ENVIRONMENT AND ECOLOGY

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1. Environment and Sustainable Development

Basic Concepts of Environment and Ecology

- 'Eco mark' is given to Indian products that are environment friendly.
- Functions of environment: Supplying resources, sustaining life, providing aesthetic services.
- Exhaustible but renewable natural resources: Water in usable condition, Soil.
- Resources classified by origin: Biotic and Abiotic.
- Ecological Footprint is measured in Global Hectares.
- Bharati, the Indian research base in Antarctica, is located about 3000 km East of Maitri and facilitates year-round scientific research for the Indian Antarctic Programme.
- Centre of Science and Environment in New Delhi publishes 'Down to Earth' magazine.
- First Indian Research Station in the Arctic: Himadri.
- Environment planning organization: NEERI (National Environmental Engineering Research Institute).
- Eco-friendly agricultural practice: Organic farming.
- Mariculture (सागरीय कृषि): Related to cultivation of marine plants and animals.
- Biotic resources: Obtained from biosphere and have life (e.g., human, flora, fauna, fisheries).
- Non-renewable resources: Form over a very long geological time (millions of years) and are not easily reproduced.
- Renewable resources: Can be reproduced by physical, chemical, or mechanical processes relatively quickly.
- World Soil Day 2019 theme: "Stop Soil Erosion, Save our Future".
- World Environment Day: June 5th.
- World Nature Conservation Day: July 28th.
- International Earth Day (Earth Day): April 22nd.
- Laser system used for environmental monitoring: Lidar.
- Factors included in chemical environment: Water and soil.
- Definition of environment ("sum total of all conditions agencies..."): From Britannica Encyclopedia.
- A complete fertilizer always contains Nitrogen (N), Phosphorus (P), and Potassium (K).
- Non-renewable natural resource example: Fossil Fuels.
- Non-conventional raw material for paper production: Sugarcane bagasse.
- Science characteristics: Guided by natural law, testable, falsifiable. (Its conclusions are NOT permanent).
- "Limits to Growth" concept: Propounded by Club of Rome (1972); predicted limits within 100 years if trends continued unchanged.

- Standard environment categories include Physical, Cultural, and Biological environment. (Operational Environment is not a general category).
- International Centre for Research on Agro-Forestry: Nairobi.
- Indian Institute of Forest Management: Bhopal.
- Central Agro-Forestry Research Institute: Jhansi.
- Tata Energy Research Institute (TERI): New Delhi.
- Population control is necessary to maintain environmental balance; rapid population increase destabilizes it.
- Organic farming does not use genetically modified seeds, synthetic pesticides or fertilizers; uses extensive crop rotation; employs ecologically protective practices.
- Conservation Agriculture practices: Adopting minimum tillage, using crop residues to cover soil surface, adopting spatial and temporal crop sequencing/crop rotations, avoiding monoculture.
- A country's natural capital includes forests, water, and minerals. (Roads are man-made capital).
- Application of gypsum is required more in the groundnut crop.
- Non eco-friendly tree: Eucalyptus (due to high water consumption).
- M. S. Swaminathan is recognized by UNEP as the 'Father of Economic Ecology'.
- Environmental impacts of agricultural practices: Synthetic fertilizers/pesticides may result in soil/water contamination; sustainable agriculture preserves soil health and biodiversity.
- International Ozone Day: September 16th.
- World Wildlife Day: March 3rd.
- Communication satellites typically use a Geosynchronous orbit.
- World Environment Day 2024 campaign in India: 'Ek Ped Maa Ke Naam' (tree plantation campaign).
- Organic farming involves: Use of vermicompost, natural pesticides like pyrethrin and rotenone, and copper sulfate. It does not use genetically modified organisms.

Biodiversity and Conservation (In-situ and Ex-situ)

- Champion of Earth Award 2022 recipients: Cecile Bibiane Ndjebet (Cameroon) and Purnima Devi Barman (India).
- Ministry of Environment, Forests and Climate Change (MoEFCC) is primarily concerned with biodiversity of lakes and rivers.
- Loss of biodiversity is caused by dumping of toxic waste into soil.
- Deforestation is responsible for frequent floods in rivers.
- Chico Mendes (not Fransisco Mendez) was known as 'Amazon Gandhi' for his environmental and social activism in the Amazon rainforest, not for work in the energy field.
- Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) is a collaboration among India, China, and Nepal.
- Important Environmental Days:
    - April 18: World Heritage Day
    - May 22: International Day for Biological Diversity
    - July 29: International Tiger Day
    - December 5: World Soil Day
- "Water Burial" won Best Film Award in Environment Conservation category at the 67th National Film Awards, 2021.
- Bombay Natural History Society (BNHS) is an independent, non-governmental research organization. It conserves nature through action-based research, education, and public awareness, including organizing nature trails and camps.
- Biological control describes the use of organisms (e.g., predators, parasites) to control pests.
- Crop rotation allows farmers to improve soil fertility, diversify crops, and reduce pesticide costs by naturally breaking the cycle of weeds, insects, and diseases.
- "Ottal" (The Trap) won the Best Film on Environmental Conservation/Preservation at the 62nd National Film Awards.

Climate Change: Causes, Impacts, Mitigation, and Adaptation Strategies

- National Mission for Sustainable Agriculture (NMSA): Launched in 2011-12, part of National Action Plan on Climate Change (NAPCC). Aims to enhance food security and make Indian agriculture resilient to climate change.
- Green India Mission: One of the eight missions under NAPCC. Aims to restore and enhance forest cover (targeting 10 million hectares) and respond to climate change through a combination of adaptation and mitigation measures.
- India's Long-Term Low Emissions Development Strategy (LT-LEDS): Envisions a just, smooth, sustainable transition from fossil fuels; increased use of biofuels; climate-resilient urban development; and financing sustainable development through Green Bonds.
- Urban Heat Island (UHI) Effect:
    - Definition: Specific areas within a city experience higher temperatures/heat loads than surrounding rural or less developed areas.
    - Nature: It is a local phenomenon.
    - Causes: Dark, impervious surfaces (e.g., concrete, asphalt) absorb more solar radiation; reduced vegetation and moisture content in soil (less evapotranspiration); anthropogenic heat sources (vehicles, industries, AC units); urban canyon effect from high-rise buildings trapping heat and reducing wind flow.
    - Impact of High-rise Buildings: Exacerbate UHI by blocking winds and trapping heat.
    - Reducing Factors: High wind velocity and high rainfall can help reduce UHI.
- Population Explosion: A primary driver leading to loss of forests, rapid urbanization, and increasing pollution.
- Earth Overshoot Day: Marks the date when humanity's demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year. Directly indicates environmental degradation.
- Coal Usage: Judicious use is critical because burning coal causes air pollution, acid rain, and contributes significantly to global warming (via CO_2 emissions).
- Carbon Credit: A tradable permit representing the right to emit one tonne of carbon dioxide (or equivalent greenhouse gases). It often signifies the difference between allowed and actually emitted carbon.
- Resilient Cities: Urban centers that can adapt, withstand, and recover from various shocks and stresses, including those posed by climate change, population growth, and globalization.
- Adaptation Gap Report: Released by the United Nations Environment Programme (UNEP).
- UNFCCC COP23 (23rd Conference of the Parties): Held in Bonn, Germany, in 2017 (presided over by Fiji).
- Important Environmental Days:
    - World Environment Day: June 5
    - Earth Day: April 22
    - World No Tobacco Day: May 31
    - International Day for the Preservation of the Ozone Layer (Ozone Day): September 16

Deforestation, Desertification, and Land Degradation

- Major causes of resource depletion/degradation: pollution, infrastructural development, over-consumption/exploitation, destruction of ecosystems, soil erosion, and deforestation.
- Soil erosion increases with high rainfall.
- Afforestation is a method to prevent soil erosion.
- Impacts of dams/reservoirs include loss of flora/fauna, reservoir-induced seismicity, and water-borne diseases; desertification is not a direct impact.
- Desertification leads to a decline in biological productivity.
- Desertification often occurs in hot desert areas.
- Contour bunding is recommended for lands with a slope less than 6%.

- Approximately 158 million hectares (mha) of India's total geographical area is under various kinds of land degradation.
- USLE stands for Universal Soil Loss Equation.
- Gypsum is used for the reclamation of sodic (alkaline) soils.
- Agricultural drought is soil moisture stress caused by an imbalance between available soil moisture and crop evapotranspiration.
- Acidic soils fix more phosphates.
- Environment-friendly farming practices in semi-arid areas include planting tree belts, crop rotation, and using organic fertilizers. Large-scale irrigation systems can be detrimental.
- Deforestation is a direct cause of loss of biodiversity, topsoil erosion, and global climate change, but not directly of species invasion.
- Land degradation is caused by soil erosion and waterlogging. Deforestation is a major cause of soil erosion.
- Large-scale land degradation in India is due to inadequate soil conservation measures and overgrazing.
- Soil erosion causes a huge loss of valuable nutrients and fertility.
- Soil erosion is largely a man-made phenomenon, caused by deforestation, overgrazing, shifting cultivation, and improperly constructed terrace outlets.
- Soil conservation methods include afforestation and slowing down water movement. Increasing the size of soil particles and regular application of fertilizers (primarily for fertility) are not direct soil conservation methods.
- India aims to achieve Land Degradation Neutrality (LDN) by the year 2030.
- The Mitti Bachao (Save the Soil) Movement started in Hoshangabad, Madhya Pradesh.
- Contour bunding is a soil conservation method used on sloping lands.
- In India, soil erosion is associated with deforestation and is intensified by a tropical climate.
- The United Nations Convention to Combat Desertification (UNCCD) aims to promote effective action through innovative national programmes and supportive international partnerships, and is committed to a bottom-up approach encouraging local participation. It focuses on all affected regions, particularly Africa.
- The Aral Sea has shrunk immensely/dried up due to human activities (e.g., diversion of rivers for irrigation).
- Nagaland mountains are becoming increasingly barren primarily due to shifting cultivation (Jhum).
- Alley cropping is a cropping system where crops are grown in the inter-spaces between rows of planted trees.
- The use of gypsum in fields is a solution for the problem of soil alkalinity (sodic soils).
- IMD (India Meteorological Department) defines severe drought when the deficiency of rainfall exceeds 50% of normal rainfall.
- Anthropogenic factors of desertification include overgrazing, changes in land use, and urbanization. Lesser rainfall is a natural factor.
- As per ISRO's 'Desertification and Land Degradation Atlas of India-2021', water erosion is the most significant process of desertification/land degradation after wind erosion in Rajasthan.
- Jhum, Bush fallow agriculture, and Slash and Burn agriculture are forms of shifting cultivation. Nomadic herding is not a form of shifting cultivation.

Ecosystem Structure and Function

- UN Decade on Ecosystem Restoration: 2021-2030.
- Dams & Reservoirs - Impacts: loss of flora and fauna, reservoir-induced seismicity, water-borne diseases.
- Dams & Reservoirs - No direct impact: desertification (often prevents, though downstream areas can experience altered hydrology).

Environmental Ethics and Human-Environment Interaction

- Environmental Ethics & Concepts:
- Anthropogenic Environment: An environment modified by human activities.

- Ecoradicals: Believe human societies are dangerously close to Earth's carrying capacity limits; advocate strict population control; stress less consumption-oriented and waste-producing lifestyles.
- Greenwashing: Conveying a false impression that a company's products/activities are eco-friendly and environmentally sound.
- Quotes & Slogans:
- "Earth provides enough to satisfy every man's need, but not every man's greed": Quote by Mahatma Gandhi.
- "Ecology is permanent economy": Slogan of the Chipko Movement.
- Key Books:
- Silent Spring: Book by Rachel Carson, centered around environmental issues (e.g., impact of pesticides).
- The Land Ethic: Concept developed by Aldo Leopold, introduced in "A Sand County Almanac."
- Global Environmental Events & Organizations:
- Earth Hour: Global event organized by the World Wide Fund for Nature (WWF).
- World Environment Day (June 5): Marks the anniversary of the Stockholm Conference on Human Environment (1972).
- First U.N. International Conference on Environment: Held at Stockholm in 1972.
- World Watch Institute: In its Jan. 1996 annual report, suggested levying an Environment Tax instead of Income Tax.
- Environmental Awards:
- Global-500 Award: Given for rare achievement in environment conservation.
- Goldman Environmental Prize (Goldman Awards): Given for the protection of the environment.
- Major Environmental Movements & Leaders (India):
- Narmada Bachao Andolan: Led by Medha Patkar; addresses both sociological and ecological issues, particularly related to the Sardar Sarovar Dam.
- Chipko Movement: An environmental movement, known for its slogan "Ecology is permanent economy." Prominent leader: Sunderlal Bahuguna.
- Appiko Movement: Associated with nature conservation, led by Pandurang Hegde (also associated with Appu and Mamtha).
- People for Animals: An organization associated with Maneka Gandhi.
- Resurrection of Kali Bein Rivulet: A conservation effort associated with Balbir Singh Seechewal.
- Chilka Bachao Andolan: Addresses both sociological and ecological issues.
- Key Personalities & Contributions (Environmental/Scientific):
- Medha Patkar: Leader of the Narmada Bachao Andolan.
- M. S. Swaminathan: Known for Rice Research and Biodiversity Conservation (pioneer of the Green Revolution in India).
- Anil Agarwal: Associated with the Centre for Environment Science (Centre for Science and Environment).
- Salim Ali: Renowned ornithologist and for Biodiversity Conservation ("Birdman of India").
- Balbir Singh Seechewal: Associated with the Resurrection of Kali Bein Rivulet.
- Maneka Gandhi: Associated with People for Animals.
- Pandurang Hegde: Leader of the Appiko Movement.
- Rachel Carson: Author of "Silent Spring."
- Mahatma Gandhi: Authored the quote on human needs versus greed.
- Sunderlal Bahuguna: A prominent leader of the Chipko Movement.
- Specific Environmental Initiatives/Facts:
- Bangalore Vertical Organic Garden: India's first, located on a pillar of the Hosur Road Electronics City Flyover, a project by NGO Jeevan.
- Aluminum as "Green Metal": Considered green because it provides a replacement for wood, thereby contributing to saving forests.
- Uttarakhand Specific (Regional Context):
- 'Kham' system: An administrative system implemented by the British in the Rawain area of Uttarakhand.
- 'Uttar Vrindavan Ashram' (Mithola, Almora): Its founder was Ronald Henry Nixon (later known as Swami Krishna Prem).

- 'Gadwali' newspaper: Started by Taradutt Gairola.

Environmental Impact Assessment (EIA)

- Environmental Impact Assessment (EIA) is a process of identifying, predicting, and evaluating likely impacts of a proposed project, defining mitigation actions, and ensuring positive contributions to the natural environment and well-being.
- Key purposes of EIA include: predicting effects of industrial/infrastructural projects, preventing approval without proper oversight/considering adverse consequences, and comparing project alternatives to identify the best combination of economic and environmental costs/benefits.
- The National Environmental Policy Act (NEPA) requires all federal agencies to conduct a prior Environmental Impact Statement (EIS) before taking any major action.
- The Ministry of Environment, Forest and Climate Change (MoEFCC) published the draft Environment Impact Assessment (EIA) Notification, 2020, which included proposals such as potentially exempting certain projects (e.g., Coal and non-Coal mineral prospecting, solar photovoltaic projects) from prior environmental clearance and changes to public consultation.
- Leopold Matrix is a method specifically associated with Environmental Impact Assessment (EIA) for identifying and evaluating potential impacts.
- ISO 14040 series deals with Life Cycle Assessment (LCA).
- R2 (Responsible Recycling) Code of Practices promotes environmentally responsible practices in the electronics recycling industry.

Environmental Pollution: Types, Sources, Effects, and Control Measures

- National Green Tribunal (NGT): Statutory body established under the National Green Tribunal Act, 2010. Provides environmental justice, helping reduce the burden of litigation in higher courts.
- Central Pollution Control Board (CPCB): Statutory organization established under the Water (Prevention and Control of Pollution) Act, 1974. Promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.
- National Environmental Engineering Research Institute (NEERI): Located at Nagpur.
- Preventive Conservation - Environment Control: For comprehensive control and monitoring, installation and use of air conditioning systems is a highly effective option, as it regulates temperature, humidity, and air quality. Other methods include proper ventilation, use of dehumidifiers, and maintaining proper air circulation.
- Silica Gel Quantity: For a room with a capacity of 20-25 cubic metres, approximately 3-4 kg of silica gel is recommended for humidity buffering and control.
- UNEP World Environment Day (WED) Theme: An annual event by the United Nations Environment Programme. The theme for WED-2025 is typically announced closer to the event date by UNEP; for reference, the 2023 theme was "Beat Plastic Pollution".

International Environmental Conventions and Protocols

- International Years/Days:
- International Year of the Ocean: 1998.
- World Environment Day (WED): June 5.
- First WED celebration (1973) theme: "Only One Earth".
- WED 2011: Theme 'Forests: Nature at Your Service'. India was the global host.
- WED 2020: Hosted by Colombia in partnership with Germany, theme "Time for Nature".
- WED 2021: Theme "Ecosystem Restoration".
- WED 2022: Theme "Only One Earth".
- WED 2023: Theme "Solutions to Plastic Pollution" (#BeatPlasticPollution).
- World Water Day: March 22.
- Earth Day: April 22.
- World Energy Conservation Day: December 14.
- Key Summits/Conferences:
- Stockholm Conference (UN Conference on the Human Environment): Held 1972. First global environmental conference. Proposed in 1968.

- First World Climate Conference: 1979.
- Earth Summit (UN Conference on Environment and Development - UNCED): Rio de Janeiro, Brazil, 3-14 June 1992. Held on 20th anniversary of Stockholm Conference. Focused on the "impact of human socio-economic activities on the environment". Outcomes: Rio Declaration, Agenda 21, establishment of UNFCCC and CBD.
- Earth Summit + 5 (UN General Assembly Special Session - UNGASS): 1997, New York. Reviewed Agenda 21.
- World Summit on Sustainable Development (WSSD): Johannesburg, South Africa, 2002.
- UN Climate Change Conference (COP14 UNFCCC): Poznań, Poland, Dec 2008. Discussed Development and transfer of Technologies, financial mechanism, reducing emissions from deforestation and forest degradation (REDD), and Disaster Management.
- First UN IPCC Conference (refers to COP1 of UNFCCC in Berlin): 1995.
- 4th Session of the UN Environment Assembly (UNEA-4): Nairobi, Kenya.
- Major Conventions/Protocols & Amendments:
- Vienna Convention for the Protection of the Ozone Layer: 1985. A framework convention to protect the ozone layer.
- Montreal Protocol on Substances that Deplete the Ozone Layer: 1987. Adopted specific measures for the total elimination of Ozone Depleting Substances (ODS).
- Kigali Agreement (Amendment to Montreal Protocol): 2016. Aimed at phasing down Hydrofluorocarbons (HFCs).
- Kyoto Protocol: Adopted 1997, entered into force 2005. Aims at stabilization and reduction of Greenhouse Gases (GHGs) / carbon emissions. Included carbon trading mechanism.
- Doha Amendment (to Kyoto Protocol): 2012. Extended the first commitment period of the Kyoto Protocol. India ratified it in 2017.
- Paris Agreement: 2015. International agreement on climate change, aiming to limit global warming below 2°C, preferably to 1.5°C, through Nationally Determined Contributions (NDCs). Aims at reducing carbon emissions.
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: 1989.
- Stockholm Convention on Persistent Organic Pollutants (POPs): 2001. Aims to protect human health and the environment from POPs.
- Cartagena Protocol on Biosafety (to CBD): 2000. Regulates transboundary movements of Living Modified Organisms (LMOs).
- Ramsar Convention (on Wetlands of International Importance): 1971. For the conservation and wise use of wetlands.
- UN Convention to Combat Desertification (UNCCD): 1994. India is a signatory. Nodal Ministry in India: Ministry of Environment, Forest and Climate Change (MoEFCC).
- New Helsinki Convention: 1992. Focuses on the protection of the marine environment of the Baltic Sea area.
- Polar Code: An international code of safety for ships operating in polar waters, adopted by the IMO.
- Institutions & Awards:
- United Nations Environment Programme (UNEP): Established 1972. Headquarters: Nairobi, Kenya.
- India's nodal agency for UNEP: Ministry of Environment, Forest and Climate Change (MoEFCC).
- "Champions of Earth" award: Conferred by UNEP.
- "Global-500" Awards: Were given by UNEP for achievements in the protection of the environment (discontinued, replaced by Champions of Earth).
- Global Environment Facility (GEF): Pilot GEF established 1990, formally established 1991. Serves as a financial mechanism for: Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), Stockholm Convention on POPs, UNCCD, Minamata Convention on Mercury. Initial partners: UNDP, UNEP, World Bank. India is both a donor and a recipient of GEF. Donors include both developed and developing countries.

- Greenpeace International: Established 1971. Headquarters: Amsterdam, Netherlands.
- World Meteorological Organization (WMO): Headquarters: Geneva, Switzerland.
- ECOLEX: An environmental law database controlled by FAO (Food and Agriculture Organization), IUCN (International Union for Conservation of Nature), and UNEP.
- Disaster Risk Reduction Frameworks (Chronological):
- Yokohama Strategy for a Safer World: 1994.
- Hyogo Framework for Action: 2005.
- Sendai Framework for Disaster Risk Reduction: 2015.

Major Environmental Laws, Policies, and Institutions in India

- National Green Tribunal (NGT):
  - Established: 2010, under the National Green Tribunal Act, 2010.
  - Purpose: Effective and expeditious disposal of cases relating to environmental protection, conservation of forests, and relief/compensation for damages to persons and property.
  - Nature: Quasi-Judicial body.
  - Procedure: NOT bound by the procedure laid down under the Code of Civil Procedure, 1908; guided by principles of natural justice.
  - Sittings: Principal Bench in New Delhi; four Zonal Benches at Bhopal, Pune, Kolkata, and Chennai (total 5 places of sitting).
  - Establishment period: 11th Five-Year Plan.
- India's Scientific Mission in Antarctica:
  - First scientific base station: Dakshin Gangotri.
  - Current use of Dakshin Gangotri: Supply base and transit camp.
  - Maitri station: Manned throughout the year for scientific activities.
- Global Environment Facility (GEF) Grant Agreement (August 2017) for 'Ecosystems Service Improvement Project':
  - Project Size: USD 25 million.
  - Duration: 5 years.
  - Financing: Entirely from its GEF Trust Fund.
  - Implementing Ministry: Ministry of Environment, Forest and Climate Change (MoEFCC).
- Ganga Rejuvenation Initiatives:
  - National Ganga River Basin Authority (NGRBA): Set up in 2009.
    - Features: River basin as the unit of planning and management; spearheads river conservation efforts nationally; chaired by the Prime Minister.
  - Namami Gange Programme: Integrated Ganga Conservation Mission; approved as "Flagship Programme" by Union Government; called 'Namami Gange' in Union Budget 2014.
    - Announcement Date: July 7, 2016.
    - Responsibility: Environment protection (Clean Ganga).
- Rivers Declared as Living Entities:
  - Ganga and Yamuna rivers were declared as living entities by the Uttarakhand High Court.
- Parivesh:
  - Single window integrated system for Environment, Forest, and Coastal Regulatory Zone (CRZ) clearance processes.
- Ecomark Scheme:
  - Launched: 1991 (Scheme of labelling environmental friendly products).
  - Allocating body: Bureau of Indian Standards (BIS).
  - Symbol: Earthen pitcher.
  - Purpose: Certification mark for products conforming to standards aimed at least environmental impact; increases consumer awareness.
- Key Environmental Acts, Rules & Policies (by year):
  - Wildlife (Protection) Act: 1972.
  - Water (Prevention and Control of Pollution) Act: 1974.
  - Water (Cess) Act: 1977.
  - Forest (Conservation) Act: 1980.
  - Air (Prevention and Control of Pollution) Act: 1981.

- Environment (Protection) Act (EPA): 1986.
  - Empowers GoI to: Lay down standards for emission/discharge of pollutants; state requirements for public participation in environmental protection processes.
  - Section 10 of EPA: Gives powers of entry and inspection.
- National Forest Policy: 1988.
- Public Liability Insurance Act: 1991.
- National Conservation Strategy and Policy Statement on Environment and Development: 1992.
- Biomedical Waste Management Rules: 1998.
- Municipal Solid Wastes (Management and Handling) Rules: 2000.
- Biological Diversity Act: 2002.
- National Environment Policy: 2006.
- Hazardous Wastes (Management, Handling and Transboundary Movement) Rules: 2008 (First Amendment Rules: 2016).
- E-Waste (Management and Handling) Rules: 2011.
- National Green Tribunal Act: 2010.
- National Water Policy: First 1987, followed by 2002, 2012.

• National Green Corps (NGC):
- Programme by MoEFCC to promote environmental awareness and educate school children through Eco-clubs.

• National Committee on Environmental Planning and Coordination (NCEPC):
- Set up: 1972, in the wake of the Stockholm Conference.

• i-Hariyali app:
- Launched by: Punjab government.
- Purpose: To increase green cover (tree plantation).

• Greenest State of India: Mizoram (based on high forest cover percentage).

• Constitutional Provisions for Environmental Protection:
- Article 48A (Directive Principles of State Policy): Protection and improvement of environment and safeguarding of forests and wildlife.
- Article 51A(g) (Fundamental Duty): To protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures.

• O-SMART Scheme:
- Extended till 2026.
- Purpose: Ocean Development Activities (Ocean Services, Modelling, Application, Resources, and Technology).

• Animal Welfare Board of India:
- Established under: Prevention of Cruelty to Animals Act, 1960.

• National Tiger Conservation Authority (NTCA):
- Statutory body, constituted under the Wildlife (Protection) Act, 1972 (as amended in 2006).

• Genetic Engineering Appraisal Committee (GEAC):
- Constituted under: Environment (Protection) Act, 1986.
- Ministry: Ministry of Environment, Forest and Climate Change.

• Rajiv Gandhi Environment Award:
- Given for: Outstanding contribution to clean technology and development.

• National Environmental Engineering Research Institute (NEERI):
- Location: Nagpur.

• Green Building Congress-2005:
- Held at: Hyderabad.

• National Museum of Natural History (New Delhi):
- Imparts non-formal education in environment and conservation.

• Environmental Information System (ENVIS):
- Acts as a decentralized information network for environmental information.

• Western Ghats Ecology Expert Panel:
- Constituted for: Eco-sensitive areas (specifically, conservation of Western Ghats).

• Directorate of Environment:
- Organized in India in: 1976.

• Legislation Not Dealing with Environment Protection:
- The Port Laws Amendment Act, 1997.
- National Housing Scheme, 2015.

Natural Disasters and Disaster Management Strategies

- Out of 35 States/Union Territories in India, 25 are disaster prone.
- National Institute of Disaster Management (NIDM) publishes a biannual journal titled "Disaster & Development".
- The impact of disasters can be significantly reduced through better planning, preparedness awareness, and mitigation measures.
- As per the Manual for Drought Management (2016), a "chronically drought prone" area receives mean annual rainfall less than 750 mm.
- Reconstruction is a post-disaster measure.
- Natural disasters cause maximum damage in developing countries.
- The Bhopal Gas Tragedy was a man-made disaster.
- India is not a disaster-free country.
- Mangroves reduce the impact of cyclones.
- A landslide caused by civil construction work in a hilly area is a man-made disaster.
- The National Institute of Disaster Management (NIDM) was established under the Disaster Management Act, 2005.
- Biological disasters do not lead to flooding. Melting of snow/ice, lack of vegetation, and broken dams can lead to flooding.
- A major tsunami occurred in the coastal areas of India in 2004.
- Riot Management is not covered under the National Disaster Management Guidelines; Flood, Earthquake, and Tsunami Management are covered.
- Features of Flood Management Mitigation include: construction of dams and Catchment Area Treatment (CAT) works, and measures for integration of soil, water and forest management. Avoiding improper diversion of flood waters is also a relevant consideration.
- The Incident Response System (IRS) is practiced to manage disasters.
- Mitigation means measures aimed at reducing the risk, impact, or effects of a disaster or threatening disaster situation.
- The Sendai Framework is related to Disaster Risk Reduction.
- Nuclear war and accelerated soil erosion are human-induced disasters.
- The Disaster Management Act was passed by the Parliament of India in 2005.
- The disaster in the Kedarnath Valley was caused by a cloudburst followed by large-scale landslides.
- Steps to reduce the intensity of natural disasters, such as those experienced in Uttarakhand, include: banning CFC-gases, large-scale plantation, and installation of early warning systems.

Renewable Energy Sources and Sustainable Energy Solutions

1. Thermal power stations use fossil fuels (oil, coal, natural gas) to heat water, generate steam, spin turbines, and produce electricity.
2. PM JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana objectives include: providing remunerative income to farmers for agriculture residues, creating rural/urban employment, and addressing environmental pollution from burning biomass/residues.
3. The State Energy Efficiency Index (BEE) 2020 categorizes states into Front Runner, Achiever, Contender, and Aspirant. Karnataka and Rajasthan were Front Runner states. Gujarat was in the Contender category, and the majority of states were in the Achiever category.
4. Organic farming characteristics: avoids chemical fertilizers, employs frequent decomposing and fallowing for soil health, uses natural methods for pest control (e.g., herbs), and aims for ecological balance rather than maximum per-hectare productivity.
5. LNG stands for Liquefied Natural Gas.
6. The Perform, Achieve and Trade (PAT) scheme in India is related to energy efficiency.
7. Volocopter (Germany) was successfully tested as the world's first green, environment-friendly, and emission-free helicopter.
8. India's Green Initiatives include the National Green Highways Mission, Research & Development for Clean Coal Technologies, and the National Green Corridor Programme.