

Chapter 7: Man and His Environment

High-detail master notes covering ecosystems, flow of energy, biogeochemical cycles, human impact on environment, and conservation strategies.

7.1 Components of an Ecosystem



Biotic Components (Living)

Producers (Autotrophs): Plants and algae converting solar energy into food via photosynthesis.

Consumers (Heterotrophs): Herbivores, carnivores, and omnivores feeding on other organisms.

Decomposers: Fungi and bacteria breaking down dead organic matter.



Abiotic Components (Non-Living)

Climatic Factors: Sunlight, temperature, humidity, and wind.

Edaphic Factors: Soil composition, pH, minerals, and moisture.

Flow of Energy & Trophic Levels



Sun as Ultimate Source

Solar energy enters the biosphere, captured by green plants during primary production.



Ten Percent Law

Only about 10% of energy is transferred from one trophic level to the next; 90% is lost as heat.



Food Chain vs Web

Interconnected food chains form complex food webs providing ecosystem stability.

Carbon and Nitrogen Cycles

The Carbon Cycle

Photosynthesis: Absorbs CO₂ from atmosphere into organic compounds.

Respiration & Combustion: Release CO₂ back into the environment.

The Nitrogen Cycle

Fixation: Rhizobium bacteria convert atmospheric N₂ into nitrates in soil.

Denitrification: Soil bacteria convert nitrates back to gaseous N₂.

Human Impact: Pollution

Air Pollution

Caused by industrial emissions, vehicle exhaust releasing SO₂, NO_x, and greenhouse gases causing smog and acid rain.

Water Pollution

Industrial effluent, sewage discharge, and agricultural fertilizers leading to eutrophication and toxic water bodies.

Land & Noise Pollution

Solid waste accumulation, non-biodegradable plastics, pesticides, and excessive urban noise disrupting wildlife and human health.

Global Warming & Greenhouse Effect

Greenhouse Effect Mechanism

Atmospheric gases like carbon dioxide, methane, and water vapor trap heat radiating from Earth's surface, maintaining planetary warmth.

Enhanced Effect: Fossil fuel burning intensifies warming.

Consequences

Melting polar ice caps, rising sea levels, severe weather anomalies, and disruption of agricultural patterns worldwide.

Deforestation & Biodiversity

Causes of Deforestation

Urbanization & Agriculture: Clearing land for housing, infrastructure, and crops.

Logging: Timber extraction for paper and furniture industries.

Impacts on Ecosystem

Loss of wildlife habitats, species extinction, soil erosion, and disrupted hydrological cycles.

Conservation & Management

Reforestation

Planting trees on cleared lands to restore forest cover, absorb carbon, and stabilize soils.

Protected Areas

Establishing national parks, wildlife sanctuaries, and biosphere reserves to safeguard endangered species.

Recycling & Waste Control

Minimizing single-use plastics, recycling materials, and promoting renewable energy sources.

KARACHI EDU COACHING

Chapter 7 Summary

Master Notes Complete

Ecosystem Dynamics

Covers biotic/abiotic factors, energy flow (10% law), and nutrient cycles.

Human Impacts

Highlights air/water pollution, global warming, and deforestation consequences.

Conservation

Details reforestation, protected areas, and sustainable environmental practices.