UNIT – IV

SOCIAL ISSUES AND THE ENVIRONMENT

URBAN PROBLEMS RELATED TO ENERGY

Urbanisation :
The movement of people from rural area to urban area for the need of economical growth, education, communication, health and employment, etc.

Urban sprawl:
Spreading of cities into sub-urban or rural areas too is called Urban sprawl.

Energy demanding activities:
The main issues are :

1. How to utilize the energy from non-renewable sources at their maximum efficiency?

2. How to make use of renewable sources of energy or the alternative energy sources?

The energy demanding activities are:

a. Industrial plants using a big proportion of energy

b. Residential and commercial lightings

c. Control and prevention of water air pollution

d. Modern life style using a large number of electrical gadgets in everyday life.

Solution:

1. Use public transport instead of motor cycles.
2. Energy consumption must be minimized.
3. Use solar and wind energy.
4. Impose strict laws, penalty, and energy audit.

Water conservation

Process of saving water for future utilization is known as water conservation.

Water source:
* Fresh water
* River
* Stream
* Pond
* Ocean

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Need for water conservation:

- Population increases water requirement also increases
- Due to deforestation annual rainfall decreases
- Over exploitation of ground water

Ways of water conservation

- Reducing evaporation loss
- Reducing irrigation loss
- Reuse water
- Avoid sewage discharge

Strategies of Water conservation:

1. **Sustainable water utilization**:

***** Minimize domestic water consumption.
* Recycling of waste products.
* Improved irrigation methods**.**

2. Rain water harvesting:

* Roof top rain water harvesting.
* Revival of traditional water harvesting structures
* Micro and macro catching water harvesting
* Recharging structures for well and bore wells.

3. Maintain the improve quality of water:

*****Collection and treatment of waste water effluents.
* Pollution check**.**

4. Encourage natural regeneration of vegetation and supplementing with artificial regeneration.

5. Awareness building on water conservation.

Water conservation method

- Rain water harvesting
- Watershed management

RAIN WATER HARVESTING:

"Rain water harvesting is defined as a method for inducing, collecting, storing and conserving local surface runoff for use later on"

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Need for Rain water harvesting:

a. To reduce run off

b. To avoid flood

c. To meet the increasing demands of water

d. To reduce ground water contamination

e. To raise the water table

f. To supplement ground water supplies during lean season.

Concept of Rain water harvesting:

It is the collection of rain as it falls on the roof of houses during rain storms and sends it through PVC or Aluminium pipe to a natural depression or tanks, ponds, recharge pits.

Methods of Rain water harvesting:

a. Percolation Pit:

* The percolation or absorption pit is a small catchment area depth 4 and 8m depending on the nature of soil and the diameter is up to 25cm.
*The pit is filled with stone and sand, which serves as a sand filter. Asquare or circular collection chamber with slit arrester is closed at the top.

b. Percolation well:

*These are constructed using cement rings.
* The depth depends on the nature of the soil and the diameter depends on the number of roof top pipes.
* These wells are covered by RCC slabs of suitable thickness.
* T he rain water is diverted to open well using PVC pipes through a filter chamber.

ELEMENTS OF A TYPICAL WATER HARVESTING SYSTEM

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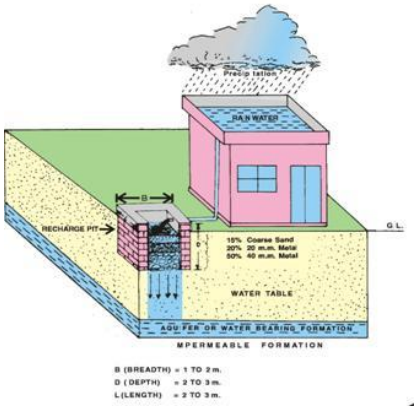

Advantages of Rain water harvesting:

a. Water consumption during summer period.

b. The ground water is recharged and its quality is improved.

c. Rise in ground water level.

d. Surface water quality is also improved due to diversion of rain water induced run-off. Mitigating the effects of floods, drought and soil erosion.

e. Reduction in the use of current for pumping water.

f. Future generation is assured of water.

WATERSHED MANAGEMENT

WATERSHED:

It is defined as the land water flows or through on its way to a common stream, river, lake, pond or reservoir under the influence of gravity.

WATERSHED MANAGEMENT:

The management of rain fall and resultant run off is called watershed management.

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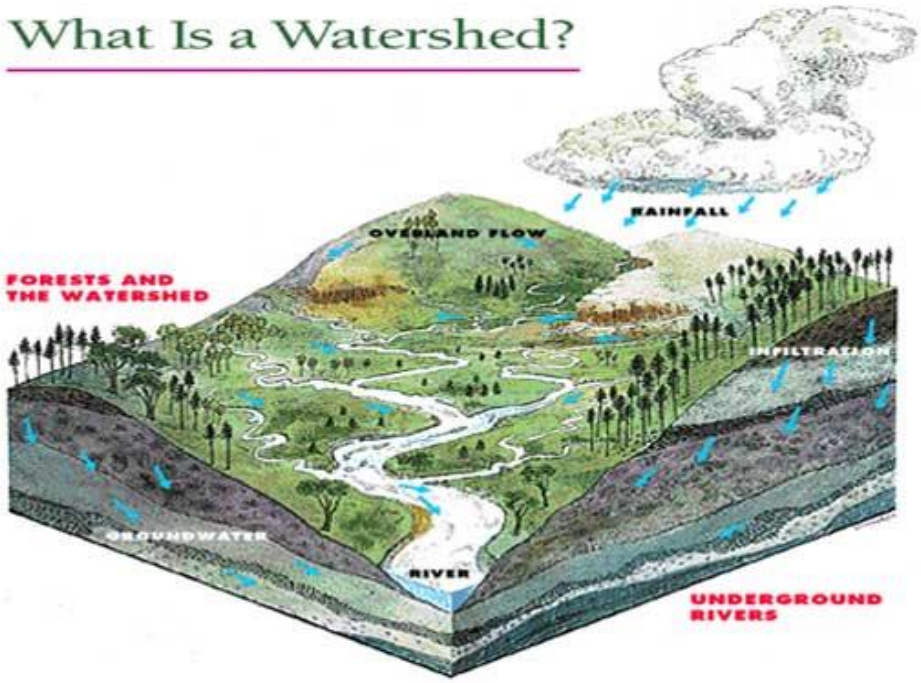

Advantages of watershed management:

1. Habitat for fish.

2. Food resources for animals and people.

3. Temporary living areas for migratory birds.

4. Drinking water for people and other animals.

5. Assimilation of water pollutants and raise the ground water level.

6. Purification of air.

7. Prevent soil erosion by run-off.

8. Transportation of goods and people.

Factors Affecting Watershed

a. Development of land eliminates these resources.

b. Overgrazing, deforestation, mining and construction activities.

c. Droughty climates.

d. Natural vegetation surfaces and soils.

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Objectives of Watershed:

1. Watersheds are natural system.

2. Watershed management is continuous and needs a multidisciplinary approach.

3. Watershed management frame work supports patterning; using sound science taking well planned actions, and achieving results.

4. A flexible approach is always needed.

Concept of Watershed:

Three essential zones are:

1. **Water body:**
Stream, river, pond, lake, estuary or ocean.

2. **Riparian:**
Non-cultivated, vegetated area between the water body edge and upland area.

3. Upland zones:
*Land around a higher water mark.
*The relationship between proper management and health including soil productivity , flood safety, water quality and production and wild life habitat protection if crucial.
*Effective watershed management conserves and enhances the resources needs of people and their ecosystem.

Watershed management practices:

Various measures taken up for management include the following:

a. Water harvesting:

Proper storage of water is done with provision for use in dry seasons in low rainfall areas. It also helps in moderation of floods.
It plays a very important role. They help to prevent soil erosion and retention of moisture.
Eg. In Dehradun, trees like Eucalyptus and grasses grown along with maize or wheat to achieve the above objectives.

b. Mechanical measures:

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Mechanical measures like terracing, bunding, bench terracing, no-till farming, contour cropping, strip cropping etc; are used to minimize run-off and soil erosion particularly on the slopes of watershed.

c. Public participation:

*People involvement including the farmers and tribal's is the key to the success of any watershed management programme, particularly the soil and water conservation.

*The communities are to be motivated for protecting a freshly planted area and maintaining a water harvesting structure implemented by government or NGO or by involving the local people.

*Successful watershed management has been done at Sukhomajri Panchkula,Haryana through active participation of the local people.

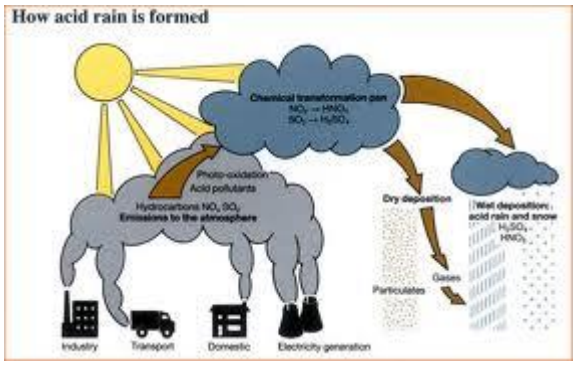
Acid Rain:

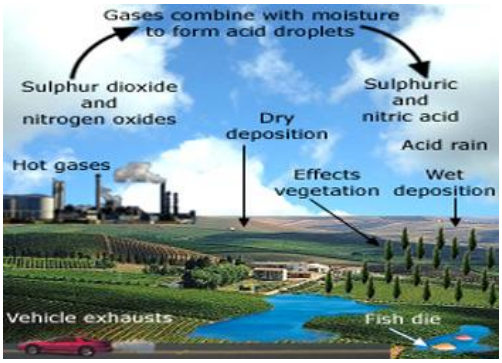
The precipitation of CO2, SO2, and NO2 gases as pollutants in water is known as Acid rain. They form their corresponding acids like nitric acid, sulphuric acid etc. It is otherwise called acid fog, acid snow and acid precipitation.

Formation of Acid rain

The thermal power plants, industries and vehicles release SO2 and NO2 gases in the atmosphere due to burning of coal and oil. When these gases react with water vapor in atmosphere, they form acids and descend on to earth's acid rain through rain water.

$$SOx + H_2O \rightarrow H_2SO_4$$
$$NOx + H_2O \rightarrow HNO_3$$





Effects of acid rain

1. Human beings
   Destroy life – nervous , respiratory and digestive system

   Causes premature death from heart and lung disorders

2. On Buildings
   Corrosion - Taj Mahal , houses, statues, bridges, metals

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3. On terrestrial and lake ecosystem
   Reduces rate of photosynthesis, growth of crops, Fish population And bio mass production

Control measures

1. Clean combustion technologies.
2. Using pollution control equipments.
3. Replacement of coal by natural gas.
4. Liming of lakes and soils.

Ozone layer depletion:

The concentrated Ozone gas (O3) in the stratosphere between 10 to 50 km is known as ozone layer. It is used to filter the ultra violet radiation (UV-B) from sun by forming ozone umbrella.

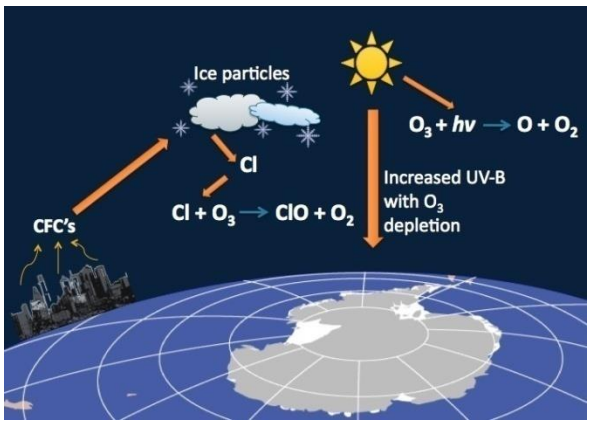
Formation of Ozone
Ozone is formed in the stratosphere by photochemical reaction.

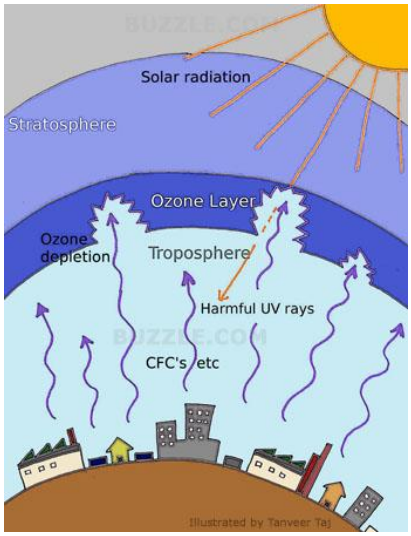
O2 + hv→ O* + O*

The atomic oxygen (O) rapidly reacts with molecular oxygen (O2) to form ozone (O3).

O* + O2 + M→ O3 + M

Where M = Third body like Nitrogen.





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Ozone depleting chemicals
The compound containing Chlorine and bromine atom breaks ozone.
For example

1. Chloro Fluoro Carbon (CFC) – Refrigerators, blowing agent, propellant, etc

2. Hydro Chloro Fluoro Carbon (HCFC) – Refrigerators, blowing agent

3. Bromo Fluoro Carbon (BFC) – Fire extinguishers

4. Halogen compounds

Control measures
1. Replacing CFCs by other materials.
2. Using of less damaging materials
3. Manufacturing and using of ozone depleting chemicals should be stopped

GLOBAL WARMING

The increased input of CO2 and other green house gases into the atmosphere from human activities will enhance the global temperature of earth's surface. This enhanced green house effect is called global warming.

GREEN HOUSE EFFECT

The green house effect may be defined as the progressive warming up of the earth's surface due to blanketing effect of manmade CO2 in the atmosphere.

Green House gases
1. CO2
2. CH4
3. Nitrous oxide (N2O)
4. Chloro fluoro carbons (CFCs)

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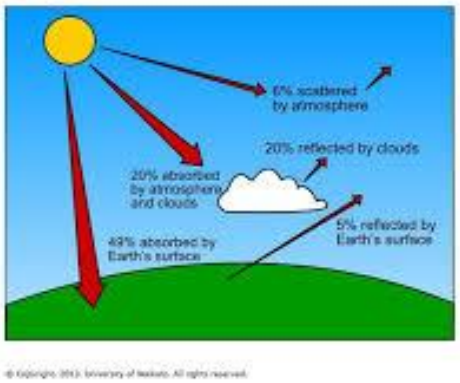

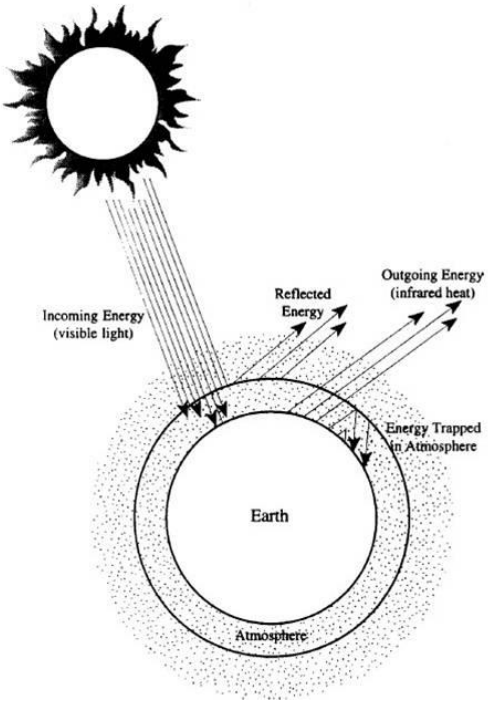

Effect of global warming

1. **Effect of sea level:**
   It increases the sea level.
2. **Effect on agriculture and forestry**:
   It affects forestry and agriculture
3. **Effect on water resources :**
   It affects Water resources and leads to water scarcity

4. **Effect on terrestrial ecosystems:**
   It affects terrestrial ecosystem.

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5. **Effect on human health :**

It affects human health by causing so many disease.

Control measures

1. CO_2 emission can be controlled by reducing use of fossil fuels.
2. Implement energy conservation measures.
3. Using renewable energy such as wind, solar, tidal etc
4. Plant more trees
5. Stabilize population growth
6. Remove atmospheric CO_2 by utilizing photosynthetic algae

CLIMATE CHANGE:

CLIMATE: The average weather of an area.

Climate change:

* Climate change is the average weather conditions mainly temperature and precipitation in an area's temperature, precipitation, wind, humidity and other physical conditions over a short period.
* Sun light strikes the earth and heats the earth.
* The heat is then slowly radiated back as infrared radiation into atmosphere and returns to space.
* Naturally occurring carbon dioxide absorbs infrared radiation escaping from the earths surface, thus helping to maintain the earths temperature.

Even small changes in climatic conditions may disturb agriculture that would lead to migration of animals including humans.

Causes of Climatic change:

1. The uneven heating of earth's surface.

2. The rotation of earth on its axis.

3. The property of air, water and land.

4. Combustion of fossil fuels.

5. Presence of green house gases in the atmosphere.

Effects of Climate change:

a. Climatic change may also disturb the migration of birds, animals including humans.

b. Toxic air pollutants are released into the atmosphere caused damage to plants, animals and humans.

c. Climate change may also disturb the migration of birds, animals including humans.

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d. The effect of air pollution is global warming through green house effect, acid rain, ozone layer depletion.

RESETTLEMENT AND REHABILITATION ISSUES

Resettlement:

It is defined as relocation or displacement or force to move out of their land. This process does not focus on their future welfare.

Rehabilitation:

*It involves making the system to work again by allowing the systems to function naturally.
*It involves replacing the lost economic assets, employment, provides safe land for building, restore social services, repair damaged infrastructures etc.

Compensation:

*The displacement of millions of people from their homes to different areas as refugees.
*The affected people are almost vulnerable to losers as their resources and properties but their culture losses are almost ignored and the compensation has not received.
*Also their customary rights are not properly recognized.

Causes of displacement of people:

1. Due to dams

*India is one of the countries in the world leading in construction of big dams. In the last 50 years more than 20 million people have been directly or indirectly affected by these dams.

Eg.

a. Hirakud dam has replaced more than 20000 people residing in about 250 villages.

b. Bhakra Nangaldam was constructed during 1950's and till now it has not been possible to rehabilitate even half of the displaced persons.

2. Due to mining:

• Mining is another development activity, which causes displacement of the native people.

• Several thousands of hectares of land area is covered in mining operation and the native people are displaced.

Eg. Jharia coal fields

This coal fields have been posing to the local residents due to under ground fires. The people of Jharia are being asked to vacate the area, but till now there is no alternative land and rehabilitation package prepared.

3. Due to creation of national park:

• *When a forest area is covered by a National Park it is a welcome step for conservation of the natural resources.

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• A major portion of the forest is declared as covered area, where the entry of local dwellers or tribal's is prohibited.

• When these villagers are deprived of their ancestral right or access to the forest, they usually retaliate by starting destructive activities.

Eg. The Wayanad Wild life sanctuary in Kerala has caused displacement of 53,472 tribal families.

Rehabilitation issues or Effects:

The major issues are as follows:

a. Tribal's are usually the most affected amongst the displaced who are already poor. Displacement further increases their poverty due to loss of land, home, jobs, loss of access to common property assets, increased morbidity and mortality and social isolation.

b. The tribal's are not familiar with the market politics and alienated in the modern economic set up.

c. Break up of families is an important social issue arising due to displacement in which the women are the worst affected and they are not even given cash or land compensation.

d. Loss of identity and loss of the intimate link between the people and the environment is one of the biggest losses.

e. Marriages, social and cultural functions, their folk songs, dances and activities vanish with their displacement.

Resettlement and Rehabilitation programmes and solutions:

a. Planning and identification of the population that is to be affected and resettled.

b. The extent of damage and suffering that the proposed project would cause should be studied and ascertained before starting the project.

c. The people should be rehabilitated on minimum dislocation basis by choosing adjacent areas.

d. Community formation and economic development.

e. The extent of rehabilitation should meet the ends of social justice and balance development.

Environmental ethics

Refers to the issues, principles and guidelines relating to human interactions with their environment.

ENVIRONMENTAL PROBLEMS:

a. Population growth and urbanization.

b. Deforestation and forest fire.

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c. Discharge of effluent from industries.

d. Water scarcity due to inadequate rainfall.

e. Land degradation and soil erosion.

f. Over exploitation of natural resources.

Solutions to Environmental problems:

1. Over exploitation of biodiversity and resources must be reduced.

2. Reduction, reduce and reuse of waste products and energy resources.

3. Pollution free disposal of hazardous waste materials.

4. Any environmental impacts of human activities must be assessed by efficient ecologist.

5. Science and technology used to changing life from unbalanced to balanced state.

6. Sustainable development is essential on conservation of resources.

7. Reduce population growth and increase the economic growth of our country.

Ethical guidelines:

1. We should not harm any natural entity that has an intrinsic worth.

2. We should not try to control, modify, manage or interfere with the functioning ecosystem.

3. We should protect the safe, clean and pollution less environment for the future generations.

4. We should utilize the natural resources are in moderate amounts

WASTE LAND RECLAMATION:

Introduction:
Waste land:- The land which is not in use – unproductive , unfit for cultivation another economic uses.

Types of waste land:

It can be divided into two types:

1. Uncultivable Land
2. Cultivable Land

1. Uncultivable Land
These lands are not suitable for cultivation, grazing, settlements and infrastructure development.

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Examples
Barren lands, hill slopes, stony or gully land, deserts, etc.

2. Cultivable Land
These lands are used for cultivation, grazing and other agricultural purposes.
Examples
Degraded forest lands, water logged lans, saline lands, guilled lands, etc.

Causes for waste land formation:

1. Soil Erosion, Deforestation, Water logging, Salinity
2. Excessive use of pesticides
3. Construction of dams
4. Over-exploitation of natural resources
5. Sewage and industrial wastes
6. Mining
7. Growing demands for fuel, fodder wood and food causes degradation and loss of soil productivity.

Objectives of waste land reclamation

1. To improve the physical structure and quality of the soil
2. To prevent soil erosion
3. To avoid over – exploitation of natural resources
4. To conserve the biological resources

Methods of Waste Land reclamation:

1. Land development and Leaching:
For reclamation of salt affected soil , it is necessary to remove the salts, which is usually achieved by leaching. It can be done by applying excess amount of water. The salt affected field is bunded in small plots and leaching is done. In continuous leaching, 0.5 to 1.0 cm water is required to remove 90% of soluble salts.

2. Drainage
This is requires for water logged soil reclamation where excess water is removed by artificial drainage.

3. Irrigation practices
Surface irrigation with precise land leveling, smoothening and efficient hydraulic design help to reduce water logging and salinity. Thin and frequent irrigation have been found to be more useful for better crop yield.

4. Gypsum amendment
Amendment of soldic soils with gypsum is recommended for reducing soil solidity as calcium of gypsum replaces sodium from the exchangeable sites.

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5. Green- manures, fertilizers and bio fertilizers

Application of farm yard manure or nitrogen fertilizers has been found to improve saline soils. Blue green algae have been found to be quite promising as bio fertilizers for improving salt affected soils.

6. Social forestry Programme

These programmes mostly involve strip plantation on road, rail and canal sides, rehabilitation of degraded forest lands from forestry, waste land forest development etc.

ENVIRONMENTAL LEGISLATION AND LAW

The "Environmental Protection Act" was established in the year 1980 for the production and improvement of environment and for the prevention, control and abatement of environmental pollution.

Objectives

1. Protection and improvement of environment(air, water and land)

2. Prevention of hazards to all living creatures (humans, plants and animals).

3. Maintenance of harmonious relationship between human beings and their environment.

Important protection Act

1. The Water (Prevention and control of Pollution) Act 1974.
2. The Air (Prevention and Control of pollution) Act, 1981.
3. Wild life protection Act, 1972.
4. The Forest (conservation) Act, 1986.
5. The Environment (protection) Act, 1986.

AIR (PREVENTION AND CONTROL OF POLLUTION) ACT

It established in the year 1981.

The objectives of the acts are:

i. Prevention and control of air pollution.

ii. Maintaining the quality of air.

iii. Establishment of Board for the prevention and control of air pollution.

Following are powers and functions of boards.

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1. Power to declare air pollution control area.

2. Power to establish standards for emission of air pollutants from automobiles.

3. Power to restrict use of industrial plants.

4. Power of entry and inspection.

5. Power to take samples.

6. Penalties for violations of the provisions of the act.

WATER (PREVENTION AND CONTROL OF POLLUTION) ACT

It was established in the year 1974.

The main objectives are:

i. Prevention and control of water pollution.

ii. Maintaining and restoring wholesomeness of water.

iii. Establishment of boards of the prevention and control of water pollution.

Powers of the State Government are:

a. Power to obtain information.

b. Power to take samples.

c. Power of prohibition on disposal of polluting matter into a stream or well.

d. Consent of State Board.

e. Penalties for violation of the provision of the act.

Functions of Central Board under section 165-4

1. To promote cleanliness of streams and wells in different areas of the State.
2. To advise the Central Government on matters concerning the prevention and control of water pollution.
3. To produce Technical assistants and guidance to the State Board to carry out research in prevention and control of water pollution.
4. To organize training of people engaged in pollution control.
5. To lay down standards for stream or wells.
6. To prepare manuals, codes or guides for treatment and disposal of sewage and industrial effluents.
7. To establish or organize laboratories for analysis of water sample from any streams, wells or trade effluent.

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The state pollution control board also has similar functions to be executed at state level and governed by the directions of Central Pollution control board.

WILD LFE PROTECTION ACT

It was established in the year 1972. Amended in 1983,1986 and 1991.

The main objectives are:

1. To maintain essential ecological process and life supporting systems in forest.
2. To preserve biodiversity.
3. To ensure a continuous use of species.

Important Features:

1. The act covers the rights and non rights of forest dwellers.
2. It provides restricted grazing in sanctuaries but prohibits in national park.
3. It also prohibits the collection of non timber forest .
4. The rights of forest dwellers recognized by the forest policy of 1988 are taken away by the amended wildlife act of 1991.

FOREST CONSERVATION ACT

It was established in the year 1980. Amended in 1988

The main objectives are:

1. To maintain essential ecological process and life supporting systems in forest.
2. To preserve biodiversity.
3. To ensure a continuous use of species.
4. To protect and conserve forest.
5. To ensure judicious use of forest product.

Important Features:

1. The reserved forest should not be diverted or deserved without the prior permission of the central government.

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2. The land that has been notified or registered or forest land may not be used for non forest purposes.
3. Any illegal non forest activity within a forest area can be immediately stopped under this act.
4. Clearance of forest area for the purpose of re-afforestation is forbidden.
5. Assigning of forest land for lease for the purpose of re-afforestation is forbidden.

ENVIRONMENT (PROTECTION) ACT

This act is enacted for the safe disposal of waste by the industries and obligates industries to submit "Environment Report" for every year. By this act the government has power to close down any firm which violates environmental quality.

The main aim of this act is:

• To provide protection and improvement of environment.

• To provide for the regulation of discharge of environmental pollutants and handling of hazardous substance.

• To provide for the creation of an authority or authorities which will provided with powers to protect environment.

• To provide for speedy response in the event of accidents threatening environment and deterrent punishment to those who endanger human environment, safety and health.

Important Features of Environment Act.

1. The act further empowers the Government to lay down procedures and safeguards for the prevention of accidents which causes pollution and remedial measures if an accident occurs.
2. The government authority to close or prohibit or regulate any industry or its operation, if violation of provisions of act occurs.
3. The penal section of the act contains more stringent penalties. Any person who fails to comply this act shall be punishable with imprisonment up to 5 years and fine up to 1 lakh. If violation continues fine of Rs. 5000 per day.
4. The act fixes the liability of the offence punishable under act on the person who is directly in charge.
5. The act empowers the officer of central government to inspect the site or the plant or the machinery for preventing pollution and to collect samples of air , water , soil or other material from any factory or its premises for testing.

ISSUES INVOLVED IN ENFORCEMENT OF ENVIRONMENTAL LEGISLATION

Following are the issues:

• Even in developed countries, subsidized and mandated pollution control equipment has often been ineffective.

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•Subsidized charges for energy water, pesticides and fertilizer contribute to pollution problems.

• Abatement will be cheap if polluters face an emission tax, because only polluters with low abatement cost will choose to reduce emissions, while those with higher costs will prefer to pay the charge.

• In addition, there are some “indirect instruments”- those that are not directly related to emissions but create pollution unintentionally. Public finance policies, through their impact on relative prices, will often have a impact on pollution.

• In the real world, monitoring each pollution is often costly or impossible, and thus it might be more effective to use selective taxes or regulations to stimulate pollution control indirectly.

• Most regulatory agencies lack the personnel and other resources to inspect and monitor all emission controls within their jurisdictions.

PUBLIC AWARENESS:

Awareness regarding the state of environment is a must for each and every person living on this plant. Twenty years before, the term ecology and environment is new to the people.

Mass media used for environmental awareness:

1. Radio:
Most communication media to the public is the radio talk.It has the advantages of quick and easy dissemination.

2. Television and Cable network:
Now days all the TV sets are connected with cable network, hence, the government can insist all the network channels to show cartoons or documentaries on environment aspects supplied by the relevant government agencies.

3. Cinema:
The film finance corporation and the government should support and encourage production of these types of films.

4. Newspaper:
The conclusions, recommendations and written articles of environmental related seminars/conferences should be published in the newspaper and periodicals.

5. Services of voluntary organizations:
The services of the voluntary bodies like rotary club, Rotract club, NSS, NCC and for spreading the environmental studies.

6. Environmental awareness in schools & colleges:

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The environmental aspects should be taught in the schools and colleges to create environmental awareness.

7. Mobile Exhibition Awareness centre:
Exhibits mounted on wheels should be continuously and periodically tour around the rural areas.

8. Environmental Functions:

In order to rouse environmental consciousness amongst the people, every village/town should be entrusted with the task of organizing “keep the village / city clean week”.

9. Leader’s appeal:
Political and community leaders as well as popular social reformers can make an appeal to the public about the urgency of environmental protection. This appeal should be communicated to the people properly by means of radio, television, paper, notices, etc.

10. Communicators:
To create environmental awareness, the announcement through vehicles may be arranged in all public places. The announcement regarding environmental aspects should be simple and attractive.

11. Mass tree plantation programme are also carried out through many government functions to encourage a forestation activities

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