Unit 5: Environmental Policy and Governance

Environmental Sustainability — DI02000051

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Unit 5 Syllabus Overview (20% Weightage, 6 Hours)

Unit 5 Topics

5.1 Environmental Laws in India (EPA 1986, WPA 1972, FCA 1980)
5.2 Pollution Control Rules (Air, Water, Noise, Plastic, E-Waste)
5.3 Environmental Impact Assessment (EIA)
5.4 Environmental Management System (EMS) — ISO 14001 / EMAS
5.5 Global Environmental Agreements (UNFCCC, CBD, CITES, Basel, Montreal, Stockholm)
5.6 Corporate Social Responsibility (CSR) in Environment
5.7 NGOs, Public Participation and Right to Information

20% marks | 6 lecture hours | PYQ topics: EPA 1986, EIA process, ISO 14001, International conventions

Section 5.1

Environmental Laws in India

Constitutional Basis for Environment (5.1)

Fundamental Rights (Part III):
- **Art 21:** Right to life includes right to live in a clean, pollution-free environment (SC interpretation)

Directive Principles (Part IV):
- **Art 48A** (added 1976): State shall protect and improve environment; safeguard forests and wildlife

Fundamental Duties (Part IVA):
- **Art 51A(g):** Every citizen's duty to protect and improve natural environment including forests, lakes, rivers and wildlife

Division of powers:
- Concurrent List – Entry 17A: forests; Entry 17B: protection of wild animals and birds
- State List – Entry 6: public health and sanitation
- Centre passes framework laws; States implement them

Environment Protection Act (EPA) 1986 (PYQ — 4M)

EPA 1986 — Umbrella Environment Law

Year: 1986 (after Bhopal Gas Tragedy, 1984)
Ministry: Ministry of Environment, Forest and Climate Change (MoEFCC)

Powers conferred:
- Set standards for emissions and discharges of environmental pollutants
- Regulate environmental impact assessment (EIA)
- Prevent, control and abate environmental pollution
- Inspect premises and take samples; seize equipment
- Notify Eco-Sensitive Areas (ESAs); coastal regulation zones (CRZ)

Key rules under EPA:
- Environment Impact Assessment (EIA) Notification 2006
- Hazardous Waste Management Rules
- E-Waste Management Rules
- Plastic Waste Management Rules

Penalty: Up to 5 years imprisonment; fine up to Rs 1 lakh per day of violation

Water (Prevention and Control of Pollution) Act 1974 (5.1)

Water Act 1974

Year: 1974 (India's first Environment Act!)
Amendment: 1988 (strengthened penalties)

Key provisions:
- Prohibits discharge of sewage/trade effluent into water bodies without consent
- Establishes **CPCB** (Central Pollution Control Board) — national regulatory body
- Establishes **SPCBs** (State Pollution Control Boards) — state-level enforcement
- Industries need **Consent to Establish (CTE)** and **Consent to Operate (CTO)** from SPCB
- Effluent standards set for industries

CPCB rolls:
- Sets national ambient water quality standards
- Issues directions to SPCBs
- Coordinates research, training, monitoring

Air (Prevention and Control of Pollution) Act 1981

(5.1)

Air Act 1981

Year: 1981 (ratifying 1972 Stockholm Conference commitment)
Amendment: 1987 (included noise as air pollutant!)

Key provisions:

- Declares all of India an **Air Pollution Control Area**
- Industries in sensitive areas need consent from SPCB to emit
- Sets emission standards for vehicles and industries
- CPCB monitors National Ambient Air Quality Standards (NAAQS)

NAAQS 2009 (24-hour limits):

$PM_{2.5}$	60 $\mu g/m^3$ (24hr)	40 $\mu g/m^3$ (annual)
PM_{10}	100 $\mu g/m^3$ (24hr)	60 $\mu g/m^3$ (annual)
NO_2	80 $\mu g/m^3$ (24hr)	40 $\mu g/m^3$ (annual)
SO_2	80 $\mu g/m^3$ (24hr)	50 $\mu g/m^3$ (annual)

WPA 1972 — Wildlife Law

Year: 1972 (before CITES 1973; India's first wildlife law)
Recent amendment: 2022 (Wildlife Protection Amendment Act)

Key provisions:
- Prohibits hunting/trapping of wild animals listed in Schedules (except with permission)
- **6 Schedules:** Schedule I = highest protection (tiger, elephant); Schedule VI = banned plants
- Protects **National Parks** (no human activity), **Wildlife Sanctuaries** (some buffers), **Tiger Reserves**
- Establishes **Wildlife Crime Control Bureau (WCCB)**
- Regulates trade in wildlife and plant product

Tiger Project: Project Tiger (1973) — 54 Tiger Reserves covering 2.97% of India's area
Elephant Project: Project Elephant (1992) — 33 elephant reserves
Amendment 2022: Implemented India's obligations under CITES

FCA 1980

Year: 1980 (to check rapid deforestation in 1970s)
Amendment: 1988; 2023 (Van Mitra: carbon credits for forests)

Key provisions:
- No state can deforest or use forest land for non-forest purposes without **Central Government approval**
- Power projects, mining, roads, etc. in forests need clearance from MoEFCC
- Forest diversion requires **compensatory afforestation** (equal area planted elsewhere)
- **CAMPA** (Compensatory Afforestation Fund Management and Planning Authority) manages compensatory planting funds

Why important?
India's forest cover: 21.7% (2021 State of Forest Report). Constitutional target: 33% (National Forest Policy 1988).
FCA saved millions of hectares from being diverted.

India's Environmental Laws at a Glance (Quick Reference)

Act	Year	What It Protects	Key Body Created
Water (P&CP) Act	1974	Water bodies from pollution	CPCB / SPCB
Wildlife Protection Act	1972	Wild animals and plants	WCCB; Tiger Reserves
Forest Conservation Act	1980	Forests from diversion	MoEFCC clearances
Air (P&CP) Act	1981	Air quality; noise (1987)	CPCB / SPCB
Environment Protection Act	1986	Umbrella act; EIA; all media	MoEFCC
Biological Diversity Act	2002	Biodiversity; traditional knowledge	NBA, SBB
NGT Act	2010	Speedy env. justice	National Green Tribunal
E-Waste Rules	2022	E-waste management	MoEFCC / SPCBs
Plastic Waste Rules	2016/2022	Plastic pollution	SPCBs / ULBs

Section 5.2

Pollution Control Rules

Plastic Waste Management Rules (5.2)

Rules: Plastic Waste Management Rules 2016; amended 2021, 2022

Ban on single-use plastics (July 2022): thick list incl.:

- Polystyrene (thermocol) items
- Plastic ear buds; plastic flags
- Plastic sticks in balloons; candy sticks
- Plastic cutlery (plates, cups, straws, stirrers, forks, spoons)
- Plastic bags $<$75 microns (from 2022); $<$120 microns (from 2023)

Responsibility:

- **Producers/importers/brand owners (PIBOs):** Extended Producer Responsibility (EPR)
- Must register; set collection targets; report to CPCB

Penalty: Fine + up to 5 years imprisonment (under EPA 1986)

E-Waste Management Rules 2022 (5.2)

Latest Rules: E-Waste Management Rules 2022 (replaced 2016 rules)

Scope: All electrical and electronic equipment (EEE) — phones, computers, TVs, fridges, washing machines, batteries (except lead-acid batteries)

Extended Producer Responsibility (EPR):
- Producers must register with CPCB
- Annual collection targets (starting 60%, increasing to 70%+ by 2026)
- Must ensure channelling to registered dismantlers/recyclers

Refurbisher obligations: Register and report
Role of CPCB: Maintain national e-waste registry; audit; enforce

Prohibited: Disposal in landfills; burning; acid baths (illegal but common in informal sector)
India's e-waste generation: 3rd largest in world ($\approx$3.2 Mt/year, 2022); only 15–22% formally recycled

Noise Pollution (Regulation and Control) Rules 2000

(5.2)

Rules: Noise Pollution (Regulation and Control) Rules 2000
Under: EPA 1986

Ambient noise standards (limits in dB(A)):

Zone	Day (6am–10pm)	Night (10pm–6am)
Industrial	75 dB(A)	70 dB(A)
Commercial	65 dB(A)	55 dB(A)
Residential	55 dB(A)	45 dB(A)
Silence Zone	50 dB(A)	40 dB(A)

Silence zones:

Within 100m of school, hospital, court, religious place.
No loudspeaker between 10pm and 6am without permission.
Enforcement: Police + SPCB + District Magistrate

Hazardous Waste Management Rules (5.2)

Rules: Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016
Under: EPA 1986

Definition: Waste with physical, chemical or biological characteristics that may:
- Cause significant harm to human health or environment
- Be toxic, flammable, corrosive, reactive, or infectious

Classification: Listed in Schedules I, II, III of the Rules (36 categories)

Obligations of Generator:
- Register with SPCB; maintain inventory
- Proper labelling, storage, handling
- Manifest system for movement (tracking document)
- Dispose only at TSDF (Treatment, Storage and Disposal Facility)

Transboundary: Import/export of hazardous waste regulated under Basel Convention (ratified by India, 1992).

Section 5.3

Environmental Impact Assessment (EIA)

EIA — Definition and Purpose (5.3)

Definition

EIA: Environmental Impact Assessment is a **systematic process** to predict and evaluate the likely impacts of a proposed project/activity on the **physical, biological and socio-economic environment** before the project is sanctioned.

Purpose of EIA

- Identify and predict adverse impacts of projects before construction begins
- Suggest mitigation measures to minimise or eliminate impacts
- Enable decision-makers to approve/reject projects with full information
- Involve affected public and communities in decisions
- Ensure sustainable development (not every project should proceed)
- Legal requirement under EPA 1986 (EIA Notification 2006)

EIA Project Categories (5.3 — Notification 2006)

Under EIA Notification 2006, projects are classified as:

Category	Scope	Approving Authority
Category A	Large projects (national impact): thermal power >500 MW; airports; large industries	**MoEFCC** (EAC: Expert Appraisal Committee)
Category B	Smaller projects (local impact): Category B1 and B2	**SEIAA** (State-level Expert Appraisal Authority)

32 project types need EIA: mining, industries, infrastructure (highways, ports), power plants, river valley projects, special economic zones, etc.

Below thresholds: de facto exemption from EIA (but not from other laws).

EIA Process — Steps (PYQ — 4–6M)

Standard EIA Process (8 steps):

1. **Screening:** Is EIA required? (Category A or B?)
2. **Scoping:** Identify significant issues / Terms of Reference (TOR)
3. **Baseline Data Collection:** Study existing environmental conditions (air, water, soil, ecology, socioeconomics) for 3 seasons
4. **Impact Prediction:** Predict magnitude and significance of impacts during construction + operation
5. **Mitigation:** Suggest measures to reduce significant impacts (Engineering, Management, or Compensation)
6. **EIA Report (EIA/EMP):** Compile into Final EIA + Environmental Management Plan
7. **Public Hearing:** Mandatory 30-day notice; public/NGOs raise concerns; recorded
8. **Decision (Environmental Clearance):** MoEFCC/SEIAA grant, reject, or ask for changes

Post-clearance: **monitoring** and **compliance** reporting (half-yearly)

EIA Report Components (5.3)

EIA Report Contains

1. **Project Description:** Location, layout, process, raw materials, water/energy needs.
2. **Baseline Report:** Existing air, water, noise, soil, ecology, socioeconomic conditions.
3. **Impact Assessment:** Predicted impacts on each environmental component.
4. **Alternatives Analysis:** Comparison of project site/technology alternatives.
5. **Environmental Management Plan (EMP):** Specific mitigation measures + monitoring plan.
6. **Risk Analysis:** Worst-case accident scenarios; emergency plan.
7. **Public Hearing Summary:** Grievances raised; project response.
8. **Executive Summary:** Non-technical summary (mandatory for public).

Section 5.4

Environmental Management System
ISO 14001 / EMAS

Environmental Management System (EMS) (5.4)

Definition

An **Environmental Management System (EMS)** is a set of processes and practices that enables an organisation to reduce its environmental impacts and increase its operating efficiency.

Why implement EMS?

- Ensure legal compliance with environmental laws
- Reduce pollution, waste, energy and water use
- Improve corporate image (customers, investors, regulators)
- Lower costs (energy, waste, fines)
- Access international markets (many buyers require ISO 14001)
- Document environmental performance for reporting (ESG, CSR)

Most widely adopted standard: ISO 14001:2015 (International Organization for Standardization)
$>$300,000 organisations certified globally (2022); India: $>$15,000 certificates

ISO 14001 — Plan-Do-Check-Act Cycle (5.4)

ISO 14001 is built on the **PDCA (Plan-Do-Check-Act)** continual improvement cycle:

PLAN:
- Environmental policy (set by top management)
- Identify significant aspects & impacts
- Legal and other requirements
- Set objectives and targets
- Environmental Management Programme

DO:
- Roles and responsibilities
- Training and awareness
- Document control
- Emergency preparedness

CHECK:
- Monitoring and measurement
- Evaluation of compliance
- Internal audit
- Management review

ACT:
- Nonconformity and corrective action
- Continual improvement
- Update objectives for next cycle

ISO 14001 — Key Elements (5.4)

Clause	Content
4 Context	Understand organisation and its environment; stakeholders; scope
5 Leadership	Top management commitment; environmental policy; roles
6 Planning	Risks and opportunities; environmental aspects/impacts; objectives
7 Support	Resources; competence; communication; documented information
8 Operation	Operational controls; emergency preparedness and response
9 Performance eval	Monitoring; internal audit; management review
10 Improvement	Nonconformity; corrective action; continual improvement

Certification process: Internal audit → Management review → Third-party audit by accredited CB → ISO 14001 Certificate (valid 3 years; annual surveillance audits).

Life Cycle Assessment (LCA) (5.4)

Definition

LCA evaluates the environmental impact of a product or service through its **entire life cycle** — "cradle to grave" or "cradle to cradle".

4 Phases of LCA (ISO 14040/44):

1. **Goal and scope definition:** What product? What system boundary? What impact categories?
2. **Life Cycle Inventory (LCI):** Collect data on all inputs (energy, water, materials) and outputs (emissions, waste)
3. **Life Cycle Impact Assessment (LCIA):** Map inventory to impact categories (GWP, ozone depletion, eutrophication, toxicity)
4. **Interpretation:** Identify significant processes; sensitivity analysis; conclusions

Applications: Product eco-design; Environmental Product Declarations (EPD); carbon footprint labelling; green procurement
Example: LCA of EV vs petrol car shows EV is lower over full lifecycle (despite battery manufacturing impact)

Section 5.5

Global Environmental Agreements

Stockholm Conference — Foundation of International Environment Law

Full name: UN Conference on the Human Environment
Date/Place: June 5–16, 1972; Stockholm, Sweden
June 5 = World Environment Day (since 1974)

Key outcomes:
- Stockholm Declaration: 26 principles of environmental protection
- Action Plan: 109 recommendations
- Created **UNEP** (United Nations Environment Programme), Nairobi
- India's Environment (Protection) Act 1986 inspired by Stockholm
- Established concept of "Principle of Preventive Action"

India's contribution: India's PM Indira Gandhi gave keynote speech: "Poverty is the greatest polluter." (Famous quote)

Followed by **Rio Earth Summit 1992** (UNCED), **Johannesburg 2002** (WSSD), **Rio+20 2012**.

CBD and CITES

CBD (1992)

Convention on Biological Diversity
Adopted: Rio 1992; in force 1993
Parties: 196

3 objectives:
1. Conservation of biodiversity
2. Sustainable use of components
3. Fair and equitable sharing of benefits from genetic resources

Nagoya Protocol (2010): Access and Benefit Sharing (ABS) for genetic resources.
India: Biological Diversity Act 2002; National Biodiversity Authority (NBA)

CITES (1973)

Convention on International Trade in Endangered Species of Wild Fauna and Flora
Adopted: 1973; in force 1975
Parties: 183

3 Appendices:
I: Threatened species (trade prohibited)
II: Species needing control (permit required)
III: Protected in at least one country

India ratified 1976. Tiger, elephant, rhino on Appendix I. Implemented via WPA 1972 (Amendment 2022).

Basel, Rotterdam, Stockholm Conventions (5.5)

Basel Convention (1989):
Control of transboundary movement of hazardous wastes. Prohibits exporting hazardous waste from OECD to non-OECD countries. India ratified 1992.

Rotterdam Convention (1998):
Prior Informed Consent (PIC) procedure for trade in hazardous chemicals and pesticides. Exporting country must get consent from importing country before shipment.

Stockholm Convention (2001):
Persistent Organic Pollutants (POPs). Targets the "dirty dozen": DDT, dioxins, furans, PCBs, etc. Prohibits/restricts manufacture and use. India ratified 2006.

Minamata Convention (2013):
Control mercury pollution (after Minamata disease in Japan from mercury-contaminated fish). Phase-out of mercury in products; regulate emissions from industry.

Montreal Protocol 1987 — The Success Story (5.5)

Montreal Protocol

Full name: Montreal Protocol on Substances That Deplete the Ozone Layer
Adopted: September 16, 1987; in force: 1989 (Sept 16 = World Ozone Day)
Parties: 198 (only treaty ratified by every UN member state!)

What it does:
- Phase-out of CFCs, halons, HCFCs, HBFCs, carbon tetrachloride, methyl bromide
- Developed countries completed CFC phaseout by 1996; developing by 2010
- **Kigali Amendment (2016):** Phase-down of HFCs (high GWP replacements for CFCs)

Result:
- Ozone layer over Antarctica is healing; full recovery expected by 2060–2066
- Called "the most successful international environmental treaty" (Kofi Annan)
- Also avoided $+0.5^{\circ}$C of warming (CFCs are also potent GHGs!)

Global Agreements Quick Reference (Exam Table)

Agreement	Year	Focus	India?
Stockholm Conference	1972	Foundation; UNEP created	Yes (Indira Gandhi keynote)
CITES	1973	Trade in endangered species	Yes (1976)
Vienna Convention	1985	Ozone: framework	Yes
Montreal Protocol	1987	CFCs/ozone-depleting substances	Yes (1992)
Basel Convention	1989	Hazardous waste trade	Yes (1992)
Rio Earth Summit / CBD	1992	Biodiversity; Agenda 21; UNFCCC	Yes
Kyoto Protocol	1997	Binding GHG targets (Annex I)	Yes (no binding target)
Rotterdam Convention	1998	Hazardous chemicals PIC	Yes (2005)
Stockholm Convention	2001	POPs (DDT, dioxins)	Yes (2006)
Nagoya Protocol	2010	Benefit sharing of genetic resources	Yes (2012)
Paris Agreement	2015	2°C / 1.5°C; NDCs	Yes
Kigali Amendment	2016	HFC phase-down	Yes

Section 5.6

Corporate Social Responsibility (CSR)
in Environment

CSR Mandate (Section 135, Companies Act 2013)

Applicability: Companies with:
- Net worth $\geq$ Rs 500 crore, OR
- Turnover $\geq$ Rs 1000 crore, OR
- Net profit $\geq$ Rs 5 crore

Obligation: Spend at least **2% of average net profit** (3 years) on CSR activities

CSR activities including environment (Schedule VII):
- Environmental sustainability
- Ecological balance
- Conservation of natural resources
- Maintaining quality of soil, air, water
- Afforestation

India = first country in world to mandate CSR spending by law

Corporate Environmental Responsibility (5.6)

Beyond legal compliance — voluntary corporate actions:

1. **ESG (Environmental, Social, Governance) reporting:**
Voluntary disclosure on carbon footprint, water use, waste, biodiversity.

2. **Green bonds:**
Fixed income instruments where proceeds fund green projects (RE, green buildings, clean transport). Global green bond market: $500B (2023).

3. **Science-Based Targets (SBTi):**
Companies set GHG reduction targets aligned with 1.5°C; verified by third party. Over 7000 companies committed.

4. **RE100 initiative:**
Pledge to use 100% renewable electricity. Members: Apple, Google, Tata Motors, Infosys, etc.

5. **Zero Waste to Landfill:** Waste hierarchy; EPR; industrial symbiosis.

Section 5.7

NGOs, Public Participation
and Right to Information

NGOs and Public Participation (5.7)

Role of NGOs

NGOs (Non-Governmental Organisations) play crucial roles in environmental protection:

- **Advocacy:** Lobbying for stronger environmental laws and enforcement
- **Public awareness:** Campaigns, rallies, social media (e.g., Chipko Movement)
- **Monitoring:** Citizen science; reporting violations to SPCB or NGT
- **Litigation:** PIL (Public Interest Litigation) in courts; approach NGT
- **Grassroots action:** Community forestry, waste management, RE adoption

Famous Indian NGOs/Movements:

- **Chipko Movement (1973):** Uttarakhand; villagers hugged trees to prevent felling
- **Save Silent Valley:** Kerala; stopped hydropower project in rainforest 1973–1983
- **Narmada Bachao Andolan:** Medha Patkar; displaced communities from dam
- **TERI** (The Energy and Resources Institute): Research + advocacy

RTI Act and National Green Tribunal (5.7)

RTI Act 2005

Right to Information Act 2005:
Citizens can request information from any public authority within 30 days.

How it helps environment:
- Obtain factory pollution data
- Get EIA reports (now public)
- Monitor government action on complaints
- Access CPCB/SPCB records

NGT Act 2010

National Green Tribunal:
Established 2010 (National Green Tribunal Act)
Speedy resolution of environmental disputes; specialised technical judges.

- Handles civil cases related to environment
- Can impose fines, order restoration
- No court fee; accessible to citizens
- India: 1st country with dedicated env. tribunal with technical members

Principles of Environmental Governance (Policy Concepts)

1. **Polluter Pays Principle (PPP):**
Those who cause pollution must bear the cost of cleaning it up and compensating victims. Embedded in EPA 1986.

2. **Precautionary Principle:**
Where there is scientific uncertainty, action to prevent harm should NOT be delayed. Better safe than sorry.

3. **Sustainable Development (Brundtland, 1987):**
"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

4. **Environmental Justice:**
No community (especially poor/indigenous) should bear disproportionate environmental burden.

5. **Common but Differentiated Responsibilities (CBDR):**
All countries must act, but developed (historical emitters) must do more.

India's Key National Environmental Policies (Reference)

Policy	Year	Focus
National Forest Policy	1988	33% forest cover target; community forestry
National Conservation Strategy & Policy	1992	Biodiversity; integration of env in development
National Environment Policy (NEP)	2006	Guiding framework; sustainable development
National Action Plan on Climate Change (NAPCC)	2008	8 national missions (solar, water, Himalaya, etc.)
JNNSM (Solar Mission)	2010	100 GW solar (achieved 2023)
Swachh Bharat Mission	2014	Clean India; solid waste management; open defec
National Air Quality Index (AQI)	2015	Real-time air quality reporting (6 pollutants)
Plastic Waste Ban	2022	Single-use plastics banned; EPR strengthened
National Green Hydrogen Mission	2023	5 MT H_2 by 2030

NAPCC — 8 National Missions (India's Climate Policy)

National Action Plan on Climate Change (2008)

Mission	Focus
1. Jawaharlal Nehru National Solar Mission	100 GW solar (achieved!)
2. National Mission for Enhanced Energy Efficiency	Star ratings; PAT Scheme for industries
3. National Mission on Sustainable Habitat	Green buildings; public transport
4. National Water Mission	20% water efficiency improvement
5. National Mission for Sustaining the Himalayan Ecosystem	Glacier monitoring; alpine ecology
6. National Mission for a Green India	10 Mha additional forest cover
7. National Mission for Sustainable Agriculture	NICRA; climate-resilient farming
8. National Mission for Strategic Knowledge for Climate Change	Research; capacity building

PAT Scheme: Perform, Achieve and Trade — market-based mechanism for energy efficiency in large industries (like cap-and-trade for energy).

Key Regulatory Bodies in India (Quick Reference)

Body	Established	Role
CPCB	1974	Central Pollution Control Board; standards; coordin
SPCB/PCCs	1974 onwards	State Pollution Control Boards; industry consents; r
MoEFCC	1985 (Ministry)	Policy; EIA clearances; international treaties; laws
Wildlife Crime Control Bureau	2007	Enforce WPA; combat poaching and illegal trade
WCCB	2007	Investigate wildlife crimes; national + international
National Biodiversity Authority (NBA)	2003	Implement Biological Diversity Act 2002
National Green Tribunal (NGT)	2010	Adjudicate environmental disputes speedily
Bureau of Energy Efficiency (BEE)	2002	Star labelling; energy audit; PAT scheme
MNRE	1992	Ministry of New and Renewable Energy; policy + pr
NDMA	2005	National Disaster Management Authority; DRR

Sustainable Development Goals (SDGs) & Environment (UN 2030 Agenda)

UN Agenda 2030: 17 SDGs (Sept 2015; replaced MDGs)

Environment-focused SDGs:	SDG 6	Clean water and sanitation
	SDG 7	Affordable and clean energy
	SDG 11	Sustainable cities and communities
	SDG 12	Responsible consumption and production
	SDG 13	Climate action
	SDG 14	Life below water (ocean conservation)
	SDG 15	Life on land (forests, biodiversity)

India's progress:

SDG 7: On track (500 GW RE target)
SDG 13: On track (Paris commitments + Net Zero 2070)
SDG 6: Jal Jeevan Mission; Swachh Bharat

Green Economy and Sustainable Development

(Integration)

Green Economy

UNEP definition: Economy that results in improved human well-being and social equity while significantly reducing environmental risks.

Sector transitions:

- **Energy:** Fossil fuel $\rightarrow$ Renewables + efficiency
- **Agriculture:** Conventional $\rightarrow$ Organic, agroforestry, no-till
- **Industry:** Linear $\rightarrow$ Circular; waste = resource
- **Transport:** ICE $\rightarrow$ EVs + public transit + walking/cycling
- **Buildings:** Conventional $\rightarrow$ Net-zero energy buildings

India green economy tools:

- Green bonds (SEBI guidelines 2023)
- Carbon Credit Trading Scheme (CCTS 2023)
- PAT Scheme (energy efficiency credits)
- FAME II (EV subsidies)

Air Quality Index (AQI) (Policy Tool)

India AQI launched 2015 by CPCB under "Swachh Vayu, Swasth Bharat"

Calculated for 6 pollutants: $PM_{2.5}$, PM_{10}, O_3, NO_2, SO_2, CO

AQI Range	**Category**	**Health Impact**
0–50	Good	Minimal
51–100	Satisfactory	Minor for sensitive group
101–200	Moderate	Breathing discomfort for some
201–300	Poor	Breathing discomfort for all on prolonged exposure
301–400	Very Poor	Respiratory illness on prolonged exposure
401–500	Severe	Affects healthy; serious for diseased persons

Delhi AQI: often 300–500 in winter (Oct–Feb) due to crop stubble burning + cold + low wind.

Emerging Environmental Policy Tools (Exam Extras)

1. Carbon Border Adjustment Mechanism (CBAM — EU 2023):
EU charges import duty based on carbon content of product. Forces exporters (including India) to decarbonise. Starts with steel, cement, aluminium.

2. EPR (Extended Producer Responsibility):
Producers responsible for products at end of life. India: Plastic EPR (2022), E-Waste EPR (2022).

3. Green Hydrogen Policy (India 2022):
Waived banking charges; RE connectivity priority; production targets.

4. Just Transition:
Ensuring coal-dependent communities have alternative jobs as coal phases down. India: NTPC re-training programs.

5. Payment for Ecosystem Services (PES):
Compensate communities for maintaining forests/wetlands that provide clean water, carbon storage, biodiversity. CAMPA is India's version.

Worked PYQs

Unit 5 — Policy & Governance
Past Year Question Practice

PYQ — Environment Protection Act 1986 (4M)

Q: Explain significance and key provisions of EPA 1986 (4M)

Why enacted: After Bhopal Gas Tragedy (Dec 1984), India needed a comprehensive umbrella environment law. EPA 1986 was enacted on May 23, 1986.

Key provisions:

1. Government can set standards for discharge/emission of pollutants
2. Restrict areas and industrial activities near sensitive zones
3. Authority to inspect; take samples; seize offending equipment
4. Environmental Impact Assessment (EIA) mandatory for designated projects
5. Notify Eco-Sensitive Areas (ESAs); coastal regulation zones
6. Central Government can issue directions to any person/industrial unit

Significance:

- Umbrella law: all other environmental rules (hazardous waste, e-waste, plastic) made under EPA
- Created MoEFCC as central authority
- India's response to Stockholm Conference commitments

Penalty: 5 yrs imprisonment + Rs 1 lakh/day fine

PYQ — EIA Process (Su'25, W'24, 6M)

Q: Explain the EIA process with flowchart/steps (6M)

EIA Process (8 steps):

1. Screening: Determine if EIA is required (Category A or B under EIA Notification 2006)
2. Scoping: Identify key issues; prepare Terms of Reference (TOR); consult stakeholders
3. Baseline data: 3-season study of air, water, soil, ecology, noise, socioeconomy
4. Impact prediction: Predict impacts of project during construction and operation
5. Mitigation: Design measures to minimise adverse impacts; prepare EMP
6. EIA Report: Compile all findings in EIA Report + Environmental Management Plan (EMP)
7. Public Hearing: 30-day mandatory notice; public meeting; record concerns
8. Decision: MoEFCC (Cat A) or SEIAA (Cat B) grants Environmental Clearance (EC)

Post-clearance: Half-yearly compliance monitoring report submitted to MoEFCC.

PYQ — ISO 14001 (4M)

Q: Explain ISO 14001 (EMS) with its benefits (4M)

ISO 14001: International standard for Environmental Management System (EMS); current version 2015.

Basis: Plan-Do-Check-Act (PDCA) continual improvement framework.

Key elements:
- Environmental policy (top management commitment)
- Identify significant environmental aspects and impacts
- Set measurable environmental objectives and targets
- Operational controls; training; emergency plan
- Monitoring; internal audit; management review; corrective action

Benefits:
1. Legal compliance (know your obligations; avoid fines)
2. Reduce environmental impacts (water, energy, waste)
3. Lower costs (efficiency gains)
4. Improve brand image; customer trust
5. Market access (international buyers require ISO 14001)
6. ESG reporting framework

PYQ — Montreal Protocol (4M)

Q: Write a note on Montreal Protocol and its importance (4M)

Montreal Protocol (1987):
- International treaty to phase out ozone-depleting substances (ODS)
- Adopted Sept 16, 1987; in force Jan 1989
- Ratified by 198 parties (every UN member state — only such treaty!)

ODS targeted: CFCs, halons, HCFCs, carbon tetrachloride, methyl bromide, HBFCs

Key achievement:
- Developed countries phased out CFCs by 1996; developing by 2010
- Ozone hole over Antarctica is healing; full recovery by 2060–2066
- Avoided $+0.5^{\circ}$C of warming (CFCs = potent GHGs)

Kigali Amendment (2016): Phase-down of HFCs (replacements that turned out to have high GWP)

Why it succeeded: Universal; specific targets; technology/financial support to developing countries; industry cooperation (DuPont developed HFC alternatives).

MCQ Practice — Unit 5 (GTU Exam)

1. EPA 1986 was enacted primarily in response to:
(A) Chernobyl accident **(B) Bhopal Gas Tragedy** (C) Stockholm Conference (D) Gulf War

2. EIA Notification in India is under which act?
(A) Water Act (B) Air Act **(C) EPA 1986** (D) Forest Act

3. CPCB was established by:
(A) Water Act 1974 (B) Air Act 1981 (C) EPA 1986 (D) WPA 1972

4. Montreal Protocol targets:
(A) CO_2 **(B) Ozone-depleting substances** (C) Mercury (D) POPs

5. 30×30 target (protect 30% land/sea by 2030) comes from:
(A) Paris Agreement **(B) Kunming-Montreal (CBD COP15)** (C) CITES (D) Basel

Common Mistakes — Unit 5 (Exam Warning)

Wrong	Correct
EPA 1986 was enacted after Stockholm	Stockholm = 1972; EPA 1986 = after **Bhopal 1984**
CPCB was created by EPA 1986	CPCB created by **Water Act 1974**
Paris Agreement targets ozone	Paris = GHGs and climate; ozone = **Montreal Protocol**
EIA is done after construction	EIA is done **before** project starts
ISO 14001 is law	ISO 14001 is a **voluntary standard** (not law)
WPA was 1986	WPA (Wild Life Protection Act) = **1972**
Stockholm Convention = 1972 conference	Stockholm Conference = 1972; **Stockholm Convention (POPs) = 2001**

Flash Revision 1 — Indian Laws (Quick Recall)

Key Acts

- WPA 1972: wildlife; Schedule I = highest protection
- Water Act 1974: CPCB + SPCBs; Consent to Operate
- FCA 1980: forest diversion needs Central approval
- Air Act 1981: NAAQS; whole India = air pollution control area
- EPA 1986: umbrella law; all rules under it; EIA; ESAs
- BDA 2002: biodiversity; NBA; national register
- NGT 2010: speedy env justice; technical judges
- Companies Act 2013: 2% CSR mandatory for large companies

EIA Quick Facts

- EIA Notification 2006 (under EPA 1986)
- Cat A: national impact → MoEFCC approval
- Cat B: local impact → SEIAA approval
- 8 steps: Screening → Scoping → Baseline → Prediction → Mitigation → Report → Public Hearing → Decision
- Public hearing: 30-day notice, mandatory
- Post-clearance: half-yearly monitoring report

Flash Revision 2 — ISO 14001 and Global Treaties

(Quick Recall)

ISO 14001 EMS

- Voluntary international standard; current version 2015
- PDCA: Plan-Do-Check-Act continual improvement
- Identify significant aspects and impacts
- Set objectives + targets; EMP
- Internal audit; management review
- Benefits: legal compliance, cost savings, market access
- >300,000 certifications globally (2022)
- LCA: cradle to grave; ISO 14040/44

Global Treaties

- CITES 1973: trade in endangered species
- Montreal Protocol 1987: CFCs; most successful treaty; ozone healing
- Basel 1989: hazardous waste trade
- CBD 1992: biodiversity; ABS (Nagoya 2010)
- Rotterdam 1998: PIC for hazardous chemicals
- Stockholm Conv. 2001: POPs (DDT, dioxins)
- Minamata 2013: mercury control
- Paris 2015: climate; NDCs

Flash Revision 3 — Policy and Governance (Quick Recall)

India Policy

- NAPCC 2008: 8 missions (Solar, Water, Agriculture...)
- NEP 2006: guiding national environment policy
- CCTS 2023: India's carbon trading market
- Green Hydrogen Policy 2022
- Plastic ban 2022: SUPs banned; EPR mandatory
- E-Waste Rules 2022: EPR; 60% collection target
- Swachh Bharat 2014: solid waste + sanitation
- SDGs 2015: SDG 7 (energy), 13 (climate), 15 (land)

Institutions and Tools

- CPCB: Central Pollution Control Board (est. 1974)
- SPCB: State-level; Consent to Establish + Operate
- MoEFCC: Ministry; EIA clearances
- NGT: National Green Tribunal (2010)
- BEE: Bureau of Energy Efficiency (2002)
- NBA: National Biodiversity Authority (2003)
- Polluter Pays Principle
- Precautionary Principle

Important Definitions — Unit 5 (Exam Guide)

Term	Definition
EIA	Systematic process to predict and evaluate impacts of proposed project on environment before sanction
EMS	Environmental Management System: framework for an organisation to manage its environmental impacts
ISO 14001	International voluntary standard specifying requirements for an EMS; PDCA cycle
CPCB	Central Pollution Control Board: national body to set standards; coordinate state PCBs
SPCB	State Pollution Control Board: enforce pollution control; grant Consent to Establish/Operate
EPA 1986	Umbrella environment law; gives government power to regulate all environmental media
EIA Notification	2006 notification under EPA; 32 categories of projects must undergo EIA
CDM	Clean Development Mechanism (Kyoto): developed countries fund RE projects in developing countries
LCA	Life Cycle Assessment: cradle-to-grave evaluation of environmental impact of product/service
CSR	Corporate Social Responsibility: companies investing in social/environmental benefit (2% of profit mandatory in India)

PYQ — Convention on Biological Diversity (3–4M)

Q: Write a short note on CBD (4M)

CBD: Convention on Biological Diversity
Adopted: Rio Earth Summit, June 5, 1992; **In force:** Dec 1993
Parties: 196 countries (USA is a signatory but has not ratified)

Three main objectives:
1. Conservation of biological diversity
2. Sustainable use of its components (genetic resources, species, ecosystems)
3. Fair and equitable sharing of benefits from utilisation of genetic resources

Nagoya Protocol (2010): Access and Benefit Sharing (ABS) — indigenous communities must be compensated when their genetic resources / traditional knowledge is used commercially.

India's implementation:
- Biological Diversity Act 2002
- National Biodiversity Authority (NBA), Chennai
- State Biodiversity Boards (SBBs) in each state
- Biodiversity Management Committees (BMCs) at local level

Kunming-Montreal (COP15, 2022): 30×30 goal: protect 30% of land and 30% of oceans by 2030.

Additional MCQ Practice — Units 1–5 (Mixed)

1. World Environment Day is observed on:
(A) April 22 **(B) June 5** (C) September 16 (D) October 2

2. Which cycle is called the "gaseous cycle"?
(A) Carbon/Nitrogen cycle (B) Phosphorus cycle (C) Sulfur cycle (D) Water cycle

3. BOD stands for:
(A) Biological Oxygen Demand (B) Bacteriological Oxygen Deficiency

4. Which is India's 1st comprehensive environment law?
(A) Air Act 1981 **(B) Water Act 1974** (C) EPA 1986 (D) WPA 1972

5. "Indira Gandhi" famously said at Stockholm: "Poverty is the greatest _____":
(A) polluter (B) enemy (C) problem (D) challenge

6. EMAS is the European Union equivalent of:
(A) ISO 9001 **(B) ISO 14001** (C) ISO 45001 (D) SA8000

Short Notes Practice — Unit 5 (3–4M each)

Q. What is the Polluter Pays Principle? (3M)
Ans: A fundamental principle of environmental law and policy: entities that produce pollution must bear the cost of preventing damage to human health and the environment. In India, embedded in EPA 1986. If a factory discharges untreated effluent and contaminates a river, it must fund cleanup + compensate affected communities.

Q. What is the Precautionary Principle? (3M)
Ans: When there is scientific uncertainty about an activity's potential harm to the environment or health, precautionary action should be taken BEFORE evidence of harm is confirmed. Principle 15 of Rio Declaration 1992. Applied in India by Supreme Court (MC Mehta cases). Better to prevent harm than wait for proof.

Q. What is CAT A project in EIA? (2M)
Ans: Projects with significant national-level environmental impact; require Environmental Clearance from MoEFCC (Ministry of Environment). Examples: thermal power plants >500 MW, airports, large mining, river valley projects.

Unit 5 — Summary (20% Weightage)

Indian Laws & EIA

- WPA 1972, Water Act 1974, FCA 1980, Air Act 1981
- EPA 1986 (umbrella law; after Bhopal 1984)
- EIA Notification 2006: Cat A (MoEFCC), Cat B (SEIAA)
- 8-step EIA: Screening to Clearance; public hearing mandatory
- CPCB (national); SPCB (state); MoEFCC (central ministry)

ISO 14001

- Voluntary EMS standard; PDCA cycle
- Aspects and impacts; objectives; monitoring; audit
- LCA: cradle-to-grave product assessment

Global Agreements

- CITES 1973; Montreal 1987 (most successful = ozone heals)
- Basel 1989 (hazardous waste); CBD 1992 (biodiversity)
- Stockholm Conv. 2001 (POPs); Paris 2015 (climate)
- CBDR: all act, developed do more

CSR & Policy

- Companies Act 2013: 2% profit to CSR (India, mandatory)
- NAPCC: 8 missions; SDG 7, 13, 15
- Polluter Pays + Precautionary Principles
- NGT 2010; RTI 2005; Chipko, NBA

Weightage: 20% | Hours: 6 | Top PYQs: EPA 1986, EIA process, ISO 14001, Montreal Protocol, CBD