Natural Resources

Big Picture

All living organisms rely on certain natural resources to survive. Natural resources can be categorized into renewable resources (water, solar energy, metals) and nonrenewable resources (fossil fuels). Materials from human societies affect both the physical and chemical cycles of the earth, usually in a negative way. Effects of our over-exploitation of Earth's natural resources include climate change and global warming. Many of us are calling for sustainable use, or the use of resources that preserves them for future generations.

Key Terms

Natural Resource: A material supplied by nature that supports life.

Renewable Resource: A resource that can be replenished by natural processes.

Sustainable Use: The use of resources in a way that meets the needs of the present but preserves the resources for future use.

Nonrenewable Resource: A natural resource that is in a fixed amount and therefore can be used up.

Soil: A mixture of eroded rocks, minerals, and partly decomposed material.

Water: The liquid that makes up all living things.

Algal Bloom: Excessive growth of algae in bodies of water because of high levels of nutrients.

Dead Zone: Area in the ocean or other body of water where low oxygen levels from excessive growth of algae have killed all aquatic organisms.

Air Pollution: Chemical substances and particles released into the atmosphere, usually by human activities.

Acid Rain: Low-pH precipitation that forms with air pollution combines with water.

pH: The chemical term that refers to how acidic a substance is.

Ozone Hole: A gap in the ozone layer due to ozone depletion.

Greenhouse Effect: A process that occurs naturally in the Earth's atmosphere where gases in the atmosphere radiate the sun's heat back down to Earth's surface.

Global Warming: Recent rise in Earth's average surface temperature generally attributed to an increased greenhouse effect.

Renewable & Nonrenewable

Examples of **natural resources**:

- Minerals
- Fossil fuels
- Biodiversity

Natural resources can be renewable or nonrenewable:

Renewable resources are not in danger of being used up.

- Sunlight and wind are renewable resources, but metals and minerals are renewable as well because they are not destroyed when they are used and can be replaced. Using renewable resources will help sustain Earth's natural resources, however, the technology used to transform renewable resources into usable energy is expensive.
- Just because a resource is renewable doesn't mean it can never be used up. **Sustainable use** is required for renewable resources to be truly renewable.

Nonrenewable resources are in a fixed amount and therefore can be used up.

- Nonrenewable resources include fossil fuels (petroleum, natural gas, and coal).
- Human consumption of nonrenewable resources is detrimental to Earth's sustainability, and it is important to realize the need to transition to alternative sources.

Soil & Water

Soil is important because it is essential for most plant growth, it breaks down wastes, and it removes toxins from water. For human purposes, soil is a nonrenewable resource because it takes hundreds of million years to form.

- Soil misuse led strong winds to erode dirt in the southwestern U.S. states. This incident was known as the Dust Bowl and lasted from 1933 - 1939.

Water is theoretically a renewable resource. For humans, water must be fresh, but only 1 percent of Earth's water is fresh, liquid water.

- Although water is constantly recycled through the water cycle, because of over-use and pollution, freshwater supply is in danger of being in short supply.
- For example, the excessive growth of algae caused by runoff containing nutrients from fertilizer leads to **algal blooms**. This algae uses up the oxygen in the water so that other aquatic organisms cannot survive. Without oxygen in the water, **dead zones** are created.

Natural Resources cont.

The Atmosphere

The atmosphere is a valuable natural resource that is a part of the water cycle and provides oxygen and carbon dioxide for important life processes.

- **Air pollution** is the contamination of the atmosphere due to released chemical substances and particles. The major cause of air pollution is the burning of fossil fuels.
- Nitrogen oxides (containing nitrogen and oxygen) and sulfur oxides (containing sulfur and oxygen) released from the burning of fossil fuels create acids when the combine with the water in the atmosphere. These acids lower the **pH** of precipitation and create **acid rain.** When this falls on living organisms, it may kill them.
- Air pollution, especially chlorine and bromine gases, can lead to ozone depletion, resulting in an **ozone hole**. This results in higher UV radiation reaching Earth, which hurts human health, disrupts biogeochemical cycles, and disturbs food webs.

Global Climate Change

Air pollution can also result in global climate change.

- The **greenhouse effect** is a natural feature. Without it, Earth's temperature at the surface would be too cold to support life.
- **Global warming** refers to the recent increase in Earth's average temperature at the surface. Within the last century, the temperature has risen 1 °C (1.3 °F). To put this in perspective, 10 °C is the difference between an ice-free and ice-covered Earth.
- Most scientists agree that global warming is caused by more carbon dioxide in the atmosphere, which increases the greenhouse effect.

Effects of Climate Change

- Threatening cold-adapted species
- Melting of glaciers and rising of sea levels
- Coastal flooding and shoreline erosion
- Human heat-related issues
- Droughts and water-shortages
- Fluctuating precipitation patterns
- Increasing severity of storms
- Major crop issues

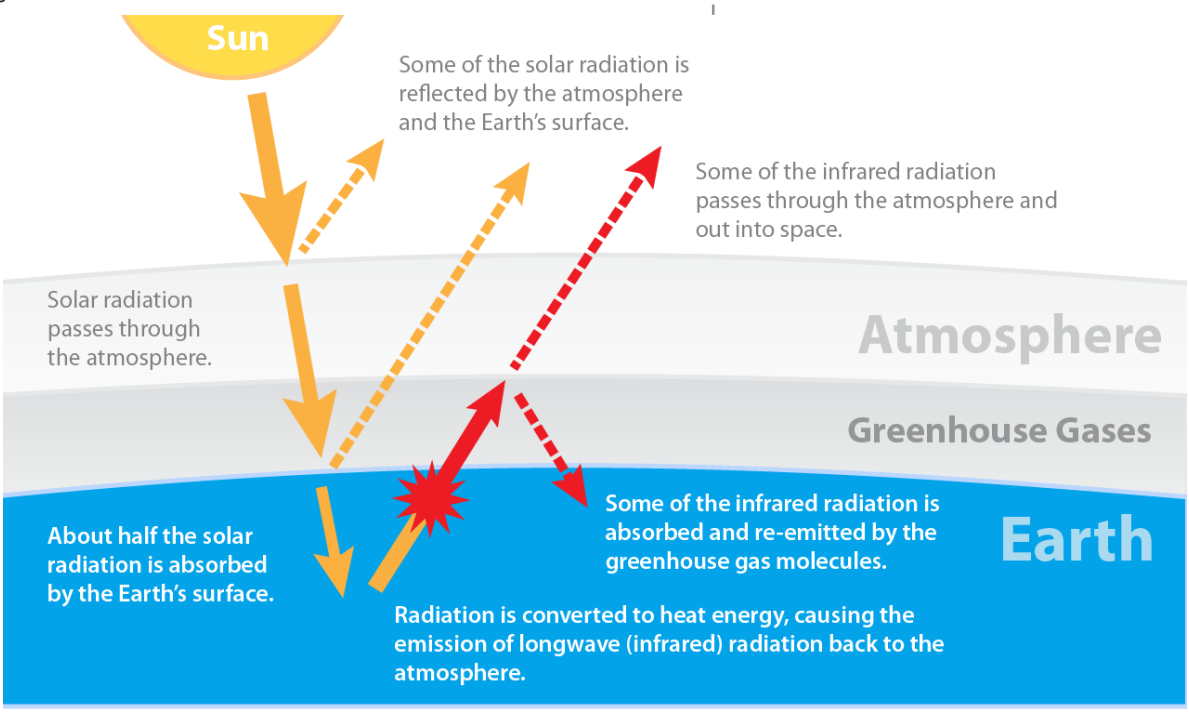

Figure: The greenhouse effect
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Ways to Help

The decisions made by one generation about the environmental crisis affect the possibilities of the next generation. Societies and individuals must make decisions that assess risks, costs, benefits, and trade-offs. Here are just a few of the many individual choices to help sustain Earth's resources and protect our environment:

- Consume wisely
- Reuse and recycle
- Avoid plastics
- Go organic
- Save energy
- Take public transportation when possible
- Switch to alternative energy sources