

- Land Resources
- Soil Resources
- Water Resources
- Natural Vegetation and Wildlife Resources

Land Resources

Land is one of the most important natural resources on Earth, covering about thirty per cent of the Earth's surface. However, not all land is habitable or suitable for human use. The uneven distribution of population across the world is largely due to the varied characteristics of land and climate. Rugged topography, steep mountain slopes, and low-lying areas prone to flooding are less populated, while plains and river valleys with fertile soil and adequate water supply are densely populated.

Land use refers to the various ways in which land is utilized, including agriculture, forestry, mining, housing, roads, and industries. The pattern of land use is influenced by physical factors such as topography, soil type, climate, minerals, and water availability, as well as human factors like population density and technology.

Land ownership can be classified as private land, owned by individuals, and community land, owned collectively for common uses such as collecting fodder, fruits, nuts, or medicinal herbs. Community lands are also known as common property resources.

Due to increasing population and demand, there has been encroachment on common lands for commercial, residential, and agricultural expansion. This has led to changes in land use patterns and environmental challenges such as land degradation, landslides, soil erosion, and desertification.

Exam-Oriented Questions

What are the main factors that determine land use patterns?

Land use patterns are determined by physical factors such as topography, soil, climate, minerals, and water availability, as well as human factors including population pressure and technological advancement.

What is the difference between private land and community land?

Private land is owned by individuals, whereas community land is owned collectively by a community for common uses like collecting fodder, fruits, or medicinal herbs.

Solved Example

Question: Explain how population growth affects land use.

Answer: Population growth increases demand for housing, agriculture, and industries, leading to expansion into previously unused or common lands. This results in changes in land use patterns, often causing environmental degradation such as soil erosion and loss of biodiversity.

Practice Set

- **Easy:** Define land use.
- **Moderate:** Describe the impact of human activities on land resources.
- **Challenging:** Discuss the environmental consequences of changing land use patterns.

Answer Key

- Land use is the way land is utilized for various purposes such as agriculture, housing, and industry.
- Human activities like deforestation, urbanization, and agriculture alter land resources and can lead to degradation.
- Changing land use patterns can cause soil erosion, loss of habitat, decreased soil fertility, and increased pollution.

Quick Reference

- Land covers 30% of Earth's surface.
- Land use includes agriculture, forestry, mining, housing, and industry.
- Land ownership: private and community land.
- Environmental issues: land degradation, soil erosion, desertification.

Glossary

- **Land Use:** The management and modification of natural environment into built environment such as fields, pastures, and settlements.
- **Community Land:** Land owned collectively by a community for common use.
- **Land Degradation:** Decline in land quality caused by human activities and natural processes.

Soil Resources

Soil is the thin layer of grainy material covering the Earth's surface, formed by the weathering of rocks and the decomposition of organic matter. It consists of minerals, organic matter, air, and water. Soil fertility depends on the right mix of minerals and organic matter, which supports plant growth.

Soil formation is influenced by factors such as the nature of the parent rock, climate, topography, living organisms (flora, fauna, and microorganisms), and time. Different types of soil exist in India, including alluvial, black, red, laterite, desert, and mountain soils.

Soil erosion and depletion are major threats caused by deforestation, overgrazing, excessive use of chemical fertilizers and pesticides, rain wash, landslides, and floods. Soil conservation methods include mulching, contour barriers, rock dams, terrace farming, contour ploughing, intercropping, and shelter belts.

Exam-Oriented Questions

What are the major factors affecting soil formation?

The major factors are parent rock, climate, relief (topography), flora and fauna, and time.

Explain two methods of soil conservation.

Terrace farming involves creating flat steps on slopes to reduce runoff and soil erosion. Contour ploughing is ploughing along the contours of a hill to slow water flow and prevent soil loss.

Solved Example

Question: How does vegetation help in soil conservation?

Answer: Vegetation covers the soil, reducing the impact of raindrops, slowing surface runoff, and holding the soil together with roots, thereby preventing soil erosion.

Practice Set

- **Easy:** What is soil made of?
- **Moderate:** Describe the role of climate in soil formation.
- **Challenging:** Discuss the impact of human activities on soil degradation.

Answer Key

- Soil is made of organic matter, minerals, air, and water.
- Climate affects the rate of weathering and organic matter decomposition, influencing soil formation.
- Human activities like deforestation and overuse of chemicals lead to soil erosion and loss of fertility.

Quick Reference

- Soil formation factors: parent rock, climate, relief, organisms, time.
- Soil conservation methods: mulching, contour barriers, terrace farming.
- Soil erosion causes: deforestation, overgrazing, chemical misuse.

Glossary

- **Weathering:** The breaking down of rocks into smaller particles by natural forces.
- **Mulching:** Covering soil with organic matter to retain moisture and prevent erosion.
- **Contour Ploughing:** Ploughing along the contours of land to reduce soil erosion.

Water Resources

Water is a vital renewable natural resource covering about three-fourths of the Earth's surface. Oceans contain saline water, while fresh water constitutes only about 2.7% of total water, mostly locked in glaciers and ice caps. Only about 1% of fresh water is accessible for human use, found as groundwater, surface water in rivers and lakes, and atmospheric water vapor.

The water cycle involves continuous movement of water through evaporation, precipitation, and runoff, maintaining the total volume of water on Earth. Human activities consume large amounts of water for drinking, agriculture, industry, and electricity generation.

Water scarcity affects many regions due to uneven distribution, droughts, over-exploitation, and pollution. Water pollution arises from untreated sewage, industrial effluents, and agricultural chemicals, contaminating water bodies and harming ecosystems and human health.

Water conservation methods include rainwater harvesting, efficient irrigation techniques like sprinklers and drip irrigation, lining canals to prevent seepage, and protecting water bodies from pollution.

Exam-Oriented Questions

What are the main causes of water scarcity?

Water scarcity is caused by uneven distribution of rainfall, droughts, overuse of water resources, and pollution of water bodies.

Explain the importance of rainwater harvesting.

Rainwater harvesting collects and stores rainwater for future use, reducing dependence on groundwater and surface water, and helps recharge aquifers.

Solved Example

Question: How does sprinkler irrigation help in water conservation?

Answer: Sprinkler irrigation distributes water evenly in the form of droplets, reducing water wastage by minimizing seepage and evaporation compared to traditional flooding methods.

Practice Set

- **Easy:** What percentage of Earth's water is fresh and accessible?
- **Moderate:** Describe the water cycle.
- **Challenging:** Discuss the effects of water pollution on ecosystems.

Answer Key

- About 1% of Earth's water is fresh and accessible for human use.
- The water cycle includes evaporation, condensation, precipitation, and runoff.
- Water pollution reduces oxygen levels, harms aquatic life, and contaminates drinking water.

Quick Reference

- Water covers 75% of Earth's surface.
- Fresh water is only 2.7%, mostly frozen.
- Water cycle: evaporation, precipitation, runoff.
- Conservation: rainwater harvesting, efficient irrigation.

Glossary

- **Water Cycle:** The continuous movement of water on, above, and below the Earth's surface.
- **Rainwater Harvesting:** Collecting and storing rainwater for reuse.
- **Sprinkler Irrigation:** A method of watering crops by spraying water like rainfall.

Natural Vegetation and Wildlife Resources

Natural vegetation refers to plant life that grows naturally without human intervention. It exists in the biosphere, the zone where the lithosphere, hydrosphere, and atmosphere interact to support life. Vegetation types include forests, grasslands, scrubs, and tundra, depending on climate and moisture availability.

Forests provide timber, shelter for animals, oxygen, and protect soil. Wildlife includes animals, birds, insects, and aquatic life, providing resources like milk, meat, wool, and honey. They play vital roles in ecosystems as pollinators, decomposers, and maintaining ecological balance.

Human activities such as deforestation, poaching, and habitat destruction threaten vegetation and wildlife, leading to extinction risks. Conservation efforts include establishing national parks, wildlife sanctuaries, biosphere reserves, and international agreements like CITES to protect endangered species.

Exam-Oriented Questions

What are the major types of natural vegetation?

The major types are forests, grasslands, scrubs, and tundra.

Why is wildlife conservation important?

Wildlife conservation maintains ecological balance, protects biodiversity, and preserves resources essential for human survival.

Solved Example

Question: Explain the role of forests in the ecosystem.

Answer: Forests provide oxygen through photosynthesis, protect soil from erosion, offer habitat for wildlife, regulate climate, and support biodiversity.

Practice Set

- **Easy:** Name two products obtained from plants.
- **Moderate:** Describe the impact of deforestation.
- **Challenging:** Discuss the importance of biosphere reserves.

Answer Key

- Timber and fruits are products obtained from plants.
- Deforestation leads to habitat loss, soil erosion, and climate change.
- Biosphere reserves protect ecosystems and promote sustainable development.

Quick Reference

- Natural vegetation types: forests, grasslands, scrubs, tundra.
- Wildlife provides food, materials, and ecological services.
- Conservation through protected areas and laws.

Glossary

- **Biosphere:** The zone of life on Earth where living organisms interact with the environment.
- **Deforestation:** The clearing or removal of forests by humans.
- **CITES:** An international agreement to protect endangered species from trade.