the community and even become part of the local library.





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Annexes

Annex 1

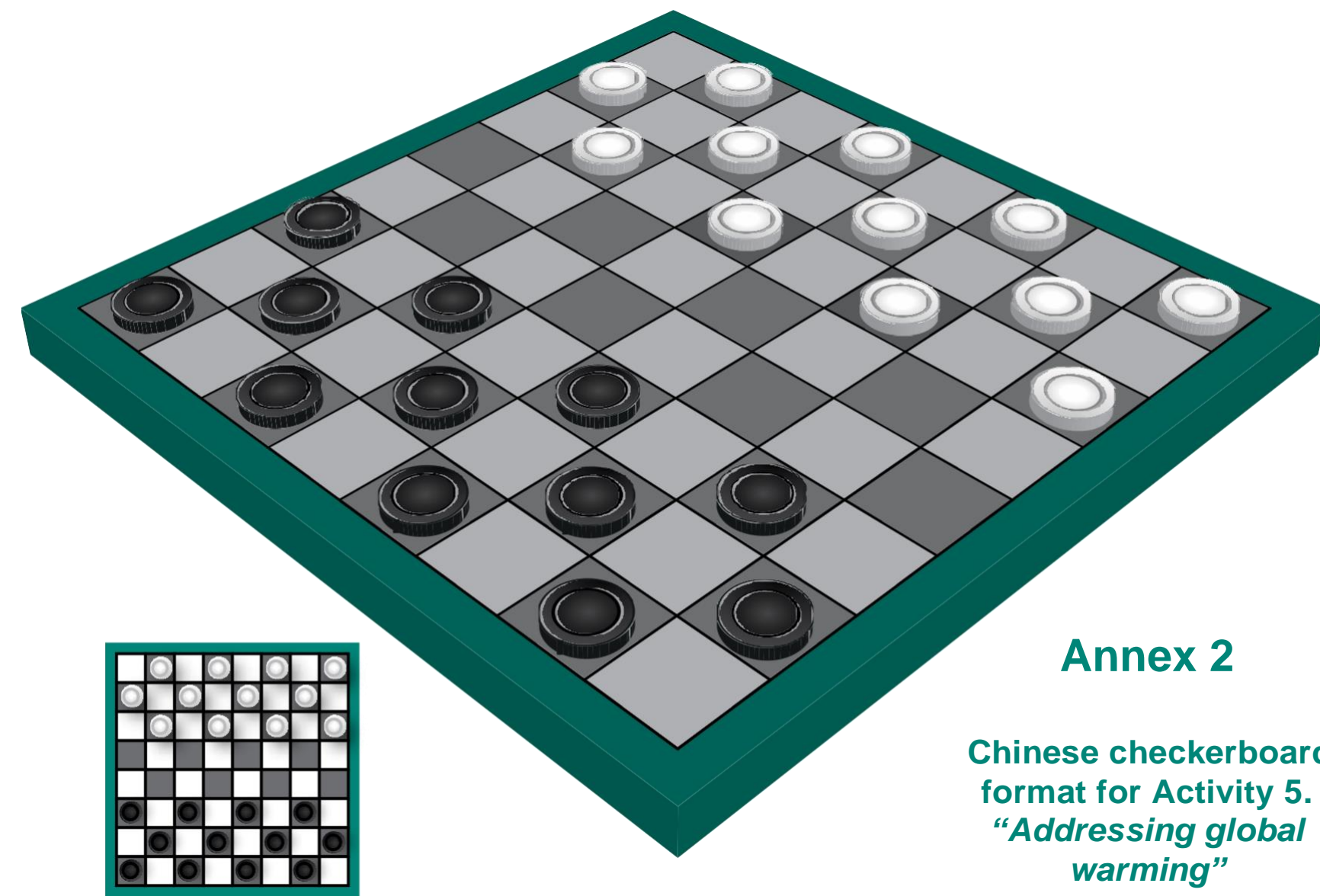
Survey template
for Activity 2:
*“During the
times of the
azacuanes”*

SURVEY

Interviewee's name:
Age:
Date of event:
Name of interviewer:

Questions

1. What month of the year did it start raining when you were a child?
2. What month did it stop raining when you were a child?
3. Has it changed compared to the rainy season now?
4. During which months was it coldest?
5. During which months was it hottest?
6. Have the hot and cold seasons changed compared to now?
7. How often were there floods?
8. How often were there hurricanes?
9. How often were there droughts?
10. What other weather-related events occurred in the community?
11. Is it the same now?
12. What has changed?
13. How many harvests took place each year?
14. How many harvests are taking place now?
15. How have these changes affected the community?



Annex 2

Chinese checkerboard
format for Activity 5.
*“Addressing global
warming”*



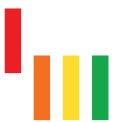
Other resources

- Farmers in the Río Cuilco Watershed, Huehuetenango and San Marcos. 2011. Sabiduría local y cambio climático. GIZ, Guatemala. 91p.
- Climate Centre. <http://www.climatecentre.org/>
- CARE International documents on climate change
 - What is Climate Change Adaptation?
- Toolkit for Incorporating Climate Change Adaptation into Development Projects – Version 1.0 – July, 2010

Methodological support module for Climate Change Adaptation



This kit includes **three modules**, each of which is independent and can be used in the order you consider most appropriate. There is also a **fourth module (Resilience)** which integrates the first three modules and should be used at the end to improve understanding and efficient use of the kit.



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