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Subject: Environmental Studies (CYL-101)

Unit-IV: Social issues and the Environment



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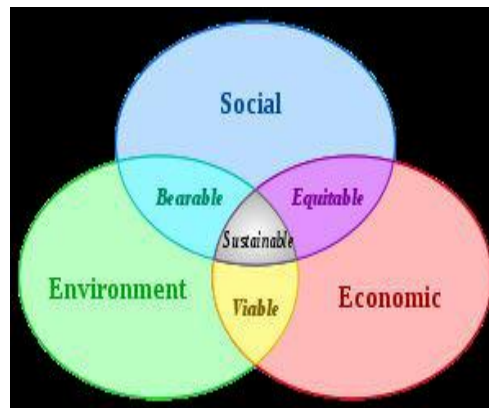
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4.1 From unsustainable to sustainable development

- It is well recognized now that rich nations of the world consume resources, especially non-renewable natural resources like coal and oil at a break-neck pace.
- The consequence of this resource use is the promotion of unfettered consumption and greed which, in turn, has begun to create global energy shortages, pollution, global warming, among other myriad problems.
- It is now recognized that this model of growth and development is unsustainable and must be addressed. The World Commission on Environment and Development defines Sustainable Development as *Development that meets the needs of the present generation without compromising the needs of the future generation to meet their needs.*
- Sustainable development requires that for any activity that brings about economic growth, the corresponding environmental impact must be studied and negative aspects addressed. Especially major projects like large dams, mining industries and major highways should be restrained.
- This, in turn, requires that unfettered consumption by people be checked. Further, Environmental Impact Assessment (EIA) must be conducted on every major public and industrial or commercial project before proceeding.



4.2 Urban problems related to energy

- Urban centers use enormous quantities of energy. In the past, urban housing required relatively smaller amounts of energy than we use at present. Traditional housing in India required very little temperature adjustments as the materials used, such as wood and bricks handled temperature changes better than the current concrete, glass and steel of ultra modern buildings.
- Until the 1950s many urban kitchens were based on fuelwood or charcoal. This was possible and practical when homes had chimneys and kitchens were isolated from the rest of the house. Smoke became a problem once this changed to apartment blocks. Kerosene thus became a popular urban fuel. This changed to electrical energy and increasingly to natural gas by the 1970s in most parts of urban India.
- Urban centers in hot climates need energy for cooling. The early systems of fans changed into air-conditioning, which consumes enormous quantities of energy. New buildings in our country have taken to using large areas covered by glass. While in cold climates this uses the green house effect to trap the warmth of the sun inside, in our hot climate this adds several degrees to the temperature inside. Thus it requires even more energy to run large central air conditioning units. High rise buildings in urban centers also depend on energy to operate lifts and an enormous number of lights.
- Urban transport depends on energy mainly from fossil fuels. Most urban people use their own individual transport rather than public transport systems for a variety of reasons. Urban transport in different cities and even different parts of a city are either inefficient or overcrowded. Thus even middle income groups tend to use their own private vehicles. This means more and more vehicles on the road which leads to traffic congestion, waste of time

for all the commuters, and a great load of particulate matter and carbon monoxide from the exhaust of vehicles. This causes a rise in the number of people having serious respiratory diseases. Thus there is a need to develop a more efficient public transport system and discourage the use of individual vehicles in all our urban areas.

- Each of us as an environmentally conscious individual must reduce our use of energy. An unnecessary light left on carelessly adds to energy use. Imagine the amount of energy wasted by thousands of careless people. If we learned to save electricity, we would begin to have a more sustainable lifestyle.

4.3 Water conservation, rain water harvesting, watershed management

4.3.1 Water conservation

- Conserving water has become a prime environmental concern. Clean water is becoming increasingly scarce globally.
- With deforestation surface runoff increases and the sub soil water table drops as water has no time to seep slowly into the ground once vegetation is cleared. As many areas depend on wells, it has become necessary to go on making deeper and deeper wells. This adds to the cost and further depletes underground stores of water.
- As deforestation and desertification spreads due to extensive changes in land use the once perennial rivers are becoming increasingly seasonal.
- In many areas the small streams run dry soon after the monsoon as the water table drops further and further below the surface. To this is added serious problems caused by rapid surface flow of water during the rains, which leads to extensive floods.
- When we waste water, we do not realize that it is affecting the lives of all of us in so many different ways. Water has to be equitably and fairly distributed so that household use,

agriculture and industry all get a share of the water. Thus water conservation is linked closely with overall human well being.

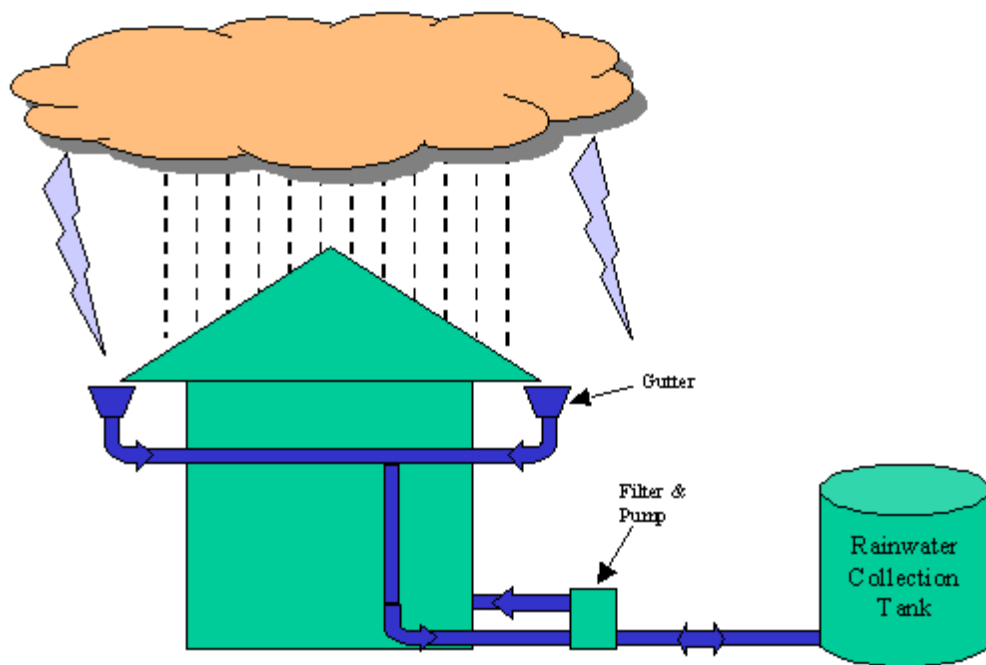
- With all these ill effects of the poorly conceived management of water at the national and local level there is a need to consider a new water policy for the country which will be useful in management of water.
- Saving water in agriculture: Drip irrigation supplies water to plants near its roots through a system of tubes, thus saving water. Small percolation tanks and rainwater harvesting can provide water for agriculture and domestic use. Rainwater collected from rooftops can be stored or used to effectively recharge subsoil aquifers.
- Saving water in urban settings: Urban people waste large amounts of water. Leaking taps and pipes are a major source of loss of water. Canals and pipes carrying water from dams to the consumer lead to nearly 50% loss during transfer. Reducing the demand for water by saving it is more appropriate than trying to meet growing demands.



Ways to save the water at home

4.3.2 Rain water harvesting

- In parts of the rural and urban areas of India, flood water quickly flows to the rivers, which then dry up soon after the rains stop. If this water can be held back, it can seep into the ground and recharge the groundwater supply.
- This has become a very popular method of conserving water especially in the urban areas.
- Rainwater harvesting essentially means collecting rainwater on the roofs of building and storing it underground for later use. Not only does this recharging arrest groundwater depletion, it also raises the declining water table and can help augment water supply.



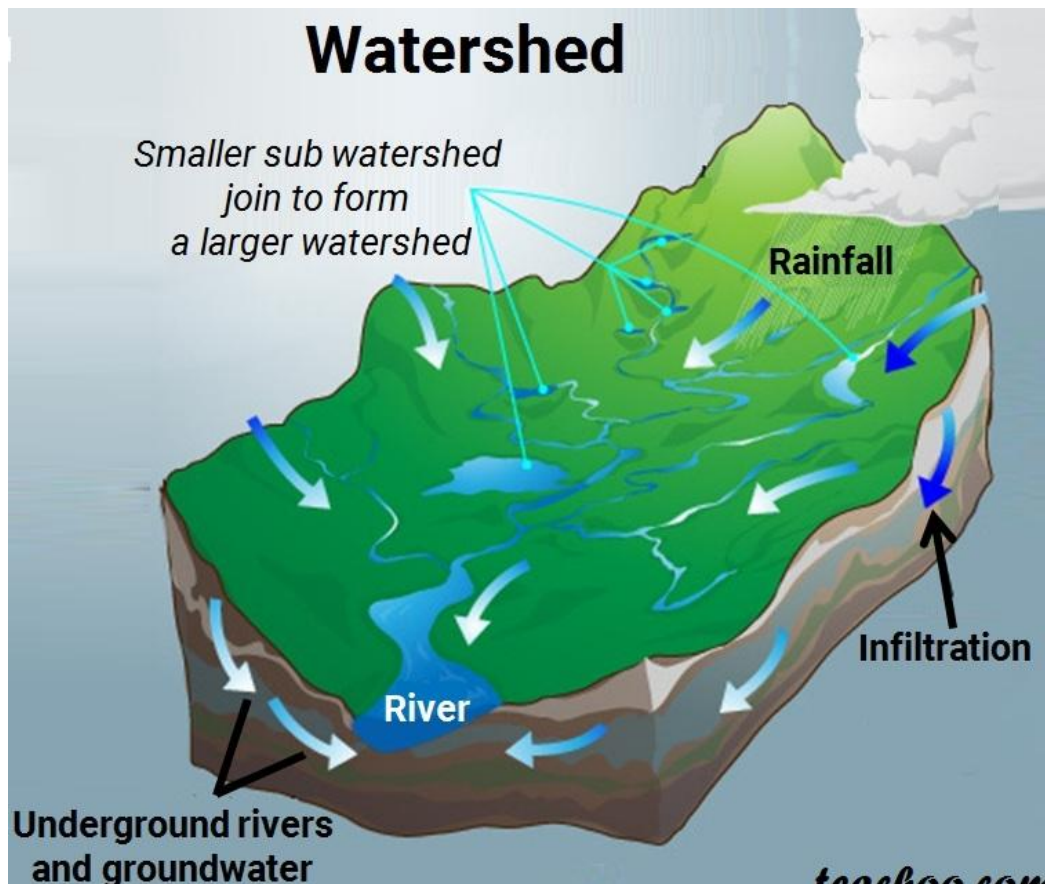
Rainwater Collection Overview

- For rain water harvesting, town planners and civic authority in many cities in India are making rainwater harvesting compulsory in all new structures. No water or sewage connection would be given if a new building did not have provisions for rainwater harvesting.

4.3.3 Watershed management

- **Concept**

- Watershed is a geo hydrological unit or piece of land that drain at a common point.
- A watershed is defined as any spatial area from which rain or irrigation water is collected and drained through a common point.
- The watershed and drainage basin are synonymous term indicating an area surrounded by a ridge line that is drained through a single outlet.
- A watershed is simply the land that water flows across or through on its way to a common stream, river or lake.
- A watershed can be very large (e.g. draining thousands of square miles to a major river or lake or the ocean), or very small, such as a 20-acre watershed that drains to a pond.



- **Objective**

1. To control damaging runoff and degradation and thereby conservation of soil and water.
2. To manage and utilize the runoff water for useful purpose.
3. To protect, conserve the land of watershed for more efficient and sustained production.
4. To protect and enhance the water resource originating in the watershed.
5. To check soil erosion and to reduce the effect of sediment yield on the watershed.
6. To rehabilitate the deteriorating lands.
7. To moderate the floods peaks at downstream areas.
8. To increase infiltration of rainwater.
9. To improve and increase the production of timbers, fodder and wild life resource.
10. To enhance the ground water recharge, wherever applicable.

- **Practices**

- Watershed management involves many techniques.
- The techniques can be summarized as : Grassland development, Gully Plugs, Tree plantation and contour trenching on hill tops and slopes, Contour bunding, Water conservation structures, Lift irrigation schemes, Land leveling etc.
- Public participation and awareness.

4.4 Environmental ethics: issues and possible solutions***4.4.1 Resource consumption patterns and the need for their equitable utilization***

- Environmental ethics deals with issues that are related to how we utilize and distribute resources. Can individuals justifiably use resources so differently that one individual uses resources many times more lavishly than other individuals who have barely enough to survive? In a just world, there has to be a more equitable sharing of resources than we encounter at present.
- The just distribution of resources has global, national and local concerns that we need to address. There are rich and poor nations. There are rich and poor communities in every country. And there are rich and poor families. In this era of modern economic development, the disparity between the haves and have-nots is widening.
- Our human environments in the urban, rural and wilderness sectors, use natural resources that shift from the wilderness (forests, grasslands, wetlands, etc.) to the rural sector, and from to the urban sector. Wealth also shifts in the same direction. This unequal distribution of wealth and access to land and its resources is a serious environmental concern.
- An equitable sharing of resources forms the basis of sustainable development for urban, rural and wilderness dwelling communities is the solution of this problem.

4.4.2 Equity – Disparity in the Northern and Southern countries

- Environmental ethics are concerned with, who owns resources and how they are distributed. This can be looked upon at different levels. At the global level it deals with the great North – South divide between the rich industrialized nations of North America and Europe, as against the needs of developing countries of the South such as in South and Southeast Asia and South America.

- People living in the economically advanced nations use greater amounts of resources and energy per individual and also waste more resources. This is at the cost of poor people who are resource dependant and live in developing nations.
- The economically advanced West has exploited their own natural resources to such an extent that they have exhausted them nearly everywhere. They now buy their resources from resource rich but economically deprived nations at a low cost. This depletes the developing nations of natural resources on which their poor depend for their livelihood.
- Changing this unfair economic practice to a more just and fair way in managing trade would require a new thinking on the part of people who live in the super rich countries.

4.4.3 Urban – rural equity issues

- The common property of rural communities has increasingly been used to supply the needs of the urban sector. Land itself that was once held as a common property resource of villages is being taken over by the urban and industrial sectors as it expands.
- The rural sector not only supplies food, but also a part of the energy needs (mainly fuelwood) to most towns and cities in India, at a pittance. As a result, the commons of the rural sector are being depleted of their resources. Thus while the cities get richer, the rural sector, especially the landless, get poorer.
- The urban rich must appreciate where their resources are derived from and be willing to pay a fair price for using them.

4.4.4 The need for Gender Equity

- All over India, especially in the rural sector, women work on the whole longer hours than men. The life of a woman is enmeshed in an inextricable cycle of poverty. Unless society begins to see that development cannot be planned by the male perspective alone.

- This disparity in the lives of women and men has also led to a lower access to education and health care for girl children.
- This has deep implications for the rate of utilization of natural resources and its conservation. Rural women who are intimately connected to resources, appreciate the value of conserving natural resources more deeply than men. Thus several environmental movements such as Chipko have been more strongly supported by local women folk rather than men.

4.4.5 Preserving resources for future generations

- Can we use up all the resources of the world, leaving nothing for our future generations? This ethical issue must be considered when we use resources unsustainably. If we overuse and misuse resources and energy from fossil fuels, our future generations would find survival much more difficult.
- A critical concern is to preserve species and natural undisturbed ecosystems that are linked with bio resources, which must be protected for the use of future generations. Our generation does not own the world's resources to do whatever we please with them. Just as our ancestors have left resources for us, it is our duty to leave them behind for our future generations.
- These unborn people have a right to these resources. We only hold the world as trustees so that future generations can also survive.
- Our current development strategies have led to environmental resources being overused and misused by our present generation, without a thought for the needs of future unborn generations.

- We need to appreciate that the next generation and those that will come later also have a right to the earth's natural resources. As they are not here today to exercise their rights, it is our generation's responsibility to appreciate the needs of future generations.
- We have no right to destroy their claim to the use of the earth's resources just because of the accident of being born before them. Development strategies have not looked at sustainable levels at which we can use resources so that the rights of future generations are protected.
- We are not given the earth so that we can use up its resources. It is given to us to hold in trust so that future generations are given their just share of the earth's resources.

4.4.6 The rights of animals

- Can man, a single species, use and severely exploit the earth's resources which we share with billions of other plant and animal species? Within our world there are a variety of living beings. The plants and animals that share the earth with us too have a right to live and share our earth's resources and living space.
- We have no right to push a species that has taken millions of years to evolve towards extinction. Not only do wild and domesticated animals have a right to life, but have the right to a dignified existence.
- Every individual, human or animal, that is living has feelings and emotions. Cruelty to animals is a crime that must be regarded seriously and action must be taken against offenders. Animals have a right to a dignified existence, and their life, well-being and liberty must be respected. While dominating over the animal world due to his superior intelligence, man cannot remain unfeeling to the right to life and well being of other species.
- There is a growing awareness of animal rights in our country and cruelty to animals is being increasingly regarded as a criminal offence.

4.4.7 The ethical basis of environment education and awareness

- Perhaps the most important concern is related to creating an ethos that will support a sustainable lifestyle in society. This brings us to the need for environmental education. The Honorary Supreme Court of our country has thus ordered that every young individual at school and college level be exposed to a course on environment.
- It is not to create only an awareness of environmental issues, but also to bring about pro environmental action. Among the variety of tools that can bring home the ethical issues of the environment, no solution is as powerful as real life experiences in nature. Creating a love for nature brings about strong pro environmental action. Our current educational processes at school and college level are being reoriented to bring this about.
- This constitutes a key solution to bring about a new ethic of conserving nature and living sustainable lifestyles.

4.4.8 The conservation ethic and traditional value systems of India

- In ancient Indian traditions people have always valued mountains, rivers, forests, trees and several animals. Thus much of nature was venerated and protected. Patches of forest have been dedicated to a deity in many Indian cultures especially in tribal areas.
- These traditionally protected forest patches depict the true nature of undisturbed vegetation and have a large number of indigenous plant species as their exploitation has been controlled through local sentiments.
- Traditions also held that these species, which were considered as an important aspect of Nature, were the basis of local life support systems and were integral to bringing about a harmonious life. In traditional societies of the past, these examples were all a part of ethical values that protected nature.

4.5 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust**4.5.1 Climate change**

- The average temperature in many regions has been increasing in recent decades. The global average surface temperature has increased by $0.6^{\circ} + 0.2^{\circ}$ C over the last century. Many countries have experienced increases in rainfall, particularly in the countries situated in the mid to high latitudes. In some regions, such as parts of Asia and Africa, the frequency and intensity of droughts have been observed to increase in recent decades.
- All these are signs that the earth is sick. Its climate is changing, making it more difficult for mankind to survive. The earth is losing its ability to balance itself due to the imbalances created by human activities.
- Projections of future climate change are derived from a series of experiments made by computer based global climate models. These are worked out on estimates of aspects such as future population growth and energy use. Climatologists of the Intergovernmental Panel on Climate Change (IPCC) have reviewed the results of several experiments in order to estimate changes in climate in the course of this century. These studies have shown that in the near future, the global mean surface temperature will rise by 1.4° to 5.8° C.
- Warming will be greatest over land areas, and at high latitudes. The projected rate of warming is greater than has occurred in the last 10,000 years. The frequency of weather extremes is likely to increase leading to floods or drought. There will be fewer cold spells but more heat waves.
- Global mean sea level is projected to rise by 9 to 88 cm by the year 2100. More than half of the world's population now lives within 60km of the sea. They are likely to be seriously

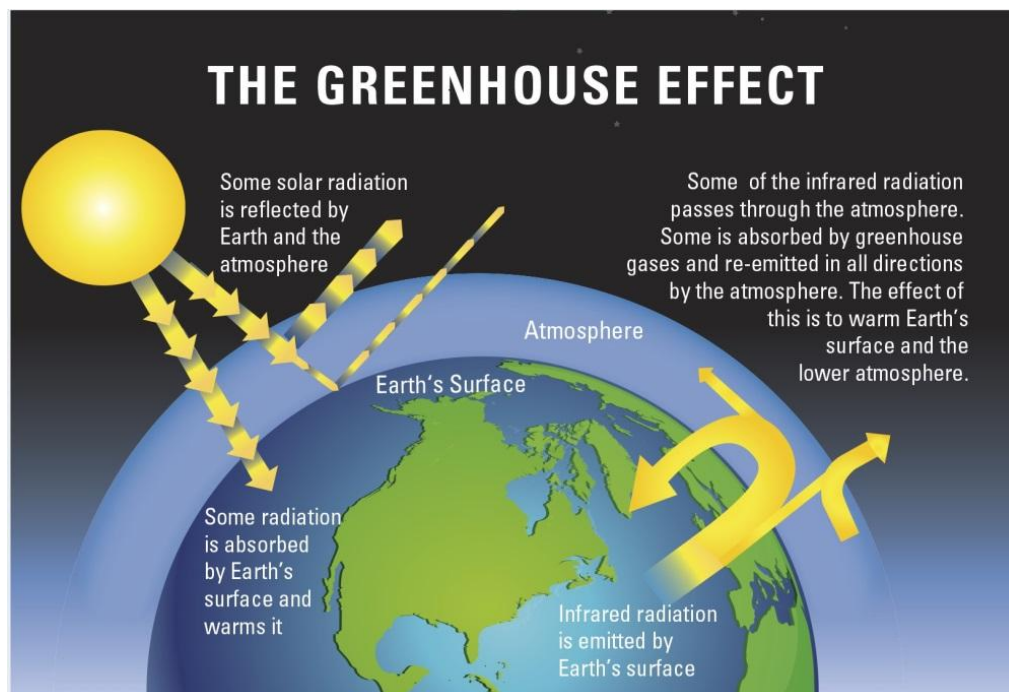
impacted by ingress of salt water and by the rising sea. Some of the most vulnerable regions are the Nile delta in Egypt, the Ganges-Brahmaputra delta in Bangladesh, and many small islands including the Marshall Islands and the Maldives, (WHO, 2001).

- Human societies will be seriously affected by extremes of climate such as droughts and floods. A changing climate would bring about changes in the frequency and/or intensity of these extremes.
- This is a major concern for human health. To a large extent, public health depends on safe drinking water, sufficient food, secure shelter, and good social conditions. All these factors are affected by climate change.



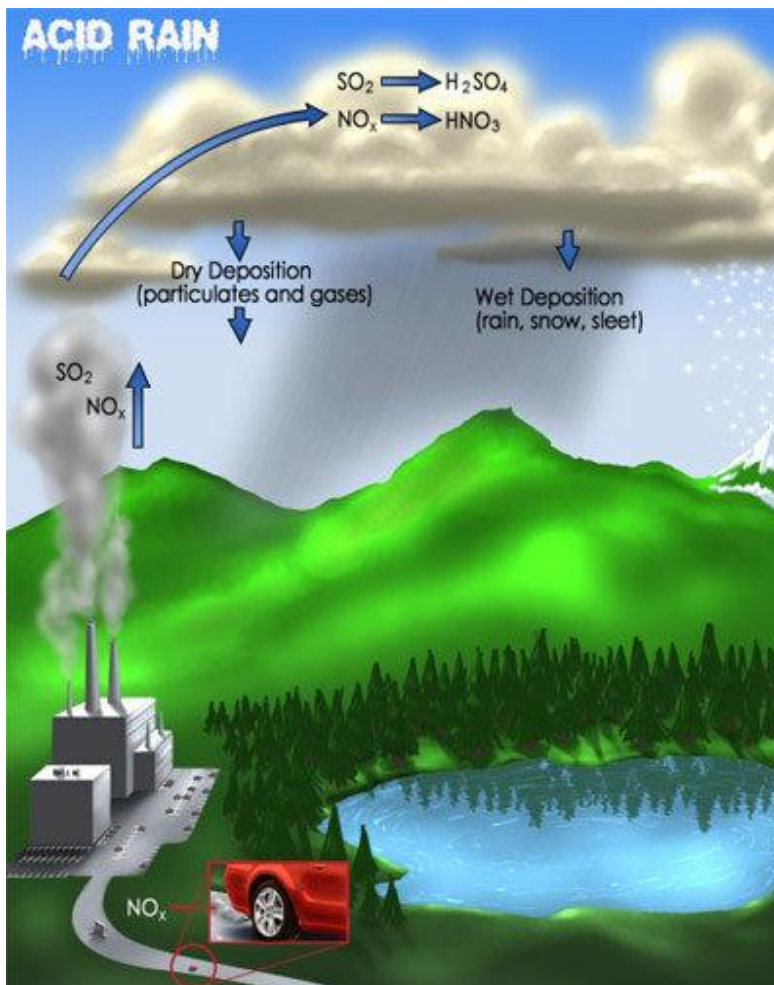
4.5.2 Global warming

- About 75% of the solar energy reaching the Earth is absorbed on the earth's surface which increases its temperature. The rest of the heat radiates back to the atmosphere. Some of the heat is trapped by greenhouse gases, mostly carbon dioxide. As carbon dioxide is released by various human activities, it is rapidly increasing. This is causing global warming.
- The average surface temperature is about 15°C. This is about 33°C higher than it would be in the absence of the **greenhouse effect**. Without such gases most of the Earth's surface would be frozen with a mean air temperature of -18°C.
- Human activities during the last few decades of industrialization and population growth have polluted the atmosphere to the extent that it has begun to seriously affect the climate. Carbon dioxide in the atmosphere has increased by 31% since pre-industrial times, causing more heat to be trapped in the lower atmosphere.
- Many countries have signed a convention to reduce greenhouse gases under the United Nations Convention on Climate Change.



4.5.3 Acid Rain

- When fossil fuels such as coal, oil and natural gas are burned, chemicals like sulfur dioxide and nitrogen oxides are produced. These chemicals react with water and other chemicals in the air to form sulfuric acid, nitric acid and other harmful pollutants like sulfates and nitrates. These acid pollutants spread upwards into the atmosphere, and are carried by air currents, to finally return to the ground in the form of acid rain, fog or snow.
- The corrosive nature of acid rain causes many forms of environmental damage. Acid pollutants also occur as dry particles and gases, which when washed from the ground by rain, add to the acids in the rain to form a corrosive solution. This is called acid deposition.
- The acids in acid rain chemically react with any object they come in contact with.



➤ **Effects:** Acid rain is known to cause widespread environmental damage.

1. Acid rain dissolves and washes away nutrients in the soil which are needed by plants. It can also dissolve naturally occurring toxic substances like aluminium and mercury, freeing them to pollute water or poison plants.

2. Acid rain indirectly affects plants by removing nutrients from the soil in which they grow. It affects trees more directly by creating holes in the waxy coating of leaves, causing brown dead spots which affect the plant's photosynthesis. Such trees are also more vulnerable to insect infestations, drought and cold.

3. Acid rain that falls or flows as ground water to reach rivers, lakes and wetlands, causes the water in them to become acidic. This affects plant and animal life in aquatic ecosystems.

4. Acid rain also has far reaching effects on wildlife. By adversely affecting one species, the entire food chain is disrupted, ultimately endangering the entire ecosystem. Different aquatic species can tolerate different levels of acidity. Land animals that are dependent on aquatic organisms are also affected.

5. Acid rain and dry acid deposition damages buildings, automobiles, and other structures made of stone or metal. The acid corrodes the materials causing extensive damage and ruins historic buildings. For instance the Parthenon in Greece and the Taj Mahal in India have been affected by acid rain.

6. Although surface water polluted by acid rain does not directly harm people, the toxic substances leached from soil can pollute water supply. Fish caught in these waters may be harmful for human consumption. Acid, along with other chemicals in the air, produces urban smog, which causes respiratory problems.

➤ **Solutions:**

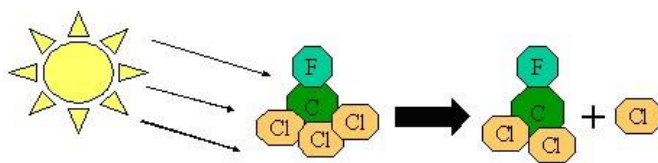
1. The best way to stop the formation of acid rain is to reduce the emissions of sulfur dioxide and nitrogen oxides into the atmosphere. This can be achieved by using less energy from fossil fuels in power plants and industry. Switching to cleaner burning fuels is also way out.
2. For instance using natural gas which is cleaner than coal, using coal with lower sulfur content, and developing more efficient vehicles.
3. If the pollutants have already been formed by burning fossil fuels, they can be prevented from entering the atmosphere by using scrubbers in smokestacks in industry. These spray a mixture of water and limestone into the polluting gases, recapturing the sulfur.
3. In catalytic converters, the gases are passed over metal coated beads that convert harmful chemicals into less harmful ones. These are used in cars to reduce the effects of exhaust fumes on the atmosphere.
4. Once acid rain has affected soil, powdered limestone can be added to the soil by a process known as liming to neutralize the acidity of the soil.

4.5.4 Ozone layer depletion

- Ozone is formed by the action of sunlight on oxygen. It forms a layer 20 to 50kms above the surface of the earth. This action takes place naturally in the atmosphere, but is very slow.
- It is a form of oxygen that has three atoms in each molecule. Ozone in the upper atmosphere however, is vital to all life as it protects the earth from the sun's harmful ultraviolet radiation. The ozone layer in the upper atmosphere absorbs the sun's ultraviolet radiation, preventing it from reaching the earth's surface.
- This layer in the atmosphere protects life on earth from the dangerous UV radiation from the sun. In the 1970s, scientists discovered that chemicals called chlorofluorocarbons or CFCs,

which were used as refrigerants and aerosol spray propellants, posed a threat to the ozone layer. The CFC molecules are virtually indestructible until they reach the stratosphere, where UV radiation breaks them down to release chlorine atoms. The chlorine atoms react with ozone which break down into oxygen molecules, which do not absorb UV radiations.

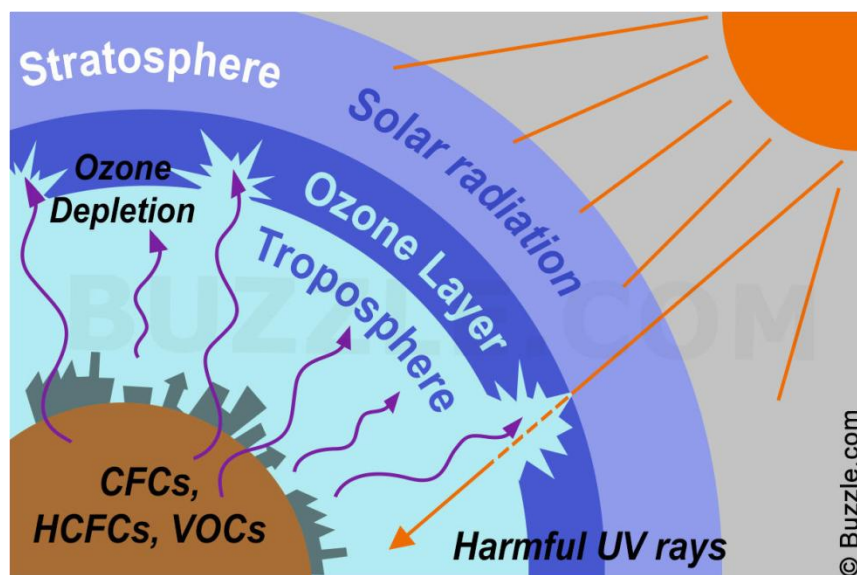
- Although the use of CFCs has been reduced and now banned in most countries, other chemicals and industrial compounds such as bromine, halocarbons and nitrous oxides from fertilizers may also attack the ozone layer.
- The destruction of the ozone layer is seen to cause increased cases of skin cancer. It also causes damage to certain crops thus affecting nature's food chains and food webs.



UV rays strike CFC molecules, causing a Cl to break away



Lone Cl strikes ozone, leaving chlorine monoxide & oxygen molecule, which results in a loss of ozone



4.5.5 Nuclear accidents and nuclear holocaust

- Nuclear energy was researched and discovered by man as a source of alternate energy which would be clean and cheap compared to fossil fuels. And although this did happen, along with the benefits of nuclear energy came its downfalls.
- In the short history of nuclear energy there have been accidents that have surpassed any natural calamity or other energy source extraction in their impacts. A single nuclear accident can cause loss of life, long-term illness and destruction of property for a long period of time.
- Radioactivity and radioactive fallout leads to cancer, genetic disorders and death in the affected area for decades after, thus affecting all forms of life for generations to come.



- The use of nuclear energy in war has had devastating effects on man and earth.
- The Hiroshima and Nagasaki incident during World War II, the only use of nuclear power in war in history, is one of the worst disasters in history. Two atomic bombs killed thousands of people, left many thousands injured and devastated everything for miles.
- The effects of the radiation from these nuclear bombs can still be seen today in the form of cancer and genetic mutations in the affected children and survivors of the incident.



4.6 Environment protection Act

- Environment (Protection) Act, 1986 not only has important constitutional implications but also an international background. The spirit of the proclamation adopted by the United Nations Conference on Human Environment which took place in Stockholm in June 1972, was implemented by the Government of India by creating this Act.
- Although there were several existing laws that dealt directly or indirectly with environmental issues it was necessary to have a general legislation for environmental protection because the existing laws focused on very specific types of pollution, or specific categories of hazardous substances or were indirectly related to the environment through laws that control land use, protect our National Parks and Sanctuaries and our wildlife.
- This was essentially related to the multiplicity of regulatory agencies. Thus there was a need for an authority which could assume the lead role for studying, planning and implementing long term requirements of environmental safety and give directions to, as well as coordinate a system of speedy and adequate response to emergency situations threatening the environment. This Act was thus passed to protect the environment, as there was a growing concern over the deteriorating state of the environment.
- As impacts grew considerably environmental protection became a national priority in the 1970s. The decline in the environmental quality was evidenced by increasing pollution, loss of forest cover and an increasing threat to biodiversity.
- The presence of excessive concentrations of harmful chemicals in the atmosphere and aquatic ecosystems leads to the disruption of food chains and a loss of species. These are symptoms of a rapidly deteriorating environment.

- The growing risks of environmental accidents and threats to life support systems now loom threateningly over our civilization. The decision taken at the conference in Stockholm strongly voiced these environmental concerns and several measures were made possible for environmental protection. While the need for a wider general legislation to protect our environment is now in place, it has become increasingly evident that our environmental situation continues to deteriorate.
- We need to implement this Act much more aggressively if our environment is to be protected. Public concern and support is crucial for implementing the EPA. This must be supported by an enlightened media, good administrators, highly aware policy makers, informed judiciary and trained technocrats who together can influence and prevent further degradation of our environment. Each of us has a responsibility to make this happen.

4.7 Air (prevention and control of pollution) Act

- The Government passed this Act in 1981 to clean up our air by controlling pollution. Sources of air pollution such as industry, vehicles, power plants, etc. are not permitted to release particulate matter, lead, carbon monoxide, sulfur dioxide, nitrogen oxide, volatile organic compounds (VOCs) or other toxic substances beyond a prescribed level.
- To ensure this, Pollution Control Boards (PCBs) have been set up by Government to measure pollution levels in the atmosphere and at certain sources by testing the air. This is measured in parts per million or in milligrams or micrograms per cubic meter. The particulate matter and gases that are released by industry and by cars, buses and two wheelers is measured by using air sampling equipment.
- This Act is created to take appropriate steps for the preservation of the natural resources of the earth which includes of high quality air and ensures controlling the level of air pollution.

- The main objectives of the Act are as follows:
 - (a) To provide for the Prevention, Control and abatement of air pollution.
 - (b) To provide for the establishment of Central and State Boards with a view to implement the Act.
 - (c) To confer on the Boards the powers to implement the provisions of the Act and assign to the Boards functions relating to pollution.
- Air pollution is more acute in heavily industrialized and urbanized areas, which are also densely populated. The presence of pollution beyond certain limits due to various pollutants discharged through industrial emission is monitored by the Pollution Control Boards set up in every State.

Powers and Functions of the Boards

- **Central Board:** The main function of the Central Board is to implement legislation created to improve the quality of air and to prevent and control air pollution in the country. The Board advises the Central Government on matters concerning the improvement of air quality and also coordinates activities, provides technical assistance and guidance to State Boards and lays down standards for the quality of air. It collects and disseminates information in respect of matters relating to air pollution and performs functions as prescribed in the Act.
- **State Pollution Control Boards:** The State Boards have the power to advise the State Government on any matter concerning the prevention and control of air pollution. They have the right to inspect at all reasonable times any control equipment, industrial plant, or manufacturing process and give orders to take the necessary steps to control pollution. They are expected to inspect air pollution control areas at intervals or whenever necessary. They are empowered to provide standards for emissions to be laid down for different industrial

plants with regard to quantity and composition of emission of air pollutants into the atmosphere. A State Board may establish or recognize a laboratory to perform this function. The State Governments have been given powers to declare air pollution control areas after consulting with the State Board and also give instructions for ensuring standards of emission from automobiles and restriction on use of certain industrial plants.

- **Penalties:** Persons managing industry are to be penalized if they produce emissions of air pollutants in excess of the standards laid down by the State Board. The Board also makes applications to the court for restraining persons causing air pollution. Whoever contravenes any of the provision of the Act or any order or direction issued is punishable with imprisonment for a term which may extend to three months or with a fine of Rs.10,000 or with both ,and in case of continuing offence with an additional fine which may extend to Rs 5,000 for every day during which such contravention continues after conviction for the first contravention.
- It is a **citizen's duty** to report to the local authorities such as the Collector or the Pollution Control Board, and the press about offences made by a polluter so that action can be taken against the offender. It is equally important to prevent and report to the authorities on cutting down of trees, as this reduces nature's ability to maintain the carbon dioxide and oxygen levels. Preventing air pollution and preserving the quality of our air is a responsibility that each individual must support so that we can breathe air that will not destroy our health.

4.8 Water (prevention and control of pollution) Act

- The Government has formulated this Act in 1974 to be able to prevent pollution of water by industrial, agricultural and household wastewater that can contaminate our water sources. Wastewaters with high levels of pollutants that enter wetlands, rivers, lakes, wells as well as the sea are serious health hazards. Controlling the point sources by monitoring levels of different pollutants is one way to prevent pollution by giving a punishment to a polluter.
- The main objectives of the Water Act are to provide for prevention, control and abatement of water pollution and the maintenance or restoration of the wholesomeness of water. It is designed to assess pollution levels and punish polluters. The Central Government and State Governments have set up Pollution Control Boards that monitor water pollution.

Functions of the Pollution Control Boards:

- The Government has given the necessary power to the PCBs to deal with the problems of water pollution in the country. The Government has also suggested penalties for violation of the provisions of the Act. Central and State water testing laboratories have been set up to enable the Boards to assess the extent of water pollution and standards have been laid down to establish guilt and default. The Central and State Boards are entitled to certain powers and functions which are as follows:
- **Central Board:** It has the power to advise the Central Government on any matters concerning the prevention and control of water pollution. The Board coordinates the activities of the State Boards and also resolves disputes. The Central Board can provide technical assistance and guidelines to State Boards to carry out investigations and research relating to water pollution, and organizes training for people involved in the process. The Board organizes a comprehensive awareness program on water pollution through mass

media and also publishes data regarding water pollution. The Board lays down or modifies the rules in consultation with the State Boards on standards of disposal of waste. The main function of the Central Board is to promote the cleanliness of rivers lakes streams and wells in the country.

- **State Boards:** They have the power to advise the State Government on any matters concerning water pollution. It plans a comprehensive program for the prevention of water pollution. It collects and disseminates information on water pollution and participates in research in collaboration with the Central Board in organizing training of people involved in the process. The Board inspects sewage or trade effluents, treatment plants, purification plants and the systems of disposal and also evolves economical and reliable methods of treatment of sewage and other effluents. It plans the utilization of sewage water for agriculture. It ensures that if effluents are to be discharged on land the waste is diluted. The State Board advises State Governments with respect to location of industries. Laboratories have been established to enable the Board to perform its functions. The State Boards have the power to obtain information from officers empowered by it who make surveys, keep records of flow, volume, and other characteristics of the water. They are given the power to take samples of effluents and suggest the procedures to be followed in connection with the samples. The concerned board analyst is expected to analyze the sample sent to him and submit a report of the result to the concerned Board. The Board is required to send a copy of the result to the respective industry. The Board also has the power of inspecting any plant record, register, document or any material object, and can conduct a search in any place in which there is reason to believe that an offence has been conducted under the Act.

- **Penalties** are charged for acts that have caused pollution. This includes failing to furnish information required by the Board, or failing to inform the occurrence of any accident or other unforeseen act. An individual or organization that fails to comply with the directions given in the subsections of the law can be convicted or punished with imprisonment for a term of three months or with a fine of Rs10,000 or both and in case failure continues an additional fine of Rs.5,000 everyday. If a person who has already been convicted for any offence is found guilty of the same offence again, he/she after the second and every subsequent conviction, would be punishable with imprisonment for a term not less than two years but which may extend to seven years with fine.
- However it is also the **responsibility of people** in general to inform the relevant authority when they see a likely source of pollution. Individuals can also do several things to reduce water pollution such as using biodegradable chemicals for household use, reducing use of pesticides in gardens, and identifying polluting sources at workplaces and in industrial units where oil or other petroleum products and heavy metals are used. Excessive organic matter, sediments and infecting organisms from hospital wastes can also pollute our water. Citizens need to develop a watchdog force to inform authorities to take appropriate actions against different types of water pollution. A polluter must pay for his actions. However preventing pollution is better than trying to cure the problems it has created, or punishing offenders.

4.9 Wild life protection Act

- This Act passed in 1972, deals with the declaration of National Parks and Wildlife Sanctuaries and their notification. It establishes the structure of the State's wildlife management and the posts designated for Wildlife Management. It provides for setting up Wildlife Advisory Boards. It prohibits hunting of all animals specified in Schedules I to IV of the Act. These are notified in order of their endangeredness. Plants that are protected are included in schedule VI.
- The Amendment to the Wildlife Protection Act in 2002 is more stringent and prevents the commercial use of resources by local people. It has brought in new concepts such as the creation of Community Reserves. It has also altered several definitions. For instance in animals, fish are now included. Forest produce has been redefined to ensure protection of ecosystems.
- While there are several changes, the new Act still has serious issues concerned with its implementation. Laws are only as good as the ones that can be complied with. The Act is expected to deter people from breaking the law. However, there are serious problems due to poaching. One cannot expect to use the Act to reduce this without increasing Forest Staff, providing weapons, jeeps, radio equipment, etc. for establishing a strong deterrent force.
- **Penalties:** A person who breaks any of the conditions of any license or permit granted under this Act shall be guilty of an offence against this Act. The offence is punishable with imprisonment for a term which may extend to three years or with a fine of Rs 25,000 or with both. An offence committed in relation to any animal specified in Schedule I, or Part II of Schedule II, like the use of meat of any such animal, or animal articles like a trophy, shall be punishable with imprisonment for a term not less than one year and may extend to six years

and a fine of Rs 25,000. In the case of a second or subsequent offence of the same nature mentioned in this sub-section, the term of imprisonment may extend to six years and not less than two years with a penalty of Rs.10,000.

➤ **It is individual's responsibility**

- 1) If you observe an act of poaching, or see a poached animal, inform the local Forest Department Official at the highest possible level. One can also report the event through the press. Follow up to check that action is taken by the concerned authority. If no action is taken, one must take it up to the Chief Wildlife Warden of the State.
- 2) Say 'no' to the use of wildlife products and try to convince other people not to buy them.
- 3) Reduce the use of wood and wood products wherever possible.
- 4) Avoid misuse of paper because it is made from bamboo and wood, which destroys wildlife habitat. Paper and envelopes can always be reused.
- 5) Create a pressure group and ask Government to ensure that the biodiversity of our country is conserved.
- 6) Do not harm animals. Stop others from inflicting cruelty to animals.
- 7) Do not disturb birds nests and fledglings.
- 8) When you visit the Zoo do not tease the animals by throwing stones or feeding them, and prevent others from doing so.
- 9) If you come across an injured animal do what you can to help it.
- 10) If the animal needs medical care and expert attention contact the Society for the Prevention of Cruelty to Animals in your city.
- 11) Create awareness about biodiversity conservation in your own way to family and friends.

4.10 Forest conservation Act

- To appreciate the importance of the Forest Conservation Act of 1980, which was amended in 1988, it is essential to understand its historical background. The Act gave the Government and Forest Department the power to create Reserved Forests, and the right to use Reserved Forests for Government use alone.
- The Act remained in force till the 1980s when it was realized that protecting forests for timber production alone was not acceptable. The other values of protecting the services that forests provide and its valuable assets such as biodiversity began to overshadow the importance of their revenue earnings from timber. Thus a new Act was essential. This led to the Forest Conservation Act of 1980 and its amendment in 1988.
- In the 1980s it became clear that forests must be protected for their other functions such as maintenance of soil and water regimes centered around ecological concerns. It also provided for the use of goods and services of the forest for its local inhabitants.
- The new policy framework made conversion of forests into other uses much less possible. Conservation of the forests as a natural heritage finds a place in the new policy, which includes the preservation of its biological diversity and genetic resources. It also values meeting the needs of local people for food, fuelwood, fodder and non-wood forest products that they subsist on. It gives priority to maintaining environmental stability and ecological balance. It expressly states that the network of Protected Areas should be strengthened and extended.
- In 1992, the 73rd and 74th Amendments to the Constitution furthered governance through panchayats. It gives States the ability to provide power to the local panchayats to manage local forest resources.

- The Forest Conservation Act of 1980 was enacted to control deforestation. It ensured that forestlands could not be de-reserved without prior approval of the Central Government. This was created as States had begun to de-reserve the Reserved Forests for non-forest use. States had regularized encroachments and resettled 'Project Affected People' from development projects such as dams in these de-reserved areas. The need for a new legislation became urgent. The Act made it possible to retain a greater control over the frightening level of deforestation in the country and specified penalties for offenders.
- **Penalties for offences in Reserved Forests:** No person is allowed to make clearings or set fire to a Reserved Forest. Cattle are not permitted to trespass into the Reserved Forest. Felling, collecting of timber, bark or leaves, quarries or collecting any forest product is punishable with imprisonment for a term of six months, or with a fine which may extend to Rs.500, or both.
- **Penalties for offences in Protected Forests:** A person who commits any of the following offences like felling of trees, or strips off the bark or leaves from any tree or sets fire to such forests, or kindles a fire without taking precautions to prevent its spreading to any tree mentioned in the Act, whether standing or felled, or fells any tree, drags timber, or permits cattle to damage any tree, shall be punishable with imprisonment for a term which may extend to six month or with a fine which may extend to Rs.500 or both.
- **Individual 's responsibility:**
 - 1) Be alert to destructive activities in your local green areas such as Reserved Forests and Protected Forests, and in Protected Areas (National Parks and Wildlife Sanctuaries). Report any such act to the Forest Department as well as the Press. Report of violations can be made

to the Conservator of Forest, District Forest Officer, Range Forest Officer, Forest Guard or the District Commissioner, or local civic body.

- 2) Acquaint yourself with the laws, detailed rules and orders issued by the Government.
- 3) Be in touch with concerned local NGOs and associations.
- 4) Create awareness about the existence and value of National Parks and Sanctuaries and build up a public opinion against illegal activities in the forest or disturbance to wildlife.
- 5) Pressurize the authorities to implement the forest and wildlife laws and rules to protect green areas.
- 6) Take legal action if necessary and if possible through a Public Interest Litigation (PIL) against the offending party. Use the help of NGOs who can undertake legal action.
- 7) Help to create public pressure to change rules laws and procedures when necessary.
- 8) Use better, ecologically sensitive public transport and bicycle tracks. Do not litter in a forest area.
- 9) Participate in preservation of greenery, by planting, watering and caring for plants.

4.11 Issues involved in enforcement of environmental legislations

- Environmental legislation is evolved to protect our environment as a whole, our health, and the earth's resources. The presence of a legislation to protect air, water, soil, etc. does not necessarily mean that the problem is addressed.
- Once legislation is made at the global, National or State level, it has to be implemented. For a successful environmental legislation to be implemented there has to be an effective agency to collect relevant data, process it and pass it on to a law enforcement agency. If the law or rule is broken by an individual or institution, this has to be punished through the legal process. Information to law enforcement officials must also come from individuals.

- In most situations, if no cognizance is given, the interested concerned individual must file a Public Interest Litigation (PIL) for the protection of the environment. There are several NGOs in the country which take these matters to court in the interest of conservation. Anyone can request them to help in such matters.
- A related issue is the fact that there are several irregular practices for which a bribe to an unscrupulous official is used to cover up an offence. Thus the general public must act as a watch dog not only to inform concerned authorities, but also to see that actions are taken against offenders.

4.11.1 Environment Impact Assessment (EIA)

- For all development projects, whether Government or Private, the MoEF requires an impact assessment done by a competent organization.
- The EIA must look into physical, biological and social parameters. EIAs are expected to indicate what the likely impacts could be if the project is passed. The Ministry of Environment and Forests (MoEF) has identified a large number of projects that need clearance on environmental grounds.
- The EIA must define what impact it would have on water, soil and air. It also requires that a list of flora and fauna identified in the region is documented and to specify if there are any endangered species whose habitat or life could be adversely affected. Most development projects such as industries, roads, railways and dams may also affect the lives of local people. This must be addressed in the EIA.
- There are 30 different industries listed by MoEF that require a clearance before they are set up. An impact created by each type of industry differs and the proposed sites also vary in their sensitivity to impacts. Some areas are more fragile than others. Some have unique

ecosystems. Others are the habitats of wildlife and some may be the home of endangered species of plants or animals. All these aspects require evaluation before a development project or an industry site is cleared.

- New projects are called 'green field projects' where no development has been done. Projects that already exist but require expansion must also apply for clearance. These are called 'brown field projects'.
- After the Environmental Protection Act of 1986 was passed, an EIA to get an environmental clearance for a project became mandatory.
- Project proponents are expected to select a competent agency to undertake an EIA. Projects can be classified into those with a mild impact, a moderate impact or a serious impact. Some may have temporary major impacts, during the construction phase, which could later become less damaging, or be mitigated by a variety of measures.
- In other situations the impact may continue and even increase, for example where toxic solid waste will be constantly generated. Some projects could thus cause temporary reversible damage while others can have irreversible or even permanent impacts.
- To get an environmental clearance the proposer of the project is expected to apply to the State Pollution Control Board. The PCB checks and confirms that the EIA can be initiated. The Agency that does the assessment submits a Report to the proposer. This may take several months. A Report of the Environmental Statement is forwarded to the MoEF, which is the impact assessment authority.
- After 1997, the MoEF has stipulated that a public hearing should be done at the local level. The Pollution Control Board puts an advertisement about the hearing in the local vernacular press.

- An Environmental Impact Statement which is an Executive Summary of the EIA is kept for the public to read. The venue and time of the Public Hearing is declared. Once the hearing is held and opinions have been expressed, both for and against the project, the minutes of the meeting are sent to the MoEF. Though this is done, it is evident that the voices of project affected people are still not heard. In some cases NGOs have taken up the cause of local people.
- Until educational levels and environmental awareness becomes a part of public thinking and is objectively based on the facts of the case, these hearings will remain an inadequate tool to control possible impacts of new development projects. Experience shows that a large number of EIAs are inadequately researched and frequently biased as they are funded by the proposer of the project. While most EIAs are adequate for studies on the possibilities of air, water and soil pollution, they generally deal inadequately with issues such as preservation of biodiversity and the social issues that may arise from future environmental impacts.
- It is not sufficient to say that an EIA has been done. It is the quality and sincerity of the EIA that is of importance. An EIA is not intended to stop all types of development. The siting of an industry can be selected carefully and if it is likely to damage a fragile area an alternate less sensitive area must be selected. In some cases it is essential to drop projects altogether if the anticipated impacts are likely to be very severe. In other cases it is necessary for the project to counter balance its effects by mitigating the ill effects on the environment. This means compensating for the environmental damage by afforestation or creating a Protected Area in the neighbourhood at the cost of the project.
- Rehabilitation and resettlement of project affected people is a key concern which should be given funds and done after a consent is clearly obtained from the people living in the area.

4.11.2 Citizens actions and action groups

- Citizens must learn to act as watch dogs to protect their own environment from the consequences of unsustainable projects around them.
- Well informed citizens not only have rights but also have a duty to perform in this regard. They can join action groups to develop a lobby to strengthen the environmental movements in the country, their State, town or village. Individuals can take one or several possible actions when they observe offenders who for their own self interest damage the environment for others living in the area. An individual has the right to bring an environmental offence or nuisance to the attention of concerned authorities.
- This ranges from Government line agencies such as the Police, the Forest Department, the Collector or Commissioner of the area as the case may be. At times the concerned officials may not be able to easily appreciate complex environmental concerns and the individual may have to learn how to communicate these issues in a way in which it becomes essential for the concerned officer to act in a pro environmental fashion.
- If this does not work a citizen can seek legal redressal under relevant statutes of law. The Environment Protection Act and the Wildlife Protection Act are the most frequently used legal instrument for these purposes. It is possible to move courts by a Public Interest Litigation, and take this up to the Hon. Apex Court – the Supreme Court of India, which in the recent past has given several highly enlightened pro-conservation judgements.
- Citizen groups can resort to alternate means of pressure such as ‘rasta rokos’, ‘dharnas’, etc. to draw attention to important environmental concerns. They can also elicit public support through the press and electronic media.

4.12 Links of some useful videos

Acid Rain: <https://www.youtube.com/watch?v=6PI5VIGosOI>

Global Warming: <https://www.youtube.com/watch?v=cv-2b8yHAfs>

Ozone hole: <https://www.youtube.com/watch?v=YHLIezdXxaI>

Differences between Acid Rain, Global Warming and Ozone hole:

<https://www.youtube.com/watch?v=vr3CCclaS-A>

Revision of Unit-IV: <https://www.youtube.com/watch?v=78prsPYm98g>

***** **THE END** *****