

Unit 5

(Environmental Policies & Practices)

(Introduction to Environmental Legislation of India and
important Environmental Acts of India)

Learning outcomes

After completing this lecture, you will be able to understand the following:

- Student get knowledge about Montreal Protocol.
- Student aware about environment legislation of India and their role in control of Environmental Pollution.

Environmental Legislations

Constitutional Provisions & Environment

- Article 21“Right to pollution free environment.”
- Article 48-A“ The state shall endeavor to protect & improve the environment and to safeguard the forests and wildlife of the country.
- Artical 51-A(g)“duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.”

ARRANGEMENT OF SECTIONS

CHAPTER I

PRELIMINARY

SECTIONS

1. Short title, extent and commencement.
2. Definitions.

CHAPTER II

GENERAL POWERS OF THE CENTRAL GOVERNMENT

3. Power of Central Government to take measures to protect and improve environment.
4. Appointment of officers and their powers and functions.
5. Power to give directions.
6. Rules to regulate environmental pollution.

CHAPTER III

PREVENTION, CONTROL AND ABATEMENT OF ENVIRONMENTAL POLLUTION

7. Persons carrying on industry, operations, etc., not to allow emission or discharge of environmental pollutants in excess of the standards.
8. Persons handling hazardous substances to comply with procedural safeguards.
9. Furnishing of information to authorities and agencies in certain cases.
10. Powers of entry and inspection.
11. Power to take sample and procedure to be followed in connection therewith.
12. Environmental laboratories.
13. Government Analysts.
14. Reports of Government Analysts.
15. Penalty for contravention of the provisions of the Act and the rules, orders and directions.
16. Offences by companies.
17. Offences by Government Departments.

CHAPTER IV

MISCELLANEOUS

18. Protection of action taken in good faith.
19. Cognizance of offences.
20. Information, reports or returns.
21. Members, officers and employees of the authority constituted under Section 3 to be public servants.
22. Bar of jurisdiction.
23. Power to delegate.
24. Effect of other laws.
25. Power to make rules.
26. Rules made under this Act to be laid before Parliament.

The Environment (Protection) Act, 1986

- The Act came into force on Nov. 19, 1986
- The Act extends to whole of India

Some terms related to environment have been described as follows in the Act:

- Environment includes water, air and land and the interrelationships that exists among and between them and human beings, all other living organisms and property.
- Environmental pollution means the presence of any solid, liquid or gaseous substance present in such concentration, as may be, or tend to be, injurious to environment.
- Hazardous substance means any substance or preparation which by its physico-chemical properties or handling is liable to cause harm to human beings, other living organisms, property or environment.

The Environment Protection Act, 1986

Objective- It provides for the protection and conservation of the Environment.

Key notes of the act;

1. Under the Act, a central government may provide permission for various works related to urbanization.
2. Protection against natural hazards
3. Maintenance of water supply in aquifers.
4. Protection of lines of communication and transportation
5. Preservation of public health.

The Act has given powers to the central government and the state governments

The act provides for:

- The quality standards
- Permissible limits of environmental pollutants
- Handling of hazardous substances
- Location and processes/operations of industries
- Prevention of accidents
- Inspection power

- Under the **Environmental (Protection) Rules, 1986** the State Pollution Control Boards have to follow the guidelines provided under Schedule VI.
- Under the Environment (Protection) Rules, 1986 an amendment was made in 1994 for Environmental Impact Assessment (EIA) of various development projects.
- Others require clearance from the State Pollution Control Board, when the proposed project or expansion activity is going to cause pollution load exceeding the existing levels.
- Under the Environment (Protection) Act, 1986 the central government also made the Hazardous Wastes (Management and Handling) Rules, 1989.
- The Environment (Protection) Act, 1986 has also made provision for environmental audit as a means of checking whether or not a company is complying with the environmental laws and regulations

Water (Prevention and Control of Pollution) Act, 1974

THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974

ARRANGEMENT OF SECTIONS

CHAPTER I

PRELIMINARY

SECTIONS

1. Short title, application and commencement.
2. Definitions.

CHAPTER II

THE CENTRAL AND STATE BOARDS FOR PREVENTION AND CONTROL OF WATER POLLUTION

3. Constitution of Central Boards.
4. Constitution of State Board.
5. Terms and conditions of service of members.
6. Disqualifications.
7. Vacation of seats by members.
8. Meetings of Board.
9. Constitution of committees.
10. Temporary association of persons with Board for particular purposes.
11. Vacancy in Board not to invalidate acts or proceedings.
- 11A. Delegation of powers to Chairman.
12. Member-secretary and officers and other employees of Board.

CHAPTER III

JOINT BOARDS

13. Constitution of Joint Board.
14. Composition of Joint Boards.
15. Special provision relating to giving of directions.

CHAPTER IV

POWERS AND FUNCTIONS OF BOARDS

16. Functions of Central Board.
17. Functions of State Board.
18. Powers to give directions.

CHAPTER V

PREVENTION AND CONTROL OF WATER POLLUTION

19. Power of State Government to restrict the application of the Act to certain areas.
20. Power to obtain information.
21. Power to take samples of effluents and procedure to be followed in connection therewith.

SECTIONS

22. Reports of the result of analysis on samples taken under section 21.
23. Power of entry and inspection.
24. Prohibition on use of stream or well for disposal of polluting matter, etc.
25. Restrictions on new outlets and new discharges.
26. Provision regarding existing discharge of sewage or trade effluent.
27. Refusal or withdrawal of consent by State Board.
28. Appeals.
29. Revision.
30. Power of State Board to carry out certain works.
31. Furnishing of information to State Board and other agencies in certain cases.
32. Emergency measures in case of pollution of stream or well.
33. Power of Board to make application to courts for restraining apprehended pollution in streams or wells.
- 33A. Power to give directions.

CHAPTER VI

FUNDS, ACCOUNTS AND AUDIT

34. Contributions by Central Government.
35. Contributions by State Government.
36. Fund of Central Board.
37. Fund of State Board.
- 37A. Borrowing powers of Board.
38. Budget.
39. Annual report.
40. Accounts and audit.

CHAPTER VII

PENALTIES AND PROCEDURE

41. Failure to comply with directions under sub-section (2) or sub-section (3) or orders issued under clause (c) of sub-section (1) of section 32.
42. Penalty for certain acts.
43. Penalty for contravention of provisions of section 24.
44. Penalty for contravention of section 25 or section 26.
45. Enhanced penalty after previous conviction.
- 45A. Penalty for contravention of certain provisions of the Act.
46. Publication of names of offenders.
47. Offences by companies.
48. Offences by Government Departments.

SECTIONS

49. Cognizance of offences.
50. Members, officers and servants of Board to be public servants.

CHAPTER VIII

MISCELLANEOUS

51. Central Water Laboratory.
52. State Water Laboratory.
53. Analysts.
54. Reports of analysts.
55. Local authorities to assist.
56. Compulsory acquisition of land for the State Board.
57. Returns and reports.
58. Bar of jurisdiction.
59. Protection of action taken in good faith.
60. Overriding effect.
61. Power of Central Government to supersede the Central Board and Joint Boards.
62. Power of State Government to supersede State Board.
63. Power of Central Government to make rules.
64. Power of State Government to make rules.

Water (Prevention and Control of Pollution) Act 1974

Objective-

- 1.It prevents, controls and provides maintenance or restoration of wholesomeness of water.
- 2.Provisions of the Act has to be implemented by Central Pollution Control Board being a main agency.

Functions-

- 1.Establishes standards of the water quality and effluent
- 2.Polluting industries must seek the permission to discharge the waste into effluent bodies.

Water (Prevention and Control of Pollution) Act, 1974

Water pollution is defined as such contamination of water, or such alteration of the physical, chemical or biological properties of water, or such discharge as is likely to cause a nuisance or render the water harmful or injurious to public health and safety or harmful for any other use or to aquatic plants and other organisms or animal life.

The salient features and provisions:

- Maintenance and restoration of quality of all types of surface and ground water
- Establishment of central and state boards for pollution control
- Powers and functions to control pollution
- Funds, budgets, accounts and audit
- Various penalties for the defaulters

Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB)

These boards advise the Central & State government

- Coordinates the activities
- Organizes training programs & comprehensive programs
- Publishes technical and statistical data & prepares manuals
- Lays down standards
- Plans nation-wide programs
- Establishes and recognizes laboratories, take industries samples and provide consent to industries to operate

The Air (Prevention and control of pollution) Act, 1981

THE AIR (PREVENTION AND CONTROL OF POLLUTION) ACT, 1981

ARRANGEMENT OF SECTIONS

CHAPTER I PRELIMINARY

SECTIONS

1. Short title, extent and commencement.
2. Definitions.

CHAPTER II

CENTRAL AND STATE BOARDS FOR THE PREVENTION AND CONTROL OF AIR POLLUTION

3. Central Pollution Control Board.
4. State Pollution Control Boards constituted under section 4 of Act 6 of 1974 to be State Boards under this Act.
5. Constitution of State Boards.
6. Central Board to exercise the powers and perform the functions of a State Board in the Union territories.
7. Terms and conditions of service of members.
8. Disqualifications.
9. Vacation of seats by members.
10. Meetings of Board.
11. Constitution of committees
12. Temporary association of persons with Board for particular purpose.
13. Vacancy in Board not to invalidate acts or proceedings.
14. Member-secretary and officers and other employees of State Boards.
15. Delegation of powers.

CHAPTER III

POWERS AND FUNCTIONS OF BOARDS

16. Functions of Central Board.
17. Functions of State Boards.
18. Power to give directions.

CHAPTER IV

PREVENTION AND CONTROL OF AIR POLLUTION

19. Power to declare air pollution control areas.
20. Power to give instructions for ensuring standards for emission from automobiles.
21. Restrictions on use of certain industrial plants.
22. Persons carrying on industry, etc., not to allow emission of air pollutants in excess of the standard laid down by State Board.
- 22A. Power of Board to make application to court for restraining persons from causing air pollution.

SECTIONS

23. Furnishing of information to State Board and other agencies in certain cases.
24. Power of entry and inspection.
25. Power to obtain information.
26. Power to take samples of air or emission and procedure to be followed in connection therewith.
27. Reports of the result of analysis on samples taken under section 26.
28. State Air Laboratory.
29. Analysis.
30. Reports of analysis.
31. Appeals.
- 31A. Power to give directions.

CHAPTER V

FUND, ACCOUNTS AND AUDIT

32. Contribution by Central Government.
33. Fund of Board.
- 33A. Borrowing powers of Board.
34. Budget.
35. Annual report.
36. Accounts and audit.

CHAPTER VI

PENALTIES AND PROCEDURE

37. Failure to comply with the provisions of section 21 or section 22 or with the directions issued under section 31A.
38. Penalties for certain acts.
39. Penalty for contravention of certain provisions of the Act.
40. Offences by companies.
41. Offences by Government Departments.
42. Protection of action taken in good faith.
43. Cognizance of offences.
44. Members, officers and employees of Board to be public servants.
45. Reports and returns.
46. Bar of jurisdiction.

CHAPTER VII

MISCELLANEOUS

47. Power of State Government to supersede State Board.
48. Special provision in the case of supersession of the Central Board or the State Boards constituted under the Water (Prevention and Control of Pollution) Act, 1974.
49. Dissolution of State Boards constituted under the Act.
50. [Omitted].
51. Maintenance of register.

Air (Prevention and Control of Pollution) Act of 1981

Objective- It provides the prevention , control and abatement of air pollution. Provisions of the Act has to be implemented by **Central Pollution Control Board** along with the state board.

Functions-

- 1.setting of the air quality standards, collecting data on air pollution, organizing training, awareness programmes, establishing laboratories.
- 2.Specify air pollution control areas and set standard for vehicle emissions.
- 3.Penalties for violation of its provisions. Applies to all.

The Air (Prevention and control of pollution) Act, 1981

Salient features of the Act:

- Prevention, control and abatement of air pollution.
- In the Act, air pollution has been defined as the presence of any solid, liquid or gaseous substance (including noise) in the atmosphere in such concentration as may be or tend to be harmful to human beings or any other living creatures or plants or property or environment.

Noise pollution has been inserted as pollution in the Act in 1987.

Pollution Control Boards at the central or state level have the regulatory authority

Provisions for defining the constitution, powers and function of the Boards

Emission standards from automobiles.

Provisions of an Appellate Authority to hear appeals as filed by some industry.

Wildlife (Protection) Act, 1972

THE WILD LIFE (PROTECTION) ACT, 1972

ARRANGEMENT OF SECTIONS

CHAPTER I PRELIMINARY

SECTIONS

1. Short title, extent and commencement.
2. Definitions.

CHAPTER II

AUTHORITIES TO BE APPOINTED OR CONSTITUTES UNDER THE ACT

3. Appointment of Director and other officers.
4. Appointment of Life Warden and other officers.
5. Power to delegate.
- 5A. Constitution of the National Board for Wild Life.
- 5B. Standing Committee of the National Board.
- 5C. Functions of the National Board.
6. Constitution of State Board for Wild Life.
7. Procedure to be followed by the Board.
8. Duties of State Board for Wild Life.

CHAPTER III HUNTING OF WILD ANIMALS

9. Prohibition of hunting.
10. [Omitted.]
11. Hunting of wild animals to be permitted in certain cases.
12. Grant of permit for special purposes.
13. [Omitted.]
14. [Omitted.]
15. [Omitted.]
16. [Omitted.]
17. [Omitted.]

CHAPTER IIIA PROTECTION OF SPECIFIED PLANTS

- 17A. Prohibition of picking, uprooting, etc. of specified plant.
- 17B. Grants of permit for special purposes.
- 17C. Cultivation of specified plants without licence prohibited.
- 17D. Dealing in specified plants without licence prohibited.
- 17E. Declaration of stock.
- 17F. Possession, etc., of plants by licensee.
- 17G. Purchase, etc., of specified plants.

SECTIONS

- 17H. Plants to be Government property.

CHAPTER IV PROTECTED AREAS

Sanctuaries

18. Declaration of sanctuary.
- 18A. Protection to sanctuaries.
- 18B. Appointment of Collectors.
19. Collector to determine rights.
20. Bar of accrual of rights.
21. Proclamation by Collector.
22. Inquiry by Collector.
23. Powers of Collector.
24. Acquisition of rights.
25. Acquisition proceedings.
- 25A. Time-limit for completion of acquisition proceedings.
26. Delegation of Collector's powers.
- 26A. Declaration of area as sanctuary.
27. Restriction on entry in sanctuary.
28. Grant of permit.
29. Destruction, etc., in a sanctuary prohibited without a permit.
30. Causing fire prohibited.
31. Prohibition of entry into sanctuary with weapon.
32. Ban on use of injurious substances.
33. Control of sanctuaries.
- 33A. Immunisation of live-stock.
- 33B. Advisory Committee.
34. Registration of certain persons in possession of arms.

National Parks

35. Declaration of National Parks.
36. [Omitted.]
- 36 A. Declaration and management of a conservation reserve.
- 36 B. Conservation reserve management committee.
- 36 C. Declaration and management of community reserve.
- 36 D. Community reserve management committee.

Closed Area

37. [Omitted.]

Sanctuaries or National Parks declared by Central Government

38. Power of Central Government to declare areas as sanctuaries or National Parks.

CHAPTER IVA CENTRAL ZOO AUTHORITY AND RECOGNITION OF ZOOS

SECTIONS

- 38A. Constitution of Central Zoo Authority.
- 38B. Term of office and conditions of service of Chairperson and members, etc.
- 38C. Functions of the Authority.
- 38D. Procedure to be regulated by the Authority.
- 38E. Grants and loans to Authority and Constitution of Fund.
- 38F. Annual report.
- 38G. Annual report and audit report to be laid before Parliament.
- 38H. Recognition of zoos.
- 38I. Acquisition of animals by a zoo.
- 38J. Prohibition of teasing, etc., in a zoo.

CHAPTER IV B NATIONAL TIGER CONSERVATION AUTHORITY

- 38K. Definitions.
- 38L. Constitution of National Tiger Conservation Authority.
- 38M. Term of office and conditions of service of members.
- 38N. Officers and employees of Tiger Conservation Authority.
- 38-O. Powers and functions of Tiger Conservation Authority.
- 38P. Procedure to be regulated by Tiger Conservation Authority.
- 38Q. Grants and loans to Tiger Conservation Authority and Constitution of Fund.
- 38R. Accounts and audit of Tiger Conservation Authority.
- 38S. Annual report of Tiger Conservation Authority.
- 38T. Annual report and audit report to be laid before Parliament.
- 38U. Constitution of Steering Committee.
- 38V. Tiger Conservation Plan.
- 38W. Alteration and de-notification of tiger reserves.
- 38X. Establishment of Tiger Conservation Foundation.

- CHAPTER IV C
TIGER AND OTHER ENDANGERED SPECIES CRIME CONTROL BUREAU
- 38Y. Constitution of Tiger and other Endangered Species Crime Control Bureau.
- 38Z. Powers and functions of the Wildlife Crime Control Bureau.

CHAPTER V TRADE OR COMMERCE IN WILD ANIMALS, ANIMAL ARTICLES AND TROPHIES

39. Wild animals, etc., to be Government property.
40. Declarations.
- 40A. Immunity in certain cases.
41. Inquiry and preparation of inventories.
42. Certificate of ownership.
43. Regulation of transfer of animal, etc.
44. Dealings in trophy and animal articles without licence prohibited.
45. Suspension or cancellation of licences.
46. Purchase.
47. Maintenance of records.
48. Purchase of animals, etc., by licensee.

SECTIONS

[48A. Restriction on transportation of wild life.

49. Purchase of captive animal, etc., by a person other than a licensee.

CHAPTER VA

PROHIBITION OF TRADE OR COMMERCE IN TROPHIES, ANIMAL ARTICLES, ETC., DERIVED FROM CERTAIN ANIMALS

49A. Definitions.

49B. Prohibition of dealings in trophies, animal articles, etc., derived from scheduled animals.

49C. Declaration by dealers.

CHAPTER VI

PREVENTION AND DETECTION OF OFFENCES

50. Power of entry, search, arrest and detention.

51. Penalties.

51A. Certain conditions to apply while granting bail.

52. Attempts and abetment.

53. Punishment for wrongful seizure.

54. Power to compound offences.

55. Cognizance of offences.

56. Operation of other laws not barred.

57. Presumption to be made in certain cases.

58. Offences by Companies.

CHAPTER VIA

FORFEITURE OF PROPERTY DERIVED FROM ILLEGAL HUNTING AND TRADE

58A. Application.

58B. Definitions.

58C. Prohibition of holding illegally acquired property.

58D. Competent authority.

58E. Identifying illegally acquired property.

58F. Seizure or freezing of illegally acquired property.

58G. Management of properties seized or forfeited under this Chapter.

58H. Notice of forfeiture of property.

58I. Forfeiture of property in certain cases.

58J. Burden of proof.

58K. Fine in lieu of forfeiture.

58L. Procedure in relation to certain trust properties.

58M. Certain transfer to be null and void.

58N. Constitution of Appellate Tribunal.

58-O. Appeals.

58P. Notice or order not to be invalid for error in description.

58Q. Bar of Jurisdiction.

58R. Competent Authority and Appellate Tribunal to have powers of civil court.

58S. Information to competent authority.

58T. Certain officers to assist Administrator, competent authority and Appellate Tribunal.

SECTIONS

58U. Power to take possession.

58V. Rectification of mistakes.

58W. Findings under other laws not conclusive for proceedings under this Chapter.

58X. Service of notices and orders.

58Y. Punishment for acquiring property in relating to which proceedings have been taken under this Chapter.

CHAPTER VII

MISCELLANEOUS

59. Officers to be public servants.

60. Protection of action taken in good faith.

60A. Reward to persons.

60B. Reward by State Government.

61. Power to alter entries in Schedules.

62. Declaration of certain wild animals to be vermin.

63. Power of Central Government to make rules.

64. Power of State Government to make rules.

65. Rights of Scheduled Tribes to be protected.

66. Repeal and savings.

Wildlife (Protection) Act, 1972

- Came into existence in 1972. Wildlife was transferred from State List to Concurrent List in 1976.
- Wildlife (Protection) Act actively takes up the task of setting up Wildlife National Parks and sanctuaries.
- Defines wildlife terminology
- Appointment of Wildlife Advisory Board and wildlife warden
- Listing of endangered wildlife species
- Protection to some endangered plants
- Setting up of National Parks, Wildlife Sanctuaries etc.

Forest (Conservation) Act, 1980

Deals with the conservation of forests in India except J & K.

- Use the forests only for forestry purposes
- For non-forest activities permission from central government is required
- Advisory committee recommends funding to central government
- Immediate stopping of illegal non-forest activities

THE FOREST (CONSERVATION) ACT, 1980

ARRANGEMENT OF SECTIONS

SECTIONS

1. Short title, extent and commencement.
2. Restriction on the dereservation of forests or use of forest land for non-forest purpose.
3. Constitution of Advisory Committee.
4. Power to make rules.
5. Repeal and saving.

1992 Amendment in the Forest Act

Provides for allowing some non-forest activities, exploration or survey in forests, with prior approval of the center

Cultivation of cash-crops not allowed in reserve forests.



Fig. Tea plantation in hills. In reserve forests it is considered a non-forest activity and hence prohibited.



Fig. Growing Muberry tree for silk worm rearing is a non-forest activity.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

Environmental Impact Assessment

Key points

- Environmental Impact Assessment (EIA) mandatory for certain types of projects.
- Project proponent must submit an EIA report, an environmental management plan, details of the public hearing and a project report to Ministry.
- The Ministry's Impact Assessment Agency evaluates the EIA reports. The assessment is to be completed within 90 days from receipt of the requisite documents and data from the Project Authorities and completion of public hearing and decision conveyed within thirty days thereafter.

Environmental Impact Assessment key points contd.....

- Mandatory for all development projects that exceed the specified threshold in terms of cost, manpower, machinery, nature of their operation. Activities which require EIA are
 - ✓ Laying and widening of roads and railways
 - ✓ Construction of dams and bridges
 - ✓ Establishing industries, airports, mines, luxury hotels
 - ✓ Hydroelectric projects, nuclear power plants, Creating landfills

Environmental Impact Assessment have two parts

EIS – Environmental impact statement

An Environmental Impact Statement (EIS) is a document prepared to describe the effects for proposed activities on the environment

EMP – Environmental management plan

An Environmental Management Plan (EMP) can be defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced

Convention on Biological Diversity

The **Convention on Biological Diversity (CBD)**, known informally as the **Biodiversity Convention**, is a multilateral treaty. The Convention has three main goals including: the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources.

In other words, its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993.

Global Climate Change problem

Climate is the average weather of an area. The Intergovernmental Panel on Climate Change (IPCC) publishes evidence that even small changes in climatic conditions may

- Disturb agriculture
- Leads to migration of animals including humans
- Increase the average global temperature
- Disturb hydrological cycle
- Temperature will fluctuate in different regions
- Poles may experience 2 to 3 times more warming than the global average
- Disturbed global pattern of winds and ocean currents
- Uneven Precipitation
- More evapo-transpiration
- Should limit warming to below 2°C relative to pre-industrial levels.

<https://www.youtube.com/watch?v=eHMLszamZ9w>

Greenhouse Effect and Global Warming

The term *greenhouse effect* is used to indicate a heat-trapping process caused by gases such as carbon dioxide, and water vapor which are transparent to incoming solar radiations but re-emit the infrared radiations from Earth's surface.

Global warming is a long-term rise in the average temperature of Earth as a whole as a result of greenhouse effect.





1. Solar radiation passes through the clear atmosphere

2. Most radiation is absorbed by the Earth's surface and warms it.

3. Some solar radiation is reflected by the Earth and atmosphere

4. Infrared radiation is emitted from the Earth's surface

5. Some of the Infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.

GLOBAL WARMING

Troposphere traps heat by a natural process -Greenhouse Effect

- “Heat trapping” or “greenhouse” gases cause global warming
- Carbon dioxide, • Ozone, • Methane, • Nitrous oxide,
- Chlorofluorocarbons (CFCs) • Water vapours
- The average global temperature is 15°C.
- Warming or cooling by more than 2°C may prove to be disastrous
- Some species could adapt or migrate

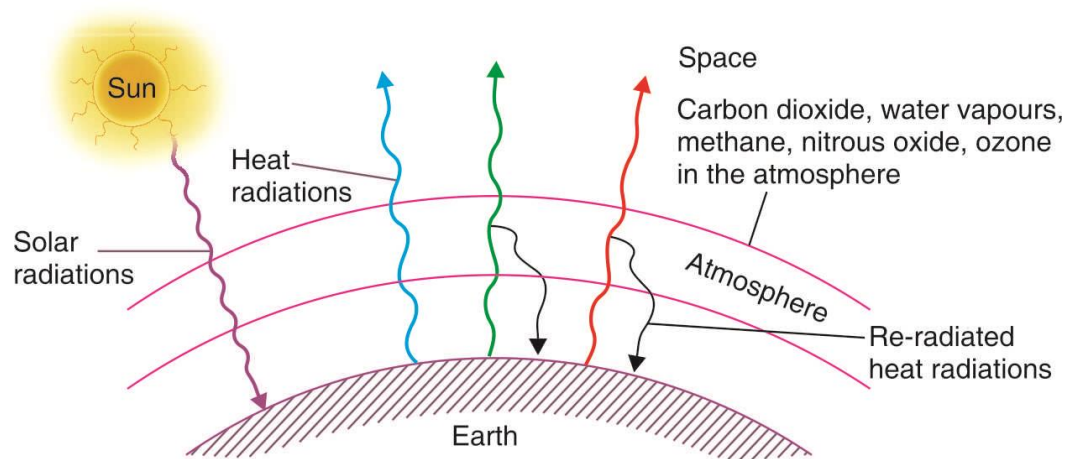


Fig. The greenhouse effect



This graph illustrates the change in global surface temperature relative to 1951-1980 average temperatures, with the year 2020 tying with 2016 for warmest on record (Source: [NASA's Goddard Institute for Space Studies](https://climate.nasa.gov)).

Impacts of Enhanced Global Warming

- Global temperature increase
- Effects on agriculture production
- Weather change
- Rise in sea level
- Storms
- Adverse effects on human health
- Loss of ecosystems and biodiversity

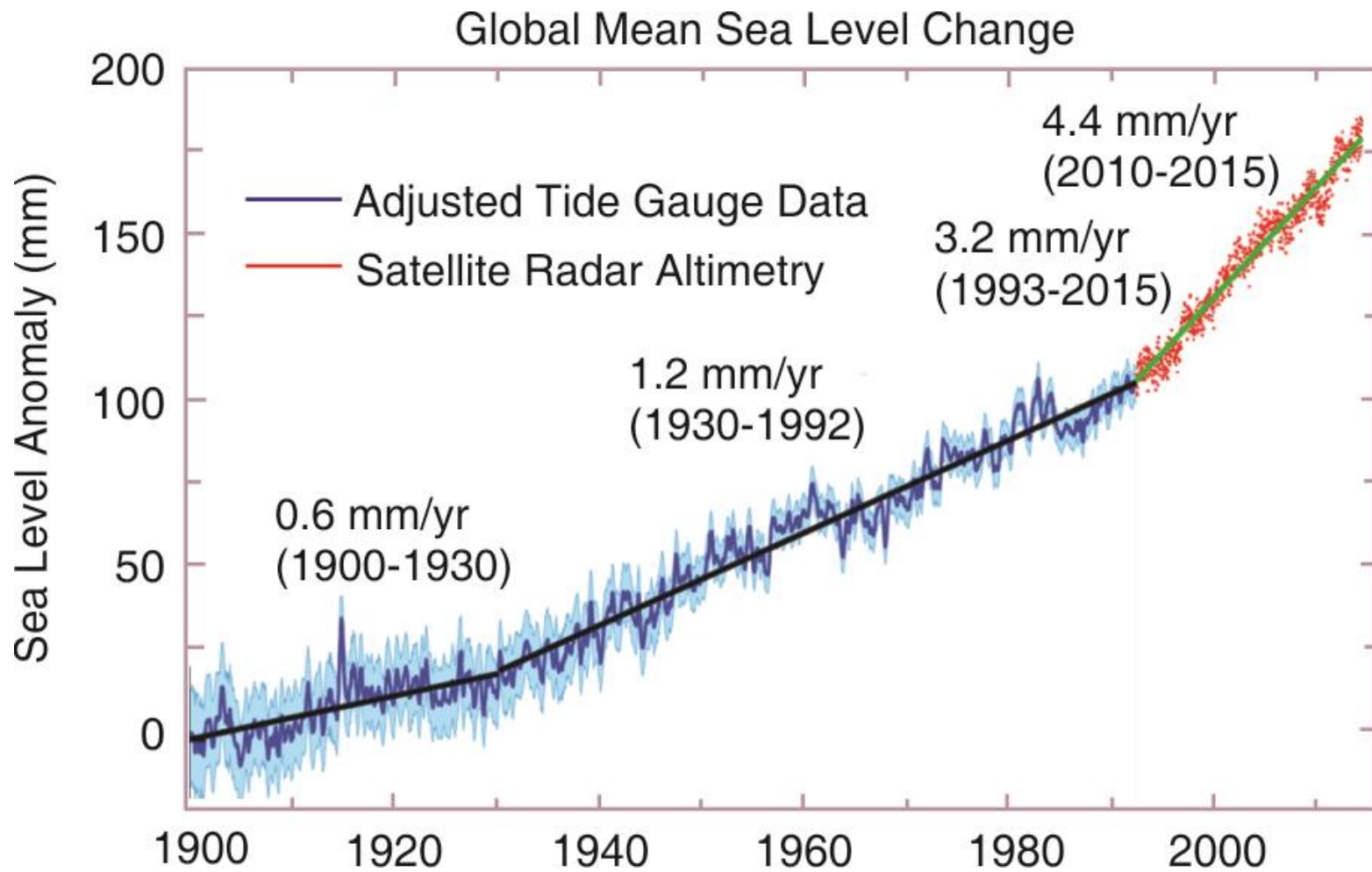


Fig. Sea level rise

Greenhouses Gases

- Carbon dioxide
- Methane
- Nitrous oxide
- Chlorofluoro carbons
- Water Vapours



Activities Responsible for Emission of Greenhouse Gases

- Fossil-fuel burning
- Industrial processes
- Deforestation
- Biomass burning
- Coal mining



Control measures

- Reduction in the use of fossil fuels.
- Shifting to the renewable energy sources that do not emit greenhouse gases.
- Increasing the use of energy efficient and cleaner production technologies and practices.
- Reducing deforestation, adopting better forest management practices, and undertaking afforestation to sequester carbon.

Kyoto Protocol

The Kyoto Protocol adopted on 11 December 1997 is an international treaty taken during the United Nations Framework Convention on Climate Change that commits state parties to reduce greenhouse gas emissions, based on the scientific consensus that global warming is occurring and that human-made CO₂ emissions are driving it. Owing to a complex ratification process, it entered into force on 16 February 2005. Currently, there are 192 Parties to the Kyoto Protocol.

Kyoto Protocol 1997 important points

Kyoto Protocol was adopted on December 11, 1997 as a supplement to the United Nations Framework Convention on Climate Change (UNFCCC).

Richer countries are subject to legal binding to cut greenhouse gas emissions by a minimum 5% in the 1990 before 2012. Later, US realizing its legal obligations agreed to sign the protocol in reducing the emissions like other countries including China and India. Developing countries also agreed to reduce their emissions provided these get financial and technical support.

Important features:

- **Clean Development Mechanism (CDM)**
- **Emission trading**
- **Joint implementation**

Acid Rain

Acid rain refers to a condition in which natural precipitation becomes acidic after reacting chemically with pollutants in the air.

Causes of Acid Rain

Burning of the fuel as well as the use of nuclear weapons leading to the evolution of large amounts of sulphur dioxide (SO_2) and nitrogen dioxide (NO_2), which get converted to sulphurous/sulphuric acid and nitric acid, respectively.

ACID RAIN : Oxides of sulfur and nitrogen

Acidic deposition: total of wet acidic deposition (acid rain) and dry deposition. Rainwater is turned acidic when its pH falls below 5.6

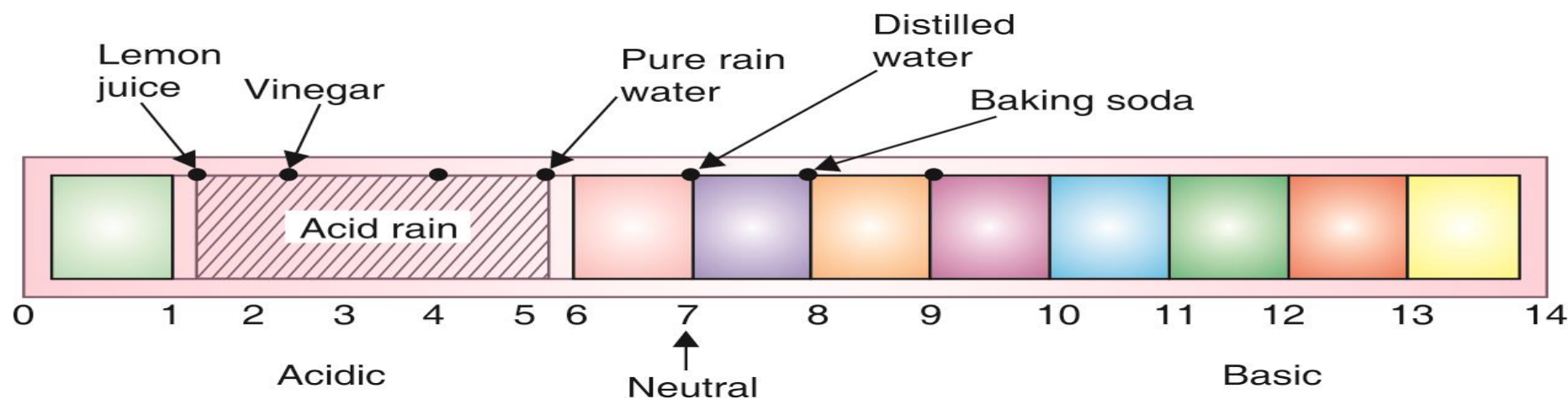


Fig. The pH scale of common substances

The strong acids release H^+

- Sulfuric acid forms a major fraction of acid rain, followed by nitric acid
- Ammonium (NH_4^+) ions help to neutralize the rain drops

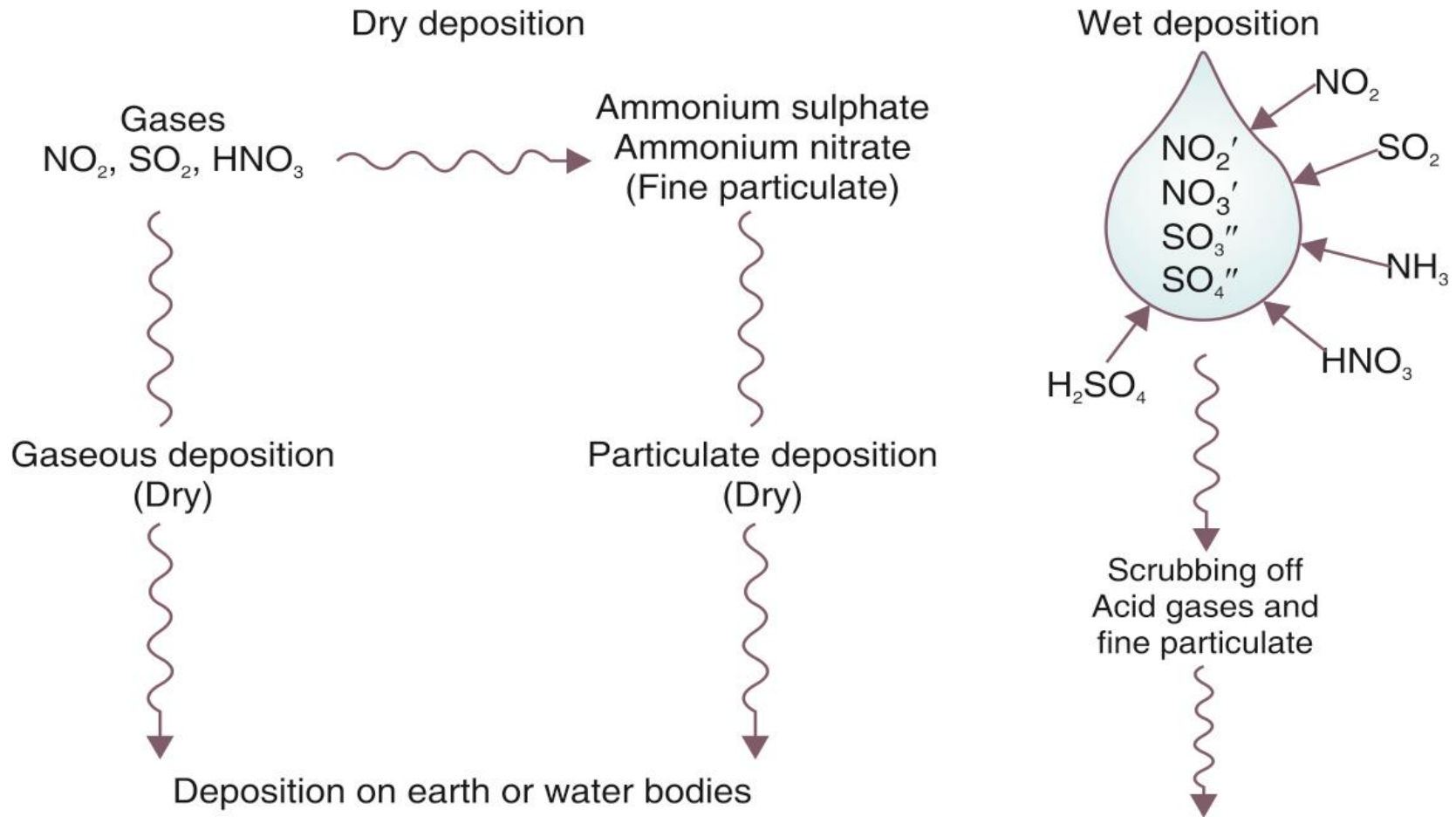


Fig. Acid deposition (dry deposition and wet deposition)

Adverse Effects of Acid Rain

- Reduction in population of aquatic biota: Due to presence of more acid content, chance of loss of biodiversity increases.
- Damage to terrestrial ecosystems: Ex- Change in Soil pH leads to effect on fertility followed by desertification process
- Corrosion(**Corrosion** refers to any process involving the deterioration or degradation of metal components) of buildings :Ex-rusting of Iron
- Effect on human beings : Health issues such as skin problem, Economic growth

<https://www.youtube.com/watch?v=1PDjVDlrFec>

Ozone Layer and Its Depletion

The decrease in the concentration of ozone (O_3) in stratosphere is known as ozone layer depletion.

Chief Cause

- Widespread use of chlorofluorocarbons (CFCs).
- Transportation vehicles (Air craft, Aeroplanes)

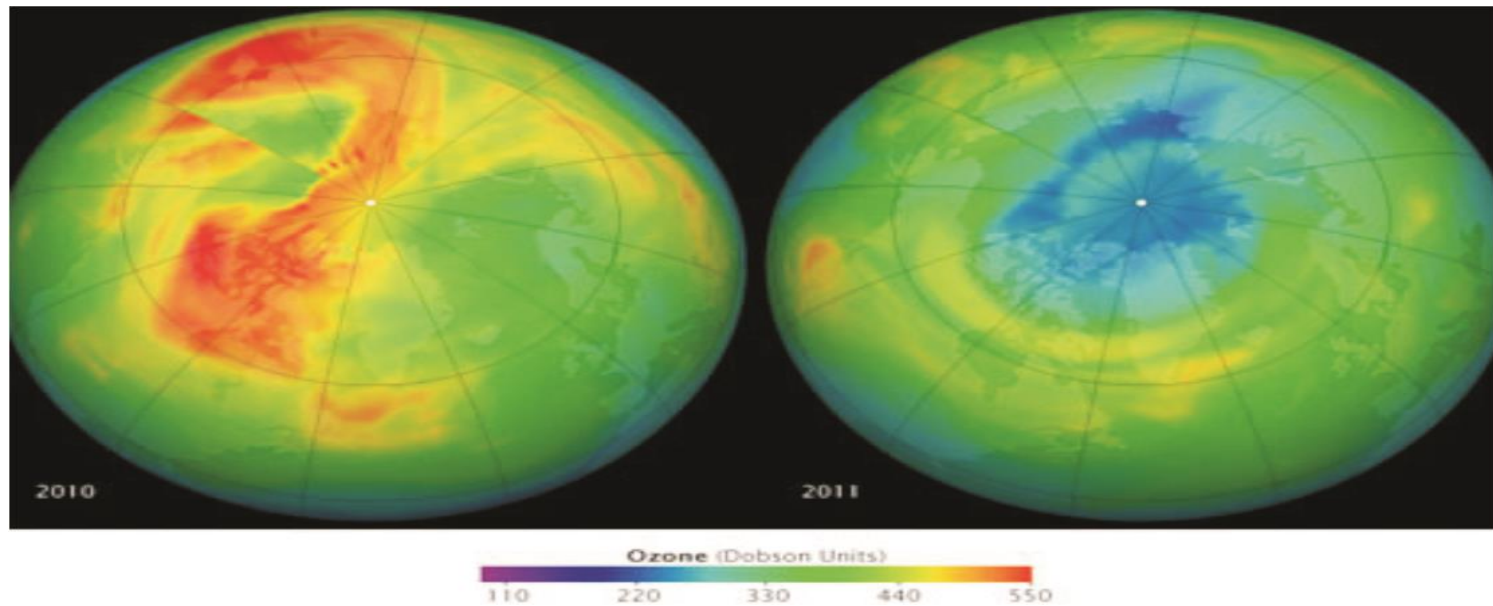
CFCs

CFCs are powerful O₃ destroyers. They are used in the following ways:

- As coolants in the compressors of refrigerators and air conditioners.
- To clean electronic circuit boards used in computers, telephones, etc.
- In the manufacture of foams for mattresses and cushions, disposable styrofoam cups, packaging material, cold storage, etc.

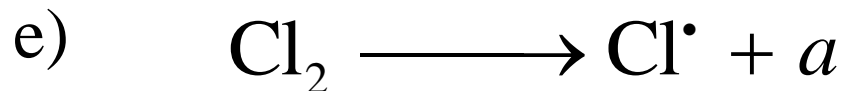
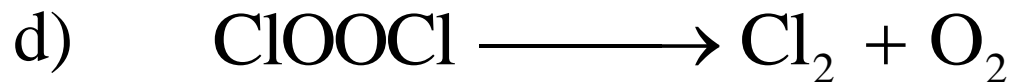
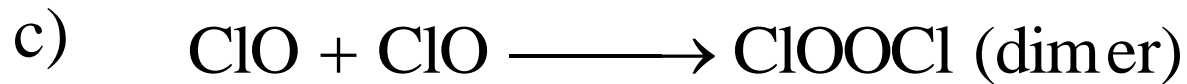
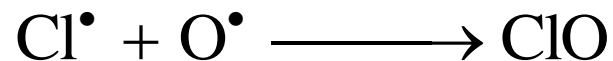
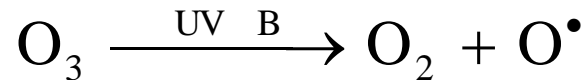
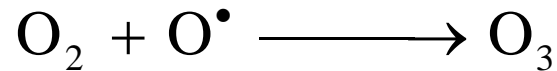
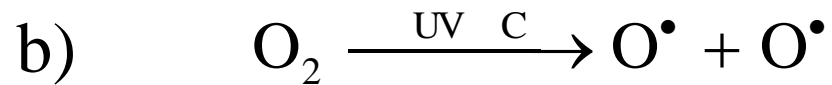
Ozone Hole

The thinning of ozone layer or reduction in concentration of ozone especially over the area of Antarctic continent is known as ozone hole, which covers approximately seven million square kilometer.



**Ozone above the Arctic on 19 March 2010 (left)
and 26 March, 2011 (right)**

Mechanism of Ozone Layer Depletion



Environmental Effects of O₃ Layer Depletion

- Damage to land plants
- Decrease in population of aquatic community
- Increase in the rate of skin diseases and cancers in human beings
- Disturbance in climate patterns
- Corrosion of materials

Control Measures

- Evolving substitutes for CFCs
- Development of hydrochloroflourocarbons and hydrofluorocarbons
- Montreal Protocol 1987

<https://www.youtube.com/watch?v=aU6pxSNDPhs>

Montreal Protocol: Designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion

Important Point:

- International agreement on the Ozone Depletion Substances (ODS)
- Montreal Protocol was signed in 1987, production and consumption of ozone depleting substances are to be phased out by 2000
- The developing countries had to freeze their consumption (of chlorofluorocarbon) at the then present level

- The developed countries will continue the use as their requirement is high.
- The developed countries refused to provide knowhow of the technology.
- The request of developing countries to provide funds to shift to new technologies was also refused.
- During the review of Montreal Protocol : Funds were provided for developing countries by the developed nation to switch over to chlorofluorocarbon (CFCs) substitutes.
- After this London meet India signed the protocol.

Issues involved in enforcement of Env Laws

1. Illiteracy
2. Growing population
3. Ignorance
4. Economic reasons
5. Insufficiency of laws/penalties

Issues Involved in Enforcement of Environmental Legislation in India

1.The precautionary principle: This principle has evolved to deal with risks and uncertainties faced by environmental management. The principle implies that an ounce of prevention is better than cure it does not prevent problems but may reduce their occurrence and helps ensure contingency plans are made.

-But some environmental problems become impossible or costly to solve if there is delay, therefore waiting for research and legal proof is not costless.

2. The polluter-pays principle: The polluter pays for the damaged caused by a development. This principle also implies that a polluter pays for monitoring and policing.

-A problem with this approach is that fines may bankrupt small businesses, yet be low enough for a large company to write them off as an occasional overhead, which does little for pollution control.

3. Freedom of information: Environmental planning and management is hindered if the public, NGOs or even official bodies are unable to get information. Many countries have now begun to release more information, the USA has a Freedom of Information Act, and the European Union is moving in this direction.

-But still many governors and multinational corporations fear that industrial secrets will leak to competitors if there is too much disclosure, and there are situations where authorities declare strategic needs and suspend disclosure.

Convention on Biological Diversity

The **Convention on Biological Diversity (CBD)**, known informally as the **Biodiversity Convention**, is a multilateral treaty. The Convention has three main goals including: **conservation of biological diversity** (or biodiversity); **sustainable use of its components**; and **fair and equitable sharing of benefits arising from genetic resources**.

In other words, its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993.

Main Points of the Convention: Facts

1. The Convention on Biological Diversity (CBD) was opened for signature at the Earth Summit in Rio de Janeiro on **5 June 1992** and entered into force on **29 December 1993**.
2. More than 150 countries signed the document at the Summit, and since then, over 175 nations have ratified the agreement. Till date, there are **196 Parties** (Signatory Countries or States).
3. Components of biodiversity are all the various forms of life on Earth including ecosystems, animals, plants, fungi, microorganisms, and genetic diversity.

India is also a party to the Convention. India ratified it in 1994.

- ✓ The Biological Diversity Act, 2002 was enacted for giving effect to the provisions of the Convention.
- ✓ To implement the provisions of the Act, the government established the National Biodiversity Authority (NBA) in 2003. The NBA is a statutory body.

4. The convention is legally binding on its signatories.

The Conference of Parties (COP) is the governing body of the convention. It consists of the governments that have ratified the treaty.

5. Its Secretariat is in Montreal, Canada.

6. Only two member states of the United Nations are not Parties to the CBD, namely: the USA and the Vatican.

Goals of the Convention on Biological Diversity

- ☐ Conservation of Biological Diversity
- ☐ Sustainable use of the components of the Biodiversity
- ☐ Fair and equitable sharing of benefits arising from the genetic resources
- ☐ The idea of CBD is to develop national strategies for the conservation and sustainable use of biological diversity. In order to implement that, the convention does the following:
 - 1 Asserting intrinsic value of biodiversity
 - 2 Affirming conservation of biodiversity as a common concern of population
 - 3 Taking responsibility to conserve biodiversity in the State and that the state uses this biodiversity sustainably
 - 4 Affirming the State to put the biological resources as the Sovereign Rights of the State.
 - 5 Taking a precautionary approach towards conservation of biodiversity
 - 6 Highlighting the vital role of local communities and women
 - 7 Supporting access to technologies for developing countries and searching for provisions for new and additional financial resources to address the biodiversity loss in the region

Nature reserve: An area of land where the animals and plants are protected, especially when they are rare or endangered.

Nature Reserve of India

1. Ranthambhore National Park Rajasthan.
2. Mahavir Harina Vanasthali National Park, Hyderabad.
3. Mrugavani National Park, Hyderabad.
4. Rajiv Gandhi Zoological Park, Pune.
5. Indian Botanical Garden, Kolkata.
6. Bhagwan Mahaveer Sanctuary and Mollem National Park, Molem.
7. Desert National Park, Jaisalmer.
8. Bannerghatta Biological Park, Bangalore.
9. Eravikulam National Park , Kerala.

Tribal population in India and Their Rights

Tribe

A Tribe is a group of distinct people, dependent on their land for their livelihood, who are largely self-sufficient, and not integrated into the National society. They are considered to be existing in the native area's as a social group existing before the development of Nation States, or outside them.

India's forests are home to crore's of people, including many Scheduled Tribes, who live in or near the forest areas of the country. Nearly 250 million people live in and around forests in India, of which the estimated indigenous Adivasi or tribal population stands at about 100 million.



Tribes Are also called Scheduled- Why?

The reason why they are called **SCHEDULE** is because they are included in **one of the Schedule of the Constitution of India**. Our Constitution has **12 Schedules**. The Scheduled Tribes people are the one who are previously untouchables. According to Hindu Mythology, this is the fifth category in the VARNA system. The Scheduled Tribes people are generally called as ADIVASI.

Problems Related to Scheduled Tribes

- 1) Land Rights:** Under the 2006 Forest Rights Act, providing land rights to forest-dwelling communities of the country, only 15 lakh complainants out of the 39,56,262 cases filed; were given the legal recognition to their property.
- 2) The tribes have their own social problems.** They are traditional and bound by customs.
- 3) Illitracy:** Due to lack of education and development they are superstitious and believe in outmoded and meaningless practices which can be harmful at times.
- 4) Others:** Child marriage, infanticide, homicide, animal sacrifice, exchange of wives, black magic and other detrimental practices are still prevalent among them. They believe in supernatural powers and have a keen desire to maintain these practices. They don't want to change their significant tribal character and hence it's said that "tribes are the tribesmen first, the tribesmen last, and the tribesmen all the time. "

Constitutional Rights to Tribal People

The Constitution of India has provided special provisions to the tribal people to safeguard their interests:

- 1) Article 15 of the Indian Constitution states that the state shall not discriminate any citizen on grounds of religion, race, caste, sex, place of birth or any of them. This explains that every citizen of India is provided equal rights and opportunities without any discrimination.
- 2) Government of India has made reservation for the tribes in employment under Article 16(4) of the Constitution of India.
- 3) The Government of India has reserved seats in The House of People (Lok Sabha) and The State Legislative Assemblies under Article 330 and 332 of The Constitution of India.
- 4) Article 19(5) of the Constitution of India guarantees the tribal people right to own property and enjoy it in any part of the country.
- 5) Article 338 of The Constitution of India grants the right to appoint a Commissioner to look after welfare activities of tribes.
- 6) Article 46 of the Constitution of India states that, The State shall promote with special care the educational and economic interests of the weaker sections of the people and in particular, the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation.
- 7) Under Article 275 of the Constitution of India the Centre Government is required to give grants-in-aid to the State Government for approved Tribal Welfare Schemes.

Importance of tribal communities

- 1) As they are living in close association with nature they carry inherent knowledge of plants and animals that help us to strategise protection measures.
- 2) They count to diversity of India, culture, cuisine and medication (Ethnomedication).
- 3) They are providing protection to number of plants and animals species from hunter and traders.
- 4) Number of tribal people are becoming role models around the globe and set an extraordinary examples in protecting environment and biodiversity.

Solid Waste and Solid Waste Management

Solid Waste

Solid waste includes domestic wastes, commercial wastes, and industrial wastes collected by a municipality within a given area. It is responsible for land pollution in urban and industrial areas.



Some common terms

- **Garbage** refers to the **putrescible** solid waste (Solid waste that contains organic matter capable of being decomposed by microorganisms easily) constituents produced during the preparation or storage of meat, vegetables, etc.
- **Rubbish** is the **non-putrescible** solid waste constituents, either combustible or non combustible. Combustible waste includes paper, wood, wood scrap, rubber, leather, etc. Non-combustible wastes are metals, glass, ceramics etc.
- **Refuse** means all decomposing and non-decomposing combustible and non-combustible solid wastes such as garbage, ashes, paper, cans, wood scraps, plastic etc.

Important Sources of Solid Waste

- Domestic garbage- household waste.
- Industrial waste-
- Commercial waste
- Mining waste
- Radioactive waste
- Agricultural waste
- Hospital waste
- E-waste



<https://www.youtube.com/watch?v=EUQ0FxzvK9o>

Solid waste management

- Main Functional Elements:
 - Waste generation
 - Waste management
 - Storage
 - Collection
 - Transfer/transport
 - Processing/recovery
 - Disposal

Solid waste management

- Solid waste management (SWM) is a three-step process:
 - Collection of solid waste
 - Transportation of solid waste
 - Disposal of solid waste

Collection of solid waste

- **Large number of dustbins** must be provided to enable proper collection of solid wastes according to categories.
- **Door to door collection** of domestic garbage, is the most common and popular practice.
- **Rag pickers** contribute to waste management. They segregate recyclable materials from other wastes and hence save the cost and time.

Transportation of solid waste

- Transportation of solid wastes from urban areas to the dumping grounds with the help of tractors, trucks etc.
- Transfer station
 - Reduces transportation cost, vehicular emission, maintenance cost.
 - Break-even point

Processing/Recovery of solid waste

- Reduction of the use of raw materials
- Reuse of waste materials
- Repair
- Recycling of materials
 - Reformation of old products
 - Formation of new products

Effects of Solid Waste

- Solid waste helps disease-causing organisms such as mosquitoes, flies, etc., to thrive freely and increase in population.
- It runs off with rainwater and mixes with the nearby water bodies causing water pollution.
- Burning of solid waste leads to air pollution.

Effects of Solid Waste cont.....

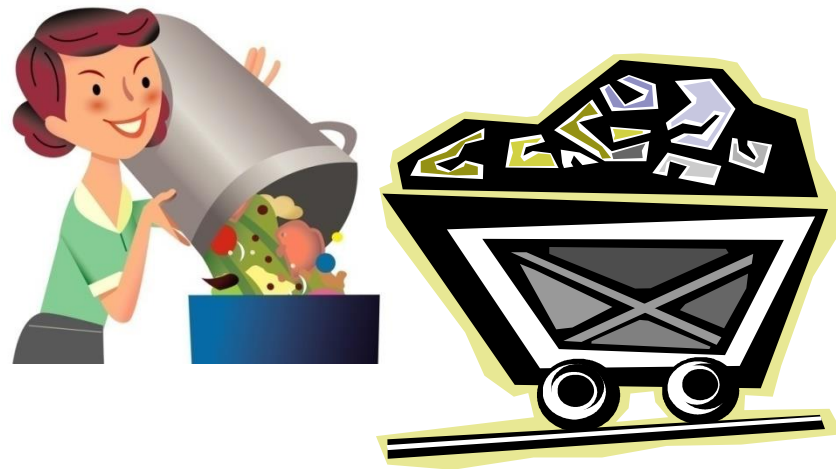
- Radioactive substances present in solid waste cause a number of diseases in human beings.
- Solid waste reduces the aesthetic value of land.
- Non-biodegradable solid wastes such as polythene, plastic, rubber, etc., obstruct the sewage system and release toxic gases when burnt hence causing air pollution.

<https://www.youtube.com/watch?v=QW0hjT7adV8>

Solid waste management

Solid waste management may be defined as the discipline associated with the control of generation, storage, collection, transfer, processing and disposal of solid waste

Solid waste management (SWM) is a Multi-step process includes:



Disposal Measures of Solid Waste

Open dumping- Method of waste disposal where refuse is disposed off in open dumps without being covered- leads to growth of mosquitoes and flies.



- Land fill – waste is covered by thick layer of soil- contaminates ground water. Reduces risk of diseases.



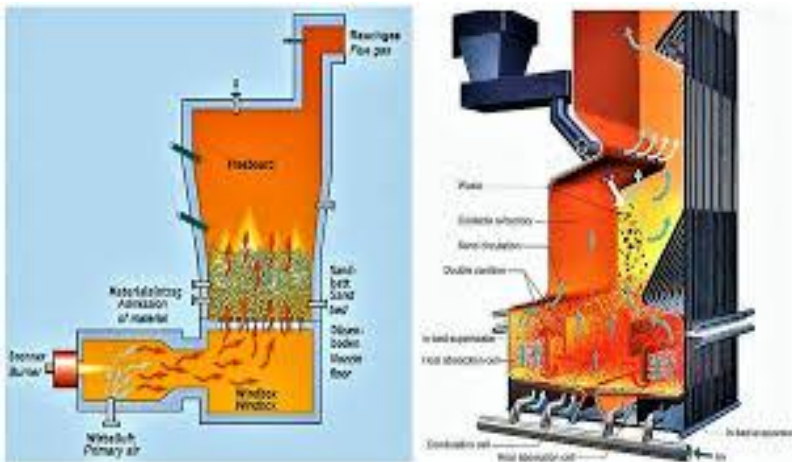
- Ocean dumping –Industrial effluents containing poisonous chemicals are dumped in ocean. Effects marine ecosystem.



Disposal Measures of Solid Waste Conti.....

Incineration:

Combustible waste is burnt at high temp and they are converted to ash. Energy is used for electricity generation. Leads to air pollution and generation of toxic waste. Volume of waste is reduced.



Disposal Measures of Solid Waste Conti.....

Composting: Biochemical degradation of organic material to yield soil supplement. It is an eco-friendly method.

Drawback- necessity to separate organic waste from other waste.

Source Reduction: This is best possible method. Over-consumption and wastage of commodities can be checked by adopting 5 Rs:

Composting/Vermicomposting



5 Rs of Solid Waste Management

Refuse: Refuse unnecessary goods and services. Ex- to minimize the disposal of plastic carry bags, it is best to minimize their use.

Reduce: Reduce consumption of goods and services.

Reuse: To minimize waste is to reuse goods. This reduces demand for new goods.

Repair: Repair broken goods and try to use them for a longer time.

Recycle: Recycle goods.

Important Video/Web Link

<https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

<https://www.nrdc.org/stories/global-warming-101#warming>

<https://www.nationalgeographic.com/environment/global-warming/acid-rain/>

Acknowledgment

Some images, animation, and material have been taken from the following sources:

Text Books: PERSPECTIVE IN ENVIRONMENTAL STUDIES by ANUBHA KAUSHIK, C P KAUSHIK, NEW AGE INTERNATIONAL PUBLISHERS

References Book: TEXT BOOK OF ENVIRONMENTAL STUDIES by D. DAVE AND S. S. KATEWA, CENGAGE LEARNING

3 All slides can be used for reading purpose only