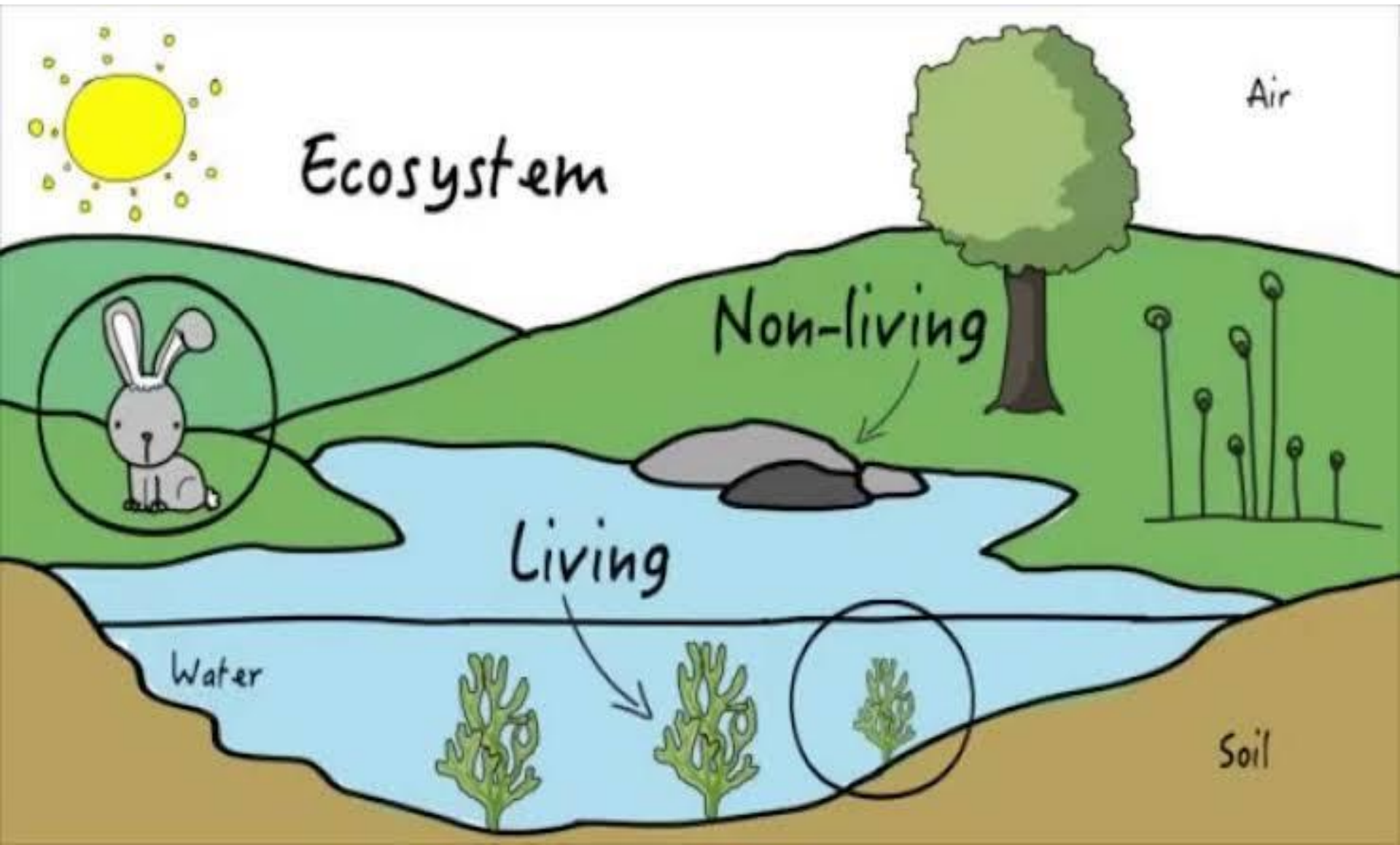


# **Ecosystem and Human Interference in Ecosystem**

# Ecosystem

- All the living (biotic) and nonliving (abiotic) parts of an environment as well as the interactions among them
- Ecosystems may be aquatic (water) or terrestrial (land).
- An ecosystem is a grouping of organisms that interact with each other and their environment in such a way as to preserve the grouping.

# Ecosystem



# Ecosystem

An ecosystem is a community of living and non-living things that work together – it consists of abiotic (soil, water, air) and biotic parts (flora, fauna). Ecosystems have no particular size. An ecosystem can be as large as a desert or as small as a tree. The major parts of an ecosystem are: water, water temperature, plants, animals, air, light and soil. They all work together. If there isn't enough light or water or if the soil doesn't have the right nutrients, the plants will die. If the plants die, animals that depend on them will die. If the animals that depend on the plants die, any animals that depend on those animals will die. All the parts in an ecosystem work together to achieve balance. A healthy ecosystem has lots of species and is less likely to be damaged by human interaction, natural disasters and climate changes. Every species has a niche in its ecosystem that helps keep the system healthy.

- **Soil**

Soil is a critical part of an ecosystem. It provides important nutrients for the plants. It helps anchor the plants to keep them in place. Soil absorbs and holds water for plants and animals to use and provides a home for lots of living organisms.

- **Air**

The atmosphere provides oxygen and carbon dioxide for the plants and animals in an ecosystem. The atmosphere is also part of the water cycle. Without the complex interactions and elements in the atmosphere, there would be no life at all!







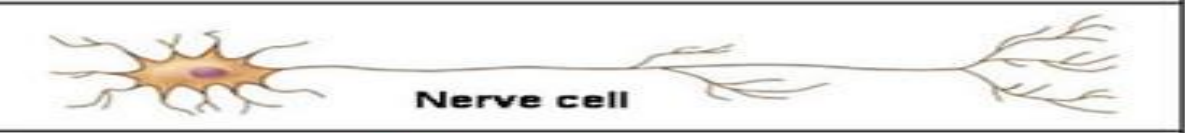

- **The sun**

The heat and light from the sun are critical parts of an ecosystem. The sun's heat helps water evaporate and return to the atmosphere where it is cycled back into water. The heat also keeps plants and animals warm. The light from the sun is necessary for photosynthesis, so that plants have the energy they need to make food.

- **Water**

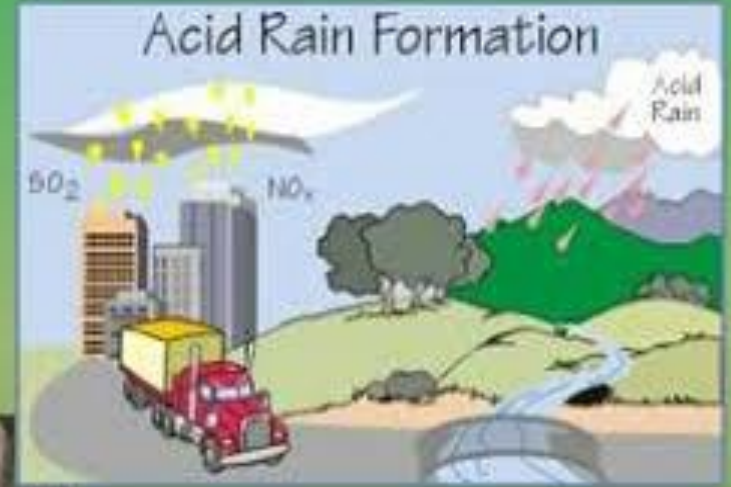
Without water there would be no life. Water is a large percentage of the cells that make up all living organisms. Water is also used by plants to carry and distribute the nutrients they need to survive.

# Ecosystem organization

<b>Biosphere</b>	The part of Earth that contains all ecosystems	 <p><b>Biosphere</b></p>
<b>Ecosystem</b>	Community and its nonliving surroundings	 <p><b>Hawk, snake, bison, prairie dog, grass, stream, rocks, air</b></p>
<b>Community</b>	Populations that live together in a defined area	 <p><b>Hawk, snake, bison, prairie dog, grass</b></p>
<b>Population</b>	Group of organisms of one type that live in the same area	 <p><b>Bison herd</b></p>
<b>Organism</b>	Individual living thing	 <p><b>Bison</b></p>
<b>Groups of Cells</b>	Tissues, organs, and organ systems	 <p><b>Nervous tissue      Brain      Nervous system</b></p>
<b>Cells</b>	Smallest functional unit of life	 <p><b>Nerve cell</b></p>
<b>Molecules</b>	Groups of atoms; smallest unit of most chemical compounds	 <p><b>Water      DNA</b></p>



# Human interference in ecosystem





# Population growth

There are about 7.68 billion people in the world. The human population is said to be growing **exponentially**. This means that the larger the population, the faster it grows. An increase in average **life expectancy** is largely responsible for the rapid increase in population. Why do people live longer than they did hundreds of years ago?

- better healthcare (hospitals, medicines, vaccines)
- more and better food
- Cleaner water
- Water sanitation

The biggest increase in population is in **economically developing** nations, rather than economically developed nations. Why do you think this is the case?

# Air pollution

Human activity produces two main types of air pollutant:

- **noxious gases** – These include carbon dioxide ( $\text{CO}_2$ ), sulfur dioxide ( $\text{SO}_2$ ) and nitrogen oxides ( $\text{NO}_x$ ).
- **particulates** – These are tiny particles suspended in air (e.g. smoke), which are usually produced by the combustion of fossil fuels.

Air pollution has been a major problem since the Industrial Revolution of the late 18<sup>th</sup> Century, and has been made worse by humans' reliance on burning fossil fuels for energy.

Air pollution, global warming, acid rain, damage to the ozone layer and smog. Each of these has serious implications for the environment and human health.

# Global warming and greenhouse gases

One of the greatest threats caused by air pollution is **global warming**. Global warming is caused by a build-up of greenhouse gases, which leads to an increase in the Earth's temperature.

A **greenhouse gas** is an atmospheric gas that absorbs infrared light.

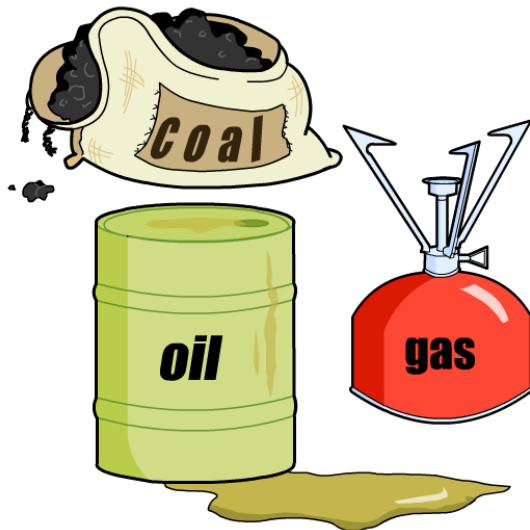
Key greenhouse gases include:

- carbon dioxide (CO<sub>2</sub>)
- methane (CH<sub>4</sub>)
- water vapour (H<sub>2</sub>O)
- nitrous oxide (N<sub>2</sub>O)

# Carbon dioxide levels

Carbon dioxide is one of the most important greenhouse gases because atmospheric concentrations have risen dramatically over the past century. **Why do you think this is?**

Burning fossil fuels, deforestation and flooding land for the construction of hydroelectric dams have all contributed to rising levels of carbon dioxide.



# What damages the ozone layer?

The **ozone layer** is a protective part of the atmosphere that absorbs some of the Sun's damaging ultraviolet (UV) rays.

Damage to the ozone layer means that more UV rays reach Earth, increasing the risk of skin cancer.

The ozone layer is damaged by chemicals called **chlorofluorocarbons** (CFCs), which contain the elements carbon, hydrogen, chlorine and fluorine.

CFCs are used in fridges and freezers, aerosol sprays and packaging materials such as polystyrene. The production and use of CFCs is now banned in many countries and could be worldwide in a few years.

# Water pollution

Sewage, industrial waste, oil, pesticides and fertilizers all pollute water.

Fertilizers and sewage can easily be washed into rivers, streams and lakes. The nutrients, phosphates and nitrates in these substances cause **eutrophication**.

Eutrophication is the accumulation of nutrients in water, which causes excessive algal growth. This leads to a reduction in oxygen levels and the death of aquatic life.





# HUMAN IMPACT ON ECOSYSTEM



Source: Rockström et al. 2009

Thank

you

