

UNIT-3

CONSERVATION OF ENVIRONMENT

LAQ 1: Control Measures for Air, Water, and Soil Pollution

1. Air pollution control measures:

- Promoting clean energy sources such as solar, wind, and hydroelectric power instead of fossil fuels. Industries should install scrubbers, filters, and electrostatic precipitators to reduce smoke and particulate matter.
- Vehicle emissions can be minimized by using catalytic converters, encouraging public transport, and promoting electric vehicles.
- Afforestation helps absorb carbon dioxide and improve air quality. \
- Strict laws and regulations should be implemented to limit emissions and penalize polluters.

2. Water Pollution control measures:

- Proper treatment of sewage and industrial effluents before releasing them into rivers, lakes, or oceans.
- Solid waste management prevents garbage and plastics from entering water bodies.
- Reducing the use of chemical fertilizers and pesticides minimizes harmful runoff from agriculture.
- Public awareness programs educate communities about water conservation and pollution prevention.
- Rainwater harvesting helps recharge groundwater and reduces dependence on polluted surface water.

3. Soil Pollution control measures:

- Promoting organic farming and reducing the use of chemical fertilizers and pesticides.
- Proper waste disposal prevents industrial waste from contaminating the land.
- Composting biodegradable waste enriches soil naturally.
- Preventing soil erosion through cover crops, trees, and grasses maintains soil fertility.
- Strict regulations and monitoring of industrial dumping, mining, and other land activities help protect soil quality.

LAQ 2: Write an Essay About Solid Waste Management

Solid waste is all types of discarded or unwanted materials generated by households, industries, hospitals, and commercial activities.

Main sources of Solid Waste are residential areas, industries, hospitals, markets, and construction sites include biodegradable waste (food scraps, garden waste), non-biodegradable waste (plastics, metals, glass), hazardous waste (chemicals, batteries), and e-waste (computers, mobile phones).

Proper solid waste management is essential to prevent pollution, protect public health, and conserve the environment.

1. **Collection:** Waste should be collected regularly using bins, containers, and vehicles to prevent littering and disease.
2. **Segregation:** Waste must be separated into biodegradable and non-biodegradable components at the source.
3. **Transportation:** Collected waste should be safely transported to treatment or disposal sites using proper vehicles.
4. **Recycling:** Materials like paper, glass, plastic, and metals should be recycled to reduce landfill load and save resources.
5. **Composting:** Biodegradable waste such as food scraps and garden waste can be converted into compost for agriculture.
6. **Incineration:** Certain wastes can be burned in controlled incinerators to reduce volume and generate energy.
7. **Landfills:** Non-recyclable and non-combustible waste is safely buried in engineered landfill sites with proper lining and drainage.
8. **Hazardous Waste Management:** Special treatment is required for medical, chemical, and e-waste to prevent health and environmental hazards.
9. **Role of Government:** Authorities should implement rules, regulations, and awareness programs for effective waste management.
10. **Public Participation:** Citizens must practice waste segregation, reduce, reuse, and recycle to support sustainable management.

LAQ 3: In-situ and Ex-situ Conservation of Biodiversity

Biodiversity conservation involves protecting, managing, and sustainably using species, habitats, and ecosystems to maintain ecological balance.

It ensures the survival of plants, animals, and microorganisms, which are essential for human well-being and environmental stability.

In-situ Conservation (On-site Conservation):

- It is the protection of species within their natural habitats.
- Maintain natural populations and ecological processes without removing organisms from the wild.
- Establishing protected areas such as national parks, wildlife sanctuaries, biosphere reserves, and community reserves.
- Ex: Sundarbans National Park for Bengal tigers, Gir Forest for Asiatic lions, and Kaziranga National Park for one-horned rhinoceros.

Advantages of in-situ conservation:

It preserves natural habitats, maintains ecological interactions, and protects large populations and ecosystems.

Ex-situ Conservation (Off-site Conservation):

- It is the protection of species outside their natural habitats in controlled environments, particularly for endangered or extinct-in-the-wild species.
- Establishing zoos, botanical gardens, seed banks, gene banks, cryopreservation, and tissue culture.
- Ex: Indian Botanic Garden, Howrah for plants, the National Zoological Park, Delhi for animals, and seed banks like NBPGR, New Delhi for crop germplasm.

Advantages of Ex-situ Conservation:

It protects endangered species from extinction, facilitating research and breeding, and conserving genetic diversity.

Both in-situ and ex-situ conservation are crucial for preserving biodiversity. In-situ conservation maintains species in their natural environment, ensuring ecological balance, while ex-situ conservation acts as a backup to save critically endangered species.

LAQ 4: Environmental Laws and Their Significance

Environmental laws are regulations and legal frameworks established by governments to protect natural resources, prevent pollution, and ensure sustainable development. They provide guidelines for industries, communities, and individuals to use resources responsibly while minimizing environmental harm.

Key Environmental Laws in India:

The Water (Prevention and Control of Pollution) Act, 1974

It regulates water pollution from industrial and municipal sources.

The Air (Prevention and Control of Pollution) Act, 1981

It controls air pollution by setting emission standards.

The Environment (Protection) Act, 1986

It offers a comprehensive framework for environmental management.

The Wildlife Protection Act, 1972

It safeguards endangered species and their habitats.

The Forest Conservation Act, 1980

It regulates deforestation and the use of forest land.

The Biodiversity Act, 2002

It promotes conservation, sustainable use, and protection of traditional knowledge.

Other important laws include the Hazardous Waste Rules, 1989, the Motor Vehicles Act, 1989 to control vehicular pollution, the Public Liability Insurance Act, 1991 for accident compensation, and the National Green Tribunal Act, 2010, which provides a specialized forum for speedy environmental dispute resolution.

Significance of Environmental Laws:

- Environmental laws play a crucial role in preventing pollution of air, water, and soil.
- They ensure the conservation of natural resources like forests, water, and wildlife.
- By promoting sustainable development, these laws help balance economic growth with ecological protection.
- They also protect public health by reducing environmental hazards and provide a legal framework that raises awareness about environmental responsibility and accountability.

LAQ 5: International Environmental Agreements and Movements in India

Environmental issues such as pollution, climate change, and biodiversity loss are global challenges that require international cooperation.

India actively participates in international agreements and encourages local environmental movements to address these problems, promoting sustainable development and ecological balance.

International Environmental Agreements:

Several international agreements aim to protect the environment.

- The Stockholm Conference of 1972 was the first UN conference to highlight global environmental concerns.
- The Montreal Protocol (1987) focuses on phasing out ozone-depleting substances such as CFCs.
- The Rio Earth Summit (1992) emphasized sustainable development, biodiversity conservation, and climate action, leading to conventions like the UNFCCC.
- The Convention on Biological Diversity (CBD).
- The Kyoto Protocol (1997) set binding targets for reducing greenhouse gas emissions.
- The Paris Agreement (2015) aims to limit global temperature rise to below 2°C.

Other important agreements include the CBD (1992) for biodiversity conservation, the Basel Convention (1989) regulating hazardous waste, and CITES (1973) controlling trade in endangered species.

Environmental Movements in India:

India has a rich history of environmental movements.

- The Chipko Movement (1970s) in Uttarakhand involved villagers hugging trees to prevent deforestation.
- The Silent Valley Movement (1973–1980) protected the rainforest in Kerala from a hydroelectric project.
- The Narmada Bachao Andolan (1985 onwards) advocated against large dams to save tribal communities and ecosystems.
- The Bishnoi Movement (18th century) in Rajasthan protected trees and wildlife.

- The Appiko Movement (1980s) in Karnataka was inspired by Chipko to save forests. Urban initiatives also promote clean rivers, solid waste management, and green spaces.

Significance:

These agreements and movements have raised awareness, influenced environmental policies, protected biodiversity, and promoted sustainable development both globally and in India.

They demonstrate India's commitment to environmental conservation and highlight the importance of local and global collaboration in addressing environmental challenges.

SAQ 1: Sustainable Development

Sustainable development refers to meeting the needs of the present without compromising the ability of future generations to meet their own needs. It emphasizes the careful use of natural resources to ensure that future generations also have access to them.

Key Principles:

- Sustainable development aims to balance economic growth, environmental protection, and social well-being.
- It promotes responsible use of resources, reduces pollution, and encourages the conservation of ecosystems.
- Long-term economic growth should be achieved without causing environmental damage, while social equity ensures fair access to resources and opportunities for all communities.
- Sustainable development encourages the use of renewable energy sources such as solar, wind, and hydropower.
- It supports waste management practices like reducing, reusing, and recycling materials to minimize environmental impact.

The ultimate goal of sustainable development is to create a healthy, equitable, and sustainable planet that meets the needs of both present and future generations, ensuring environmental, social, and economic harmony.

SAQ 2: Write a short note on Montreal and Kyoto Protocols

Montreal Protocol (1987):

- Established in 1987 to protect the ozone layer by phasing out ozone-depleting substances (ODS) such as chlorofluorocarbons (CFCs) and halons.
- It was signed by almost all countries worldwide, making it a globally recognized agreement.
- Highly successful in reducing the production and consumption of ODS, allowing the ozone layer to gradually recover.
- Lies in preventing harmful ultraviolet (UV) radiation from reaching the Earth, thereby protecting human health, crops, and ecosystems.

Kyoto Protocol (1997):

- Focuses on reducing greenhouse gas (GHG) emissions to mitigate global warming.
- Targets gases such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases.
- Industrialized countries agreed to legally binding emission reduction targets under this protocol.
- Mechanisms like emissions trading, clean development mechanism (CDM), and joint implementation help countries achieve these goals.
- Promotes climate change mitigation and encourages nations to adopt cleaner and sustainable energy sources.

SAQ 3: Mention any two Methods of Solid Waste Management

1. Composting:

- Process of converting biodegradable waste such as food scraps, garden waste, and agricultural residues into nutrient-rich compost.
- Organic waste is collected, segregated, and allowed to decompose naturally with the help of microorganisms.
- Composting produces organic fertilizer, reduces the amount of waste in landfills, and improves soil fertility.
- Prevents the release of methane from landfills and reduces soil and water pollution.
- Ex: Kitchen waste or park garden waste being converted into compost for use in gardens and farms.

2. Recycling:

- Processing non-biodegradable waste such as plastics, glass, paper, and metals to create new products.
- The waste materials are collected, sorted, cleaned, and reprocessed into usable raw materials.
- Conserves natural resources, reduces energy consumption, and lowers environmental pollution.
- Minimizes the amount of waste sent to landfills, thereby reducing environmental degradation.
- Ex: Recycling old newspapers into new paper and converting plastic bottles into new plastic products.

SAQ 4: What are Renewable and Alternate Sources of Energy

Renewable Sources of Energy:

- Renewable energy comes from natural resources that are continuously replenished.
- Ex: solar energy, wind energy, hydropower, biomass, and geothermal energy.
- unlimited, eco-friendly, and sustainable.
- help to reduce dependence on fossil fuels, decrease pollution, and mitigate climate change.
- Plays a significant role in promoting sustainable development by providing clean and safe energy for present and future generations.

Alternate Sources of Energy:

- Alternate energy sources refer to non-conventional energy sources that can replace fossil fuels.
- Ex: solar panels, wind turbines, tidal energy, biofuels, and hydrogen fuel cells.
- Innovative, renewable, and environmentally friendly.
- Help reduce the carbon footprint, conserve natural resources, and ensure energy security.
- Essential for meeting the growing energy demands while protecting the environment.

SAQ 5: Write briefly about the Chipko and Silent Valley Movements

Chipko Movement:

- Origin: Started in the 1970s in Uttarakhand (then part of Uttar Pradesh).
- Method: Villagers hugged trees to prevent them from being cut down.
- Purpose: To protect forests from deforestation and preserve the environment.
- Significance: Raised awareness about forest conservation and inspired similar movements across India.
- Impact: Led to the introduction of stricter forest protection laws and community involvement in forest management.

Silent Valley Movement:

- Origin: Started in 1973–1980 in Kerala to protect the Silent Valley rainforest.
- Reason: A hydroelectric project threatened to submerge the forest, endangering its biodiversity.
- Method: Protests, campaigns, and public awareness were used to halt the project.
- Significance: Helped in protecting endangered species and rich biodiversity of the region.
- Impact: The government cancelled the dam project and declared Silent Valley as a National Park.