

Social Issues and the Environment (UNIT- 4)

*** From unsustainable to sustainable development:**

Sustainable development definition:

Meeting the needs of the present, without compromising the ability of future generations, to meet their own needs.

True sustainable development

Optimum use of natural resources with high degree of reusability, minimum wastage, least generation of toxic by products and maximum productivity.

Dimensions of sustainable development

Multi dimensional concept – derived from interactions between society, economy and environment.

Aspects of sustainable development

i. Inter-generational equity ii. Intra-generational equity

Approaches for sustainable development

- 1) Developing appropriate technology - locally adaptable, eco-friendly, resource efficient and culturally suitable.
- 2) Reduce, reuse, recycle [3R] approach – reduces waste generation and pollution
- 3) Providing environmental education and awareness – changing attitude of the people
- 4) Consumption of renewable resources – attain sustainability
- 5) Conservation of non renewable resources – conserved by recycling and reusing
- 6) Population control

*** WATER CONSERVATION:**

Definition: The process of saving water for future utilization

Water conservation refers to the preservation, control and development of water resources, both surface and groundwater, and prevention of pollution.

*** Rain water harvesting**

The storage of rain water for future use is called rain water harvesting.

The rain water harvesting is carried out in two main methods.

In one method, the rain water is directly collected on vessels and tanks and is used for drinking, cooking, bathing, etc. The water collected and stored can be used for months.

In the second method, the rain water is allowed to percolate into the soil by constructing percolation pits. It increases the underground water table.

Need for rain water harvesting (Use of rain water harvesting):

1. To provide water for domestic purposes.
2. To reduce water scarcity.
3. To increase water resources.
4. To increase water table.
5. To increase the quality of water
6. To reduce intrusion of sea water.
7. To reduce floods.

Methods of rain water harvesting:

There are many methods of rain water harvesting:

1. Collection in ponds
2. Collection in vessels
3. Rain water harvesting in tanks
4. Rain water harvesting in open place
5. Percolation pond
6. Percolation pit (Absorption pit)
7. Percolation well

1. Collection in ponds:

Rain water is harvested in surface water bodies like ponds, lakes, irrigation tanks, temple tanks etc. It is a traditional method.

2. Collection in vessels:

The rain water falling on the sloping roofs of houses fall down along the edge of the roof. This is collected in vessels.

3. Rain water harvesting in tanks:

The rain water collected on flat concrete roof is diverted through a pipe into a cement tank constructed near the house or under the house.

The water is passed through a filter. The filter is made up of a layer of 2'' stones, a net, sand and charcoal.

In this method, the water can be stored in a cement tank or well or a bore well.

4. Rain water harvesting in open place:

In the open places, open polythene bags or asbestos sheets are arranged in a slanting manner.

The rain water, falling on this, is collected into vessels or tanks.

5. Percolation pond:

The rain water falling in the elevated areas is collected in small ponds by constructing dykes. This water percolates through the soil and reach the underground water table. This helps to raise the water table.

6. Percolation well:

Rain water from the terrace is diverted into an open well using PVC pipes through a filter chamber.

7. Percolation pit:

A pit of 1 × 1 meter is made on the ground by the side of the house. It is filled with 2'' stones and sand. The rain water falling on the roof is diverted into the pit through PVC Pipes.

The rain water percolates in to the ground and increases the water table.

*** Environmental ethics**

Environmental ethics is the scientific looking of various issues related to the rights of individuals on the environment.

It is the moral relationship of human beings with the environment. It is concerned with the do's and dont's of the human beings to the environment.

It deals with the ecological rights of all creatures present today as well as those which will come next to live on the earth. Ethical standards are necessary for a long term conservation and maintenance of nature and its resources.

Environmental ethics is maintained by the following methods.

1. Equitable utilization of natural resources.
2. Equity among the Northern and Southern countries.
3. Equity among people of rural and urban areas.
4. Equity for males and females.
5. Conservation of resources for future generations.
6. Environmental rights of animals.
7. Environmental education.
8. Conservation of traditional value systems.
9. Use of ecofriendly items.
10. Prevention of hunting and poaching.
11. Regulation of felling of trees.
12. Respecting animals and plants.

*** Green house effect**

Green house effect is the increased warming of the earth caused by the raise in green house gases of the air.

It is the case of air pollution.

In green house effect, the temperature of the earth increases causing global warming.

Green house is a glass house, where green plants are reared. In a glass house the temperature will be slightly higher than that of the outside.

The glass allows the sunlight to pass into the glass house. The sunlight heats the floor of the green house and the floor reflects infrared radiation.

The glass does not allow the infrared radiation to go out. A part of the radiation is absorbed by the glass and another part is reflected back into the green house. Hence the glass house gets heated.

Certain gases such as CO₂, methane, nitrous oxide, chloro fluoro carbon, water vapour, etc. function as glasses in a glass house. These gases are called green house gases. They form a layer of about 20 km above the earth's surface.

The green house gases allow sunlight to pass through them. The sunlight heats the earth and the earth reflects infrared radiation. The green house gases reflect the infrared radiation back to earth. This process warms up the earth.

The warming increases proportionally to the increase in the concentration of green house gases.

*** Green house gases**

The gases responsible for the warming up of the earth are called green house gases.

The following are the important green house gases.

1. Carbon dioxide
2. Methane
3. Chloro fluoro carbon
4. Nitrous oxide
5. Water vapour
6. Ozone
7. Sulphur dioxide, etc.

Green house gases are produced by automobiles, industries, agricultural products, dairy products etc.

Among the green house gases CO_2 has the most harmful effect. It is produced by burning fossil fuels, such as coal, petroleum, etc. In industries, thermal power plants, automobiles, railways, air crafts, etc. The plants and animals release CO_2 by respiration. Burning of firewood and forest fire also release CO_2 .

The coolants used in refrigerators and air conditioners release chloro fluoro carbons.

Methane is produced by bacteria living in the gut of cattle. It is also produced by the decomposition of dead bodies of plants and animals.

The green house gases form a layer about 20 km above the surface of the earth. They allow the sunlight to pass through. They reflect back, the infrared radiation (heat rays).

The green house gases prevent the escape of the infrared rays. They reflect back a portion of the infrared rays to the earth and absorb the remaining portion. This helps the earth to remain warm at about 15°C .

The green house gases bring about the effects similar to that in a glass house. Hence they are called green house gases.

If the green house gases are not there, the earth will become very cold and the water becomes ice. Hence the green house gases are necessary and they are the blessing to the earth.

When the green house gases exceed the optimum amount, the earth becomes over heated and it leads to undesirable and destructive changes on the earth.

*** Global warming**

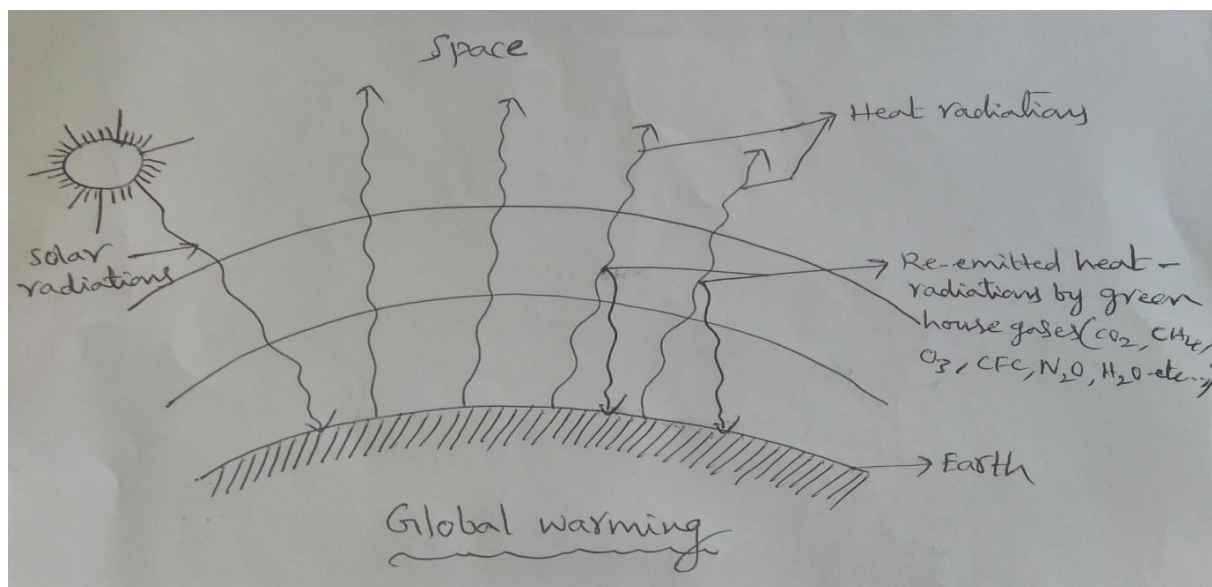
The overheating of the earth by the increased amount of green house gases is called global warming.

The earth is kept warm at an average of 15°C by the green house gases, such as CO_2 , methane, CFC, nitrous oxide, water vapour, ozone, SO_2 , etc.

The green house gases form a layer about 20 km above earth. They trap infrared radiations of the earth and keep the earth warm at an average temperature of 15°C .

The optimum amount of green house gases keeps the earth warm at the optimum level.

But now the industries, automobiles, aircrafts, railways, forest fire and dairy farms release high amount of green house gases. The increased green house gases, reflect back more portion of the infrared rays to the earth and absorb the remaining portion. This leads to increase in the global temperature.



In the last century there was an increase at 0.6°C at the global level. It is estimated that the raising temperature will be 0.5°C for every 10 years. It is estimated that in 2050, the global temperature will increase by 4°C .

Harmful effects of global warming (Harmful effects of green house effect)

Green house effect increases global temperature. The increase in global temperature or global warming produces the following ill effects.

1. The polar ice caps will melt causing an increase in sea level. When the sea level increases, low lying coastal towns and cities will be swallowed by the sea.
2. The drastic changes in the global climate.
3. Melting of ice leads to floods in the river.
4. The rain fall will be affected.
5. Food production will be decreased.
6. The ozone umbrella will be depleted.
7. High temperature may be harmful to the life of man.
8. The agriculture and forestry will be affected.
9. Water resources are also affected
10. It shows effect on human health.
11. It shows effect on both terrestrial and aquatic ecosystems.

Control measures to check global warming:

1. CO₂ emissions can be cut by reducing the use of fossil fuels.
2. Implement energy conservation measures.
3. Utilize renewable resources such as wind, solar, hydro power, etc.
4. Plant more trees
5. Shift from coal to natural gas
6. Adopt sustainable agriculture.
7. Stabilize population growth.
8. Efficiently remove CO₂ from smoke stacks.
9. Remove atmospheric CO₂ by utilizing photosynthetic algae.
10. Public awareness regarding reduction of global warming.
11. Implement strict laws to regulate human activities to control global warming.

*** Acid rain**

Normal rain water is always slightly acidic because of the fact that CO_2 present in the atmosphere gets dissolved in it. Because of the presence of SO_2 and NO_2 gases as pollutants in the atmosphere, the pH of the rain water is further lowered. This type of precipitation of water is called acid rain or acid deposition. (Presence of excess of acid in the rain water is called acid rain. The pH of acid rain is lower than 5.6)

Formation of acid rain:

Acid rain means the presence of excessive acids in the rain water. The thermal power plants, industries and vehicles release nitrogen oxide and sulphur dioxide into atmosphere due to burning of coal and oil. When these gases react with water vapour in the atmosphere, they form acids and descend on to the earth as acid rain through rain water.

Effects of acid rain:

The following are the effects of the acid rain.

1. The acid rain collect in ponds and the ponds becomes acidic. The acidic water kills the fishes in pond. Thus the ponds become fish grave yards. In Sweden there are about 15,000 fishless lakes.
2. The acid rain falling on the earth, leach aluminium. The dissolved aluminium is washed into the pond. In the pond, the aluminium clogs the gills, prevents respiration and caused death of fishes.
3. The bacteria and green algae are killed by acidified water.
4. Acid rain damaged the green leaves and hence the deforests.
5. The acid rain leached the soil nutrients such as calcium, potassium, iron, magnesium, etc. They are washed away from the soil. Hence the plant growth is affected.
6. Photosynthesis is reduced.
7. The yield in crop plants is reduced due to acidification.
8. The activity of nitrogen fixing bacteria present in the root nodules is inhibited and hence the fertility of the soil is reduced.
9. Pine trees are weakened due to acidity.
10. Acid rain damages buildings.
11. Acid rain corrodes monuments, statues, etc.
12. Acid rain causes corrosion of British Parliament Building.
13. Acid rain causes stone leprosy in Taj mahal.

14. Acid rain contaminates potable water and causes abnormality in the nervous system, respiratory system and digestive system.

Control measures of acid rain:

The following are the control measures of acid rain.

1. Improvement in technologies and switching to clear combustion technologies are highly essential in order to monitor the air pollution.
2. Emissions of SO₂ and NO₂ from industries and power plants should be reduced by using pollution control technologies.
3. Coal with low sulphur content is desirable to use in thermal plants. Replacement of coal by natural gas would also reduce the problem.
4. Liming of lakes and soils should be done to correct the adverse effects of acid rain.
5. The real use of cut back on the use of fossil fuels by reducing our dependency on motor vehicles and unnecessary utility of motor vehicles.
6. Prefer to use renewable energy resources for heating and energy purpose
7. Plant more trees to pollutant levels in air.
8. Implement strict laws to regularise human activities to control acid rain.
9. Public awareness regarding reduction of acid rain.

*** Ozone layer depletion**

Ozone is a gas found throughout the atmosphere, but most highly concentrated in the stratosphere between 10 to 50 km above sea level, where it is known as ozone layer.

Importance of ozone layer:

Without the ozone layer, life on the earth's surface would not be possible. It protects us from the damaging ultraviolet radiation of the sun. In particular it filters out UV-B radiations.

Causes for ozone layer depletion:

In 1970, it was found that the ozone layer was attacked by chlorofluoro carbons (CFCs) which are released in to the atmosphere by refrigeration units, air conditioning systems, aerosol sprays and cleaning solvents. chlorofluoro carbons release chlorine which breaks ozone into oxygen.

Each chlorine atom is capable of attacking several ozone molecules. So that a long chain process is involved. A 1% loss of ozone results in a 2% increase in UV rays reaching the earth's surface.

Ozone depleting chemicals:

The ozone depleting chemicals essentially consists of chlorine or bromine atoms which are extremely reactive while they are in the free state. The following gases are accumulated in the atmosphere and are found to be instruments in ozone depletion.

1) Chloro Fluoro Carbon (CFC)

Sources: Refrigerants (Freon) in refrigerators, propellant in aerosol spray cans, blowing agent, foam plastic blowing agent.

2) Hydro Chloro Fluoro Carbon (CFC)

Sources: Refrigerants, blowing agents

3) Bromo Fluoro Carbons (BFC)

Sources: Fire extinguishers

4) Other chemicals

i) Certain halogen compounds are potential ozone destroyers upto ten times more powerful than the CFCs.

ii) Sometimes the atmospheric sulphur dioxide is converted into sulphuric acid which greatly increases the rate of ozone depletion.

Effects of ozone layer depletion:

As the ozone layer gets deteriorated the harmful UV rays will reach the ground and cause various adverse effects.

1) Effect on human health:

a) The UV-rays damage the genetic material in the skin cells which cause skin cancer.

b) For fair skinned people life long exposure to the high level radiation of UV rays increases the risk of non melanoma skin cancer.

c) Prolonged human exposure to UV-rays may lead to slow blindness called actinic keratitis. Enhanced level of UV-rays could lead to more people suffering from cataracts.

d) Human exposure to UV-rays can suppress the immune responses in humans and animals. It also reduces human resistivity leading to a number of diseases such as cancer, allergies and some other infectious diseases.

2) Effect on Aquatic systems:

a) UV-rays directly affect the aquatic forms such as phytoplankton, fish, larval crabs.

b) The phytoplankton consumes large amounts of CO₂.

Decrease in population of phytoplankton could have more amount of CO₂ in the atmosphere which contributes to the global warming.

3) Effect on materials:

Degradation of paints, plastics and other polymeric material will result in economic loss due to effects of UV radiation.

4) Effect on climate:

The ozone depleting chemicals can contribute to the global warming i.e., increasing the average temperature of the earth's surface.

Control measures:

- 1) Replacing CFCs by other materials which are less damaging.
- 2) Use of gases such as methyl bromide which is a crop fumigant should be controlled.
- 3) Manufacturing and using of ozone depleting chemicals should be stopped.
- 4) Implement strict laws to regulate human activities.
- 5) Public awareness regarding the ozone depleting gases.

*** Nuclear Accidents and Holocaust:**

Nuclear accidents can occur at any stage of the nuclear fuel cycle and such accidents are viewed more seriously because the effects of reactor accidents are more drastic. Although the estimated chance of disastrous nuclear accident is very low, but the probability of an accident occurring increases with every reactor put into operation anywhere in the world. Till date following nuclear accidents are most well-known.

1) Three Mile Island Accident: In 1979, on March 28, the most dramatic incident occurred in the U.S. at the Three Mile Island nuclear power plant (Pennsylvania). Radioisotopes as well as intense radiation was released into the environment due to the malfunctioning within one of the nuclear facilities in the nuclear plant. However, the plume emitted into the atmosphere has been estimated quite low for causing toxic effect.

2) The Chernobyl Nuclear Accident: This accident occurred at 28th April, 1986 and resulted in wide spread contamination by radioactive substances. After the incident there were 237 confirmed cases of chronic radiation illness and also 37 deaths.

3) In nuclear holocaust in Japan, 1945, two nuclear bombs were dropped on Hiroshima and Nagasaki cities of Japan. one fission bomb was dropped on Hiroshima. This holocaust (large scale destruction of human lines by fire) killed about 1,00,000 people and destroyed the city. Even after more than 50 years the impacts of the nuclear fallout are still visible.

But the most significant effect of radioactivity is that it causes long range effects affecting the future of man and hence future of our civilization

*** Waste land reclamation**

The conversion of wasteland into land suitable for use of habitation or cultivation is called waste land reclamation.

Waste land. The land which is not in use is called waste land . Waste land is unproductive, unfit for cultivation Grazing etc. 20% of the geographical area of India is waste land.

Types of waste land: 1.Uncultivable waste land .2. Cultivable waste land.

1. Uncultivable waste land: These lands can not be brought under cultivation.

Ex. Barren rocky areas, hilly slopes, sandy deserts, etc.

2. Cultivable waste land: These are cultivable but become waste lands because not cultivated for more than 5 years. Ex Degraded forest land, Gullied lands, water logged and marsh lands , saline lands, etc.

Causes for wasteland formation:

The following are the causes for waste land formation.

1. Over-exploitation of natural resources.
2. By the industrial and sewage wastes.
3. Due to soil erosion, over grazing, deforestation, water logging, salinity etc.
4. Mining activities destroy the forest and cultivable land.
5. The increasing demand for fire-wood and excessive use of pesticides.
6. Developmental activities like construction of dams and power projects have caused considerable damage to land due to water logging.
7. Growing demand for fuel, fodder, wood and food causes degradation and loss of soil productivity.

Objects of waste land reclamation:

1. To prevent soil erosion, flooding and landslides.
2. To avoid over exploitation of natural resources.
3. To improve the physical structure and quality of the soil.
4. To conserve the biological resources and natural ecosystem.
5. To improve the availability of good quality of water for agricultural purposes and industrial operations.

Methods waste land reclamation:

Drainage: Excess water is removed by artificial drainage. This is for water logged soil reclamation.

Leaching: Leaching is a process of removal of salt from the salt affected soil by applying excess amount of water. Leaching is done by dividing the field into small plots. In continuous leaching 0.5 to 1.0 cm water is required to remove 90% of soluble salts.

Irrigation practices: High frequency irrigation with controlled amount of water helps to maintain better availability of water in the land.

Green-manure and biofertilizers: Application of green manure and bio fertilisers improves saline soil.

Application of gypsum: Soil sodality can be reduced with gypsum. Ca of gypsum replaces sodium from the exchangeable sites. This converts clay back into calcium clay.

Social Forestry programmes: These programmes involve strip plantation on road, canal sides, degraded Forest land etc.

Afforestation programmes: These programmes also help to reclaim the waste lands.

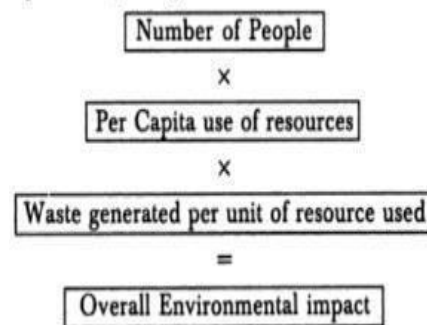
*** Consumerism and waste products:**

Consumerism refers to the consumption of resources by the people. While early human societies used to consume much less resources, with the dawn of industrial era, consumerism has shown an exponential rise it has been related, both to the increase in the population size as well as increases in our demands due to change in life-style. Earlier we used to live a much simpler life and used to have fewer wants. In the modern society our needs have multiplied and so consumerism of resources has also multiplied.

Our population was less than 1 billion for thousands of years ever since we evolved on this earth. Today we have crossed the six billion mark and are likely to reach 11 billion by 2045 as per World Bank estimates. Let us see how these changing population trends influence consumerism of natural resources and generation of wastes. Two types of conditions of population and consumerism exist. These are,

- i) ***People over-population:*** It occurs when there are more people than available supplies of food, water and other important resources in the area. Excessive population pressure causes degradation of the limited resources and there is absolute poverty, undernourishment and premature death.
This occurs in less developed countries (LDCs). Here due to large number of people, adequate resources are not available for all. So there is less per capita consumption although overall consumption is high.
- ii) ***Consumption over-population:*** Consumption occurs in the more developed countries (MDCs). Here population size is smaller while resources are in

abundance and due to luxurious life style per captia consumption of resources is very high. More the consumption of resources more is the waste generation and greater is the degradation of the environment This cocept can be explained by using the model of Paul Ehlich and John Hodlren (1972)



*** Air (Prevention and control of pollution) act – 1981**

The Parliament enacted the Air (Prevention and Control of Pollution) Act, 1981 to arrest the deterioration in the air quality. The notable points from this act are as follows:

- 1) The central board may lay down the standards for the quality of air.
- 2) The central board coordinates and settle disputes between state boards, in addition to providing technical assistance and guidance to state boards.
- 3) The state boards are empowered to lay down the standards for emissions of air pollutants from industrial units or automobiles or other sources.
- 4) The state boards are to collect and disseminate information related to air pollution and also to function as inspectorates of air pollution.
- 5) The state boards are to examine the manufacturing processes and the control of equipment to verify whether they meet the standards prescribed.
- 6) The directions of the central board are mandatory on state boards.
- 7) The operation of an industrial unit is prohibited in a heavily polluted areas without consent of the central board.
- 8) Violation of law is punishable with imprisonment for a term, which may extend to three months or fine up to rupees ten thousand or both.
- 9) The state board can advise the state government to declare certain heavily polluted areas as pollution control areas and can advise to avoid the burning of waste products which can cause air pollution in such areas.

*** Water (Prevention and control of pollution) act – 1974**

The Water (Prevention and Control of Pollution) Act was enacted (1974) for prevention and control of water pollution and maintaining or restoring of wholesomeness of water. The Central and State Pollution Control Boards have been constituted under section 3 and 4 of the water Act respectively.

Obligation on the part of the industries and local bodies are:

- a) To obtain prior consent to establish and operate industry for new discharge of domestic sewage or trade effluent under section 25 of the Act.
- b) Board within four months will either refuse or grant consent.

Function of Central board:

- a) Subject to the provision of this act, the main function of the Central Board shall be to promote cleanliness of streams and wells in different areas of the country.
- b) Advise the central government on any matter concerning the prevention and control of water pollution.
- c) Co-ordinate the activities of the state boards and resolve dispute among them.
- d) Provide technical assistance and guidance to the state boards, carry out and sponsor investigations and research relating to problems of water pollution and prevention.
- e) The board may establish or recognize a laboratory or laboratories to enable the board to perform its function under this section efficiently, including the analysis of the samples of water from any stream or well or of sample of any sewage or trade effluents.

Power of State board:

- a) To obtain information under section 20.
- b) Carry out any related work under section 30.
- c) Collect and analyze sample of streams/wells or trade effluent.
- d) To give direction for closure/prohibition or regulation of industries.
- e) Enter and inspect any place, examine any plants/records etc. and seize if necessary.

*** Wild life protection act – 1972**

The Wildlife Act was passed in 1972 to protect the wildlife and their habitats. The habitat destruction due to agriculture, industries, urbanisation and other human activities had led to the erosion of the country's wildlife.

The notable points from this act are as follows:

1. It defines the wildlife related terminology.
2. Enactment of an All India Wildlife Protection Act (1972).
3. It provides for the appointment of wildlife advisory Board, Wildlife warden, their powers, duties etc.
4. Becoming a party to the Convention of International Trade in Endangered Species of Fauna and Flora (CITES, 1976).
5. Launching a “national component of UNESCO’s ‘Man and Biosphere Programme’ (1971).
6. Under the Act, comprehensive listing of endangered wildlife species was done for the first time and prohibition of hunting of the endangered species was mentioned.
7. Protection to some endangered plants.
8. The Act provides for setting up of National Parks, Wildlife Sanctuaries etc.
9. The Act provides for the constitution of Central Zoo Authority.
10. There is provision for trade and commerce in some wildlife species with license for sale, possession, transfer etc.
11. The act imposes a ban on the trade or commerce in scheduled animals.
12. It provides for legal powers to officers and punishment to offenders.

*** Forest conservation act – 1980**

The forest conservation act (1980) covers all types of forests including reserve forests, protected forests or any forested land irrespective of its ownership. The Act has made ample provisions to check deforestation and encourage afforestation of non-forest areas.

The National Forest Policy (1980) prohibits State governments for declaring any portion of forests as non-reserved without approval of Central government. The policy also prohibits State government for allotting any forest land for non-forest purposes.

The amended Act (1988) prohibits lease of forest land to anybody other than the government. It enhances conservation, plantation and increase of forest cover to an average of 30%.

Amended Forest Act, 1992:

1. The Act made provision for allowing some non-forest activities in forests without cutting trees with prior approval of Central government. These activities include setting of transmission lines, seismic surveys, exploration, drilling and hydroelectric projects.

2. Wildlife sanctuaries, National Parks etc. are totally prohibited for any exploration or survey without prior approval of Central government even if no tree felling is involved.

3. Cultivation of tea, coffee, spices, rubber, mulberry for rearing silk worms and cash crops are included under non-forestry activities and are not allowed in reserve forests.

4. Even cultivation of fruit bearing trees, oil yielding plants or medicinal plants in the forest area need to be first approved to maintain the balance in the ecology of the forest.

5. Mining is a non-forestry activity and prior approval of Central government is mandatory.

6. Any proposal sent to Central government for non-forest activity must have a cost-benefit analysis and also Environmental Impact Statement (EIS) of the proposed activity.

7. More stringent penal provisions are made against violators of the Act.

*** Environmental protection act – 1986**

This is a general legislation law in order to rectify the gaps and laps in other acts. This act empowers the central government to fix the standards for quality of air, water, soil and noise and to formulate procedures and safe guards for handling of hazard substance.

Important features of the environmental protection act – 1986

1) The act further empowers the government to lay down procedures and safe guards for the prevention of accidents which cause pollution and remedial measures if an accident occurs.

2) The government has the authority to close or prohibit or regulate any industry or its operation, if the violation of the provisions of the act occurs.

3) The penal sections of the act contain more stringent penalties. Any person who fails to comply or who contravenes any provision of the act shall be punishable with imprisonment for a term extending to five years or be punishable with fine upto rupees one lakh or both.

4) If the violation continues, an additional fine of rupees five thousands per day may be imposed for the entire period of violation of rules.

5) The act fixes the liability of the offence punishable under act on the person who is directly in charge.

Whether he/she is the director or manager or secretary or any other officer,

unless he/she proves that it was committed without his/her knowledge or consent.

6) The act empowers the officers 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.

The environmental protection act is the most comprehensive legislation with powers for the central government to directly act, avoiding many regulatory authorities or agencies.