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**CHAPTER- People Development &
Environment**



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37. Development & Environment

MILLENNIUM DEVELOPMENT GOALS (MDGS)

In September 2000, leaders of 189 countries gathered at the United Nations headquarters and signed the historic Millennium Declaration, in which they committed to words achieving a set of eight measurable goals that range from halving extreme poverty and hunger to promoting gender equality and reducing child mortality, by the target date of 2015.

The Millennium Development Goals (MDGs)

- Eradicate extreme poverty and hunger
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combating HIV/AIDs, malaria, and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development

The MDGs were revolutionary in providing a common language to reach global agreement. These 8 goals were realistic and easy to communicate, with a clear measurement/monitoring mechanism. Substantial progress has been made regarding the MDGs. The world realized the first MDG of halving the extreme poverty rate by 2015. However, the achievements had been uneven. When the

MDGs were set to expire in 2015 then discussions on post-2015 agenda continued, and the focus was on building a sustainable world where environmental sustainability, social inclusion, and economic development were equally valued. The MDG Fund contributed directly and indirectly to the achievement of the MDGs. It adopted an inclusive and comprehensive approach to the MDGs. The approach was guided by the Millennium Declaration and its emphasis on development as a right, with targeted attention directed towards traditionally marginalized groups such as ethnic minorities, indigenous groups, and women.

THE GLOBAL CONSULTATION OF SUSTAINABLE DEVELOPMENT GOALS

The United Nations Conference on Sustainable Development - or Rio+20 - took place in Rio de Janeiro, Brazil on 20-22 June 2012. It resulted in a focused political outcome document which contains clear and practical measures for implementing sustainable development.

The Conference also adopted ground-breaking guidelines on green economy policies.

In July 2014, the UN General Assembly Open Working Group (OWG) proposed a document containing 17 goals to be put forward for the General Assembly's approval in September 2015. This document set the ground for the new SDGs and the global development agenda spanning from 2015-2030.

38. Interaction

HUMAN AND ENVIRONMENTAL INTERACTIONS:

ANTHROPOGENIC ACTIVITIES AND THEIR IMPACT ON ENVIRONMENT

Human Environmental Interactions can be defined as interactions between the human social system and the ecosystem. Human social systems and ecosystems are complex adaptive systems (Marten, 2001). It is complex because ecosystems and human social systems have many parts and many connections between these parts. It is adaptive because they have feedback structures that promote survival in a constantly changing environment. Human-environment interaction provides a framework that brings together scholarship sharing both disciplinary depth and interdisciplinary scope to examine past, present, and future social and environmental change in different parts of the world. Human environment interaction is the way people adapt and modify the environment. There are three types of human environment interaction:

- i. The way people depend on the environment for food, water, timber, natural gas etc
- ii. The way people adopt the environment to fulfil their own needs
- iii. The way people modify the environment positively or negatively like drilling holes, building dams

SOME EXAMPLES OF HUMAN ENVIRONMENT INTERACTIONS

The use of natural resources People use different kinds of natural reserves like timber, metals, and oil in the day to day lives. There is also a dependence on food and water for a continued existence. People also require energy for various reasons such as cooking at home and industrial purposes. From clothes, transport services, constructions, electronic devices and other items that are used all need different resources so as to be produced.

Deforestation

Deforestation happens when forests get cut down and the trees are not replaced or permitted to grow back. Countries such as Ethiopia, Mexico, Brazil, America, Congo, and India have cleared a lot of its forests for economic and agricultural purposes to meet the food demand, fuel and building materials. These activities have led to a steady loss of areas with forests and it still continues. Converting forests to agricultural areas decreases biodiversity which is essential for human beings. They use other living organisms for getting their requirements such as food, medication and ecological processes.

Organisms such as plant life and micro-organisms have a crucial role of maintaining people's lives and the ecosystem by giving air, purifying the air, decontaminating the water, decomposing wastes and preventing soil erosion.

Energy resources

Using of renewable or non-renewable sources demonstrate human environmental interaction as the energy is used to power transport and communication systems, electrical equipment, and our homes as well as offices. Fossil fuels have been the key ingredient in the world's globalization, but since they cannot be renewed, the amount is eventually inadequate and their usage is not sustainable in the long-run. There are a number of renewable energies that can be used instead of fossil fuels like wind power, hydroelectric power, and solar power that work by converting the wind's, water, and sun's energy into electricity respectively.

Water resources

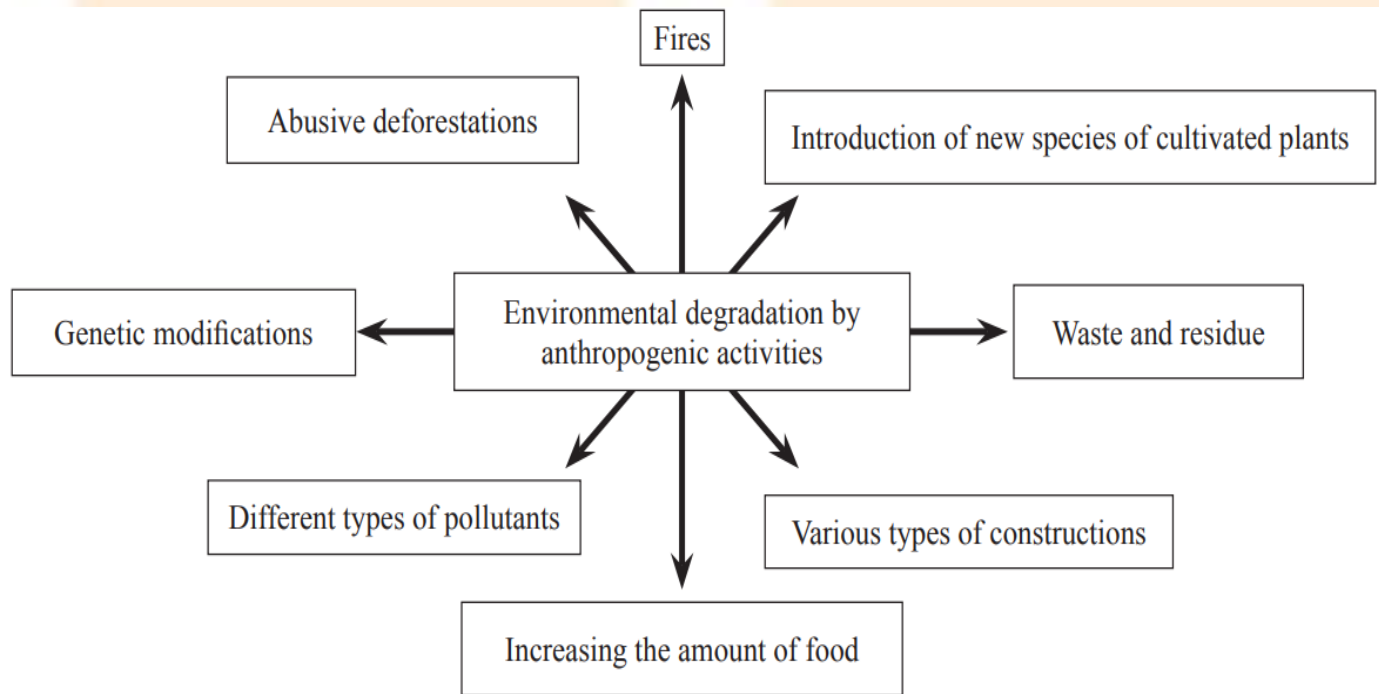
The use of water resources highly signifies human environmental interaction. Water has a lot of uses, from domestic to agricultural and in industrial processes. The relative quantities of the three groups differ in various parts of the universe. However, agriculture generally uses the largest quantity of water. The rising demand in water is leading to unsustainable use of water sources.

Human Impacts on the Environment

Humans impact the physical environment in many ways: overpopulation, pollution, burning fossil fuels, and deforestation. Changes like these have triggered climate change, soil erosion, poor air quality, and undrinkable water. These negative impacts can affect human behavior and can prompt mass migrations or battles over clean water.

The anthropogenic activities on the environment cause topographic changes that have strong repercussions, some positive (afforestation, embankments) but other negative (deforestation, soil erosion, and inning).

Sources of environmental degradation by anthropogenic actions



39. Environmental Issues

INTRODUCTION

Environmental issues are harmful effects of human activity on the biophysical environment. Environmentalism, a social and environmental movement, addresses environmental issues through advocacy, education and activism.

Our environment is constantly changing, which no one can deny. With these great environment changes, it becomes highly important for us to become increasingly aware of the environmental problems as well. With a monumental inundation of natural disasters warming and cooling periods, different types of environmental problems our earth is facing.

REGIONAL ENVIRONMENTAL DAMAGE

Those environmental damages which affect the living and non-living things locally over a small area are termed as regional environmental damages.

GLOBAL ENVIRONMENTAL DAMAGE

The environmental damages which affect the living and non living things globally or wider part of the earth are called global environmental damages.

Global Warming

Atmospheric gases like Carbon dioxide (CO₂), Nitrogen oxide (NO₂), Methane (CH₄), Chlorofluro carbons (CFCs) and water

vapour have the ability of trapping the outgoing radiation (infrared) from the surface of earth. Such trapped infrared radiation by the earth's surface cannot pass through these gases present in the atmosphere and exhibits the thermal energy or heat in the atmosphere. As a result the temperature of atmosphere is on rise globally. The phenomenon of increase in temperature i.e. heating in green houses are known as green house effect.

Green House Effect

The earth gets energy from the sun in the form of sunlight. The earth's surface absorbs some of this energy and heats up. That's why the surface of a road can feel hot even after the sun has gone down because it has absorbed a lot of energy from the sun. The earth cools down by giving off a different form of energy, called infrared radiation. But before all this radiation can escape to outer space, greenhouse gases in the atmosphere absorb some of it, which makes the atmosphere warmer. As the atmosphere gets warmer, it makes the earth's surface warmer, too. Without this Greenhouse effect the earth would be at least 30 degrees cooler, in which life would not exist.

Greenhouse Gases

A greenhouse gas (GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water

vapour, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

- **Water vapour** contributes to 36-72% of Greenhouse effect.
- **Carbon Dioxide (CO₂)** arises from burning fossil fuels and as a result of deforestation. It contributes to 9-26% of Greenhouse effect. It is the primary greenhouse gas emitted through human activities.
- **Methane (CH₄)**, also called “Marsh gas”, arises from rice paddies, wetlands, enteric fermentation in cattle, burning of wood, and landfills. It is responsible for about 4-9% of Greenhouse effect.
- **Nitrous Oxide (NO₂)** contributes (5%) which arises from coal burning, biomass burning, and breakdown of chemical fertilizers.
- **Chlorofluorocarbons (CFCs)** and their replacements (15%) are 1000 times more heat absorbent than carbon dioxide.
- **Ozone contributes** to 3-7% of Greenhouse effect. The largest net source of tropospheric ozone is influx from the stratosphere. Large amounts of ozone are also produced in the troposphere by photochemical reactions, the amounts increasing with high levels of air pollution.

Ozone Depletion

Ozone (O₃) is a gas found throughout the atmosphere, but most highly concentrated in the stratosphere, between 10 and 50 km

above the sea level, where it is known as the “Ozone layer”. This Ozone layer forms a protective shield for the earth from the harmful ultra-violet radiation from outer space, particularly UV-B rays which affects DNA molecules, causing damage to the outer surface of plants and animals and also marine life. In humans it causes skin cancer, eye cataracts and is a general immunosuppressant.

“**Ozone Holes**” were first discovered over Antarctica by the British Antarctica Survey in 1983. Levels of ozone are dropping very fast, resulting in parts of the layer becoming thin and ‘holes’ developing because only a small percentage of O₃ gets naturally replenished every year.

Pollution refers to deterioration or unclean objectionable conditions in the quality of natural resources such as air, water and soil because of the action or presence of unwanted substances beyond a certain limit. Pollutants are the substances or effect introduced into the environment in significant amounts in solid, semi solid, liquid, gas or sub molecular particle form which has a detrimental effect on the environment.

Pollutants can be **natural** or man-made (**anthropogenic**).

40. Impacts of Pollutants on Human Health

Major Pollutants of Air

Pollutants	Primary sources	Significant Effects
SO ₂	Vehicular combustion, fossil burning	Acid rain, irritation in eyes, premature falling of leaves
CO and CO ₂	Vehicular combustion, burning of fuels and hydrocarbons	Global warming, green house effect, CO has great affinity for haemoglobin and forms carboxy haemoglobin
Smoke, fly ash and soot	Thermal power stations	Respiratory diseases.
Lead and mercury	Autoexhaust from gasoline (petrol), paints, storage batteries. Fossil fuel like coal burning.	Affects the nervous system and circulatory system, brain damage
CFCs (Chloro fluoro Carbons)	Refrigerants and aerosol	Kidney damage and ozone depletion.

Major Pollutants of Water

Pollutants	Primary sources	Significant Effects
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Pesticides and insecticides	Improper use in agriculture like DDT, BHC, mosquito repellants	Toxic to fishes, predatory birds and mammals
Plastics	Homes and industries	Kills fishes and animals. Persists in the environment because of non-biodegradability.
Chlorine compounds	Water disinfection with chlorine, paper industries and bleaching powder	Fatal for plankton (organisms floating on the surface of water), foul taste and odour, can cause Cancer in humans.
Lead paints	Leaded gasoline	Toxic to organisms
Mercury	Natural evaporation and dissolved industrial wastes, fungicides	Highly toxic to humans
Acids Mine drainage, industrial wastes	Mine drainage, industrial wastes	Kills organisms
Sediments	Natural erosion, run off from factories mining and construction activities, fertilizer and other	Reduces ability of water to assimilate oxygen.

SOUND/ NOISE POLLUTION

In India, the Air (Prevention and control of pollution) Act came into force in 1981 and in 1987 it was amended to include Noise as an Air pollutant.

Unwanted sounds created by humans, animals and machines which disturbs the environment and humans is called as sound pollution. The word noise comes from the Latin word nausea meaning seasickness.

SOIL POLLUTION

Soil is a thin layer of organic and inorganic materials that covers the Earth's rocky surface. Soil pollution is defined as the 'addition of substances to the soil, which adversely affect physical, chemical and biological properties of soil and reduces its productivity.' It is build-up of persistent toxic compounds, chemicals, salts, radioactive materials, or disease causing agents in soil which have adverse effects on plant growth, human and animal health.

A soil pollutant is any factor which deteriorates the quality, texture and mineral content of the soil or which disturbs the biological balance of the organisms in the soil.

THERMAL POLLUTION

- Power plants- thermal and nuclear, chemical and other industries use lot of water (about 30 % of all abstracted water) for cooling purposes and the used hot water is discharged into rivers, streams or oceans. The waste heat from the boilers and heating processes increases the temperature of the cooling water.

Discharge of hot water may increase the temperature of the receiving water by 10 to 15 °C above the ambient water temperature.

RADIOACTIVE POLLUTION

Radioactive pollution is the increase in over the natural background radiation. There are many sources of radioactive pollution such as nuclear wastes from nuclear power plants, mining and processing of nuclear material etc. The worse case of nuclear pollution was the Chernobyl disaster in Russia occurred in 1986 but the effects still longer today.

SOLID WASTE

Solid waste refers to the non-liquid waste materials arising from domestic (garbage debris and night soil) activities, trade and commercial activities (hazardous and non-hazardous) industrial activities, agricultural activities, mining and public services (office and hospital wastes). Solid waste management is one of the major challenges faced by many countries around the globe. Inadequate collection, recycling or treatment and uncontrolled disposal of waste in dumps can lead to severe hazards, such as health risks and environmental pollution.

E-waste :

“E-waste” is a popular, informal name for electronic products nearing the end of their “useful life. “E-wastes are considered dangerous, as certain components of some electronic products

contain materials that are hazardous, depending on their condition and density.

Management of E-waste

It is estimated that 75% of electronic items are stored due to uncertainty of how to manage it. These electronic junks lie unattended in houses, offices, warehouses etc. and normally mixed with household wastes, which are finally disposed off at landfills. This necessitates implementable management measures. In industries management of e-waste should begin at the point of generation, this can be done by waste minimization techniques and by sustainable product design. Waste minimization in industries involves adopting:

- inventory management,
- production-process modification,
- volume reduction,
- recovery and reuse.

RADIOACTIVE WASTE

Radioactive waste which arises from civil nuclear activities as well as from defence related nuclear weapon activities, poses a terrible problem for handling and keeping the environment to be safe to the present and future generations. The techniques used emphasizes on waste minimization and volume reduction. Nuclear waste is categorized into high, intermediate and low levels depending on the level of radioactivity in it.

PLASTIC WASTE

Plastics have become an indispensable part of our daily lives. Invented in 1935, they are wonderful products of polymer chemistry produced from the by-products of petroleum refining. They are classified as into two main categories:

- **Thermoplastics**
- **Thermosetting plastics**

41. Natural and Energy Resources

1. Renewable Sources of Energy

Renewable sources of energy are those which can be generated by us or which are constantly being generated by natural processes or whose supply is unlimited. Examples: The sun, wind, flowing water, etc.

2. Non-renewable Sources of Energy

Non-renewable sources of energy are those which were produced in the past by natural processes, whose supply is limited and which we cannot generate again in short interval of time, these will be exhausted in future. Examples : Coal, petroleum, natural gas, etc.

CONVENTIONAL SOURCES OF ENERGY

The sources of energy which are extensively used by man due to their easy availability.

For example : Fossil fuels, wind energy, energy from biomass, etc.

Fossil Fuels: Fossil fuels are hydrocarbon based natural resources that were formed over 300 hundred millions of years ago by the fossilization of prehistoric plants and animals. There are three major forms of fossil fuels: coal, oil and natural gas.

Bio-Mass: Biomass is a renewable energy source because the energy it contains comes from the sun. Through the process of photosynthesis, chlorophyll in plants captures the sun's energy

and converting carbon dioxide from the air and water from the ground into carbohydrates, complex compounds composed of carbon, hydrogen, and oxygen. When these carbohydrates are burned, they turn back into carbon dioxide and water and release the sun's energy they contain. In this way, biomass functions as a sort of natural battery for storing solar energy.

Bio-Gas: Bio-gas is made from organic waste matter after it is decomposed. The decomposition breaks down the organic matter, releasing various gases. The main gases released are methane, carbon dioxide, hydrogen and hydrogen sulphide.

Wind Energy: Along with sun, it was the air, which showed man its power. Even before the solar energy, it was the wind energy that man used for his work. Initially, it was used in two main ways; to drive wind mills on land and to drive sailboat at sea. The first use of windmills were to grind food grains and to run pumps to irrigate.

Solar Energy: The energy obtained from the sun is called solar energy. The inner temperature of the sun is very high (107K). At this high temperature the nucleus of hydrogen atoms present in the sun fuse to convert into heavy nucleus of helium. A lot of energy is released in this nuclear reaction. Sun is the biggest source of energy. Energy of the sun reaching every year on earth is about 1.6×10^8 KWh (Kilo watt hour).

Tidal Energy: Tide arise due to the gravitational pull of mainly the moon on the water and spinning earth. The tide moves a huge

amount of water twice each day, and harnessing it could provide a great deal of energy. Tide is the alternate rise and fall in the water level of oceans and seas.

(i) It is an inexhaustible and renewable source of energy.

Wave Energy: Kinetic energy exists in the moving waves of the ocean. Waves are a powerful source of energy. That energy can be used to power a turbine. There are several methods of getting energy from waves, but one of the most effective works like a swimming pool wave machine in reverse.

Ocean Thermal Energy: The energy from the sun heats the surface water of the ocean. In tropical regions, the surface water can be 40° celsius or more degrees warmer than the deep sea water. This temperature difference can be used to produce electricity. **Geothermal Energy:** Energy present in the depth of the earth is called geothermal energy. Temperature in the earth at a distance of 10 kilometres is about 120°C and it increases to 300°C at the depth of 320 kilometres.

Nuclear Energy: Nuclear power is an alternative energy source that can be obtained from either the splitting of the bigger nucleus of atoms (nuclear fission) or the combining of the lighter nuclei of atoms (nuclear fusion). In either of these two reactions, great amounts of energy are released.

42. Natural Hazard and Disasters

The term disaster owes its origin to the French word “Desastre” which is a combination of two words ‘des’ meaning bad and ‘aster’ meaning star. Thus the term refers to ‘Bad or Evil star’. A disaster can be defined as “A serious disruption in the functioning of the community or a society causing wide spread material, economic, social or environmental losses which exceed the ability of the affected society to cope using its own resources”.

HAZARD

Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.” The word ‘hazard’ owes its origin to the word ‘hasard’ in old French and ‘az-zahr’ in Arabic meaning ‘chance’ or ‘luck’. Hazards can be grouped into two broad categories namely natural and manmade.

Types	Types of Hazard
Geological Hazards	<ol style="list-style-type: none">1. Earthquake2. Tsunami3. Volcanic Eruption4. Landslides5. Dam Burst6. Mine Fire
Water & Climatic Hazards	<ol style="list-style-type: none">1. Tropical Cyclone2. Tornado and hurricane3. Flood

	<ol style="list-style-type: none"> 4. Drought 5. Hailstorm 6. Cloud Burst 7. Landslide 8. Heat and Cold Wave 9. Snow Avalanche 10. Sea Erosion
Environmental Hazards	<ol style="list-style-type: none"> 1. Environmental Pollution 2. Deforestation 3. Desertification 4. Pest Infection
Biological Hazards	<ol style="list-style-type: none"> 1. Human/Animal Epidemics 2. Pest attacks 3. Food Poisoning 4. Weapons of mass destruction.
Chemical, Industrial and Nuclear Accidents	<ol style="list-style-type: none"> 1. Chemical disasters 2. Nuclear disasters 3. Oil Spills/Fires 4. Nuclear
Accident Related	<ol style="list-style-type: none"> 1. Transportation Urban fires bomb blast, Forest fires, Air Crash 2. Building collapse 3. Electrical accidents 4. Festival related disasters

DISASTER RISK MANAGEMENT

Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are:

- 1. Before a Disaster (Pre-disaster).**
- 2. During a Disaster (Disaster Occurrence).**
- 3. After a Disaster (Post-disaster)**

Natural hazard management Earthquake : An earthquake (also known as a quake, tremor or temblor) is the shaking of the surface of the Earth, resulting from the sudden release of energy in the Earth's lithosphere that creates seismic waves.

TSUNAMI

The term Tsunami has been derived from a Japanese term 'Tsu' meaning 'harbor' and 'nami' meaning 'waves'. Tsunamis are popularly called tidal waves but they actually have nothing to do with the tides. These waves which often affect distant shores, originate by rapid displacement of water from the lake or the sea either by seismic activity, landslides, volcanic eruptions or large meteoroid impacts. Whatever the cause may be sea water is displaced with a violent motion and swells up, ultimately surging over land with great destructive power. The effects of a tsunami can be unnoticeable or even destructive.

CYCLONE

Cyclone is a region of low atmospheric pressure surrounded by high atmospheric pressure resulting in swirling atmospheric disturbance accompanied by powerful winds blowing in anticlockwise direction in the Northern Hemisphere and in the clockwise direction in the Southern Hemisphere. They occur mainly in the tropical and temperate regions of the world.

CYCLONES ARE KNOWN BY DIFFERENT NAMES IN DIFFERENT PARTS OF THE WORLD:

- Typhoons: in the Northwest Pacific Ocean west of the dateline
- Hurricanes: in the North Atlantic Ocean, the Northeast Pacific Ocean east of the dateline, or the South Pacific Ocean.
- Tropical cyclones: the Southwest Pacific Ocean and Southeast Indian Ocean.
- Severe cyclonic storm” (the North Indian Ocean)
- Tropical cyclone (the Southwest Indian Ocean)
- Willie-Willie in Australia
- Tornado in South America

FLOOD

Flood is a state of high water level along a river channel or on the coast that leads to inundation of land, which is not usually submerged. Floods may happen gradually and also may take

hours or even happen suddenly without any warning due to breach in the embankment, spill over, heavy rains etc.

DROUGHT

Drought is either absence or deficiency of rainfall from its normal pattern in a region for an extended period of time leading to general suffering in the society. It is interplay between demand that people place on natural supply of water and natural event that provides the water in a given geographical region.

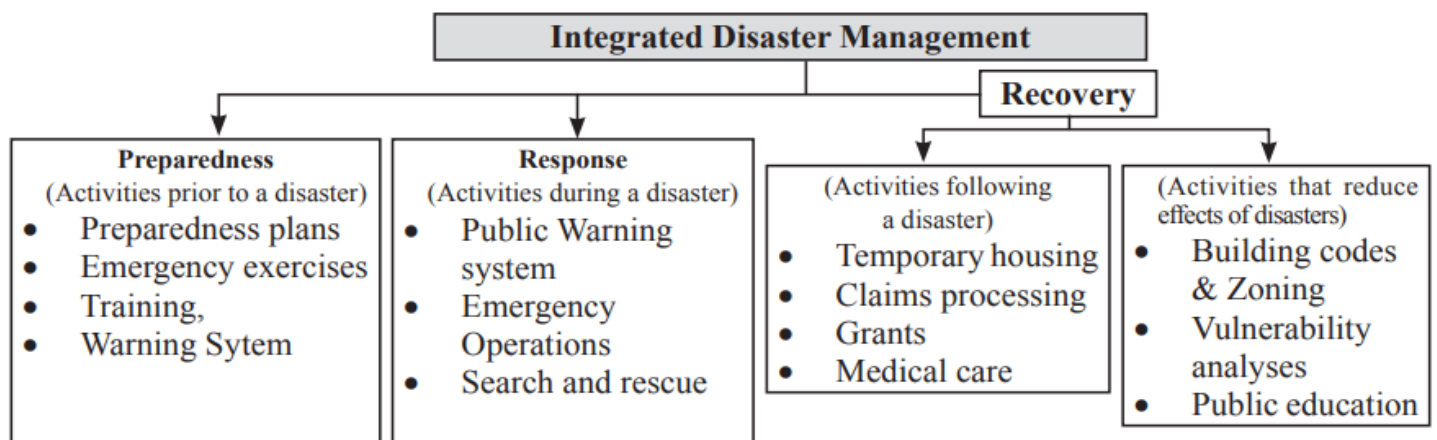
LANDSLIDES

The term 'landslide' includes all varieties of mass movements of hill slopes and can be defined as the downward and outward movement of slope forming materials composed of rocks, soils, artificial fills or combination of all these materials along surfaces of separation by falling, sliding and flowing, either slowly or quickly from one place to another. Although the landslides are primarily associated with mountainous terrains, these can also occur in areas where an activity such as surface excavations for highways, buildings and open pit mines takes place.

Volcanic Eruptions: A volcano is a rupture in the crust of a planetary-mass object, such as Earth, that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface.

Industrial Hazard

Industrial accidents resulting in releases of hazardous materials usually occur in a commercial context, such as mining accidents. They often have an environmental impact but also can be hazardous for people living in proximity. The Bhopal disaster saw the release of Dioxins into the neighbouring environment seriously affecting large numbers of people.



NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)

The Government of India, in recognition of the importance of Disaster Management as a national priority, set up a High-Powered Committee (HPC) in August 1999 and a National Committee after the Gujarat earthquake, for making recommendations on the preparation of Disaster Management plans and suggesting effective mitigation mechanisms. The Tenth Five-Year Plan document also had, for the first time, a detailed chapter on Disaster Management. The Twelfth Finance Commission was also mandated to review the financial arrangements for Disaster Management.

The Disaster Management Act, 2005 provides for constitution of a number of institutions at national, state and district levels. At the national level, the Act establishes the National Disaster Management Authority headed by the Prime Minister. State Disaster Management Authorities (SDMAs) are headed by respective Chief Ministers, to spearhead and implement a holistic and integrated approach to Disaster Management in India. National Disaster Management Authority is responsible for laying down policies and guidelines on disaster management. State Disaster Management Authorities also lays down policies and plans for disaster management in their respective states.

NATIONAL DISASTER RESPONSE FORCE (NDRF)

National Disaster Response Force (NDRF), a specialized multi skilled, humanitarian force of the country, working in the field of Disaster management.

The Disaster Management Act has statutory provisions for constitution of National Disaster Response Force (NDRF) for the purpose of specialized response to natural and manmade disasters. Accordingly, on January 19th, 2006 it came into existence and has been playing a vital role in Disaster Management and Community awareness for Disaster Risk Reduction (DRR) in the country.

43. Environmental Protection Laws of India

In the Constitution of India it is clearly stated that it is the duty of the state to 'protect and improve the environment and to safeguard the forests and wildlife of the country'. It imposes a duty on every citizen 'to protect and improve the natural environment including forests, lakes, rivers, and wildlife'.

Reference to the environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985. The constitutional provisions are backed by a number of laws – acts, rules, and notifications. The EPA (Environment Protection Act), 1986 came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws came into existence as the problems began arising, for example, Handling and Management of Hazardous Waste Rules in 1989.

GENERAL LAWS & ACTS

The Environment (Protection) Act (1986)

It authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.

The Environment (Protection) Rules (1986)

These lay down procedures for setting standards of emission or discharge of environmental pollutants.

The objective of Hazardous Waste (Management and Handling) Rules (1989) is to control the generation, collection, treatment, import, storage, and handling of hazardous waste.

The Manufacture, Storage, and Import of Hazardous Rules (1989) define the terms used in this context, and sets up an authority to inspect, once a year, the industrial activity connected with hazardous chemicals and isolated storage facilities.

The Manufacture, Use, Import, Export, and Storage of hazardous Micro-organisms / Genetically Engineered Organisms or Cells Rules (1989) were introduced with a view to protect the environment, nature, and health, in connection with the application of gene technology and microorganisms.

The Public Liability Insurance Act and Rules and Amendment, (1992) was drawn up to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident while handling any hazardous substance.

The National Environmental Tribunal Act (1995) has been created to award compensation for damages to persons, property, and the environment arising from any activity involving hazardous substances.

The National Environment Appellate Authority Act (1997) - has been created to hear appeals with respect to restrictions of areas in which classes of industries etc. are carried out or prescribed subject to certain safeguards under the EPA.

The Biomedical waste (Management and Handling) Rules (1998) is a legal binding on the health care institutions to streamline the process of proper handling of hospital waste such as segregation, disposal, collection, and treatment.

The Environment (Siting for Industrial Projects) Rules, (1999) lay down detailed provisions relating to areas to be avoided for siting of industries, precautionary measures to be taken for site selecting as also the aspects of environmental protection which should have been incorporated during the implementation of the industrial development projects.

The Municipal Solid Wastes (Management and Handling) Rules, (2000) apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.

The Ozone Depleting Substances (Regulation and Control) Rules (2000) have been laid down for the regulation of production and consumption of ozone depleting substances.

The Batteries (Management and Handling) Rules, (2001) - rules shall apply to every manufacturer, importer, re-conditioner, assembler, dealer, auctioneer, consumer, and bulk consumer

involved in the manufacture, processing, sale, purchase, and use of batteries or components so as to regulate and ensure the environmentally safe disposal of used batteries.

The Noise Pollution (Regulation and Control) (Amendment) Rules (2002) lay down such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address systems during night hours (between 10:00 p.m. to 12:00 midnight) on or during any cultural or religious festive occasion.

The Biological Diversity Act (2002) is an act to provide for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources and knowledge associated with it.

FOREST AND WILDLIFE

The Indian Forest Act and Amendment, (1984) is one of the many surviving colonial statutes. It was enacted to 'consolidate the law related to forest, the transit of forest produce, and the duty leviable on timber and other forest produce'.

The Wildlife Protection Act, Rules 1973 and Amendment 1991 provides for the protection of birds and animals and for all matters that are connected to it whether it be their habitat or the waterhole or the forests that sustain them.

The Forest (Conservation) Act and Rules, (1981) provides for the protection of and the conservation of the forests.

WATER The Easement Act (1882) allows private rights to use a resource that is, groundwater, by viewing it as an attachment to the land. It also states that all surface water belongs to the state and is a state property.

The Indian Fisheries Act (1897) establishes two sets of penal offences whereby the government can sue any person who uses dynamite or other explosive substance in any way (whether coastal or inland) with intent to catch or destroy any fish or poisonous fish in order to kill.

The River Boards Act (1956) enables the states to enroll the central government in setting up an Advisory River Board to resolve issues in inter-state cooperation.

The Merchant Shipping Act (1970) aims to deal with waste arising from ships along the coastal areas within a specified radius.

The Water (Prevention and Control of Pollution) Act (1974) establishes an institutional structure for preventing and abating water pollution. It establishes standards for water quality and effluent. Polluting industries must seek permission to discharge waste into effluent bodies. The CPCB (Central Pollution Control Board) was constituted under this act.

The Water (Prevention and Control of Pollution) Cess Act (1977) provides for the levy and collection of cess or fees on water consuming industries and local authorities.

The Water (Prevention and Control of Pollution) Cess Rules

(1978) contains the standard definitions and indicate the kind of and location of meters that every consumer of water is required to affix.

The Coastal Regulation Zone Notification (1991) puts regulations on various activities, including construction, are regulated. It gives some protection to the backwaters and estuaries.

AIR

The Factories Act (1948) and Amendment in 1987 was the first to express concern for the working environment of the workers. The amendment of 1987 has sharpened its environmental focus and expanded its application to hazardous processes.

The Air (Prevention and Control of Pollution) (1981) Act provides for the control and abatement of air pollution. It entrusts the power of enforcing this act to the CPCB .

The Air (Prevention and Control of Pollution) Rules (1982) defines the procedures of the meetings of the Boards and the powers entrusted to them.

The Atomic Energy Act (1982) deals with the radioactive waste.

The Air (Prevention and Control of Pollution) Amendment Act (1987) empowers the central and state pollution control boards to meet with grave emergencies of air pollution.

The Motor Vehicles Act (1988) states that all hazardous waste is to be properly packaged, labelled, and transported.

International Conventions for Climate Change

Convention	Place	Crucial Documents
International Whaling Commission (1946)	Washington, D.C., United States.	<ul style="list-style-type: none"> • To keep under review and revise as necessary the measures laid down in the Schedule to the Convention which govern the conduct of whaling throughout the world.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	Washington, U.S.A.	<ul style="list-style-type: none"> • Help in conservation of species
Ramsar Convention on Wetland (1971)	Ramsar, Iran	<ul style="list-style-type: none"> • Halt the worldwide loss of wetlands and • To conserve, use and manage, those that remain. • This requires international cooperation, policy making, capacity building and technology transfer.
World Heritage Convention, 1972	Paris	<ul style="list-style-type: none"> • Recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. • Defines the kind of natural or cultural sites which can be considered for inscription on the

		World Heritage List under UNESCO.
Convention on the Conservation of Migratory Species of Wild Animals (1979)	Bad Godesberg, Germany	<ul style="list-style-type: none"> • It is an intergovernmental treaty • should promote, cooperate in and support research relating to migratory species • endeavour to provide immediate protection for migratory species • conservation and management of migratory species included in Appendix II
MARPOL Convention (73/78)	-	<ul style="list-style-type: none"> • To minimize pollution of the oceans and seas, including dumping, oil and air pollution.
Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	Helsinki, Finland	<ul style="list-style-type: none"> • Play role in controlling the ozone depletion
Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal (1989)	Basel, Switzerland	<ul style="list-style-type: none"> • To reduce hazardous waste generation and promote environmental sound management system for their disposal. • Restrict trans boundary movement of such wastes and • Provide regulatory system applying to cases where such movement is allowable.

<p>Convention on Biological Diversity (1993)</p>		<ul style="list-style-type: none"> • The conservation of biological diversity • The sustainable use of the components of biological diversity • The fair and equitable sharing of the benefits arising out of the utilization of genetic resources
<p>The United Nations Framework Convention on Climate Change (1994)</p>	<p>Kyoto, Japan</p>	<ul style="list-style-type: none"> • Gather and share information on greenhouse gas emissions, national policies and best practices • Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries • Cooperate in preparing for adaptation to the impacts of climate change
<p>Global Tiger Forum (1994)</p>	<p>New Delhi, India</p>	<ul style="list-style-type: none"> • Set up to embark on a worldwide campaign to save the wild tiger
<p>United Nations Convention to Combat Desertification (1994)</p>		<ul style="list-style-type: none"> • Promotes a global response to desertification, land degradation and drought
<p>Kyoto Protocol (1997)</p>	<p>Kyoto, Japan</p>	<ul style="list-style-type: none"> • Set targets on greenhouse-gas emissions for developed countries.

		<ul style="list-style-type: none"> • Fight global warming by reducing greenhouse gas concentrations in the atmosphere. • Reduce greenhouse gases by 18% below the emission levels of 1990
United Nations Forum on Forests (2000)		<ul style="list-style-type: none"> • Implementation of agreements and foster a common understanding on sustainable forest management; • To provide policy development and dialogue among Governments and international organizations, • To enhance cooperation • To foster international cooperation and • To monitor, assess and report on progress of the above functions and objectives • To strengthen political commitment to the management, conservation and sustainable development.
Stockholm Convention on Persistent Organic Pollutants (2001)	Stockholm, Sweden	<ul style="list-style-type: none"> • It develops a risk management evaluation • Determines whether the substance fulfills POP screening. • Manage and dispose of POPs

		wastes in an environmentally sound manner
Rotterdam Convention (2004)	Rotterdam, Netherlands	<ul style="list-style-type: none"> • Convention promotes open exchange of information • Calls on exporters of hazardous chemicals to use proper labelling • Inform purchasers of any known restrictions or bans

INTERNATIONAL AGREEMENTS ON ENVIRONMENT

AGENDA-21

- It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992.
- The Agenda emphasizes on issues like poverty, health consumption patterns, natural resource use, financial resources and human settlements.

CARTAGENA PROTOCOL ON BIOSAFETY

- It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.
- It was adopted on 29th January, 2000 and entered into force on 11 September 2003.

RIO EARTH SUMMIT

The Rio Earth Summit took place in June 1992 in Rio de Janeiro, Brazil. It was the largest environmental conference ever held attended by over 30,000 people including more than 100 heads of states. The objectives of the conference were to build upon the hopes and achievements of the Brundtland Report, in order to respond to pressing global environmental problems and to agree major treaties on biodiversity, climate change and forest management. The biggest challenges faced at the Rio Earth Summit involved finance, consumption rates and population growth. The developed nations demanded environmental sustainability while the developing nations argued that they should be given the chance to catch up socially and economically with the developed world. Five separate agreements were made at the Rio Earth Summit.

- The Convention on Biological Diversity;
- The Framework Convention on Climate change;
- Principles of Forest Management;
- The Rio Declaration on Environment and Development; and
- Agenda 21.

MONTREAL PROTOCOL

The Montreal Protocol is an international environmental agreement with universal ratification to protect the earth's ozone layer by eliminating use of ozone depleting substances (ODS), which would otherwise allow increased UV radiation to reach the earth, resulting in higher incidence of skin cancers and eye cataracts, more-compromised immune systems, and negative effects on watersheds, agricultural lands and forests.

INTERNATIONAL SOLAR ALLIANCE

International Solar Alliance (ISA) is an alliance of 121 solar resource rich countries lying fully or partially between the Tropics of Cancer and Capricorn. ISA was jointly launched by India and France on November 30, 2015 in Paris, on the sidelines of the 21st Conference of Parties (CoP 21) to the United Nations Framework Convention on Climate Change (UNFCCC). The ISA Framework Agreement was opened for signature on 15 November 2016 in Marrakech, Morocco, on the side-lines of CoP-22.

Important Dates Related to Environment

Name	Date
World Wetland Day	2nd February
World Forest Day	21st March
World Water Day	22nd March
World Meteorological Day	23rd March
World Heritage Day	18th April
Earth Day	22nd April
Bio- Diversity Day	22nd May
World Environment Day	5th June
World Nature Conservation Day	28th July
International Tiger Day	29th July
International Day for Disaster Reduction	13th October
International Day of Climate Action	24th October
World Fisheries Day	21st November
World Soil Day	5th December
International Day to Combat Desertification and Drought	17th June
World Tiger Day	29th July
World Elephant Day	12th August