

An aerial photograph of a vast, dense forest with a rich green canopy. The trees are packed closely together, creating a textured, undulating surface of green. The lighting is bright, highlighting the various shades of green from deep forest greens to lighter, sunlit areas.

CLIMATE CHANGE & THE ROLE OF FORESTS

A Community Manual

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Conservation International is a non-profit organization founded in 1987 with program offices and partners in over 30 countries. CI's mission: "Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity." In 2003, CI established the **Indigenous and Traditional Peoples Program** to strengthen our commitments to indigenous and traditional peoples and support their vital role in maintaining healthy ecosystems.

An electronic version of this publication can be downloaded at:
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Climate Change & the Role of Forests

A Community Manual

Susan Stone
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This document is part of a package of tools created to support the development of skilled local trainers on the basics of climate change and REDD+. Other components include the Training of Trainers Course Manual and the Climate Change & the Role of Forests Training Toolkit. A team of writers and designers contributed to the authorship of the products, supported by reviewers and editors credited in the acknowledgment. The principal authors of the different components are:

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LIST OF ACRONYMS

AOSIS	Alliance of Small Island States
CCBA	Carbon, Community and Biodiversity Alliance
FCPF	Forest Carbon Partnership Facility
FPIC	Free, Prior, and Informed Consent
GHG	Greenhouse Gas
MRV	Monitoring, Reporting and Verification
PES	Payment for Ecosystem Services
RED	Reducing Emissions from Deforestation
REDD	Reducing Emissions from Deforestation and Degradation
REDD+	Reducing Emissions from Deforestation and Degradation, plus conservation, sustainable management of forests and enhancement of forest carbon stocks
R-PP	Readiness Preparation Proposal
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
UNPFII	United Nations Permanent Forum on Indigenous Issues
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

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Most importantly, this document and the other training tools benefited from review and feedback by the participants in a pilot workshop held at the Bina Hill Institute, Annai, Guyana in November 2009, sponsored by Iwokrama as part of a project to build capacity to support Reducing Emissions from Deforestation and Degradation (REDD+) initiatives in Guyana. The workshop tested the technical content of the manual and the associated Training of Trainers course. The participants provided feedback, comments and suggestions to improve the course and manual. The participants' assistance was invaluable to improving the final product as a tool for community use. Their contributions are gratefully acknowledged. The workshop included members of communities of Regions 8 and 9; representatives of district councils, Amerindian advocacy organizations, and government agencies; and field staff from non-governmental organizations. The names and affiliations of the participants are listed below:

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FOREWORD

The traditional way of life of the Amerindian people of Guyana is such that it embraces and in fact is founded upon respect and hence the wise use and valuing of the bounty of resources and riches that nature provides for us. For many millennia we have respected nature as our marketplace from where we get all that we need to survive and from where we take just what we need to ensure our survival and the survival of nature itself for the future generations.

While we have used nature in a wise way, others in many parts of the world have been destroying it in quest of economic wealth. This trend is here with us now as we, as forest people, are faced with a changing world and changing desires. We sometimes abandon our culture and traditions of caring for nature as we integrate into a world based on monetary values, to the detriment of ourselves and that of nature.

Changes globally, primarily fueled by the quest of countries for economic wealth, have resulted in a changing climate. We have altered the natural world to the extent that the globe is becoming hotter, and the climate is changing as a result. Man's factories and vehicles emit too much gas into the air which is causing much more of the heat from the sun to be captured close to the earth. At the same time we are removing the forests which purify the air. By removing the forests themselves, we are also causing more of the gases to be put into the air.

Around the world, countries are now embracing conservation even more as they begin to realize what we, the Amerindians, have been practicing for time immemorial—that we must care for nature for her to care for us. They are willing to help to provide for the economic needs of countries with lots of forests like Guyana so that we do not have to cut our forest down to survive. For us, the forest people of Guyana, the forest, our market-place, is also becoming our bank.

We must understand the reasons why the earth is changing and how the new things such as REDD+ and Guyana's Low Carbon Development Strategy (LCDS) can help to address the global problem of climate change.

We must also learn and think about how these things can affect us in both good and bad ways and how we can ensure that we can make the best of them.

For the realization of the development of our communities, leaders must have vision, the will to realize their vision and have (or be able to access) the skills necessary for sustainability. With partners like Conservation International and Iwokrama, and along with the Government of Guyana we can work towards increasing our understanding of these important issues. I hope that this manual will help to partly realize this. I encourage all Guyana to make good use of the knowledge and materials contained in it and put it to good use. Discuss it in your communities and seek the help of others to help you understand.

Tamīnawīrī éñi ya meruntike éñi. All together we will be strong.

Sydney Allicock

Community Leader and Chairman North Rupununi District Development Board

Mr. Allicock is a visionary community leader from Surama Village, North Rupununi, Guyana. His focus on community development through sustainable use of communal resources and equitable partnerships has earned him recognition both nationally and internationally. He is the recipient of the Anthony N. Sabga Caribbean Awards for Excellence as the 2010 Laureate in Public and Civic Contributions.

As policy-makers and governments move forward on taking action to stop global climate change and adapt to the changes that are already happening, it is essential that local communities are informed about the issues that are being discussed globally and nationally. Building a good foundation of knowledge about the causes of climate change, how the world's governments are working toward solutions, and what are the proposed actions to reduce climate change and its impacts are very important for local stakeholders. With this knowledge indigenous peoples and local communities, as well as other local stakeholders, will have the tools and information needed to participate fully and effectively in decision-making processes related to climate change planning and action, bringing their own traditional knowledge, experience and priorities to these discussions.

It is challenging to get information to local communities that are often in remote areas. Local organizations are better placed to deliver information and training to local communities, but they also require tools that are appropriate for community audiences and skills in training design and delivery. This manual is part of a collaboration between Conservation International and local partners. The goal is to build a resource of local trainers and training tools that can help to expand learning to local communities, bringing key information that is presented in ways that work well for community learners. Skilled local trainers can help get essential information about climate change and REDD+ to local communities more quickly and be more readily available for follow-up training activities. The first step is a Training of Trainers (ToT) course, at which participants learn how to organize, design and conduct a successful training workshop and how to present information on the basics of climate change science, policy and action. Then, the trainers are provided with a set of tools and materials, including this participant manual, to help them deliver trainings to local communities or other local stakeholders.

This manual presents basic information on the natural processes that affect climate; the reasons why the climate is changing; some of the impacts of climate change that have already happened; and how the world's governments are working to solve the problems caused by climate change now and in the future. Because healthy ecosystems and forests are very important in helping to maintain the natural processes that affect climate, this manual discusses how forests, and the ways forests are used, can impact climate change. It also discusses how new ways of valuing forest ecosystems may support conservation and sustainable use and thereby help countries and communities to develop, to lessen climate change, and to adapt to its effects. Finally, information is presented on REDD+, an important action for lessening climate change that is being discussed at international climate meetings and tested in many forest countries.

This information was first presented at a pilot Training of Trainers workshop in Guyana in November of 2009 that tested the course and materials designed to teach members of local organizations, agencies and communities to become community trainers. The pilot workshop was sponsored by the Iwokrama International Centre for Rain Forest Conservation and Development and Conservation International Guyana. Conservation International's global program staff provided expertise in training design, delivery and materials development. This collaboration included the workshop participants, whose feedback and participation allowed the course and materials to be tested in an actual working situation with insights from communities, indigenous peoples, local organizations and government agencies.

It is intended that this manual will assist in expanding the delivery of training courses to local communities, and, along with the Training of Trainers Course and toolkit, will provide indigenous peoples, local communities, and local agencies and organizations with information needed to participate fully in climate change planning and action in their countries and in their communities.

LEARNING OBJECTIVES

At the end of the session, participants should be able to:

- Explain the concepts of climate and weather
- Understand what climate change means and why the climate is changing
- Understand why we should be concerned about climate change
- Explain the signs of climate change
- Explain the impacts of climate change

PART 1. HOW IS THE EARTH FORMED?

The earth is a living planet with natural processes that provide a good environment for human, plant and animal life. Before studying climate and why it is changing, it is important to review some of the basic information about the earth and the natural processes that make life on earth possible.

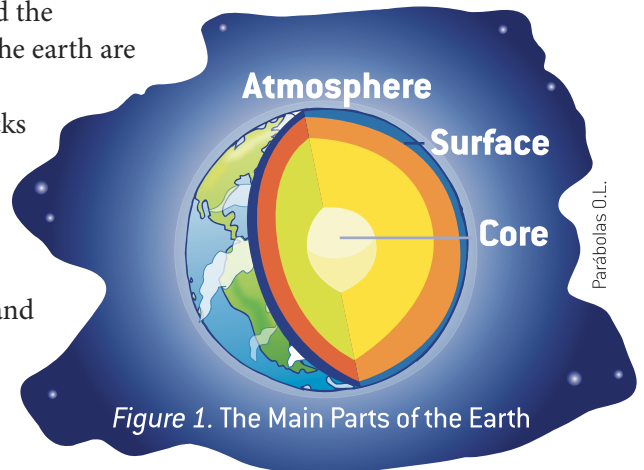
HOW DO THE PARTS OF THE EARTH WORK TOGETHER?

The earth is a living planet formed by rocks, minerals, soils, water, gases and living organisms. The three main parts of the earth are the inside or core, the surface of the earth, and the atmosphere or area above the earth's surface. The parts of the earth are all made up of different materials:

- The inside or core of the earth is mostly made up of rocks and other dense or thick materials.
- The surface of the earth is mostly water. The oceans, lakes and rivers cover 70% of the surface of the earth—almost three quarters. The rest is land—about 30%, or a little more than one fourth. More than 10% of the total land on earth is permanently covered in ice.¹



Parabolias O.L.



Parabolias O.L.

Figure 1. The Main Parts of the Earth

- The **atmosphere** or air is made up of invisible gases such as nitrogen; oxygen, which humans, plants and animals breathe; carbon dioxide, which is taken in by plants and trees as part of their growing process; and many others. The atmosphere begins at the surface of the earth and extends up into outer space in many layers. Most of the processes that affect the earth’s climate happen in the lowest layer of the atmosphere, which starts at the surface of the earth and goes about 10 miles, or 16 kilometers, into space. This layer of the atmosphere contains the air we breathe.

The way the earth is made up and the way the different parts work together make life on earth possible. Conditions in the atmosphere affect the surface of the earth, and the land and waters of the earth affect the atmosphere. Natural processes like **photosynthesis**—where plants take in the light and heat from the sun and carbon dioxide from the air, and release oxygen—make plants grow and keep our air clean. The earth’s climate is the result of these types of natural processes—how the land, water, and air work together.

PART 2. WHAT IS CLIMATE AND WHAT IS WEATHER?

Our climate produces the temperatures and rainfall that make plant, animal, and human life possible. Without the right temperature and rainfall, plants and trees could not grow, animals would not have food to eat, and people could not survive.

Climate talks about these conditions over long periods of time—many, many years.

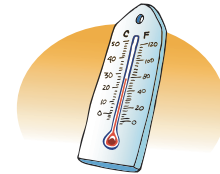
Weather talks about the temperature, rainfall, or storms in a specific place on a specific day or over a very short period, like one season. When someone says “it is raining a lot today,” or “it has been very rainy this season,” they are talking about the weather. Weather measures the temperature, rainfall, wind and cloud conditions that are happening that day or that season. Storms happen when weather conditions happen in an extreme way, such as heavy rain and strong winds.

Climate is described as “the average weather” or weather conditions that happen over a long period of time. When someone says, “it is always rainy here for six months of the year” or “it never snows here” they are talking about the climate. When climate is measured, it takes into account the average temperature, the average rainfall or snowfall, and how often storms happen in an area or over a long period of time—many decades or even many centuries.

The climate is a very complex natural process that includes the interaction among the air, the water, and the land surface. The way the air moves through the atmosphere and the way the water moves through the ocean can also affect temperature and rainfall.

Both climate and weather measure:

Temperature (Hot or Cold)



Precipitation (Rain or Snow)



Wind and Clouds



Parábolas O.L.

The figure below shows how the climate components work together.

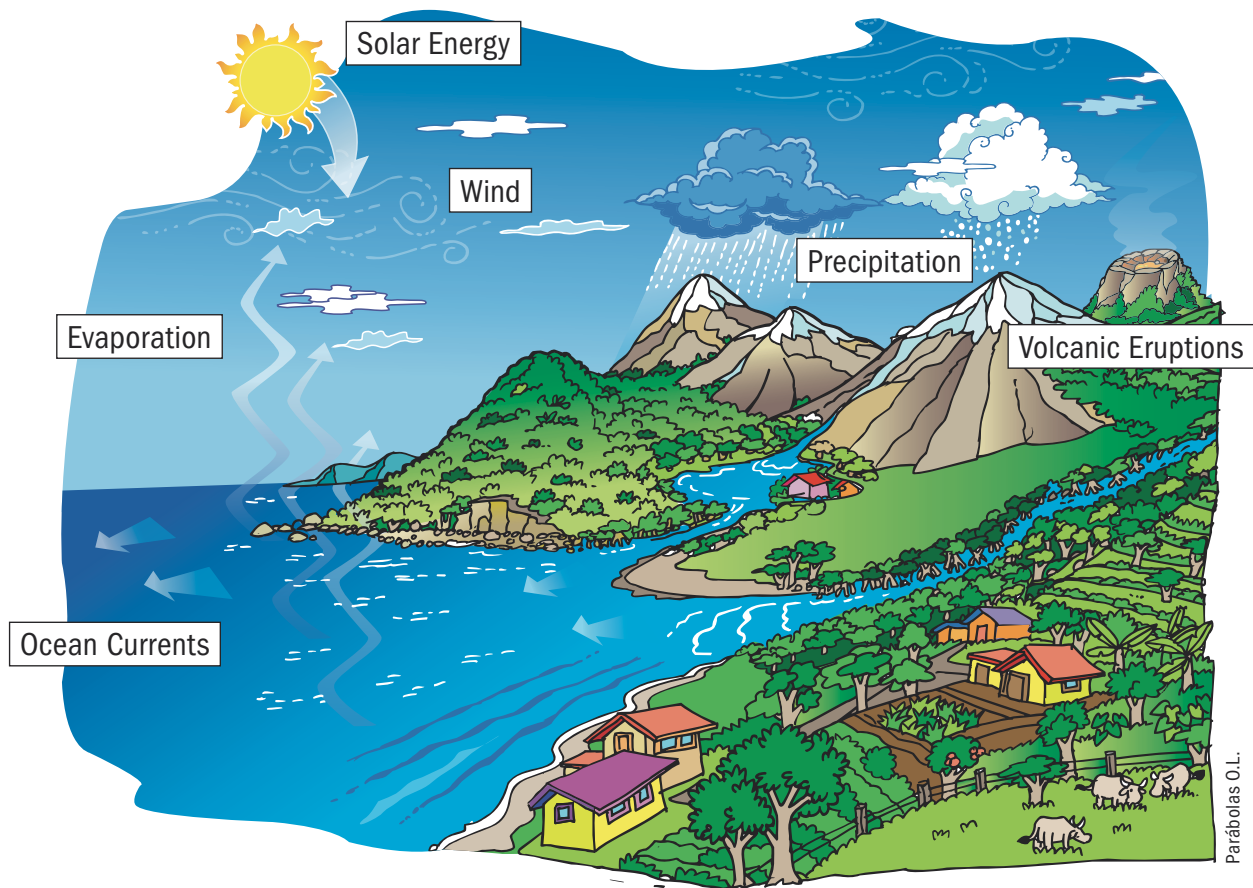


Figure 2. The Climate Components

Some of the processes that affect climate, like **volcanic eruptions** and changes in the amount of the sun's energy coming to earth, are natural. Others are caused by human activities. The main natural processes that affect climate are:

THE SUN'S ENERGY

Climate can change if there is a change in the amount of solar energy that gets to earth. This can make the earth seem warmer or colder.

GASES IN THE ATMOSPHERE

Some gases have a strong affect on climate. These gases trap heat in the earth's atmosphere. While these gases are a natural part of the atmosphere, the amount has increased over the past 150 years. It is the increase in the amount of gases in the atmosphere that is most responsible for global warming and climate change. Human activities are responsible for most of the increase in these gases. Both the natural processes and the human activities affecting climate change are discussed in the next session.

OCEAN CURRENTS

Ocean water is always moving. These movements are called **ocean currents**. Wind moves water over the ocean's surface in regular patterns. Water also moves up from the colder, deeper parts of the ocean to the warmer surface. The movement of ocean water also moves heat around the globe, so ocean currents have a

big impact on climate change. When the normal way ocean water moves is disturbed, extremes of rainfall or drought can happen. El Niño is an example of the impacts of a change in the way ocean water moves.

El Niño and **La Niña** are names given to temporary changes in the movement of winds in the atmosphere and the movement of the waters of the oceans. About every 3 to 7 years the winds over the tropical Pacific Ocean become weaker. This affects the movements of ocean water and results in warmer water in the eastern Pacific Ocean. In La Niña, the reverse happens—the winds over the tropical Pacific become stronger, bringing colder water to the eastern Pacific Ocean. These changes can affect weather all over the world, including increased rainfall or extreme drought, which in turn affects food production. These effects can last as long as one year. El Niño and La Niña are not caused by climate change, but when they happen, it can be even more difficult to adapt to the impacts of climate change that are already happening.

Other processes that affect climate are:

VOLCANIC ERUPTIONS

When volcanoes erupt they release tiny particles into the atmosphere. These particles get into the upper parts of the atmosphere and can affect the earth's temperatures—usually for a year or two.

SNOW AND ICE

Because the snow and ice are light in color, they have the ability to reflect solar energy back out to the atmosphere. When snow and ice melt as earth's climate warms, less energy is reflected and this causes even more warming.

PART 3. WHAT IS CLIMATE CHANGE AND HOW DO WE KNOW IT IS HAPPENING?

Climate change is the change of the normal weather patterns around the world over an extended period of time, typically decades or longer.

The earth's average temperature has slowly increased over the last 100 years. The term '**global warming**' is used often when discussing climate change. This means that the average temperature of the earth's atmosphere is getting higher. Remember that 'average' means that scientists are looking at the changes in temperature all over the planet. In some places the temperature is getting warmer, in other places it may actually be getting cooler, but overall the earth is getting warmer. It is important to keep in mind that climate change is not happening in the same way everywhere.

We know that the climate is changing, because scientists are observing and measuring changes in weather patterns and people all around the world are experiencing these changes. Changes are also happening much faster than they have in the past. The major signs of global climate change are:

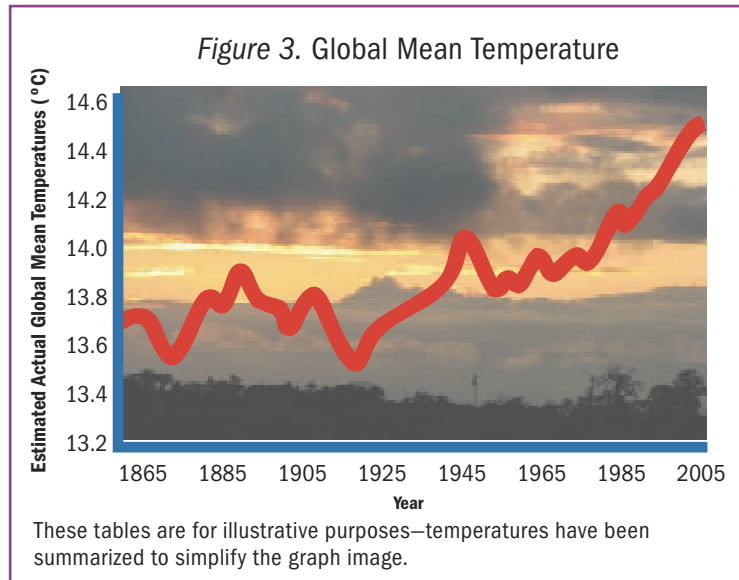
INCREASING GLOBAL TEMPERATURES

- Global warming—the average global temperature has increased steadily during the last 100 years—about .74 degrees Celsius (1.3 degrees Fahrenheit).²

- Temperature increases have occurred in all regions around the world.

CHANGES IN RAINFALL

- There have been changes in rainfall worldwide, due to changes in surface temperatures of oceans and land areas.
- Globally, the areas experiencing drought, or periods of extremely dry weather, have increased since the 1970s.³
- While some regions are receiving less rainfall and suffering longer and more droughts, other regions of the world are experiencing much higher levels of rainfall.
- In many places the seasons or times of year when rain falls are changing. Rain is falling at different times and for shorter or longer periods than in the past.



Graph data: IPCC 2007/Photo: Mario Chacón León

DECREASING SNOW COVER AND MELTING ICE LAYERS AT THE POLES

- At the **earth's poles**, which are found in the most southern and the most northern parts of the world, the climate is very cold. There is ice covering the earth's surface and some covering parts of the sea as well. These areas of ice are called **glaciers**. More and more of these glaciers are melting because of global warming.
- Glaciers are also found on very high mountains. Many mountain glaciers are also melting because of warmer temperatures.



The ice of this mountain glacier on Mt. Kilimanjaro has almost disappeared. The glacier is over 12,000 years old, but scientists think it could be gone by 2020.⁴

UNUSUAL OR EXTREME WEATHER EVENTS ARE HAPPENING MORE OFTEN

- Over the past 50 years, very hot days and nights are happening more often and very cold days and nights are happening less often.
- Periods of high temperature (heat waves) have become longer and hotter over most land areas.
- Big storms with heavy winds and rain are happening more often and causing more and more damage.

CHANGES IN THE LEVEL OF THE WORLD'S OCEANS

The height of the surface of the ocean is called the 'sea level.'

- In the last 100 years, the average global sea level has risen about 6 inches or 15 centimeters.⁵
- Sea levels are rising because warmer ocean temperatures cause the oceans to expand and because temperature increases in the atmosphere are causing ice in the mountains and at the north and south poles to melt. This is adding more water to the oceans and causing sea levels to rise.
- Rising sea levels are threatening communities in coastal areas and some island countries, causing flooding and washing away coastal land.
- Higher sea levels can also cause salt water to get into rivers—affecting the quality of water supplies.

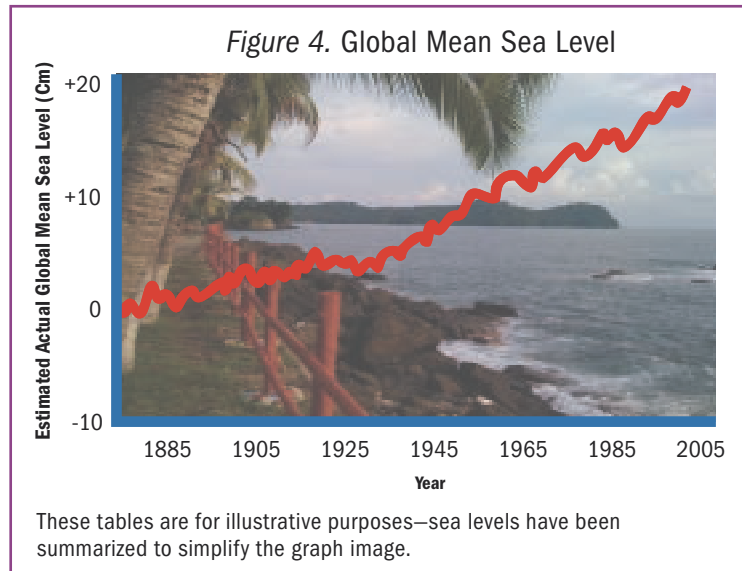


Figure 5. Rising Sea Levels

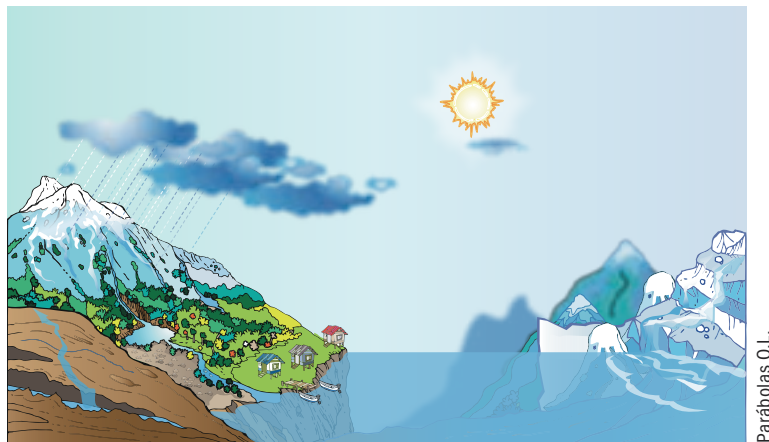
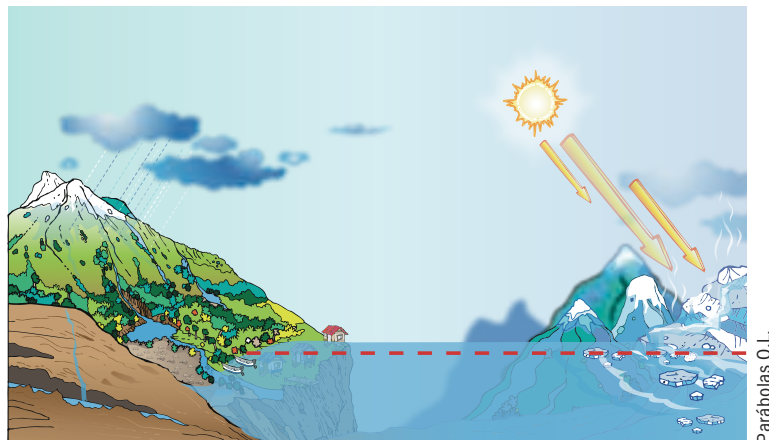


Illustration of normal sea level



Melting glaciers and warmer water temperatures cause sea levels to rise.

PART 4. HOW DOES CLIMATE CHANGE AFFECT THE EARTH AND OUR LIVES?

Climate change means that the land, the forest, the water resources, animal behavior, crop production, and other things on earth are going to change. The way we grow food, the types of plants that can live in different areas, the patterns of rainfall and hot and cold weather will all continue to change if we do not halt the process of global warming and climate change. Humans, plants and animals will not be able to survive in areas that get too hot or in places that are flooded because of rising sea levels. If we want to survive on this earth in the future, then we will need to stop activities that are causing climate change and learn to adapt to new ways of doing things.

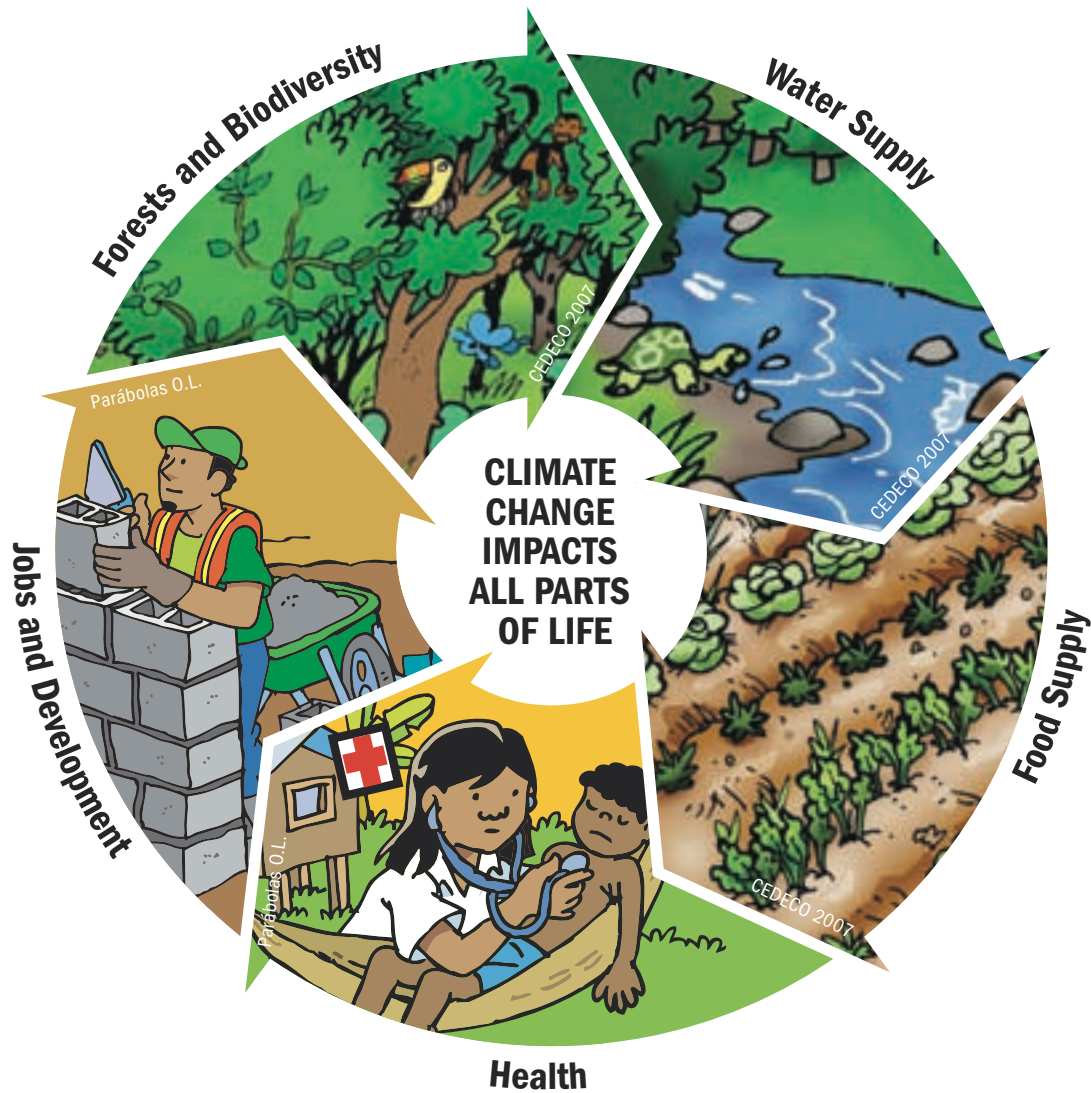


Figure 6. The Impacts of Climate Change

IMPORTANT THINGS TO REMEMBER:

- The earth is a living planet formed by rocks, minerals, soils, water, gases and living organisms.
- Climate is a complex process that is determined by how the sun, atmosphere, land, water and winds work together.
- Human activities can also affect climate.
- Climate change is the change of normal weather patterns around the world over a long period of time. The average temperature of the earth is getting warmer.
- The climate is changing faster than in the past. Climate change is not happening in the same way everywhere.
- Scientists are observing and measuring climate change and people are experiencing the effects of climate change now.
- Climate change impacts all parts of life.

KEY TERMS TO REMEMBER:

Atmosphere: the mixture of gases that surrounds the earth—the atmosphere begins at the surface of the earth and extends into outer space in many layers. Most processes that affect life on earth happen in the lowest layer of the atmosphere—nearest to the earth’s surface

Climate: is described as “the average weather” or weather conditions that happen over a long period of time

Climate change: the change of the normal weather patterns around the world over a long period of time

Earth’s poles: areas at the far north and far south of the earth. These are also called the ‘polar regions’

Evaporation: the process in which water is heated and changes from a liquid into a gas. The sun heats water in lakes, rivers or oceans causing it to evaporate or turn into a gas called water vapor

Glacier: layers of ice on land or mountains in very cold places. Sometimes glaciers extend into the ocean

Global warming: the increase in the average temperature of the earth’s atmosphere

Ocean currents: movement of the surface water of the ocean. Water is moved mainly by wind in regular patterns that normally stay the same

Photosynthesis: natural process where plants take in the light and heat from the sun and carbon dioxide from the air, and release oxygen to make plants grow and keep our air clean

Precipitation: rain, snow, or hail (ice) that forms from the moisture in the atmosphere and falls to the ground

Sea level: the height of the ocean’s surface

Volcanic eruptions: volcanoes are mountains formed at openings in the earth’s surface by melted rock that comes to the surface and flows out and hardens. When a volcano erupts, melted rock, called lava, flows out of the mountain along with ash and gases that go into the atmosphere

Weather: the temperature, rainfall, or storms in a specific place on a specific day or over a very short period, like one season

LEARNING OBJECTIVES

At the end of the session, participants should be able to:

- Understand and explain the greenhouse effect and identify the main greenhouse Gases
- Explain the role of human activities in causing climate change
- Understand the carbon cycle
- Understand how the way our land and forests are used can impact climate change

PART 1. HOW DOES NATURE CONTROL CLIMATE?

Most of the increase in global average temperature is due to the increase of certain gases in the atmosphere. The atmosphere is made up of many different gases that occur from natural processes. The gases are also produced by human activities. Producing too much of some of these gases can cause a change in natural processes that in turn causes climate to change.

To better understand the causes of climate change it is important to know something about the gases in the atmosphere and to understand the natural processes that do the work of keeping the earth's temperature at the right levels. The gases that help regulate the temperature of the earth are called '**Greenhouse Gases**' or **GHGs** for short.

WHAT IS THE GREENHOUSE EFFECT?



The term '**greenhouse**' comes from a type of building with clear glass or plastic walls and roof. This lets in the light and heat from the sun and traps it inside the building, allowing plants to be grown inside during cold weather. The earth's atmosphere acts like a greenhouse—trapping the light and warmth from the sun—so that is why the process of warming the earth is called the '**Greenhouse Effect**.'

The greenhouse effect is the natural process of how the atmosphere keeps the earth warm. The atmosphere is formed by a layer of invisible gases. Without those gases in the atmosphere to keep in the sun's warmth, the earth would be a frozen planet and no life could survive. The greenhouse effect is a natural process. Both greenhouse gases and the greenhouse effect are good for the earth. Having the right amount of GHGs allows the earth to be just the right temperature to support life. But when human activities disturb this natural process by adding more and more greenhouse gases to the atmosphere more heat is trapped and the earth gets warmer.

This works in the same way as a blanket does when you use it to stay warm at night. When you are in bed and you feel cold, you cover your body with a blanket. The blanket traps the warmth of your body and keeps the air around you warm, so your body stays warm. With one blanket, only some of the warmth stays close to you, and some of the warm air escapes. If you are still cold, you could add more blankets. But if you add too many blankets, you would get hot because all the warm air is trapped and your body would get warmer and warmer.

This is what is happening to the earth now. As more and more gases are sent into the atmosphere, these gases are acting like a blanket and trapping too much heat close to the earth. This is making the earth get warmer.



Parábolas O.L.

Figure 7. The Greenhouse Effect

The greenhouse gases that make up the atmosphere have the capacity to retain solar energy (the warmth from the sun) and keep the earth warm enough to make life possible.



Parábolas O.L.

Figure 8. Human Impacts on the Greenhouse Effect

But, when there is a higher quantity of these gases in the atmosphere, the atmosphere retains more and more solar energy, and the earth gets warmer.

WHAT IS A GREENHOUSE GAS?

Some of the gases in the atmosphere are able to take in or absorb the heat from the sun and the earth and keep it in the lower part of the atmosphere closest to the earth.

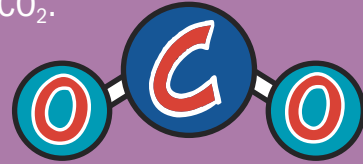
There are many greenhouse gases in the atmosphere. Some of the important ones include:


- Methane (CH₄): this comes from animal droppings and wetlands, as well as human activities such as rice cultivation
- Nitrous oxide (N₂O): this gas comes from fertilizers and also from burning plants

But the most important GHG is **carbon dioxide (CO₂)**. This gas is produced when the substance carbon joins with the oxygen in the air. The increase of CO₂ in the atmosphere is the biggest cause of climate change, so it is important to understand more about how CO₂ is formed from carbon; how they work together in nature; and how human activities affect this natural process.

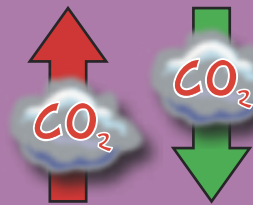
WHAT IS CO₂?

CO₂ is the result of joining carbon (C) with oxygen (O). It takes 1 part of carbon joining with 2 parts of oxygen to form the gas CO₂.



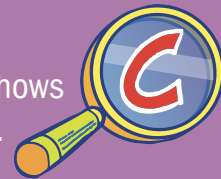
 The red C refers to the carbon stored in trees, plants, animals, and fuels.

This symbol refers to the gas carbon dioxide.



The red arrow represents CO₂ being emitted. The green arrow represents CO₂ being absorbed, and carbon being stored.

The magnifying glass shows carbon stored.



PART 2. CARBON, CARBON DIOXIDE, AND THE CARBON CYCLE

Carbon is one of the most common elements in the universe. Carbon is in the air, in the water, in the soil, in the forest and even in humans—carbon is in all things on earth. All life on earth needs carbon to grow and survive. But there is also carbon in non-living things such as rocks, gases, or **fossil fuels**.

Carbon is found in:



Dead material, like rocks and minerals

© Robin Moore



Living materials, such as animals, plants, and even people

© Conservation International/photography by John Martin

Carbon dioxide comes from changing the substance carbon into a gas. For example, when a tree is burned, the carbon in the tree joins with the oxygen in the air as it is burned and becomes the gas called carbon dioxide or CO₂ (you can see the smoke carrying CO₂ into the air)—or when the gasoline is burned to run a vehicle or a boat engine, the carbon in the gasoline joins with the oxygen in the air and becomes the gas CO₂ (you can see the exhaust coming out from the engine carrying CO₂ into the air).

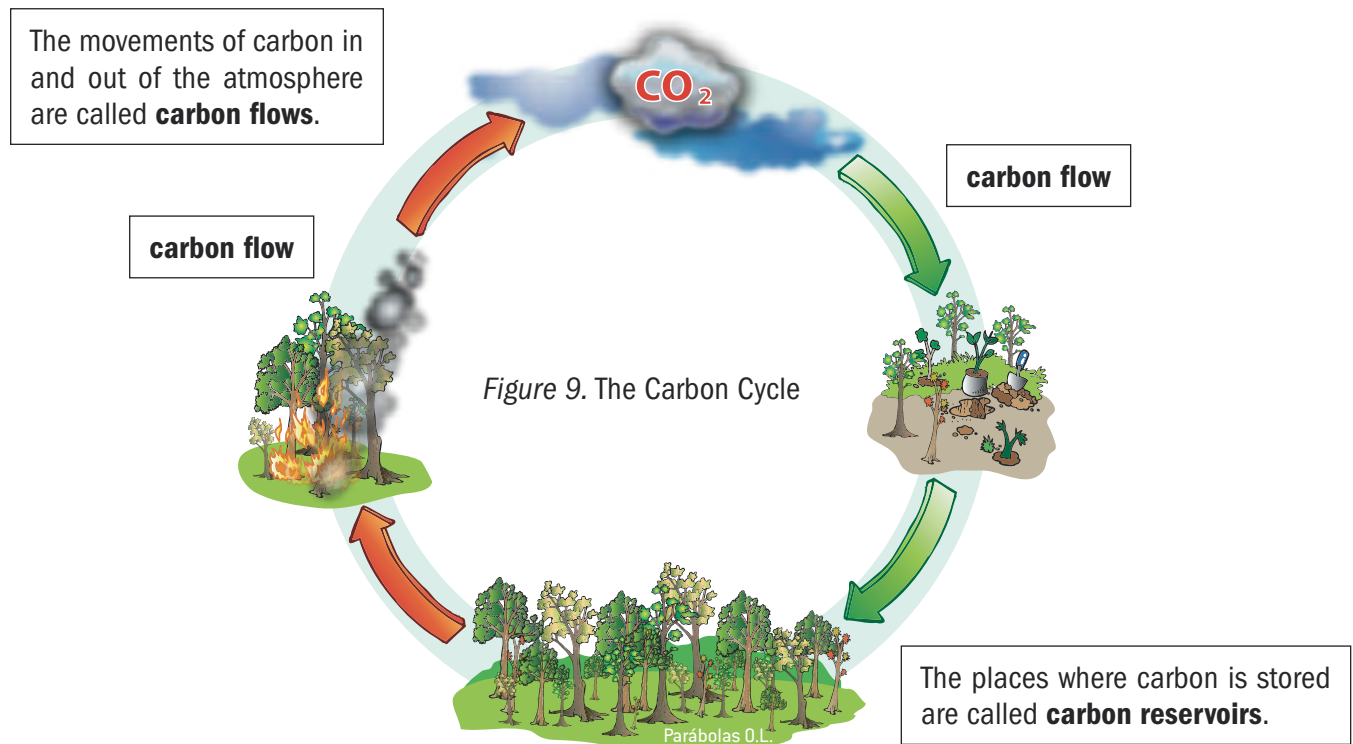
- CO₂ is very important in the earth's natural process of photosynthesis—providing the carbon needed for plants to grow and oxygen for the air.
- CO₂ is produced naturally when plants or animals die and decay, and it is also produced from human activities such as burning wood and operating vehicles.
- CO₂ produced by human activities does most to cause climate change.

WHAT IS THE CARBON CYCLE?

Carbon can always be found in three different ways. Carbon is either being:

1. pulled out of the air as part of carbon dioxide by plants and trees and used as energy and food for growth;
2. released back into the air as part of CO₂ by plants, trees, animals and humans through respiration or breathing;
3. stored in the bodies of trees, animals, humans, as well as rocks and other non-living things.

Different types of areas store different amounts of carbon. Forests with many trees store a large amount of carbon. Grasslands or farms store much less carbon.



The natural process of carbon moving or flowing between the different places where it is used and stored (reservoirs) is called the **carbon cycle**.

HOW DOES THE CARBON CYCLE WORK?

Carbon is constantly being absorbed from the carbon dioxide in the air, stored in trees, plants or other living things, then used and released as carbon dioxide into the atmosphere where it becomes part of the greenhouse gas effect.

Plants use solar energy from the sun, water, nutrients and carbon to grow. When a tree is planted, it takes carbon out of the air so that it can build leaves, roots, branches, flowers and fruits. Plants and trees store carbon and return CO_2 and oxygen to the air through respiration (a kind of breathing!). When plants and animals die, the carbon that was stored in their bodies returns to the soil and into the air. So the carbon is constantly moving or flowing within the carbon cycle in many different ways.

PART 3. HOW DO HUMAN ACTIVITIES HELP CAUSE CLIMATE CHANGE?

The main reason the climate is changing is that human activities are disturbing the earth's processes and cycles that control the earth's climate, like the greenhouse effect and the carbon cycle. More and more CO_2 emissions from human activities are changing the balance of the earth's natural processes—causing global warming and climate change.

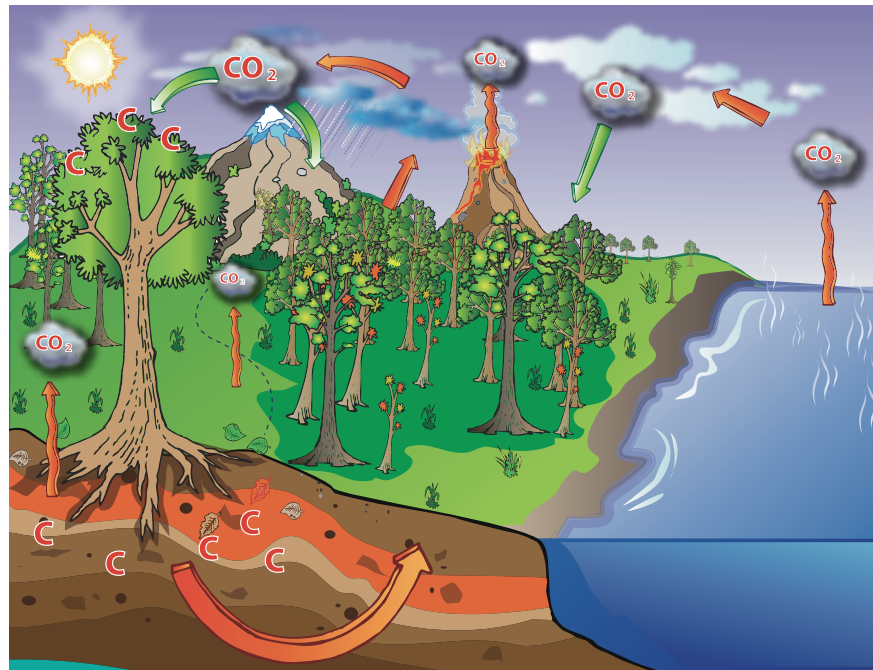


Figure 10. The Natural Carbon Cycle

Carbon flows in and out of the atmosphere through natural processes and is stored in reservoirs.



Figure 11. Human Impacts on the Carbon Cycle

Human activities can produce more CO_2 in the atmosphere (industry and fires) and can also reduce the amount of CO_2 pulled out of the air and stored (cutting down forests). This disturbs the natural process of the carbon cycle.

Almost every single activity we do releases some CO₂ into the air, but some activities release large amounts, such as burning fossil fuels through industry, the use of vehicles, and deforestation and fires:

BURNING OF FOSSIL FUELS (PETROLEUM, NATURAL GAS)

Vehicles and industries, such as mining or manufacturing use fossil fuels. Electricity is often produced by burning fossil fuels such as coal or natural gas. These fuels all contain high amounts of carbon. When cars or machines use gasoline or diesel the carbon in the fuel changes into carbon dioxide that goes straight to the atmosphere.

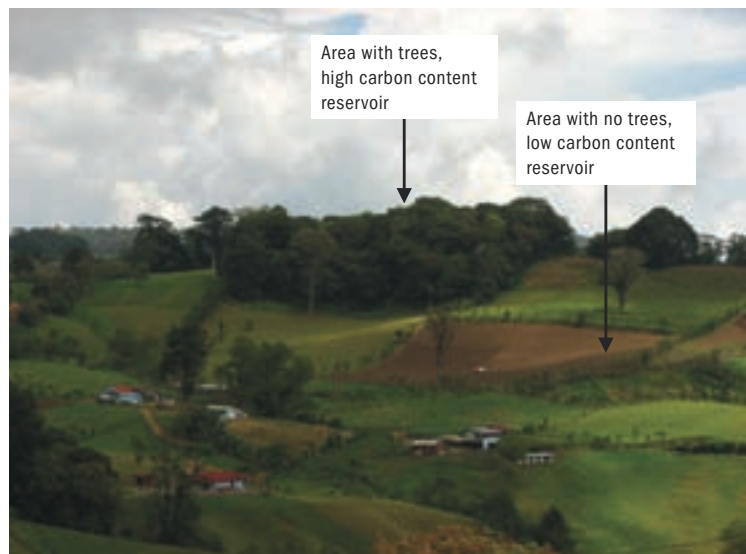
Fossil fuel is the term for fuel that is formed inside the earth over a long time from decaying plants and other organisms. Examples are oil, coal, and natural gas.

DEFORESTATION AND FIRES

Cutting down or burning trees to change forests into pastures or agricultural land or for commercial timber production releases carbon dioxide into the atmosphere.

LAND USE CHANGE

Land use change also affects the carbon cycle in another way. When forests are cut down for commercial timber, agriculture, or livestock grazing, the amount of forest available to pull CO₂ out of the air is reduced so more CO₂ stays in the atmosphere. Changing natural ecosystems to areas of human use (agriculture, pasture lands, building land and so forth) usually causes a change from an area of high carbon storage (often forest or woodland) to one of lower carbon storage (such as pasture land).



Mario Chacón León

Figure 12. Carbon Storage
Different types of areas store different amounts of carbon. Forests with many trees store a large amount of carbon. Grasslands or farms store much less carbon.




Industrial Processes		Land Use Change		
Burning of Fuels (Petroleum, Gasoline)		Fires	Deforestation	Mining
				

Figure 13. Industrial Processes and Land Use Change Cause CO₂ Emissions and Reduce Carbon Storage

Reducing the quantity of fossil fuels used in industry and vehicles and stopping deforestation will reduce the amount of carbon that is sent into the atmosphere. Planting trees or reforesting areas that have already

been cut and cleared will add new trees to remove carbon from the air and store it as they grow, increasing the amount of carbon taken out of the atmosphere. These activities can help restore the balance of the earth's natural processes and help stop climate change.

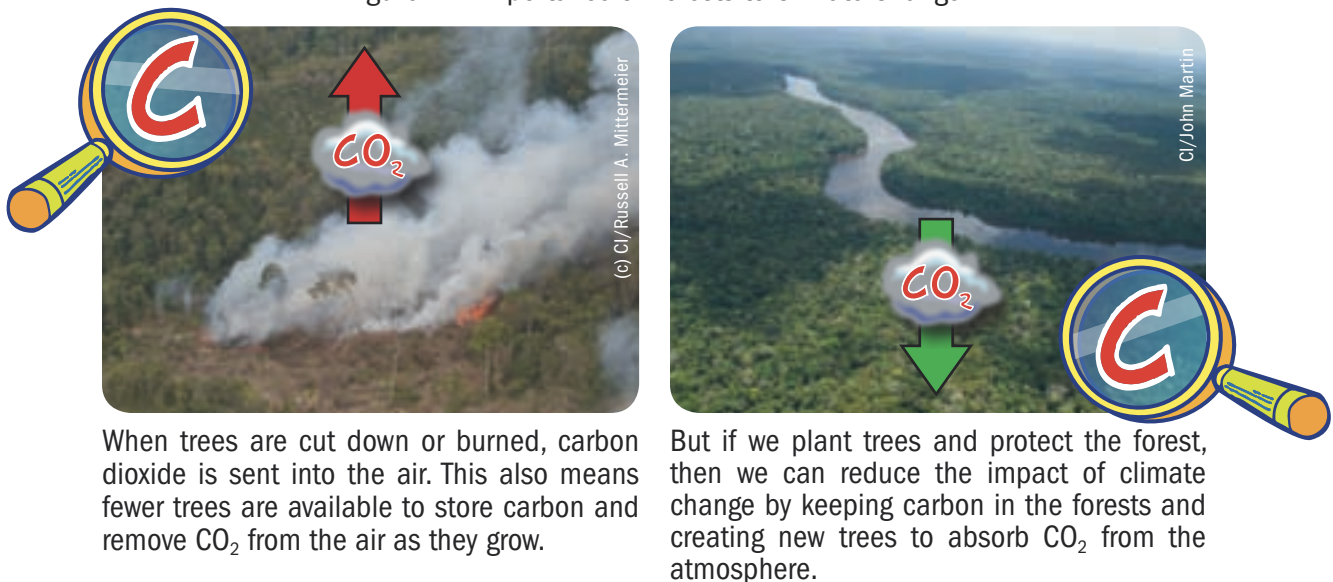
The **Industrial Revolution** is called a turning point in human history. It began in the late 1700s with the invention of machines that began to replace human manual labor. By the mid 1800s the use of machines was increasing rapidly. These machines were powered by coal and other fossil fuels. While the Industrial Revolution brought many benefits to people's daily lives, it also marked a change in the impact of human activities. Now mass production with increased use of fossil fuels began to cause more greenhouse gases to be released into the atmosphere. This increased even more when electricity and vehicles were invented and widely produced and used. Technology must be used in a sustainable way to avoid increasing the effects of climate change.

PART 4. WHY ARE FORESTS SO IMPORTANT?

Forests and natural areas play a very important role in maintaining natural processes. Forests are one of the biggest reservoirs of carbon, so they help to keep the carbon cycle and other natural processes working and help reduce climate change.

But forests can also be one of the biggest sources of CO₂ emissions. Since forests and other plants also pull CO₂ out of the atmosphere, this double role makes forests even more important. Scientific studies say that between 12-17% of all the CO₂ sent into the atmosphere by human activities comes from the destruction of forests.¹

Figure 14. Importance of Forests to Climate Change



The following sessions of the training discuss more about how healthy forest ecosystems can help to solve the problem of climate change. Using and managing forests wisely is not the only solution to stopping climate change. All over the world, especially in countries with many industries and vehicles, humans need to find new ways to make goods, energy and transportation that produce less CO₂.

IMPORTANT THINGS TO REMEMBER:

- Greenhouse gases and the greenhouse effect are both part of natural processes that support life on earth.
- Carbon is found in all things. When carbon is released into the air through burning fuel or trees, or by decaying plants, it joins with oxygen to form the gas CO₂.
- CO₂ is the most important GHG—when there is too much CO₂ in the atmosphere, the earth gets warmer and the climate changes.
- Carbon flows in and out of the atmosphere and is stored in reservoirs like forests and oceans in the natural carbon cycle.
- Human activities can upset the natural carbon cycle and cause climate change by adding too much CO₂ to the atmosphere.
- Managing forests wisely plays a double role in keeping the carbon cycle and greenhouse effect working naturally by reducing CO₂ emissions and increasing the CO₂ pulled out of the atmosphere and stored as carbon.

KEY TERMS TO REMEMBER:

Carbon: one of the most common elements in the universe, found in all living and non-living things

Carbon cycle: the natural process of carbon moving or flowing between the different places where it is used and stored (reservoirs)

Carbon dioxide (CO₂): the result of joining carbon (C) with oxygen (O). It takes 1 part of carbon joining with 2 parts of oxygen to form the gas CO₂

Carbon flows: the movements of carbon in and out of the atmosphere

Carbon reservoirs: the places where carbon is stored

Carbon stock: the quantity of carbon in a carbon reservoir at a given time

Fossil fuel: fuel that is formed inside the earth over a long time from decaying plants and other organisms, such as oil or coal

Greenhouse effect: the name for the process of how the atmosphere keeps the earth warm

Greenhouse gases: the gases that help regulate the earth's temperature

Land use change: changes in the way an area is used or managed, such as changing forest to farms, changing farms to pasture, or returning pasture to forest by re-planting trees

SESSION 3. CLIMATE CHANGE POLICIES AND ACTION: WORKING TO SOLVE THE PROBLEM OF CLIMATE CHANGE

Piotr Naskrecki

LEARNING OBJECTIVES

At the end of the session, participants should be able to:

- Understand how countries work together to make policies and take action on climate change
- Understand some of the ways indigenous organizations are working on climate change
- Define mitigation and some of the ways climate change can be slowed
- Define adaptation and understand how some communities are adapting to climate change

PART 1. CLIMATE CHANGE POLICIES: WHAT IS THE WORLD DOING ABOUT CLIMATE CHANGE?

A **policy** is a plan of action to guide decisions and achieve results. Governments from countries around the world are working to design policies that will stop climate change, help people adapt to the changes that have already happened, and better prepare for changes that are likely to happen in the future. Countries work through international organizations that help governments work together to make policies on many important issues, including climate change. The international organization that leads international policy-making is the United Nations (UN), which includes 192 countries—almost every country in the world.

Within the United Nations, a body called the United Nations Framework Convention on Climate Change (UNFCCC) works to organize countries to design climate change policies. The UNFCCC holds important policy-making meetings each year. Every country that is part of the UNFCCC sends **delegates** or representatives to participate in these policy meetings to negotiate and make decisions on ways to deal with climate change. Non-governmental organizations (NGOs), private businesses, and groups with special interest, such as indigenous peoples' organizations, also attend these meetings to make their opinions heard and to influence decisions. **But only the government delegations make the decisions at the UNFCCC.**

The most important actions that the UNFCCC is working on right now are policies to assist countries to stop or lessen climate change and to adjust to the effects of climate change that are already happening. These policies create plans, encourage research, and support countries with money and technologies to take action to solve the problems that have come with climate change.

The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. The Convention has been ratified (agreed to) by 192 countries, so it has nearly universal membership. Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change such as sea level rise, droughts and flooding.¹

The Convention entered into force on 21 March, 1994.

WHAT DO THESE POLICIES MEAN IN PRACTICE?

These policies are created in order to help countries and people reduce or improve some practices, like how much electricity is used or how factories are powered, in order to reduce the amount of greenhouse gases (GHG) released into the atmosphere. These kinds of action which try to stop or lessen climate change are called **mitigation**. The policies also help countries to find new ways to adjust to the changes already brought by climate change and to prepare for changes that are likely in the future. This is called **adaptation**. Within the UNFCCC, countries work to come to agreement on mitigation and adaptation actions.

The most important agreement made by the UNFCCC so far is called the **Kyoto Protocol**. In this agreement countries promised to reduce greenhouse gas **emissions** and to look for new ways to create energy that causes less CO₂ emissions. Developed countries also agreed to transfer technology and funds to developing countries to assist them to help stop climate change and to adapt to the changes they are seeing now and will likely see in the future.

Countries promised, or made commitments, to take these actions in a specific period of time. This is called a 'commitment period.' The Kyoto Protocol's first commitment period is 2008 to 2012. Now the countries within the UNFCCC are working to design new policies or agreements for the next commitment period, after 2012. Several important areas that are under discussion include:

- Reduction of the amount of CO₂ and other gases released into the atmosphere
- Stopping deforestation
- Improving forest management and forest conservation
- Protecting communities from rising sea levels
- Creating national adaptation plans
- Finding ways to provide expertise, technology and funds to pay for these actions.

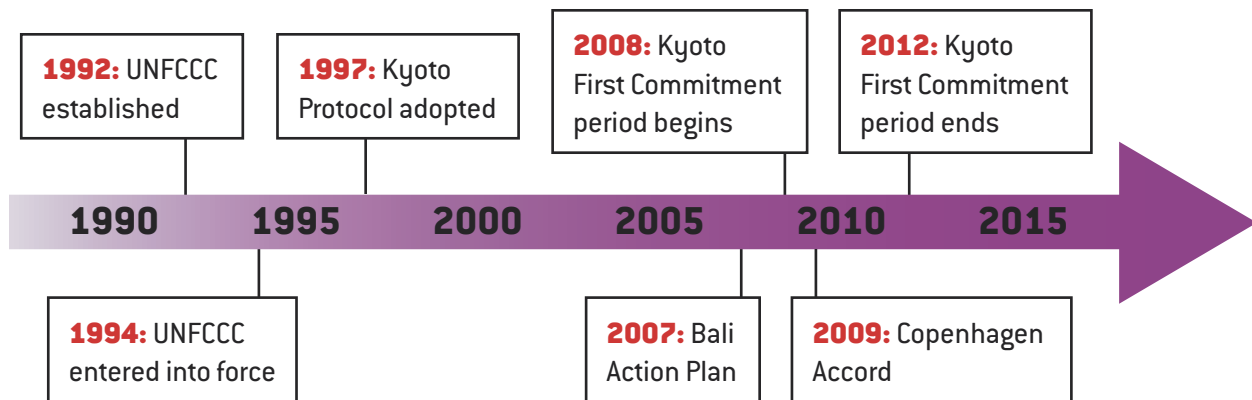


Figure 15. Timeline of Important Actions at the UNFCCC

GROUPS OF COUNTRIES WITH COMMON INTERESTS WORKING ON CLIMATE CHANGE:

- Many small island nations work together through the Alliance of Small Island States (AOSIS).
- Forty-nine of the poorest countries with low income and high vulnerability, called the Least Developed Countries, work together to promote higher mitigation goals to stop or lessen climate change, and increased resources for adaptation.
- Many of the developing countries form a loose coalition call the Group of 77 that frequently works together with China to promote common interests.
- The European Union negotiates as a group, and several of the other developed countries, including the US, Canada and Japan work in a group called the Umbrella Group.
- The Rainforest Coalition, a group of 33 developing countries with tropical rainforests works to address the impact of carbon emissions from deforestation related to global climate change.

Other important actions on climate change that have been taken at UNFCCC annual meetings include:

2007: Bali Action Plan—adopted at the UNFCCC meeting in Bali, Indonesia. Countries agreed to a course of action for a new negotiating process to tackle climate change—the goal was to make decisions on what would be included in a new agreement after the Kyoto Protocol.

2009: Copenhagen Accord—a document that discusses several important points for a future agreement, including commitments to reduce emissions and long-term funding plans for supporting action to stop climate change. This was not a legally binding agreement, but is a step toward reaching agreement at the next annual UNFCCC meeting in Mexico in 2010.

HOW DO NATIONAL GOVERNMENTS ENGAGE IN INTERNATIONAL CLIMATE POLICY?

Every country has its own unique environmental, social, and economic situation. When governments negotiate at the UNFCCC on climate change, they must take into consideration the potential impacts to their

people, environment, and economy. With 192 different governments involved in the decision making process, it is a challenge for them to all agree. **In the UNFCCC, every country must agree in order for a decision to be made.**

Even though each country has its own views and priorities, there are groups of countries that have similar interests and these groups often work together in order to get a final agreement that is in their best interest. *(See box on page 20.)*

Developing countries frequently share similar concerns about the rising impacts and threat of climate change to their economies, as well as the need for significant mitigation action by developed countries and support for adaptation to climate change.

Developed countries are often concerned about the impacts of climate mitigation action on their economies and trade relationships, and the ability to obtain and distribute funding for adaptation.

In the UN climate policy process, each country negotiates based on its needs. In order to have a larger impact, countries will work closely with those that share common concerns and interests. Those concerns and interests change over time, so a country's position in the negotiation can change too. The UNFCCC process is a continual dialogue and developing and developed countries have all acknowledged that they need to work harder to come to agreement. In the UNFCCC, the developed world has agreed that it must make large commitments to begin to address climate change and support the developing world. However, the policy process continues in order to decide exactly how that will be done.

HOW ARE INDIGENOUS PEOPLES CONTRIBUTING TO POLICY-MAKING AT THE INTERNATIONAL LEVEL?

Indigenous peoples' organizations from around the world send representatives to the UNFCCC and other climate meetings to influence decisions. They work to ensure that the rights of indigenous peoples as defined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and other international agreements are respected as governments make decisions on climate change actions.

Some countries include indigenous representatives as members of their country's official delegations to the UNFCCC negotiations.

Indigenous peoples are also working on policy development through the United Nations Permanent Forum on Indigenous Issues (UNPFII). (A forum is a place where people discuss and make decisions on specific issues.) This forum has the mandate from the United Nations to discuss indigenous issues related to economic and social development, culture, the environment, education, health and human rights.



The role of indigenous peoples and local communities in contributing to climate change policies at the national and local level is also very important. Their traditional practice and knowledge of the land, forests and natural processes can make an important contribution to local and national planning to combat climate change. They also have an important role as sustainable forest managers.



Indigenous peoples' organizations also come together independently to discuss issues related to climate change. The Inuit Circumpolar Council, in collaboration with other organizations, hosted a Global Summit on Climate Change in April 2009 in Anchorage, Alaska that brought together indigenous delegates and observers from all regions of the globe to exchange their knowledge and experience in adapting to the impacts of climate change, and to develop key messages and recommendations to be presented to the world at the UN Framework Convention on Climate Change in their annual meeting in 2009.

WHAT ARE NATIONAL GOVERNMENTS DOING?

National governments are working to make new policies and approaches that will help to lessen climate change and still allow their countries to grow and develop a strong economy. While much remains to be done, developed countries are working to reduce their emissions and lessen the impacts of climate change. The UNFCCC and other international organizations are working to assist developing countries with funding and technology to help them design sustainable development strategies that do not increase greenhouse gases.

Many developing countries still have the forests and other resources that can play an important role in absorbing CO₂ from the atmosphere and storing carbon to reduce or mitigate climate change. Forests and other ecosystems provide critical resources (like freshwater and food) that help communities to deal more effectively with the impacts of climate change and adapt to things like rising temperature and sea level. National governments, the UNFCCC and other organizations are looking at ways to safeguard those ecosystems and resources in order to protect communities and help the world mitigate and adapt to climate change.

PART 2. MITIGATION ACTION: HOW CAN INTERNATIONAL POLICY HELP TO REDUCE CLIMATE CHANGE?

WHAT IS MITIGATION AND MITIGATION ACTION?

Climate change mitigation is the process of reducing greenhouse gas (GHG) emissions that come from industrial activities and forestry and agricultural activities. Reducing GHGs in the atmosphere will require that all the different parts of a country's economy are taken into account when considering changes that will reduce the CO₂ that human activities produce.

Industry works on new ways to operate factories that use less fuel. Vehicle makers look for new ways to run cars and trucks, such as electrical power or **biofuels** (fuel made from plants such as corn). Cities and towns look for better ways to make electricity, such as solar and hydro power.

Good management of forests can play a very important role to mitigate or lessen climate change. This will be discussed more in Session 5.

Some other examples of mitigation actions are:







From the Energy Sector:	From the Transportation Sector:
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Courtesy of Sunlabob Renewable Energy, Ltd</p>	 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">www.4e-moto.com</p>
<p>Using more efficient electrical equipment like solar panels to provide electricity to communities</p>	<p>Use cars less and public transportation more (buses, trains)</p>
From the Forestry and Agricultural Sectors:	
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Courtesy of UNEP Climate Neutral Network</p>	 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">C/John Martin</p>
<p>Reforestation—planting new trees</p>	<p>Avoiding deforestation, or the cutting of trees</p>
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Courtesy of Tropical Forest Foundation</p>	 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Mario Chacón León</p>
<p>Improved management of forest resources</p>	<p>Improved crop and pasture management to increase carbon storage in the soil</p>

Figure 16. Mitigation Actions in Different Parts of Daily Life

PART 3. CLIMATE CHANGE ADAPTATION: HOW CAN WE COPE WITH CLIMATE CHANGE?

WHAT IS ADAPTATION?

Adaptation is a change in the way of doing something because of new conditions. Because the climate is changing, plants, animals and people are going to need to adapt to new weather conditions and sea levels.

Imagine people who live in cities or villages on the coasts, right in front of the ocean. If the sea level rises too much, houses and streets will be under water.

One way of adapting is to build houses on stilts so the water can run underneath them, or to move buildings to higher ground. This is a way of adapting to more flooding.



WHY DO WE NEED TO CHANGE?

Even if all greenhouse gas emissions could be stopped immediately, climate change would continue for many years because CO₂ and other gases stay in the atmosphere for a very long time.

Because the climate is changing, many aspects of daily life for people and communities are going to change. In some areas conditions are changing slowly; in others change is happening more rapidly. Some areas will change more than others. This depends on the part of the world, and how climate impacts it. Change is occurring more rapidly in cold climates where warmer temperatures are melting snow and ice and threatening people's way of life. In the past, changes in climate happened over a long period of time, so people, animals and plants had time to adapt naturally. Now change is happening too fast for animals and plants to adapt naturally. People also need time to make plans and changes, so it is important to work on ways to adapt now.

WHAT ARE GOVERNMENTS DOING ABOUT ADAPTATION?

Climate change is affecting people now and there will likely be more impacts in the future. Scientists and local communities are observing earlier melting of snow in the spring, higher sea levels, and changes in rainfall patterns. These changes affect how people live. Governments and international agencies are talking about what actions can be taken to protect people and the environment. International funds are being created to help developing countries adapt, and there has been discussion of increasing those funds.

Governments of the countries most affected by climate change are making plans called National Adaptation Plans of Action. The goal of these plans is to identify the communities, ways of living, and ecosystems that are the most at risk and to increase their ability to deal with climate change.

HOW CAN COMMUNITIES ADAPT TO CLIMATE CHANGE?

People living in tropical forests have their own cultures, goals, and interests. Indigenous peoples and local communities have local knowledge, practices and traditions for managing the natural resources that allow them to survive. Indigenous and other forest dependent peoples who depend on the forests are skilled at adapting to changes in natural conditions. This local knowledge and traditional practice are helpful tools for adapting to climate change.

Traditional knowledge: the wisdom, knowledge and practices of indigenous peoples and local communities gained over time through experience and orally passed on from generation to generation.³ Over the years, traditional knowledge has played a significant part in solving problems related to resource management, and it can also help communities adapt to the problems related to climate change.



C/Vitus Antone

- In Brazil's semi-arid region, family farmers are responding to decreases in food production by rethinking how they farm. Among the strategies used to reduce risk are water conservation and planting several different crops.⁴
- The Aymaras People of Bolivia have problems with getting enough water for their needs. They have developed a new way of collecting water in the mountains by placing small dams along the mountain rivers. The dams have been very useful, not only for human needs, but also for their domestic animals, especially in times of drought.⁵
- In Burkina Faso, a country in Africa where drought has been increasing, farmers dig holes during the dry season where they will accumulate leaves and dead plants and manure. This brings termites when the season of rains begins. The termites create tunnels that store water and improve the soil for farming.⁶



IMPORTANT THINGS TO REMEMBER:

- The United Nations Framework Convention on Climate Change (UNFCCC) is the international body that organizes countries to make policies about climate change.
- Only country governments can make decisions about policies at the UNFCCC, but many other organizations attend meetings to observe and influence decision-making.
- Groups of countries with similar interests often work together to promote policies that are in their best interests.
- Indigenous peoples' organizations work to influence decisions at the UNFCCC.
- Under the Kyoto Protocol developed countries agreed to reduce GHG emissions and to assist developing countries to mitigate climate change.
- Mitigation actions help stop or lessen climate change.
- Adaptation action helps countries adjust to changes that have already happened or that may happen in the future.

KEY TERMS TO REMEMBER:

Adaptation: adaptation is a change in the way of doing something. Because the climate is changing, plants, animals and people need to adapt to new weather conditions

Delegates: representatives

Emission: a substance discharged into the air. In climate change, the term emissions refers to GHGs sent into the atmosphere

Mitigation: the process of stopping or lessening climate change by reducing

greenhouse gas (GHG) emissions that come from industrial activities and forestry and agricultural activities

Policy: a plan of action to guide decisions and achieve results

Traditional knowledge: the wisdom, knowledge and practices of indigenous people and local communities gained over time through experience and orally passed on from generation to generation

SESSION 4. NEW METHODS OF MANAGING AND VALUING FORESTS TO BENEFIT CLIMATE, COMMUNITIES AND BIODIVERSITY: PAYMENTS FOR ECOSYSTEM SERVICES

CI/Russ Mittermeier

LEARNING OBJECTIVES

At the end of the session, participants should be able to:

- Understand the importance of ecosystems
- Understand the meaning of ecosystem services
- Understand what payments for ecosystem services are and how they work

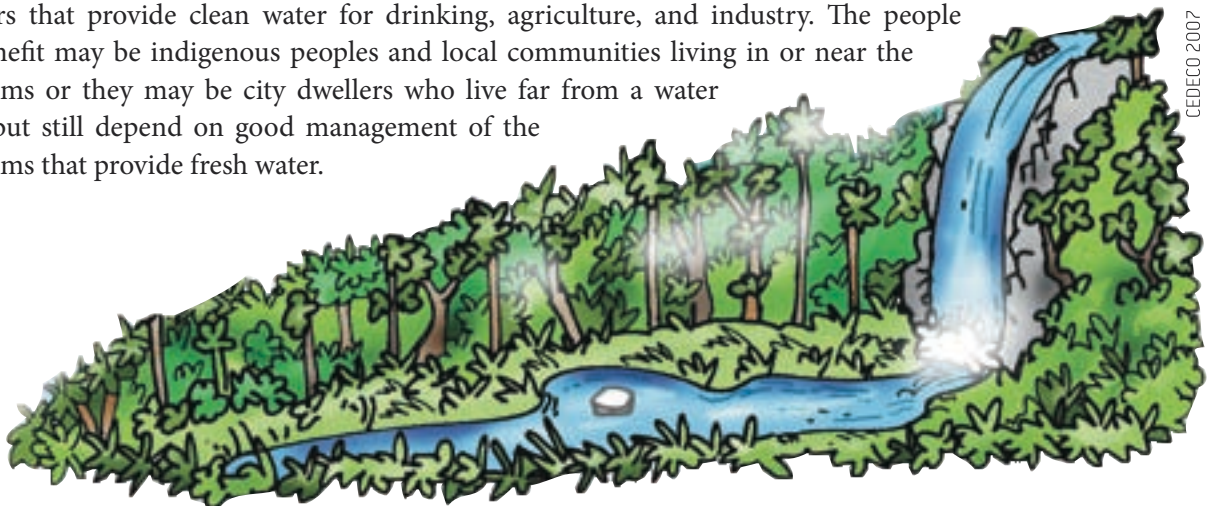
PART 1. WHAT ARE ECOSYSTEMS AND ECOSYSTEM SERVICES?

An **ecosystem** is a natural group of plants, animals and microorganisms that live together in a specific place depending on the environment to survive. The environment is the characteristics of the surrounding place, for example soil, rocks and water. The most common ecosystems are shown on the following page.

Ecosystems provide essential services for people all over the world. These **ecosystem services** include:

- services that provide food, water, timber, and fiber;
- services that control climate, floods, disease, wastes, and water quality;
- cultural services that are a source of beliefs, traditions, and also enjoyment.

Ecosystems benefit everyone in some way—mountain and forest ecosystems contain the **watersheds** for rivers that provide clean water for drinking, agriculture, and industry. The people who benefit may be indigenous peoples and local communities living in or near the ecosystems or they may be city dwellers who live far from a water source but still depend on good management of the ecosystems that provide fresh water.



CEDECO 2007

Some of the most common ecosystems:

Forest



CI/John Martin

Desert



CI/Russell A. Mittermeier

Cold-weather Ecosystems



CI/Russell A. Mittermeier

Mangroves



CI/Haroldo Castro

Marine



© Brian Skerry, International League of Conservation Photographers

Grasslands



© CI/photo by Gina Buchanan

Figure 17. Common Ecosystems

Because human life depends on ecosystem services, it is very important that we conserve and sustainably manage the ecosystems that provide these services. One of the biggest challenges to national governments

and local communities is finding enough resources to conserve and sustainably manage natural ecosystems so that both current and future generations will continue to benefit from the services ecosystems provide.

People and countries also depend on the resources within ecosystems for economic development. Cutting logs provides cash income and building dams produces electricity, so there has to be a balance between maintaining ecosystems for natural services such as clean air and water, and economic services such as timber and electricity.

PART 2. WHAT ARE PAYMENTS FOR ECOSYSTEM SERVICES?

Governments and international policy makers are working to find ways to provide the resources to help countries and forest managers keep this balance. One way is to provide funds and technology to help countries and forest managers use forests sustainably, replant forests and restore areas that have been over used. Another way is to provide payments that compensate governments and forest managers for conserving ecosystems—leaving areas in their natural state to continue providing ecosystem services.

These plans are called **payments for ecosystem services** or **PES**.

- At the national level, payments can come from different sources, such as national programs paid for by taxes or from funding from other countries, international organizations, or private investors.
- At the local level, payments for maintaining ecosystem services can take the form of cash or other benefits important to local communities, such as new income opportunities, training, or health services.

Payments for ecosystem services are frequently done through arrangements that require countries or communities to agree to certain actions, such as sustainably managing forests, as a condition for receiving the payments. Payments for ecosystem services are creating new ways of valuing ecosystems and the services they provide.

PES agreements can be very local and small, such as protecting a local forest or watershed; or they can be very large and impact an entire country and the world, such as maintaining large forest areas that store carbon and help keep the air clean.

HOW DOES A PAYMENT FOR ECOSYSTEM SERVICES WORK?

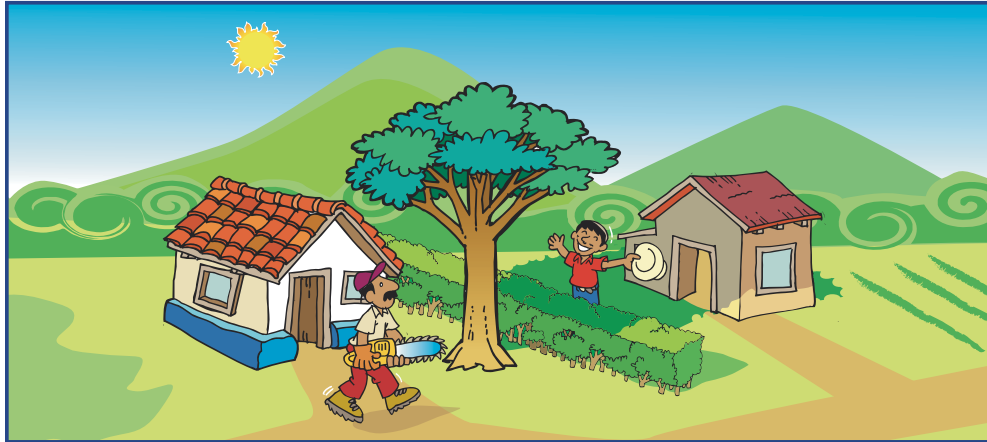
A payment for ecosystem services is a project or activity in which people or governments agree to conserve natural resources and receive benefits as compensation.

A payment for ecosystem services activity (sometimes called a scheme) works like a trade activity. For example, a PES activity would include:

- a person or a group of people (such as the community or government),
- that offers a service (such as forest conservation) and
- a person or group of people who provide the community or government with payment or benefits in exchange for the service they receive (such as clean water).

In other words, a payment for ecosystem services is a scheme of work, where the community or government conserves and manages the forest in a sustainable way, while they receive a payment from those who benefit from the ecosystem services from that forest.

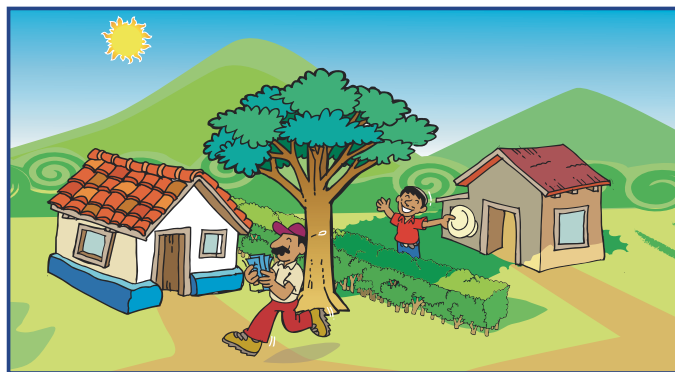
Shown below are two examples of how payments for ecosystem services work. The first example is a very small but important PES agreement.



Your neighbor has a tree that gives shade to your house.



The neighbor needs money, so plans to cut down the tree to sell. You know this will make your house very hot during the day. You could plant your own tree, but it will take many years to grow. So your neighbor's tree has value to you for the services it provides.



To avoid losing the shade for your house, you can offer to pay your neighbor for agreeing to leave the tree standing. The neighbor gets the money he needs, and you keep the shade for your house. You have made a PES agreement with your neighbor!

Parábolas O.L./Concept by Hannah Campbell

Figure 18. A Basic PES Agreement

The next example shows an agreement at a larger scale between forest owners and downstream water users:

The people who live in a town are using water from a river that flows from a forest that is close to the town.

The forest is being cut by the owners of the forest for cash income. This deforestation, or removal of trees, also causes soil to runoff into the river, causing contamination of the water used by the people in the town.

Because they value having clean water, the people of the town want to resolve the problem by making an agreement to pay the forest owners to leave the forest standing for a period of years.

Through this PES agreement, the townspeople get the clean water they need; the forest owners get the income they need; the ecosystem stays healthy and provides many other services, including storing carbon to mitigate climate change.

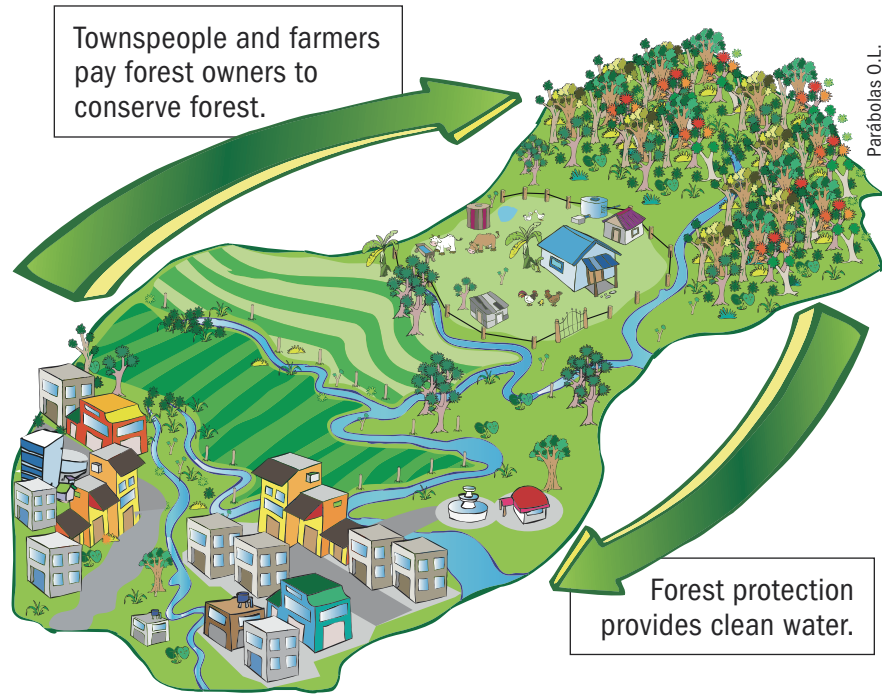


Figure 19. A PES Agreement Between a Town and Forest Owners

WHERE DOES THE MONEY COME FROM TO PAY FOR THE SERVICES?

Funding can come from national government programs, other countries, international organizations, or from the people who benefit from the services. There are different ways that money can be found for payments for ecosystem services:

- In the above example, the townspeople could pay a small fee for continuing to receive clean water.
- The government could set aside funds to help keep the water clean while also helping forest owners to have good livelihoods.
- In some cases, a value is set for a service, such as the value of keeping carbon stored in trees. This could allow government and landowners to sell this service through markets. This is explained in the next session.
- There can be international funds that are set up to help governments, communities and forest owners or users to make agreements that keep ecosystems services healthy and available to everyone.

IMPORTANT THINGS TO REMEMBER:

- Natural ecosystems such as forests and mangroves can provide multiple **ecosystem services** including climate benefits.
- National governments and local communities in developing countries do not have enough resources to protect and manage natural ecosystems. **Payments for ecosystem services** could be a good option to help conserve and manage natural ecosystems.
- Payment for ecosystem services agreements can be very small and local or very large and benefit whole countries.

KEY TERMS TO REMEMBER:

Ecosystem: a natural group of plants, animals and micro-organisms that live together in a specific place with specific characteristics or environment

Ecosystem services: ecosystem services are the benefits people obtain from ecosystems. Ecosystems provide essential services for people all over the world. These include: services that provide food, water, timber, and fiber; services that control climate, floods, disease, waste, and water quality; cultural services that are a source of spiritual benefits and also enjoyment

Environment: the characteristics of a place

Payment for ecosystem services: a way to provide resources to countries and communities to help maintain healthy ecosystems

Payment for ecosystem services agreement: an agreement in which people agree to take specific actions to manage and conserve ecosystems and receive specific benefits in return

Sustainable forest management: managing forests in a way that takes only what is needed and leaves the ecosystem healthy with resources for the future

Watershed: an area of land that sheds or drains all of its water into the same place, such as a river

SESSION 5. A NEW WAY TO VALUE THE ROLE OF FORESTS TO MITIGATE CLIMATE CHANGE: REDD+

© Robin Moore

LEARNING OBJECTIVES

At the end of the session, participants should be able to:

- Understand the concept of reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable forest management and enhancing forest carbon stocks in developing countries (REDD+) as a new way for valuing forest
- Understand how REDD+ can mitigate climate change and bring benefits to climate, communities and biodiversity

PART 1. AN OVERVIEW OF REDD+

International policy-makers recognize that reducing GHG emissions from deforestation and forest degradation is an important part of international and national plans for mitigating or reducing climate change.

REDD+ is described as ‘... policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.’ (UNFCCC Decision 2/CP.13-)¹

In the early days of this policy discussion on the impact of forests on climate change, attention was mostly paid to stopping harmful practices related to forest use and management—such as rapid cutting of trees. Now the discussions have expanded to take into account the ecosystem services that forests provide. Governments are also discussing how to support **sustainable forest management**, and the role of carbon storage in the forests of developing countries as part of a process to mitigate climate change. The term has now changed from just REDD to REDD+ to include these forest services in the discussions.



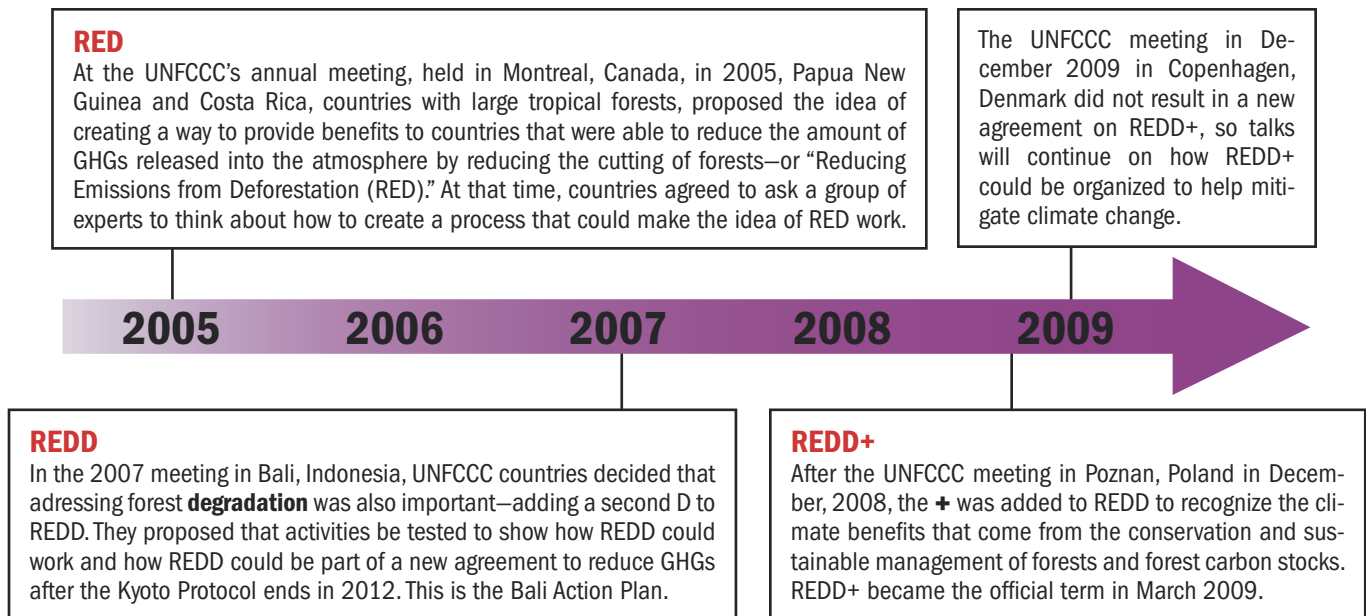


Figure 20. Timeline for the Development of the REDD+ Idea

WHAT SHOULD BE INCLUDED IN REDD+ PLANNING?

REDD+ is a very complicated topic and negotiations and discussions are moving ahead very slowly. At each UNFCCC meeting over the last few years, some progress has been made, but remember that all countries must agree in order to create a new policy. Since each country or group of countries has their own ideas, needs and priorities, coming to agreement on how REDD+ should work is very difficult. There are several parts of the discussions about REDD+ on which countries will need to come to agreement. Some of the most important areas of work and the questions that must be solved are shown below:²

1. The way REDD+ should be organized

- Can REDD+ be coordinated as many projects at the local level?
- How should REDD+ be coordinated as a national plan?

2. Financing and benefits distribution

- Where will the funds come from to pay for REDD+ action?
- How will decisions be made on distributing REDD+ funds to reduce deforestation?

3. Monitoring, Reporting and Verification (MRV)

- How should the international community and individual countries make sure that REDD+ activities are conducted correctly?
- Who should monitor and report that activities are producing results—such as verifying or checking on the amount of carbon stored; or monitoring the impact of benefits for national and community development?

4. Stakeholder involvement

- How will the rights of indigenous peoples and local communities be respected in a REDD+ policy, including **free, prior and informed consent (FPIC)**?

The underlying principles of **free, prior and informed consent** can be summarized as follows: (i) information about and consultation on any proposed initiative and its likely impacts; (ii) meaningful participation of indigenous peoples; and, (iii) representative institutions.³

- b. How will the effective participation of indigenous peoples and local communities in REDD+ decisions and activities be achieved?

5. REDD+ and other benefits

- a. How can REDD+ activities contribute to sustainable development and the protection of biodiversity and ecosystem services?
- b. How will REDD+ provide benefits to the poor and protect human rights?

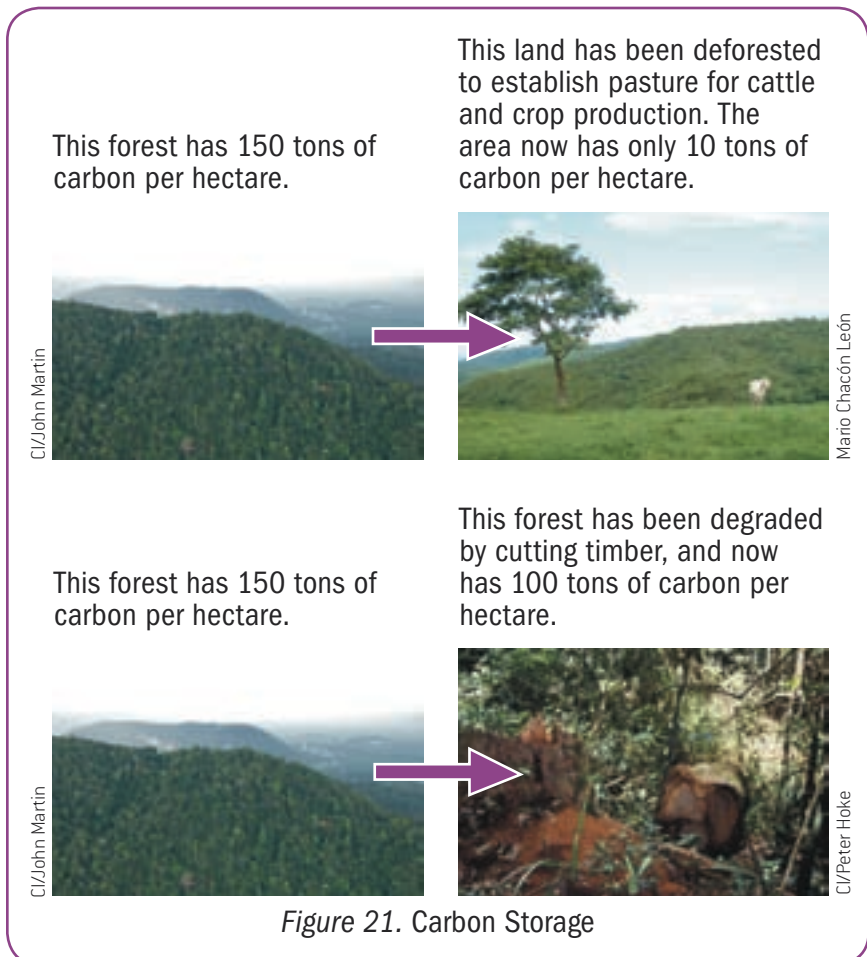
These are important and complicated questions that are being worked on at the UNFCCC meetings and in countries around the world. They are also being researched and discussed by many organizations and groups to find answers—such as indigenous peoples’ organizations, scientists, conservation organizations, and other interest groups.

PART 2. HOW COULD REDD+ WORK?

REDD+ is a kind of international payment for ecosystem services. Developed countries, international funds, or private companies offer financial or other benefits to developing countries, landowners, or communities to take action to reduce carbon emissions from deforestation and forest degradation. In countries that still have much of their forests intact, benefits may come from keeping these forests standing and continuing to store carbon. For countries with high rates of deforestation—cutting many trees each year—benefits could be paid for stopping deforestation practices and restoring degraded forests. How these actions will be monitored and how funds will be paid under REDD+ are some of the issues being discussed at the UNFCCC meetings. In both situations, by reducing the amount of CO₂ released into the atmosphere and conserving the forest, REDD+ will help to mitigate climate change.

To understand how REDD+ could work, it is important to understand what is meant by deforestation and degradation. In this manual the definitions shown relate to REDD+ and climate change, but deforestation and degradation also impact many other issues.

Deforestation is the loss of forest and loss of carbon storage. All of the forest is cut and the land used for another purpose, such as farming or grazing. The carbon that was in the trees is no longer stored in the forest. Widespread deforestation also removes biodiversity and affects other ecosystem services.



Forest degradation reduces the number of trees and the stock of carbon in a specific forest area. Many of the trees are removed and the carbon storage and other ecosystem services provided by the forest are reduced.

Forest restoration is another important term. Some areas that were deforested many years ago can be returned to forest again by doing forest restoration activities such as tree planting. Carbon storage is increased as new trees grow.

HOW COULD A REDD+ ACTIVITY WORK?

All REDD+ activities in developing countries are either newly started or in the planning process. The results of the REDD+ activities now underway will help countries at the UNFCCC to make decisions and come to agreement about how REDD+ will work in the future. Remember REDD+ activities that are happening now are tests or demonstrations of ways REDD+ can help to mitigate or lessen climate change. There are 2 main types of REDD+ activities:

Readiness activities: these actions help countries ‘get ready’ for REDD+. These include capacity building, scientific studies, and developing REDD+ national strategies. (This training is a REDD+ readiness activity because the goal is to help communities to understand climate change and how REDD+ can help to mitigate climate change.) Another example of a readiness activity is the planning processes underway in some countries. In this process countries receive support from international institutions such as the Forest Carbon Partnership Facility (FCPF) to prepare Readiness Preparation Proposals (R-PP) for how REDD+ could work as a strategy to mitigate climate change.

Demonstration activities: these activities aim to show how REDD+ can reduce CO₂ emissions from forests and increase carbon storage by reducing deforestation and forest degradation, and how REDD+ can produce benefits for developing countries and local communities. The example below shows how one type of REDD+ demonstration activity can work.

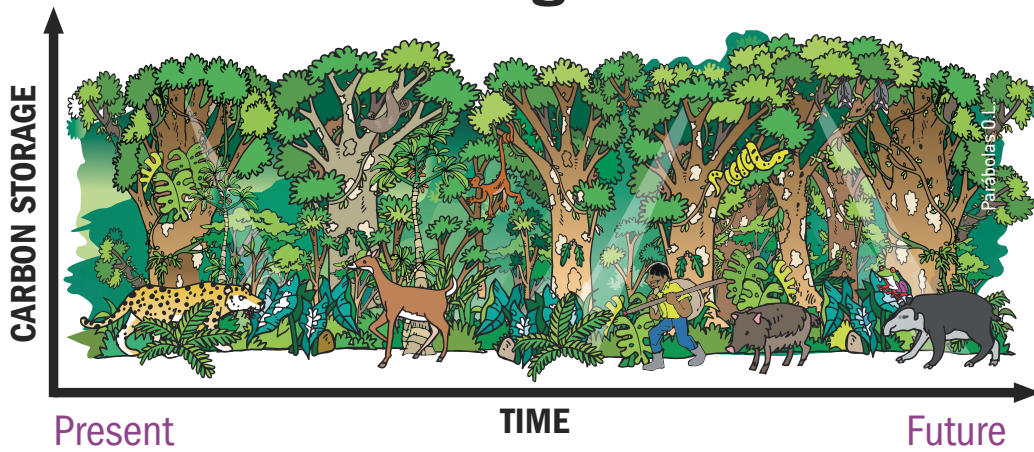
STEPS IN A REDD+ DEMONSTRATION ACTIVITY:

REDD+ activities are very complex, but some of the basic steps for a REDD+ activity are shown below:

1. First, an area of forest is identified where conducting a REDD+ activity could reduce emissions from deforestation or degradation or conserve or increase the amount of carbon stored; and where a decision has been agreed upon to conduct a REDD+ activity.
2. Next, the size of the forest area is measured—usually in acres or hectares, and measurements taken to estimate the number, size and type of trees in the forest area.
3. Next, the amount of carbon stored in the forest must be calculated to determine how much carbon is stored in the forest and how much CO₂ would be emitted if the forest was cut down or burned.
4. Then, the value of keeping the carbon stored in the forest is calculated to determine how much the benefits for the REDD+ activity could be.
5. In countries where there are high threats to forests from logging or changing forest land to other uses, the amount of deforestation that is prevented is measured.
6. Finally, agreements are made between the developing country government or other forest owners and the funding organizations that are willing to provide the funds for the agreements—usually developed country governments, international institutions, or possibly private business.

Below is a general example of how a REDD+ activity could work:

Standing Forest

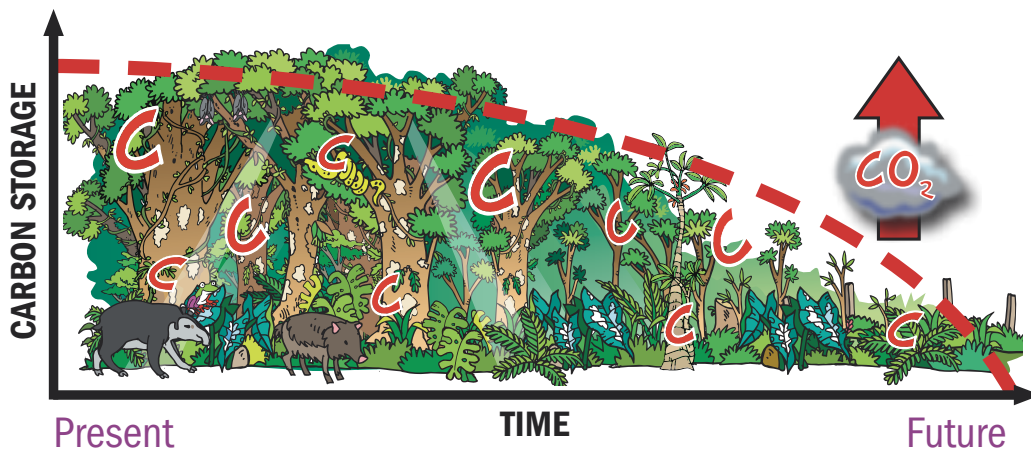


This is a natural forest that stores high amounts of carbon. The forest is also protecting ecosystem services and biodiversity.

Result:

- Carbon stored, emissions prevented
- Healthy ecosystems

Choice A: Cut Forests

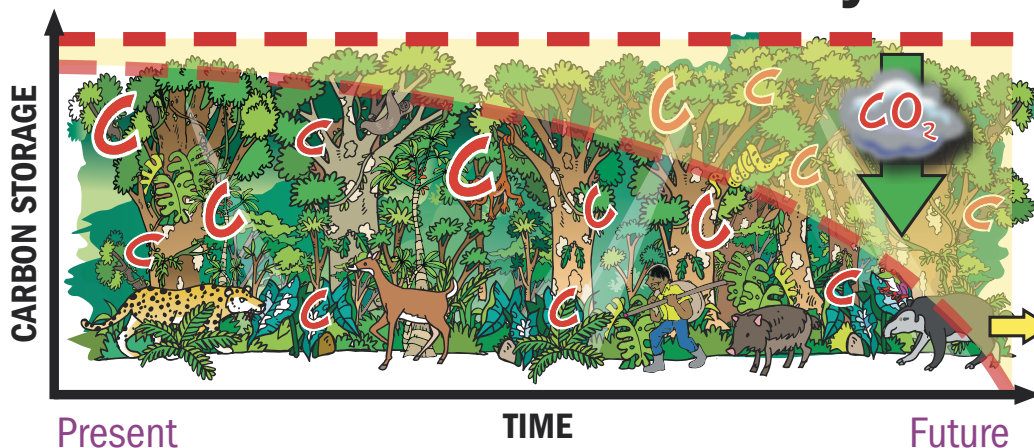


There is a plan to grant a concession to cut part of this forest.

Result:

- CO₂ emitted, carbon storage reduced
- Eco-systems decline
- No long-term benefits

Choice B: REDD+ Activity



Instead, an agreement is made to keep the forest standing.

Result:

- Carbon stored, emissions prevented
- Healthy ecosystems
- Avoided deforestation brings benefits from REDD+

Figure 22. How a REDD+ Activity Works

HOW IS THE VALUE OF A FOREST'S CLIMATE SERVICES DETERMINED?

Reducing deforestation and forest degradation provides an ecosystem service to mitigate climate change. How can maintaining this service create financial and other benefits?

To create financial benefits from forests, there needs to be an economic value to avoiding CO₂ emissions and maintaining carbon stored in trees. Forests have high value already for people and for biodiversity. They are very important for many traditional cultures and have great spiritual and livelihood value for indigenous and other forest dependent peoples. Forests also have value for the role they play in helping to keep the earth's climate healthy. The value of the climate services the forest provides for storing carbon is related to the amount of CO₂ that is kept out of the atmosphere by not cutting the trees and allowing the forest to continue providing carbon storage and other services. This determines the amount of benefits a forest can provide in a REDD+ agreement. The value of a forest in a REDD+ agreement depends on:

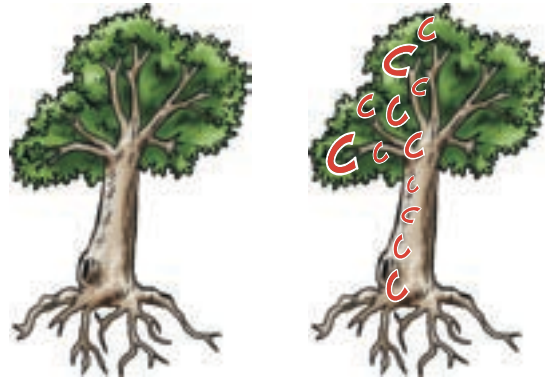
- the amount of trees in the forest area
- the amount of carbon that is stored in those trees
- the amount of new carbon storage that will be created as degraded forest is allowed to re-grow and new forest is planted and grows up
- finally, in countries with high levels of deforestation, the amount of deforestation and CO₂ emissions prevented.

MEASURING THE AMOUNT OF CARBON IN A FOREST

When the carbon stays in the trees and is not released as CO₂ into the air, the forest becomes a big storehouse of carbon. To

How much carbon is in this tree?

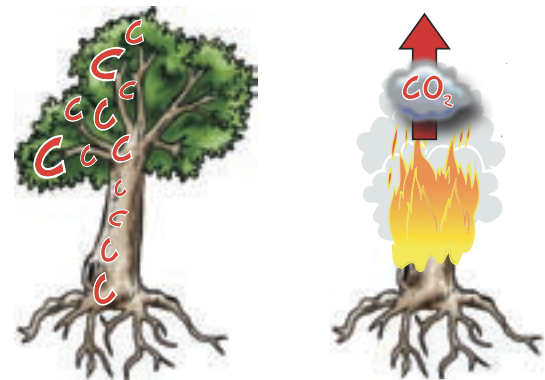
Each ton of **dry tree weight (biomass)** equals **one-half ton** of carbon.



This tree weighs 10 tons, so $10 \div 2 = 5$ tons of carbon stored in the tree.

How much carbon dioxide (CO₂) will be released if this tree is burned?

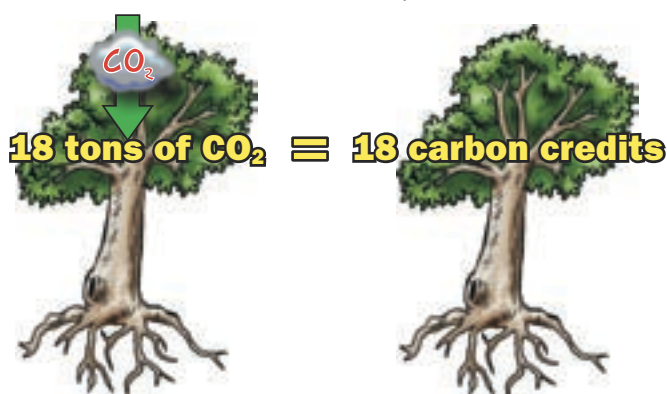
One ton of carbon produces **3.67 tons** of (CO₂) if the tree is burned.



This tree has 5 tons of carbon, so $5 \times 3.67 = 18.35$ tons of CO₂ that could be released.

How are a tree's carbon credits calculated?

One ton of CO₂ that is **NOT** released is equal to **one carbon credit**.



A tree that would keep 18 tons of CO₂ out of the air has a value of **18 carbon credits**.

Tree image courtesy of CEDECO/concept by Regina Harrig

Figure 23. Measuring the Amount of Carbon in a Forest

know how much carbon is in a tree or forest, there needs to be a way to measure it. The unit of measurement for carbon in a tree or forest is called a ton—just like the unit of measurement for a sack of sugar is a pound or a kilo. Each forest has many tons of carbon—depending on the size and age and type of the trees. By knowing the number of trees in an area of forest and the size and type of trees, it is possible to measure the amount of carbon.

Since the gas CO₂ is created when carbon is released from the tree, we also need to know how much CO₂ could be released into the air. If a tree is cut down and burned, one ton of carbon turns into a little more than 3½ tons of CO₂ (1 ton carbon = 3.67 tons of CO₂). Since the value of a forest in a REDD+ agreement is for keeping the carbon in the tree, the forest owner can get credit for the amount of CO₂ that is not released into the air—for reducing the emission of CO₂. In REDD+ a ton of CO₂ kept in a tree is called a **carbon credit**.

WHERE DOES THE MONEY COME FROM FOR REDD+ PAYMENTS?

Like other PES payments, money for REDD+ payments can come in different ways. One example is an international fund (money set aside for a specific purpose) created to provide money to help developing countries keep their forests or re-plant forests that have already been cut. Some developed countries have made promises to provide funds for developing countries to help them with plans and activities to mitigate climate change. In this case agreements or Memorandums of Understanding (MOUs) can be made between a developed country and a developing country to provide funds for the government to create a plan for conducting REDD+ readiness and demonstration activities.

A new way to help pay for REDD+ activities is being discussed at UNFCCC meetings and tested in some ‘demonstration’ activities for REDD+. This involves developed countries or businesses in developed countries paying forest owners in developing countries to conserve their forests by paying them for ‘carbon credits’ that represent the tons of CO₂ emissions avoided when countries protect their forests. This helps countries or businesses meet their promises to reduce emissions and provides funds to help conserve and manage forests and benefit forest owners. This is a very new idea and there is still much testing and discussion to be done before agreement about how it should work will be reached. The following is a description and an example of how this could work:

Under other international agreements to mitigate or stop climate change, developed countries have made promises to reduce the amount of greenhouse gases (GHGs) they are releasing or emitting into the air. (Remember the Kyoto Protocol?) To help do this, governments make new laws about how much CO₂ or other GHGs industrial businesses can release. But, changing the way a business operates can take a long time—buying more efficient machinery, using new technology, etc., so it can be difficult for a business to reduce their GHG emissions quickly—in time to meet the rules made by their governments. One way businesses can help reduce the total amount of CO₂ in the air more quickly would be to make an agreement with a developing country or with forest owners to conserve their forest and keep the carbon stored in the trees. Under a REDD+ agreement, a forest owner could sell the carbon credits in the forest to a company to help the business meet its goals for reducing the amount of CO₂ that is released into the atmosphere. The company buys the carbon credits and pays the forest owner to keep the carbon in the trees so CO₂ emissions are prevented.

For example, a business that makes zinc sheets for roofing is required to reduce the CO₂ emissions from its factory by 1000 tons over two years. But, they will not be able to complete this for 3 years—past the deadline for reducing their CO₂ emissions. The business is able to reduce its emissions by 800 tons through

improving some of their other practices. But how can they meet their obligation to reduce emissions by another 200 tons of CO₂ in time? The business could pay for another country or forest owner to reduce CO₂ emissions by 200 tons by paying the forest owner to keep the forest standing—the carbon in the trees is NOT released as CO₂, so the business can count these 200 tons of CO₂ stored in the forest as part of the emissions reduction it is required to make. By adding the 200 tons of carbon credits purchased from the forest owner to the 800 tons the business reduced on its own, the goal of 1000 tons is met. Since the atmosphere is a shared resource—used by the entire world, the goal of reducing emission worldwide is also met. And finally, benefits from selling the carbon credits help countries and communities. **(Remember: 1 carbon credit = 1 ton of CO₂ emissions prevented)**

But a business cannot meet all of the required emissions reductions by buying carbon credits. Developed countries and business must change. Most of the reduction in emissions must come from changing and improving the way industry is run, finding better ways to produce energy, and other ways of reducing emissions.

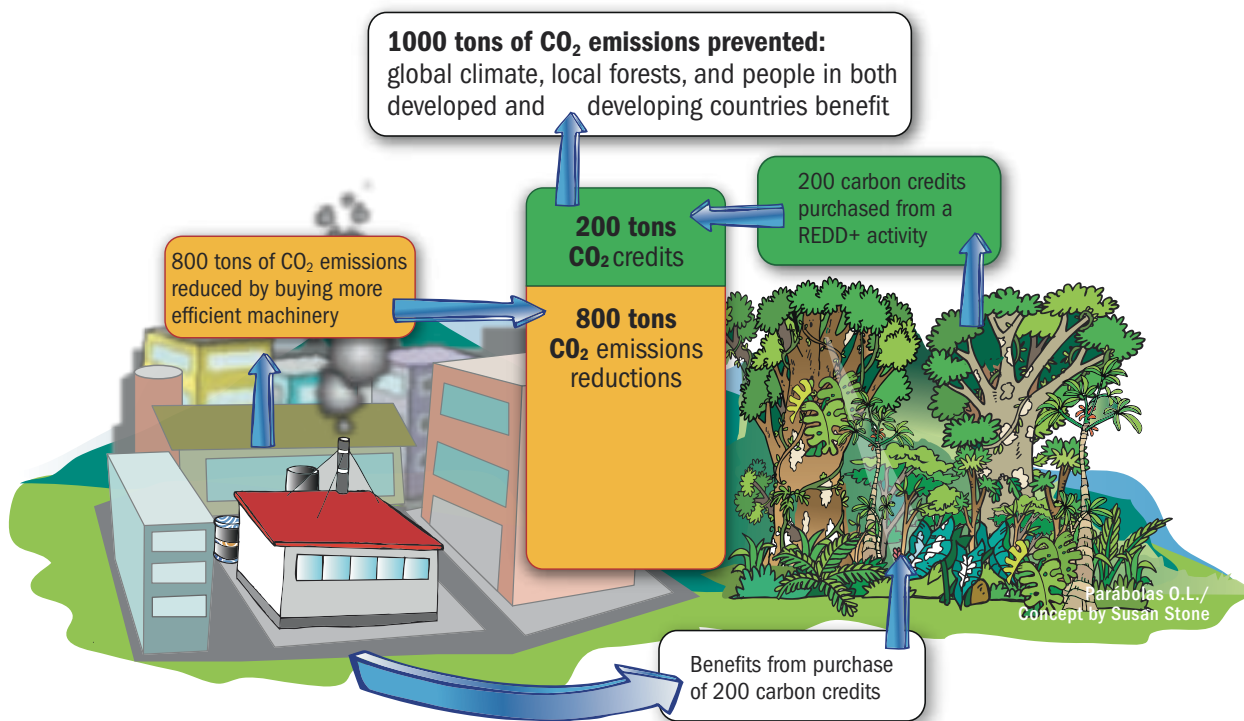


Figure 24. Carbon Credit Transaction Example

Since there are many developing countries, forest owners, and businesses, there could be many groups wanting to sell and buy carbon credits to reduce CO₂ in the air and to get benefits from not cutting trees. In order to help with buying and selling carbon credits, carbon 'markets' have been set up. These markets can help test how financing for REDD+ activities could work.

A market is the place or process where people exchange goods and services. A market needs a seller who provides the goods and services and a buyer who pays for that good or service. In REDD+, the seller is the government, community or forest owner that offers to reduce carbon emissions by conserving the forest and selling the carbon credits contained in the forest; the buyers, or those who benefit from the climate ser-

vice, are usually governments or private companies that need to meet their commitments, or private donors and international funds that want to help mitigate climate change. **Carbon markets** provide the service of connecting these buyers and sellers and determining the price for carbon credits.

HOW COULD REDD+ ACTIVITIES BE ORGANIZED?

Agreements to receive benefits for avoiding deforestation or forest degradation could be made at the national level when a country government includes REDD+ as part of its sustainable forest management planning and strategies, reducing the amount of deforestation and degradation in the country's forests. The government sets out a strategy through which the country as a whole can benefit from its forests and distributes benefits to forest owners and users, including indigenous peoples and other forest dependent communities. REDD+ funding can also provide more resources for sustainable forest management and for fighting illegal logging or threats to a country's forests.



Another way of managing REDD+ is through demonstration projects in different areas of a country. In some cases, forest owners could start REDD+ activities with technical support from government, NGOs or other institutions in order to create benefits from conserving the forests in a specific area. If a community or other forest owner participates in a REDD+ activity, they could get benefits by selling the carbon credits in its forest through a carbon market.

How REDD+ activities should be organized—whether as a national strategy or as activities in different areas of a country—is still being discussed at UNFCCC meetings.

ARE THERE SOME RISKS AND CONCERNS RELATED TO REDD+?

REDD+ can be an opportunity for local communities to help to mitigate climate change while receiving social and economic benefits, but the activities must be well planned and carried out with the participation of local communities. Some of the key concerns that need to be taken into account are:

- The need for clear land tenure rights (Who owns the forests? Who owns the carbon credits? Who defines the values of forests?);
- The need for a transparent plan and processes for local stakeholder engagement and consultation for all REDD+ readiness and demonstration activities;
- Respect for the rights of indigenous peoples and local communities as defined in international instruments and agreements and within national laws when designing strategies and carrying out REDD+ activities;
- Participation of indigenous and local communities in decisions related to sustainable forest management and REDD+;
- The need for Free, Prior, and Informed Consent (FPIC) to all activities impacting indigenous peoples and local communities, including monitoring and reporting;
- The need for clear, transparent and participatory decision-making on how benefits and payments are decided on and how they are distributed;
- Participation of forest communities and indigenous peoples in the design, monitoring and evaluation of national REDD+ programmes;
- The need to include traditional knowledge in planning and implementing REDD+ activities.

Groups such as the Climate, Community and Biodiversity Alliance (CCBA) have been working to develop guidelines and standards that help decision-makers and designers of REDD+ activities to plan and implement these activities in ways that:

- provide benefits for climate, communities and biodiversity
- respect the rights of indigenous peoples and local communities
- promote stakeholder participation and outreach
- provide for the fair sharing of benefits
- ensure that activities are designed and monitored with the correct social and environmental methods and techniques

WHAT ARE POTENTIAL BENEFITS OF REDD+ ACTIVITIES?

REDD+ should bring multiple benefits. The main benefit, of course, is mitigating or lessening climate change due to the reduction of carbon emissions to the air. Other benefits include the natural or biodiversity benefits which are the result of forest conservation and social benefits like financial resources for communities and governments to help them develop and to pay for the costs of managing forests and protecting them from threats like illegal logging. Also, when forests are sustainably managed, other ecosystem services and resources, such as water and cultural areas, are protected.



Climate Benefits:

- climate change mitigation
- adaptation to climate change
- healthy weather in our communities



Community Benefits:

- ecosystem services such as water, food, wood
- new opportunities for community development



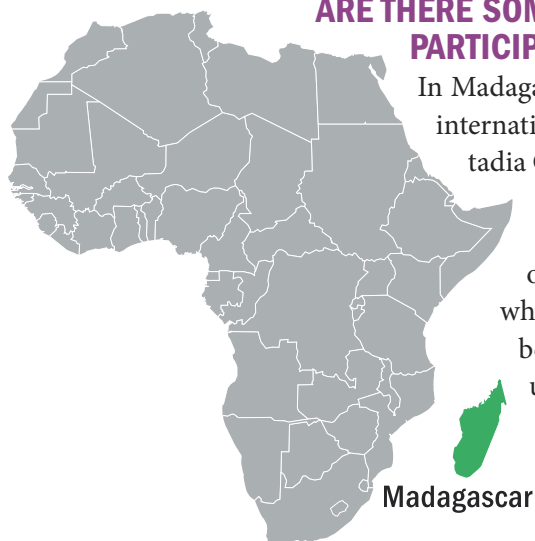
Biodiversity Benefits:

- food and homes for plants and animals
- conserving all types of plants and animals

PART 3. WHAT REDD+ ACTIVITIES ARE HAPPENING NOW?

ARE THERE SOME REDD+ EXPERIENCES WITH LOCAL COMMUNITY PARTICIPATION?

In Madagascar, local communities, with the support of the government and international organizations, are developing a REDD+ activity called Mantadia Corridor Forest Carbon Project. To avoid deforestation, the project promotes forest conservation, tree planting, and livelihood activities like organic gardens. The project will conserve 425,000 hectares of forest. Community Managements Zones have been established where communities manage and monitor forest resources. Financial benefits are received through the sale of carbon credits to a buyer using the carbon market.



ARE THERE SOME REDD+ EXPERIENCES AT THE NATIONAL LEVEL?

There are several countries that are starting to prepare for REDD+ activities. The countries that are getting ready for REDD+ are receiving funds and technical advice from international institutions.

There are also national forest conservation programs that are already in action such as Socio Bosque in Ecuador, which is a PES scheme that will be linked to international REDD+ funding. This is a government led initiative which aims to protect around 4 million hectares of natural forest; reducing GHG emissions caused by deforestation and improving the living conditions of the poor. Socio Bosque is providing an annual economic benefit per hectare of forest to individuals or indigenous communities, who voluntarily decide to protect the native forest they own. Each year the project is monitored to verify that the agreements are kept.⁴



WHAT ARE INTERNATIONAL INSTITUTIONS DOING TO ASSIST COUNTRIES WORKING ON REDD+?

The two main international institutions that are helping countries to get ready for REDD+ are the Forest Carbon Partnership Facility (FCPF) of the World Bank and the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme).

The Forest Carbon Partnership Facility (FCPF) of the World Bank assists countries in their efforts to reduce emissions from deforestation and forest degradation, by providing value to standing forests through sustainable forest management, forest conservation and increasing carbon storage. The World Bank is an international institution that provides financial and technical assistance to countries around the world. The FCPF includes indigenous peoples as observers along with other non-government organizations. Indigenous experts are also included in the FCPF Technical Advisory Panel, where they participate in reviewing proposals presented by country governments.

The FCPF asks countries to get ready for REDD+ by designing a plan. The name of this plan is the Readiness Preparation Proposal (R-PP). The R-PP will help the country to identify and then establish the capacity to implement a REDD+ strategy. The R-PP must also include a plan for engaging stakeholders and conducting consultations. The plan must respect the rights of indigenous peoples and other stakeholders. There are more than 30 countries participating with the FCPF. Some of those countries are Bolivia, Colombia, Costa Rica, Peru, Kenya, Gabon, Cambodia, Suriname and Guyana.

The UN-REDD Programme assists developing countries to get ready to participate in future REDD+ activities. UN-REDD supports the capacity of national governments to plan REDD+ strategies and put them into action with the active involvement of all stakeholders, including indigenous peoples and other forest-dependent communities. Nine countries from Asia, Africa, and Latin America are part of UN-REDD Programme's initial work. Indigenous peoples are represented on UN-REDD's governing board.

IMPORTANT THINGS TO REMEMBER:

- REDD+ is under discussion by governments through the UNFCCC. Many decisions are still to be made about how REDD+ can work.
- Many countries are preparing for REDD+ and some activities are happening to test how REDD+ can reduce deforestation and mitigate climate change.
- Benefiting from REDD+ depends on making agreements to prevent CO₂ emissions from deforestation and forest degradation and on conserving forests as storage places for carbon.
- Funding for REDD+ activities could come from international agencies, developed country governments or from carbon markets.
- Both the potential risks and the potential benefits of REDD+ activities should be clearly understood and considered.
- REDD+ processes should be transparent so all stakeholders understand how REDD+ works, how benefits are distributed and rights respected.
- Forests have a very important potential to both mitigate climate change and provide benefits to countries and communities.

KEY TERMS TO REMEMBER:

Biomass: the total dry weight or mass in a given plant or other living thing

Carbon calculation: a way to measure the amount of carbon in a forest

Carbon credit: in REDD+, a ton of CO₂ kept in a tree (not released into the atmosphere) is called a carbon credit

Deforestation: the loss of forest and loss of carbon storage

Demonstration activities: test how REDD+ can reduce CO₂ emissions from forests and increase carbon storage by reducing deforestation and forest degradation, and how REDD+ can produce benefits for developing countries and local communities

Forest degradation: reduces the number of trees and the stock of carbon in a specific forest area

Forest restoration: areas that were deforested many years ago can be returned to forest

Free, prior and informed consent (FPIC): A summary of the underlying principles of FPIC is: (i) information about and consultation on any proposed initiative and its likely impacts; (ii) meaningful participation of indigenous peoples; and, (iii) representative institutions

Readiness activities: the actions that help countries 'get ready' for REDD+, including capacity building, scientific studies, and developing national strategies, with the goal of mitigating climate change

REDD+: 'reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries'

Climate change is bringing many changes to the way people live all over the world. Governments and local communities need to understand why these changes are happening and how to stop climate change and adapt to the changes that are already happening.

Action is needed by both developed and developing countries—by governments and by local communities everywhere. In developed countries, people need to use technology more wisely, decrease their use of fossil fuels and find better ways to produce energy. Countries and businesses need to share their resources and technology. Developing country governments and communities need to manage the wealth of their forest resources wisely as they grow and develop. And everyone needs to work together to maintain the natural ecosystems and processes that can keep the world's climate healthy. New ideas like REDD+ will need the experience and participation of governments, science and local communities to work in a way that brings triple benefits—to reduce climate change, maintain healthy forest ecosystems and to improve livelihoods in forest communities and countries. The traditional knowledge of indigenous peoples and other local communities is an important resource that can assist decision-makers as they plan action to mitigate and adapt to climate change, and test new ways of managing forests. The involvement of indigenous peoples and local communities at all stages of planning and action will create the opportunity for sharing this knowledge and bring local needs and priorities into these processes.

Keeping local stakeholders informed and ensuring that they have the knowledge and tools to participate in national and local planning and action is a long-term need and should be planned for and funded as an ongoing part of all climate change related work. Scientists are continually doing new research to learn new things about the impacts of climate change. Negotiations and agreements move slowly at the international meetings, but new decisions are being made at each meeting that need to be shared with local communities. This booklet provides introductions to the topics of climate change and REDD+, but local stakeholders must be continually be updated about new research, and new policies at both the global and national levels. This will ensure that indigenous peoples, local communities, and other local stakeholders are informed and are able to integrate their own knowledge and world views into all areas of planning and action to mitigate and adapt to climate change.



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SESSION 2

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Adaptation	Adaptation is a change in the way of doing something. Because the climate is changing, plants, animals and people are going to need to adapt to new weather conditions.
Atmosphere	The mixture of gases that surrounds the earth—the atmosphere begins at the surface of the earth and extends into outer space in many layers. Most processes that affect life on earth happen in the lowest layer of the atmosphere—nearest to the earth's surface.
Biomass	The total dry weight or mass in a given plant or other living thing. Sometimes the term 'dead biomass' is used to describe the dry weight of dead plant materials.
Carbon calculation	A way to measure the amount of carbon in a forest.
Carbon credit	In REDD+, a ton of CO ₂ kept in a tree (not released into the atmosphere) is called a carbon credit.
Carbon cycle	The natural process of carbon moving or flowing between the different places where it is used and stored (reservoirs).
Carbon dioxide (CO₂)	The result of joining carbon (C) with oxygen (O). It takes 1 part of carbon joining with 2 parts of oxygen to form the gas CO ₂ .
Carbon flows	The movements of carbon in and out of the atmosphere.
Carbon reservoirs	The places where carbon is stored.
Carbon stock	The quantity of carbon in a carbon reservoir at a given time.
Carbon	One of the most common elements in the universe, found in all living and non-living things.
Climate change	The change of the normal weather patterns around the world over a long period of time.
Climate	Is described as “the average weather” or weather conditions that happen over a long period of time.
Deforestation	The loss of forest and loss of carbon storage.
Delegates	Representatives.

Demonstration activities	These activities are aimed to show how REDD+ can reduce CO ₂ emissions from forests and increase carbon storage by reducing deforestation and forest degradation. These activities also test how REDD+ can produce benefits for developing countries and local communities.
Earth's poles	Areas at the far north and far south of the earth. These are also called the 'polar regions'.
Ecosystem services	Ecosystem services are the benefits people obtain from ecosystems. Ecosystems provide essential services for people all over the world. These include: services that provide food, water, timber, and fiber; services that control climate, floods, disease, waste, and water quality; cultural services that are a source of spiritual benefits and also enjoyment.
Ecosystem	A natural group of plants, animals and micro-organisms that live together in a specific place with specific characteristics or environment.
Emission	A substance discharged into the air.
Environment	The characteristics of a place.
Evaporation	The process in which water is heated and changes from a liquid into a gas. The sun heats water in lakes, rivers or oceans causing it to evaporate or turn into a gas called water vapor.
Forest degradation	Reduces the number of trees and the stock of carbon in a specific forest area.
Forest restoration	Areas that were deforested many years ago can be returned to forest.
Fossil fuel	Fuel that is formed inside the earth over a long time from decaying plants and other organisms, such as oil or coal.
Free, prior and informed consent (FPIC)	<p>“Free, prior and informed consent recognizes indigenous peoples’ inherent and prior rights to their lands and resources and respects their legitimate authority to require that third parties enter into an equal and respectful relationship with them, based on the principle of informed consent.”¹</p> <p>The underlying principles of free, prior and informed consent can be summarized as follows: (i) information about and consultation on any proposed initiative and its likely impacts; (ii) meaningful participation of indigenous peoples; and, (iii) representative institutions. ²</p>

Glacier	Layers of ice on land or mountains in very cold places. Sometimes glaciers extend into the ocean.
Global warming	The increase in the average temperature of the earth's atmosphere.
Greenhouse effect	The name for the process of how the atmosphere keeps the earth warm.
Greenhouse gases	The gases that help regulate the earth's temperature.
Land use change	Changes in the way an area is used or managed, such as changing forest to farms, changing farms to pasture, or returning pasture to forest by re-planting trees.
Mitigation	The process of stopping or lessening climate change by reducing greenhouse gas (GHG) emissions that come from industrial activities and forestry and agricultural activities.
Ocean currents	Movement of the surface water of the ocean. Water is moved mainly by wind in regular patterns that normally stay the same.
Payment for ecosystem services agreement	An agreement in which people agree to take specific actions to manage and conserve ecosystems and receive specific benefits in return.
Payment for ecosystem services	A way to provide resources to countries and communities to help maintain healthy ecosystems.
Photosynthesis	Natural process where plants take in the light and heat from the sun and carbon dioxide from the air, and release oxygen to make plants grow and keep our air clean.
Policy	A plan of action to guide decisions and achieve results.
Precipitation	Rain, snow, or hail (ice) that forms from the moisture in the atmosphere and falls to the ground.
Readiness activities	The actions that help countries 'get ready' for REDD+, including capacity building, scientific studies, and developing national strategies, with the goal of mitigating climate change.
REDD+	'Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.'
Sea level	The height of the ocean's surface.

Sustainable forest management	Managing forests in a way that takes only what is needed and leaves the ecosystem healthy with resources for the future.
Traditional knowledge	The wisdom, knowledge and practices of indigenous people and local communities gained over time through experience and orally passed on from generation to generation.
Volcanic eruptions	Volcanoes are mountains formed at opening in the earth's surface by melted rock that comes to the surface and flows out and hardens. When a volcano erupts, melted rock, called lava, flows out of the mountain along with ash and gases that go into the atmosphere.
Watershed	An area of land that sheds or drains all of its water into the same place, such as a river.
Weather	The temperature, rainfall, or storms in a specific place on a specific day or over a very short period, like one season.

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