IITM MURTHAL
LECTURE NOTES
DIPLOMA 1ST YEAR
ENVIRONMENTAL STUDIES
UNIT - 4 (SOIL POLLUTION)

DEFINATION OF SOIL POLLUTION

Soil pollution is defined as the presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem. In the case of contaminants which occur naturally in soil, even when their levels are not high enough to pose a risk, soil pollution is still said to occur if the levels of the contaminants in soil exceed the levels that should naturally be present.

SOURCES OF SOIL POLLUTION

1. Agricultural sources

Agricultural practices such as the use of non-organic products in crop lead to soil pollution. These substances include artificial chemical pesticides, herbicides, fungicides, and fertilizers as discussed below:

a) ***Pesticides, herbicides, and insecticides***. -: These chemicals are used to control the pest, insects, weeds, fungi, and diseases that attack crops. Most of these chemicals are non-biodegradable while others decompose to products that are toxic to soil. These products seep into the ground and act on the soil thereby changing its structure, composition, and pH.

b) ***Improper use of fertilizers-:*** Fertilizers are mostly used to correct the deficiency of soil nutrients. A soil which is deficient of potassium, calcium, nitrogen, and sulfur among other important macro-nutrients should be treated with the right fertilizer and at the right amount. However, some farmers use them indiscriminately leading to soil pollution.

2. Industrial sources

Industrial wastes or byproducts are among the leading causes of soil pollution. They can be in the form of gas, liquid or solid substances. Carbon dioxide, nitrogen dioxide,

sulfur dioxide, and carbon monoxide are some of the gases produced from industrial activities that cause considerable pollution to soil indirectly.

They combine with the rainwater causing the production of acidic rain which changes the soil pH and thereafter affects the overall crop production. Industries also dump their solid and liquid effluents into the soil.

3. Deforestation

Though not a direct contributing factor to soil pollution, deforestation leads to the removal of the shield that protects the soil against the agents of erosion. The exposed soil is easily eroded and exposed to artificial chemical pollutants from the air, wind, and rain.

4. Sewer sludge

Sewage plants also contribute to soil pollution owing to how they dispose of sewage sludge from domestic and commercial waste. The sewage sludge is usually treated before being disposed into land or water bodies. When disposed on land, the sludge can release high amounts of nutrients depending on the source that may surpass the natural soil nutrient requirement thus posing a risk to human health and/or the ecosystem at large. Sewer sludge may also contain high levels of metals, further polluting the soil.

HOW TO CONTROL SOIL POLLUTION

To reduce soil pollution, there is a need to adopt the Reduce, Reuse and Recycle strategy. Some of the solutions to soil pollution include;

1. Reduction of artificial fertilizers and pesticides use

Use of organic means of farming can reduce soil pollution on a global scale. Bio-fertilizers and manures reduce the need for chemical fertilizer. Pests and diseases in crops can also be controlled through the use of biological methods, consequently reducing soil pollution.

2. Reusing and Recycling of materials

Glass containers, papers, and cloth materials, as well as products, can be reused at domestic levels in a bid to reduce soil pollution. Reusing will limit the need for replacing the used products thus relatively reducing the number of household waste products such as plastics and e-waste that are sent to the landfill.

3. Reforestation

Planting of more tree cover is the best way of reducing soil pollution through minimizing erosion and effects of floods. Reforestation achieves this by providing protective ground cover for the soil.

4. Solid waste treatment

Solid wastes should be treated and discarded properly. They should be treated before dumping them through physical, chemical and biological means until their hazardous levels to the environment are reduced to the minimum requirement.

TYPES OF SOLID WASTE

1. HOUSEHOLD WASTE

Household waste, also known as domestic waste or residential waste is disposable materials generated by households. This waste can be comprised of non-hazardous waste and hazardous waste. Non-hazardous waste can include food scraps, paper, bottles, etc. which can be recycled or composted. Examples of hazardous waste include batteries and household cleaners. It is important that hazardous waste is handled in a safe manner to ensure that they are disposed properly so they do not cause harm as they can be consumed by animals and also contain chemicals that are harmful to all living beings.

2. WASTE FROM HOSPITALS

Biomedical waste/hospital waste is any kind of waste containing infectious materials e.g., packaging, unused bandages, infusion kits, etc. Biomedical waste must be properly managed and disposed of to protect the environment, general public and workers, especially healthcare and sanitation workers who are at risk of exposure to biomedical waste as an occupational hazard. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal.

3. AGRICULTURAL WASTE

It is defined as unwanted waste produced as a result of agricultural activities (i.e., manure, oil, silage plastics, fertilizer, pesticides and herbicides; wastes from farms, poultry houses and slaughterhouses; veterinary medicines, or horticultural plastics). Fertilizers are a main source of agricultural waste because they contain nutritive minerals including nitrogen, phosphorus, and potassium (N, P, K) which help plants grow faster and increase yields, but when released into the open environment they are hazardous.

4. E-WASTE

Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.

Electronic scrap components, such as CPUs, contain potentially harmful materials such as lead, cadmium, beryllium, or brominated flame retardants. Recycling and disposal of e-waste may involve significant risk to health of workers and their communities

EFFECTS OF SOLID WASTE

- Direct handling of solid waste can result in various types of infectious and chronic diseases with the waste workers and the rag pickers being the most vulnerable. Exposure to hazardous waste can affect human health, children being more vulnerable to these pollutants
- Disposing of waste has huge environmental impacts and can cause serious problems. Some waste will eventually rot, but not all, and in the process it may smell, or generate methane gas, which is explosive and contributes to the greenhouse effect.
- Fertilizers are a main source of agricultural waste because they contain nutritive minerals including nitrogen, phosphorus, and potassium (N, P, K) which help plants grow faster and increase yields, but when released into the open environment they are hazardous.

- Hazardous waste include batteries and household cleaners. It is important that hazardous waste is handled in a safe manner to ensure that they are disposed properly so they do not cause harm as they can be consumed by animals and also contain chemical that are harmful to all living beings.

SOLID WASTE MANAGEMENT

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be changed and used as a valuable resource. Solid waste management should be embraced by each and every household including the business owners across the world. Industrialization has brought a lot of good things and bad things as well. One of the negative effects of industrialization is the creation of solid waste

The following are major sources of solid waste:

- **Residential**
- **Industrial**
- **Commercial**
- **Agriculture**
- **Biomedical**

Effects of Poor Solid Waste Management

Due to improper waste disposal systems particularly by municipal waste management teams, wastes heap up and become a problem. People clean their homes and places of work and litter their surroundings which affects the environment and the community.

Solid wastes from industries are a source of toxic metals, hazardous wastes, and chemicals. When released to the environment, the solid wastes **can cause biological and physicochemical problems to the environment** and may affect or alter the productivity of the soils in that particular area

Toxic materials and chemicals may seep into the soil and pollute the ground water. During the process of collecting solid waste, the hazardous wastes usually mix with ordinary garbage and other flammable wastes making the disposal process even harder and risky.

When hazardous wastes like pesticides, batteries containing lead, mercury or zinc, cleaning solvents, radioactive materials, e-waste and plastics are mixed up with paper and other scraps are burned they produce dioxins and gasses. These **toxic gases have a potential of causing various diseases including cancer**.

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LECTURE NOTES

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ENVIRONMENTAL STUDIES

UNIT - 4 (SOIL POLLUTION)

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LECTURE NOTES
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ENVIRONMENTAL STUDIES
UNIT - 5 (NOISE POLLUTION)

What is Noise Pollution?

Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night. All of these have become a part of the urban culture and rarely disturb us. However, when the sound of the television keeps you from sleeping all night or the traffic starts to give you a headache, it stops becoming just noise and starts turning into noise pollution. For many of us, the concept of pollution is limited to nature and resources. However, noise that tends to disrupt the natural rhythm of life makes for one solid pollutant.

By definition, noise pollution takes place when there is either an excessive amount of noise or an unpleasant sound that causes a temporary disruption in the natural balance. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production. Our environment is such that it has become difficult to escape the noise. Even electrical appliances at home have a constant hum or beeping sound. By and large, lack of urban planning increases the exposure to unwanted sounds. This is why understanding noise pollution is necessary to curb it in time.

1. Industrialization

Most of the industries use big machines which are capable of producing a large amount of noise. Apart from that, various equipments like compressors, generators, exhaust fans, grinding mills also participates in producing big noise. Therefore, you must have seen workers in these factories and industries wearing earplugs to minimize the effect of noise.

2. Poor Urban Planning

In most of the developing countries, poor urban planning also plays a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights over basic amenities leads to noise pollution which may disrupt the environment of society.

3. Social Events

Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally flout rules set by the local administration and create nuisance in the area. People play songs on full volume and dance till midnight which makes the condition of people living nearby pretty worse. In markets, you can see people selling clothes via making a loud noise to attract the attention of people.

4. Transportation

A large number of vehicles on roads, airplanes flying over houses, underground trains produce heavy noise and people get it difficult to get accustomed to that. The high noise leads to a situation where in a normal person loses the ability to hear properly.

5. Construction Activities

Under construction activities like mining, construction of bridges, dams, buildings, stations, roads, flyovers takes place in almost every part of the world. These construction activities take place every day as we need more buildings, bridges to accommodate more people and to reduce traffic congestion. The down point is that these construction equipment are too noisy.

6. Household Chores

We people are surrounded by gadgets and use them extensively in our daily life. Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are minor contributors to the amount of noise that is produced but it affects the quality of life of your neighborhood in a bad way.

Effects of Noise Pollution

1. Hearing Problems

Any unwanted sound that our ears have not been built to filter can cause problems within the body. Our ears can take in a certain range of sounds without getting damaged. Man-made noises such as jackhammers, horns, machinery, airplanes and even vehicles can be too loud for our hearing range. Constant exposure to loud levels of noise can easily result in the damage of our eardrums and loss of hearing. It also reduces our sensitivity to sounds that our ears pick up unconsciously to regulate our body's rhythm.

2. Health Issues

Excessive noise pollution in working areas such as offices, construction sites, bars and even in our homes can influence psychological health. Studies show that the occurrence of aggressive behavior, disturbance of sleep, constant stress, fatigue, and hypertension can be linked to excessive noise levels. These, in turn, can cause more severe and chronic health issues later in life.

3. Sleeping Disorders

Loud noise can certainly hamper your sleeping pattern and may lead to irritation and uncomfortable situations. Without a good night sleep, it may lead to problems related to fatigue and your performance may go down in the office as well as at home. It is therefore recommended to take a sound sleep to give your body proper rest.

4. Cardiovascular Issues

Blood pressure levels, cardiovascular disease, and stress-related heart problems are on the rise. Studies suggest that high-intensity noise causes high blood pressure and increases heartbeat rate as it disrupts the normal blood flow. Bringing them to a manageable level depends on our understanding of noise pollution and how we tackle it.

5. Trouble Communicating

High decibel noise can put trouble and may not allow two people to communicate freely. This may lead to misunderstanding and you may get difficult understanding the other person. Constant sharp noise can give you a severe headache and disturb your emotional balance.

6. Effect on Wildlife

Wildlife faces far more problems than humans because of noise pollution since they are more dependent on sound. Animals develop a better sense of hearing than us since their survival depends on it. The ill effects of excessive noise begin at home. Pets react more aggressively in households where there is a constant noise.

Prevention of Noise Pollution

Some noise pollution preventive measures are provided in the points below.

- Honking in public places like teaching institutes, hospital, etc. should be banned.
- In commercial, hospital, and industrial buildings adequate soundproof systems should be installed.
- Musical instruments sound should be controlled to desirable limits.
- Dense tree cover is useful in noise pollution prevention.
- Explosives should be not used in forest, mountainous, and mining areas.

UNIT OF NOISE AND ACCEPTABLE NOISE LEVEL

What is noise level?

Any unwanted sound that causes annoyance, irritation and pain to the human ear is termed as noise. Noise is measured in dB (A) which indicates the loudness of the sound. Noise level refers to the decibel levels of noise that is produced by any appliance or machine. In general, the human ear can tolerate noise levels up to 85 dB and anything beyond that can affect their productivity as well as their quality of life. The decibel levels of common sounds above 80 dB are considered as ‘loud’ while the decibel levels of common sounds between 100-125 dB are termed as 'uncomfortable'. So, all the machines operating in an area should produce noise within the acceptable noise level to maintain the well-being of the people around.

Permissible noise level in India

CPCB has laid down the permissible noise level in India for different areas. In industrial areas,

the permissible limit is 75 dB for daytime and 70 dB at night. In commercial areas, it is 65 dB and 55 dB while in residential areas it is 55 dB and 45 dB during daytime and night respectively. Additionally, there is a category called 'silent zone' which includes areas that lie within 100 meters of the premises of schools, colleges, hospitals and courts. The permissible noise limit in this zone is 50 dB during the day and 40 dB during the night.

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UNIT - 6 (ENVIRONMENTAL LEGISLATION)

Water (Prevention & Control of Pollution) Act, 1974

- It is a comprehensive legislation that regulates agencies responsible for checking on water pollution and ambit of pollution control boards both at the centre and states.
- The Water (Prevention & Control of Pollution) Act, 1974 was adopted by the Indian parliament with the aim of prevention and control of Water Pollution in India.

Some of the important sections regulating the prevention of water pollution as per the act are as discussed below-:

Functions of the State Board

- Section 17 of the Water (Prevention & Control of Pollution) Act, 1974 clearly lists all functions of the respective state boards for reducing water pollution.
- The state board of respective states has power to plan program for the prevention, control pollution of streams, wells, and collect information relating to water pollution and encourage, conduct and participate in investigations and research relating to problems of water pollution and prevention.
- The state water boards also have the right to inspect sewage or trade effluents, works and plants for the treatment of sewage and trade effluents and to review all water purification plants.
- The Board may establish or recognize a laboratory or laboratories to enable the Board to perform its functions under this section efficiently, including the analysis of samples of water from any stream or well or of samples of any sewage or trade effluents.

Consent of the State Board is necessary to discharge sewage

- Section 25 of the Water (Prevention & Control of Pollution) Act, 1974 states that important work of the State Board under section 25 is to keep check on any industry, plant or process which is likely to discharge harmful chemicals in sewage or into a stream or well or on land.
- The section further states that every State Board is liable to maintain a register containing particulars or conditions imposed under the section related to any outlet, or to any effluent, from any land or premises which must be open to inspection by the state board.

Penalties and fines

Section 42 of the of the Water (Prevention & Control of Pollution) Act, 1974 states penalties and fines for certain acts including pulling down pillars, Obstructs any person acting under the orders or direction of the Board, Damages any works or property belonging to the Board and Failure to furnish any officer other employee of the Board any information required. The fine and penalty includes Imprisonment for a term which may extend up to three months or with fine to Rs. 10,000/- or both.

The composition of Central Board

The Central Pollution Control Board (CPCB) once appointed, should consist of the following key members.

- A full-time chairman: A person having special knowledge or practical experience in respect of matters relating to environmental protection having knowledge and experience in administering institutions dealing with such matters, to be nominated by the Central Government
- A full-time member-secretary: Possessing qualifications, knowledge, and experience of scientific, engineering or management aspects of pollution control, to be appointed by the Central Government.
- Not more than 5 officials to be nominated by the Central Government to represent that Government.
- Not more than 5 officials to be nominated by the Central Government, from amongst the members of the State Boards.
- Not more than 3 officials to be nominated by the Central Government, to represent the interests of agriculture, fishery or industry or trade or any other interest which, in the opinion of the Central Government, ought to be represented.
- 2 persons to represent the companies or corporations owned, controlled or managed by the Central Government, to be nominated by that Government

The composition of State Board

The State Pollution Control Board (SPCB) once appointed, should consist of the following key members.

- A full-time chairman: A person having special knowledge or practical experience in respect of matters relating to environmental protection having knowledge and experience in administering institutions dealing with such matters, to be nominated by the State Government
- A full-time member-secretary: Possessing qualifications, knowledge, and experience of scientific, engineering or management aspects of pollution control, to be appointed by the State Government.
- Not more than 5 officials to be nominated by the State Government to represent that Government.
- Not more than 5 officials to be nominated by the State Government, from amongst the members of the local authorities functioning within the state.
- Not more than 3 officials to be nominated by the State Government, to represent the interests of agriculture, fishery or industry or trade or any other interest which, in the opinion of the Central Government, ought to be represented.
- 2 persons to represent the companies or corporations owned, controlled or managed by the State Government, to be nominated by that Government.

Functions of the Central Board

The primary goal of the Central Board as stated in accordance with the Water Act shall be to promote cleanliness of streams and wells in different areas of the States.
Highlight functions of the Central Pollution Control Board (CPCB) are as follows:

- Advise the Central Government on any matter concerning the prevention and control of water pollution.
- Co-ordinate the activity of the State Boards and resolve disputes among them.
- Provide technical assistance and guidance to the State Boards, carry out and sponsor investigations and research relating to problems of water pollution and prevention, control or abatement of water pollution.
- Plan and organize the training of persons engaged or to be engaged in programs for the prevention, control or abatement of water pollution.
- Collect, compile and publish technical and statistical data relating to water pollution and the measures devised for its effective prevention and control.

Annual reports and meetings

A Board shall meet at least once in every three months and shall observe such rules of procedure in regard to the transaction of business at its meetings as may be prescribed.

The Air Act (1981)

This is an Act to provide for the prevention and control and abatement of air pollution through various management guidelines and restrictions. One of the prime objectives of this act is carrying out the purposes mentioned above by assigning a set of responsibilities, powers, and functions to the Boards for the prevention and control of air pollution.

The act was introduced and incorporated into the Constitution of India in 1981 laying down guidelines for the preservation of the quality of air and control of air pollution. In contrast to the water act of 1974 which covers only 13 states and union territories of India, the air act extends to the whole of India.

The composition of Central Board

The Central Pollution Control Board (CPCB) once appointed, should consist of the following key members.

- A full-time chairman: A person having special knowledge or practical experience in respect of matters relating to environmental protection having knowledge and experience in administering institutions dealing with such matters, to be nominated by the Central Government

- A full-time member-secretary: Possessing qualifications, knowledge, and experience of scientific, engineering or management aspects of pollution control, to be appointed by the Central Government.
- Not more than 5 officials to be nominated by the Central Government to represent that Government.
- Not more than 5 officials to be nominated by the Central Government, from amongst the members of the State Boards.
- Not more than 3 officials to be nominated by the Central Government, to represent the interests of agriculture, fishery or industry or trade or any other interest which, in the opinion of the Central Government, ought to be represented.
- 2 persons to represent the companies or corporations owned, controlled or managed by the Central Government, to be nominated by that Government.

The composition of State Board

The State Pollution Control Board (SPCB) once appointed, should consist of the following key members.

- A full-time chairman: A person having special knowledge or practical experience in respect of matters relating to environmental protection having knowledge and experience in administering institutions dealing with such matters, to be nominated by the State Government
- A full-time member-secretary: Possessing qualifications, knowledge, and experience of scientific, engineering or management aspects of pollution control, to be appointed by the State Government.
- Not more than 5 officials to be nominated by the State Government to represent that Government.
- Not more than 5 officials to be nominated by the State Government, from amongst the members of the local authorities functioning within the state.
- Not more than 3 officials to be nominated by the State Government, to represent the interests of agriculture, fishery or industry or trade or any other interest which, in the opinion of the Central Government, ought to be represented.
- 2 persons to represent the companies or corporations owned, controlled or managed by the State Government, to be nominated by that Government.

Functions of the Central Board are as follows:

- Advise the Central Government on any matter concerning the improvement of the quality of air and the prevention, control or abatement of air pollution;
- Plan and cause to be executed a nation-wide programme for the prevention, control or abatement of air pollution;
- Co-ordinate the activities of the State and resolve disputes among them;
- Provide technical assistance and guidance to the State Boards, carry out and sponsor investigations and research relating to problems of air pollution and prevention, control or abatement of air pollution.

- Plan and organize the training of persons engaged or to be engaged in programmes for the prevention, control or abatement of air pollution on such terms and conditions as the Central Board may specify;
- Organize through mass media a comprehensive programme regarding the prevention, control or abatement of air pollution;
- Collect, compile and publish technical and statistical data relating to air pollution and the measures devised for its effective prevention, control or abatement and prepare manuals, codes or guides relating to prevention, control or abatement of air pollution.
- Lay down standards for the quality of air.
- Collect and disseminate information in respect of matters relating to air pollution.

Functions of the State Board are as follows:

- Plan a comprehensive programme for the prevention, control or abatement of air pollution and to secure the execution thereof-,
- Advise the State Government on any matter concerning the prevention, control or abatement of air pollution;
- Collect and disseminate information relating to air pollution;
- Collaborate with the Central Board in organizing the training of persons engaged or to be engaged in programmes relating to prevention, control or abatement of air pollution and to organize mass-education programme relating thereto.
- Inspect, at all reasonable times, any control equipment, industrial plant or manufacturing process and to give, by order, such directions to such persons as it may consider necessary to take steps for the prevention, control or abatement of air pollution;
- Inspect air pollution control areas at such intervals as it may think necessary, assess the quality of air therein and take steps for the prevention, control or abatement of air pollution in such areas;

Annual reports and meetings

- A Board shall meet at least once in every three months and shall observe such rules of procedure in regard to the transaction of business at its meetings as may be prescribed.

Penalties:

The 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.

Introduction to Environment (Protection) Act,1986

The Environment (Protection) Act was enacted in the year 1986. It was enacted with the main objective to provide the protection and improvement of environment and for matters connected therewith. The Act is one of the most comprehensive legislations with a pretext to protection and improvement of the environment.

The Constitution of India also provides for the protection of the environment. Article 48A of the Constitution specifies that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. Article 51 A further provides that every citizen shall protect the environment.

Objectives

As mentioned earlier, the main objective of the Act was to provide the protection and improvement of environment and for matters connected therewith. Other objectives of the implementation of the EPA are:

- To implement the decisions made at the UN Conference on Human Environment held at Stockholm in June 1972.
- To enact a general law on the areas of environmental protection which were left uncovered by existing laws. The existing laws were more specific in nature and concentrated on a more specific type of pollution and specific categories of hazardous substances rather than on general problems that chiefly caused major environmental hazards.
- To co-ordinate activities of the various regulatory agencies under the existing laws
- To provide for the creation of an authority or authorities for environmental protection
- To provide deterrent punishment to those who endanger the human environment, safety and health

Definitions

Section 2 of the EPA deals with definitions. Some important definitions provided in the Section are:

- Section 2 (a) "**Environment**" includes water, air, and land and the interrelationship that exists among and between water, air and land and human beings, other living creatures, plants, micro-organism and property. This definition is not exhaustive but an inclusive one.
- Section 2 (b) "**Environmental Pollutant**" means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be injurious to environment.
- Section 2 (c) "**Environmental Pollution**" means the presence in the environment of any environmental pollutant. This implies an imbalance in the environment. The materials or substances when after mixing in air, water or land alters their properties in such manner, that the very use of all or any of the air-water and land by man and any other living organism becomes lethal and dangerous for health.
- Section 2 (e) "**Hazardous Substance**" means any substance or preparation which, by reasons of its chemical or Physico-chemical properties or handling, is liable to cause harm to human beings, other living creatures, plants, micro-organism, property or environment.

Powers of Central Government to take measures to Protect and Improve Environment

According to the provisions of the Act, the Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

Such measures may include measures with respect to all or any of the following matters, namely:

a. co-ordination of actions by the State Governments, officers and other authorities- (a) under this Act, or the rules made thereunder, or (b) under any other law for the time being in force which is relatable to the objects of this Act;
b. planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution;
c. laying down standards for the quality of the environment in its various aspects;
d. laying down standards for emission or discharge of environmental pollutants from various sources whatsoever: Provided that different standards for emission or discharge may be laid down under this clause from different sources having regard to the quality or composition of the emission or discharge of environmental pollutants from such sources;
e. restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards;

Penalties

Section 15 provides for Penalties for contravention of the provisions of the Act as well as the Rules, Orders and Directions. Whoever fails to comply with or contravenes any of the provisions, rules, orders or directions of this Act shall be punishable with imprisonment for a term which may extend to five years or with fine which may extend to one lakh rupees, or with both.

If the failure or contravention continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which, may extend to seven years.

Environmental Impact assessment (EIA)

It is a scientific tool which ensures sustainable development and helps in carrying out evaluation of impacts arising from a project activity that are likely to have significant environmental effects and also in turn helps in realising mitigation measures. It is anticipatory, participatory, and systematic in nature and relies on multidisciplinary input. Environmental Assessment enables us in carrying out Environmental Cost-Benefit Analysis of projects at an initial stage. It is thus, a precursor to detailed analysis of environmental impacts, which is necessary to take a decision whether to go with the project activity or not.

In India EIA process is quite effective because many good initiatives have been taken by Ministry of Environment & Forests (MoEF) that are as follows:

- Constitution of Sector specific Expert Appraisal Committees (EACs)
- Constituted State Level Environment Impact Assessment Authorities and Committees
- Holding of regular and longer duration EAC Meetings
- Display of project reports, status and minutes on website
- Issue of administrative instructions for clarity and uniformity in implementation of EIA Notification
- Initiated scheme for accreditation of consultants through Quality Council of India who only can do EIA process for specific sectors.
- Provision of Environment Management Plan:

- For optimization of resource utilization
- Minimization of emissions and waste generation
- Recycling and reuse of waste
- Promote energy efficiency
- Address Social Issues

- Post Environmental Clearance Monitoring to ensure that project proponents have taken action in accordance with the conditions specified in the EC letter.
  - Environmental Clearance (EC) stipulates project specific and general conditions
  - EC letters uploaded in MOEF/project proponent's website for transparency
  - Monitoring Reports received from Regional Offices are examined in the Ministry.
  - Quantitative Monitoring on Air and Water Pollution by Central / State Pollution Control Boards.
  - Compliance status to be uploaded by project proponent and submit six monthly Report

For better implementation and adoption of EIA process, there are many amendments done from time to time. In the comprehensive EIA Notification, 2006, like in years 2009, 2011, 2012, 2013 and 2014. Many circulars and Office Memorandums have also been issued time to time for better complying & implementation of EIA process.

National Green Tribunal Act, 2010

It is an Act of the Parliament of India which enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues. It draws inspiration from the India's constitutional provision of (Constitution of India/Part III) Article 21 Protection of life and personal liberty, which assures the citizens of India the right to a healthy environment. Delhi Pollution Control Committee (DPCC) is a department to control pollution in Delhi.

Definition

The legislate Act of Parliament defines the National Green Tribunal Act, 2010 as follows:

An Act to provide for the establishment of a National Green Tribunal for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.

The Tribunal's dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice. The tribunal is mandated to make and endeavour for disposal of applications or appeals finally within 6 months of filing of the same. Initially, the NGT is proposed to be set up at five places of sittings and will follow circuit procedure for making itself more accessible; New Delhi is the Principal Place of Sitting of the Tribunal and Bhopal, Pune, Kolkata and Chennai shall be the other place of sitting of the Tribunal.

Structure

The Principal Bench of the NGT is in New Delhi. It has regional benches in Pune (West), Bhopal (Central), Chennai (South) and Kolkata (East). Each Bench has a specified geographical jurisdiction in a region. Further, mechanism for circuit benches are also available. For example, the Southern Zone bench, which is based in Chennai, can decide to have sittings in other places like Bangalore or Hyderabad.

The Chairperson of the NGT is a retired Judge of the Supreme Court, head quartered in New Delhi. On 18 October 2010, Justice Lokeshwar Singh Panta became its first Chairman. Retired justice Adarsh Kumar Goel is the incumbent chairman. Other Judicial members are retired Judges of High Courts. Each bench of the NGT will comprise at least one Judicial Member and one Expert Member. Expert members should have a professional qualification and a minimum of 15 years experience in the field of environment/forest conservation and related subjects.

GLOBAL WARMING

Global warming is the phenomenon of gradual increase in temperature near the Earth's surface. This phenomenon has been observed over the past one or two centuries. This change has disturbed the climatic pattern of the earth. However, the concept of global warming is quite controversial. But, the scientists have provided relevant data in support of the fact that the temperature of the Earth is rising constantly.

There are several causes of global warming which have a negative effect on human, plant and animal lives. These causes may be natural or might be the outcome of human activities. In order to curb the issues, it is very important to understand the negatives of global warming.

Causes of Global Warming

Following are the major causes of global warming:

Man-made Causes of Global Warming

Deforestation

Plants are the main source of oxygen. They take in carbon dioxide and release oxygen thereby maintaining environmental balance. The forests are being depleted for many domestic and commercial purposes. This has led to an environmental imbalance thereby giving rise to global warming.

Use of Vehicles

The use of vehicles even for very short distances results into various gaseous emissions. Vehicles burn fossil fuels which emit a large amount of carbon dioxide and other toxins into the atmosphere resulting in a temperature increase.

Chlorofluorocarbon

With the excessive use of air conditioners and refrigerators, humans have been adding CFCs into the environment which affects the atmospheric ozone layer. The ozone layer protects the earth surface from the harmful ultraviolet rays emitted by the sun. The CFCs has led to ozone layer depletion making way for the ultraviolet rays, thereby increasing the temperature of the earth.

Industrial Development

With the advent of industrialization, the temperature of the earth has been increasing rapidly. The harmful emissions from the factories add to the increasing temperature of the earth.

In 2013, the Intergovernmental Panel for Climate Change reported that the increase in the global temperature between 1880 and 2012 has been 0.9 degrees Celsius. The increase is 1.1 degrees Celsius when compared to the preindustrial mean temperature.

Agriculture

Various farming activities produce carbon dioxide and methane gas. These add to the greenhouse gases in the atmosphere and increase the temperature of the earth.

Overpopulation

Increase in population means more people breathing. This leads to an increase in the level of carbon dioxide, the primary gas causing global warming, in the atmosphere

Natural Causes of Global Warming

Volcanoes

Volcanoes are one of the largest natural contributors to global warming. The ash and smoke emitted during volcanic eruptions goes out into the atmosphere and affects the climate.

Water Vapour

Water vapour is a kind of greenhouse gas. Due to the increase in earth's temperature more water gets evaporated from the water bodies and stays in the atmosphere adding to global warming.

Melting Permafrost

Permafrost is there where glaciers are present. It is a frozen soil that has environmental gases trapped in it for several years. As the permafrost melts, it releases the gases back into the atmosphere increasing the earth's temperature.

Effects of Global Warming

Following are the major effects of global warming:

Rise in Temperature

Global warming has led to an incredible increase in earth's temperature. Since 1880, the earth's temperature has increased by 1.4 degrees. This has resulted in an increase in melting of glaciers which have led to an increase in the sea levels. This could have devastating effects on coastal regions.

Threat to the Ecosystem

Global warming has affected the coral reefs that can lead to a loss of plant and animal lives. Increase in global temperatures has made the fragility of coral reefs even worse.

Climate Change

Global warming has led to a change in climatic conditions. There are droughts at some places and floods at some. This climatic imbalance is the result of global warming.

Spread of Diseases

Global warming leads to a change in the patterns of heat and humidity. This has led to the movement of mosquitoes that carry and spread diseases.

Decrease in the Human Population

Due to an increase in floods, tsunamis and other natural calamities, the population of humans tends to decrease. Also, the spread of diseases leads to a decrease in the human population.

Loss of Natural Habitat

A global shift in the climate leads to the loss of habitats of several plants and animals. In this case, the animals need to migrate from their natural and many of them even get extinct. This is yet another major impact of global warming on biodiversity.

Prevention -:

Global warming can be controlled by simple measures like -:

1. Planting a lot of trees and avoiding deforestation
2. Minimize the use of vehicles
3. Reduce the release of green house gases
4. Industries should filter the smoke before releasing it into the atmosphere
5. Restrict the use or release of CFCs
6. Reduce the burning of fuels so as to reduce CO_2 emissions
7. Adopt the concept of reduce reuse and recycle

GREEN HOUSE EFFECT

"Greenhouse effect is the process by which radiations from the sun are absorbed by the greenhouse gases and not reflected back into space. This insulates the surface of the earth and prevents it from freezing."

What is the Greenhouse Effect?

A greenhouse is a house made of glass that can be used to grow plants. The sun's radiations warm the plants and the air inside the greenhouse. The heat trapped inside can't escape out and warms the greenhouse which is essential for the growth of the plants.

Same is the case in the earth's atmosphere. During the day the sun heats up the earth's atmosphere. At night, when the earth cools down the heat is radiated back into the atmosphere. During this process, the heat is absorbed by the greenhouse gases in the earth's atmosphere. This is what makes the surface of the earth warmer that makes the survival of living beings on earth possible.

However, due to the increased levels of greenhouse gases, the temperature of the earth has increased to a very high level due to various factors. This has led to several drastic effects.

Greenhouse Gases

"Greenhouse gases are the gases that absorb the infrared radiations and create a greenhouse effect. For example carbon dioxide and chlorofluorocarbons."

Causes of Greenhouse Effect

The major causes of the greenhouse effect are:

Burning of Fossil Fuels

Fossil fuels are an important part of our lives. They are widely used in transportation and to produce electricity. Burning of fossil fuels releases carbon dioxide. With the increase in population, the utilization of fossil fuels had increased. This has led to an increase in the release of greenhouse gases in the atmosphere.

Deforestation

Plants and trees take in carbon dioxide and release oxygen. Due to the cutting of trees, there is an inconsiderable increase in the greenhouse gases which increases the earth's temperature.

Farming

Nitrous oxide used in fertilizers is one of the contributors to the greenhouse effect in the atmosphere.

Industrial Waste and Landfills

The industries and factories produce harmful gases which are released in the atmosphere.

Landfills also release carbon dioxide and methane that adds to the greenhouse gases.

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Effects of Greenhouse Effect

The main effects of increased greenhouse gases are:

Global Warming

It is the phenomenon of a gradual increase in the average temperature of the Earth's atmosphere. The main cause for this environmental issue is the increased volumes of greenhouse gases such as carbon dioxide and methane released by the burning of fossil fuels, emissions from the vehicles, industries and other human activities.

Depletion of Ozone Layer

Ozone Layer protects the earth from harmful ultraviolet rays from the sun. It is found in the upper regions of the stratosphere. The depletion of the ozone layer results in the entry of the harmful UV rays to the earth's surface that might lead to skin cancer and can also change the climate drastically.

The major cause of this phenomenon is the accumulation of natural greenhouse gases including chlorofluorocarbons, carbon dioxide, methane, etc.

Smog and Air Pollution

Smog is formed by the combination of smoke and fog. It can be caused both by natural means and man-made activities.

In general, smog is generally formed by the accumulation of more greenhouse gases including nitrogen and sulfur oxides. The major contributors to the formation of smog are the automobile and industrial emissions, agricultural fires, natural forest fires and the reaction of these chemicals among themselves.

Prevention -:

1. Reduce the release of green house gases - According to the Indian Ecological Protection Agency, carbon dioxide makes up more than 80% of the greenhouse gas releases in this country. Methane, nitrous oxide and fluorinated gases also have the aptitude to trap heat in the earth's sky and create the greenhouse effect. Most of these gases enter the air when fossil fuels, like coal, oil and natural gas are burned. Paying close attention to energy use is an outstanding way to help prevent the greenhouse effect.
2. Conserve energy - Almost half of the greenhouse gas releases in the India are the result of energy manufacture and other manufacturing process that rely on the red-hot of fossil fuels. To help prevent the greenhouse effect caused by these releases, take steps to conserve energy. Turn off lights when you leave the room. Buy a programmable thermostat, and attire a sweater instead of turning up the heat.
3. Prefer walk over ride - According to the EPA, the transport sector accounts for closely 30% of conservatory gas emissions, so if you must to drive to work, try carpooling with colleagues. Using public transportation, walking or equestrian a bike whenever likely will also help stop the greenhouse effect. Buying locally made products reduces the distance that products need to be shipped to reach customers, thereby reducing the conservatory gas

emissions caused by freight transportation. Cross cars also emit less greenhouse gases and eat less gasoline.

4. Reforestation - Trees and plants store carbon dioxide; throughout the process of photosynthesis, florae absorb carbon dioxide from the mid-air, convert it to sugar for development, and release oxygen back into the air. Planting a tree means another plant is absorbing carbon dioxide from the atmosphere and stopping the greenhouse effect. Deforestation releases stored carbon back into the atmosphere, so using wood and paper crops sparingly will also help prevent the conservatory effect by reducing the release of conservatory gases.

OZONE LAYER DEPLETION

Ozone Layer Definition

"The ozone layer is a region in the earth's stratosphere that contains high concentrations of ozone and protects the earth from the harmful ultraviolet radiations of the sun."

What is Ozone Layer?

The ozone layer is found in the lower portion of the earth's atmosphere. It has the potential to absorb around 97-99% of the harmful ultraviolet radiations coming from the sun that can damage life on earth. If the ozone layer was absent, millions of people would develop skin diseases and weakened immune systems.

However, scientists have discovered a hole in the ozone layer over the Antarctic. This has focused their concern on various environmental issues and steps to control them. The main reasons for the ozone hole are chlorofluorocarbons, halogens, carbon tetrachloride, methyl bromide and hydrochlorofluorocarbons.

Let us have a detailed look at the various causes and effects of ozone layer depletion.

Ozone Layer Depletion

"Ozone layer depletion is the gradual thinning of the earth's ozone layer in the upper atmosphere caused due to release of chemical compounds containing gaseous bromine or chlorine from industries or other human activities."

What is Ozone Layer Depletion?

Ozone layer depletion is the thinning of the ozone layer present in the atmosphere. This happens when the chlorine and bromine atoms in the atmosphere come in contact with ozone and destroy the ozone molecules. One chlorine can destroy 100,000 molecules of ozone. It is destroyed more quickly than it is created.

Some compounds release chlorine and bromine on exposure to high ultraviolet light which then contributes to the ozone layer depletion. Such compounds are known as Ozone Depleting Substances (ODS).

Causes of Ozone Layer Depletion

The ozone layer depletion is a major concern and is associated with a number of factors. The main causes responsible for the depletion of the ozone layer are listed below:

Chlorofluorocarbons

Chlorofluorocarbons or the CFC are the main cause of ozone layer depletion. These are released by soaps, solvents, spray aerosols, refrigerators, air-conditioners, etc.

The molecules of chlorofluorocarbons in the stratosphere are broken down by the ultraviolet radiations and release chlorine atoms. These atoms react with ozone and destroy it.

Unregulated Rocket Launches

Researchers say that the unregulated launching of rockets result in much more depletion of ozone layer than the CFCs do. If not controlled, this might result in a huge loss of the ozone layer by the year 2050.

Nitrogenous Compounds

The nitrogenous compounds such as NO2, NO, N2O are highly responsible for the depletion of the ozone layer.

Natural Causes

The ozone layer has been found to be depleted by certain natural processes such as Sun-spots and stratospheric winds. But it does not cause more than 1-2% of the ozone layer depletion.

The volcanic eruptions are also responsible for the depletion of ozone layer.

Effects Of Ozone Layer Depletion

The depletion of ozone layer has harmful effects on the environment. Let us see the major effects of ozone layer depletion on man and environment.

Effects on Human Health

The humans will be directly exposed to the harmful ultraviolet radiations of the sun due to the depletion of ozone layer. This might result in serious health issues among humans such as skin diseases, cancer, sunburns, cataract, quick ageing, and weekend immune system.

Effects on Animals

Direct exposure to ultraviolet radiations leads to skin and eye cancer in animals.

Effects on the Environment

Strong ultraviolet rays may lead to minimal growth, flowering and photosynthesis in plants. The forests also have to bear the harmful effects of the ultraviolet rays.

Effects on Marine Life

Planktons are greatly affected by the exposure to harmful ultraviolet rays. These are higher in the aquatic food chain. If the planktons are destroyed the organisms present in the lower food chain are also affected.

Solutions to Ozone Layer Depletion

The depletion of ozone layer is a serious issue and various programmes had been launched by the government of various countries to prevent it. But, steps should be taken at the individual level as well to prevent the depletion of ozone layer.

Following are some of the points that would help in preventing this problem at a global level:

Avoid Using Pesticides

Natural methods should be implemented to get rid of pests and weeds instead of using chemicals. One can use eco-friendly chemicals to remove the pests or remove the weeds manually.

Minimize the Use of Vehicles

The vehicles emit a large amount of greenhouse gases that lead to global warming as well as ozone depletion. Therefore, the use of vehicles should be minimized as much as possible.

Use Eco-friendly Cleaning Products

Most of the cleaning products have chlorine and bromine releasing chemicals that find way into the atmosphere and affect the ozone layer. These should be substituted with natural products to protect the environment.

The Use of Nitrous Oxide should be Prohibited

The government should take actions and prohibit the use of harmful nitrous oxide that is adversely affecting the ozone layer. The people should be made aware of the harmful effects of nitrous oxide and the products emitting the gas so that its use is minimized at the individual level as well.

ACID RAIN

Acid Rain as the name suggests can be said to be the precipitation of acid in the form of rain in the simplest manner. When atmospheric pollutants like oxides of nitrogen and Sulphur react with rainwater and come down with the rain, then this results in Acid Rain.

Causes of Acid Rain

The causes of acid rain are ***Sulfur and Nitrogen particles which get mixed with the wet components of rain***. Sulfur and Nitrogen particles which get mixed with water are found in two ways either man-made i.e. as the emissions are given out from industries or by natural causes like how a lightning strike in the atmosphere releases nitrogen ions and sulphur is released from volcanic eruptions.

The regular clean rain we experience, even though it is not clean i.e. water and carbon dioxide react together to form weak carbonic acid which essentially by itself is not extremely harmful. The reaction occurring is :

$$H_2O\ (l) + CO_2\ (g) \rightleftharpoons H_2CO_3\ (aq)$$

The pH value of regular rainwater is around 5.7, giving it an acidic nature. The oxides of nitrogen and sulphur are blown away by the wind along with the dust particles. They settle on the earth's surface after coming down in the form of precipitation. Acid rain is essentially a byproduct of human activities which emit oxides of nitrogen and sulphur in the atmosphere. Example – the burning of fossil fuels, unethical waste emission disposal techniques.

Sulphur dioxide and nitrogen dioxide undergo oxidation and then they react with water resulting in the formation of sulphuric acid and nitric acid respectively. The following reaction will clarify the acid formation reaction:

$$2SO_2\ (g) + O_2\ (g) + 2H_2O\ (l) \rightarrow 2H_2SO_4\ (aq)$$
$$4NO_2\ (g) + O_2\ (g) + 2H_2O\ (l) \rightarrow 4HNO_3\ (aq)$$

Effects of Acid Rain

- Acid rain is very harmful to agriculture, plants, and animals. It washes away all nutrients which are required for the growth and survival of plants. Acid rain affects agriculture by the way how it alters the composition of the soil
- It causes respiratory issues in animals and humans.
- When acid rain falls down and flows into the rivers and ponds it affects the aquatic ecosystem. As it alters the chemical composition of the water, to a form which is actually harmful to the aquatic ecosystem to survive and causes water pollution.
- Acid rain also causes the corrosion of water pipes. Which further results in leaching of heavy metals such as iron, lead and copper into drinking water.
- It damages the buildings and monuments made up of stones and metals.

Prevention of Acid Rain

- The only precaution that we can take against acid rain is having a check at the emission of oxides of nitrogen and sulphur.

- We have so far seen the details of acid rain and its harmful effect on animals, plants and the monuments.
- Being responsible citizens, one should be aware of the harmful effects they cause and of the industries which give out nitrogen and sulphur compound wastes unethically.

ECO FRIENDLY MATERIALS

Eco-friendly materials are "material that do not harm the environment whether in their production, use or disposal". In other words, these products help preserve the environment by significantly reducing the pollution they could produce.

Bamboo Fiber

Bamboo is considered one of the most renewable resources on the planet due to its ability to rapidly grow in various climates throughout the world and its natural antibacterial properties, which don't require the need for chemicals or pesticides.

Cork

Cork has naturally buoyant and waterproof properties. As a naturally harvested material, only the bark from the cork tree is taken which means the tree can keep on living and provide oxygen to the environment. Cork is a biodegradable and easily recyclable resource. During the manufacturing process, any cork waste that is produced can be recycled to make other cork products and will not pollute the environment.

Bioplastic Compostable

Bioplastics are materials made from sugar cane fibers, corn, and potato starch. They are an eco-friendly alternative to petroleum-based plastics which can take hundreds of years to biodegrade in the environment. Since bioplastics are generated from sustainable sources, they will break down naturally instead of producing more plastic waste into the environment.

Organic Cotton

The "fabric of our lives" is used for nearly everything we come in contact with on a daily basis, from our clothes and bedsheets to even some of the food we eat. The growth of conventional cotton can have a huge environmental impact on the use of toxic pesticides and fertilizers. Organic cotton is grown without toxic chemicals and requires less water so the surrounding environmental impact organic cotton farming is much lower.

Soybean Fabric

Soybean fabric is a renewable resource as it is made from a by-product of soy foods such as tofu and soybean oil. It has a soft texture comparable to silk when it drapes and can be used for many textiles in the home. It's also a cruelty-free alternative to silk and cashmere production, which both involve the use of animals.

Recycled Glass

Recycled glass can be melted down into different forms of glass or glass fiber. When glass bottles arrive in the recycling facility, they are broken and crushed up into tiny pieces, sorted and cleaned, then prepared to be mixed with raw materials like sand, soda ash, and limestone. Combined with these raw materials, glass pieces are melted and molded into new glass bottles and jars.

Glass produced from recycled glass is melted at lower temperatures thus lowering energy requirements for production compared to glass produced directly from raw materials. Recycling glass also reduces the amount of glass waste that will end up in landfills.

RECYCLING

Introduction

Recycling of waste product is very important as it helps in processing waste or used products into useful or new products. Recycling also helps in controlling air, water and land pollution. It uses less energy. There are a number of items that can be recycled. For e.g. Paper, plastic, glass, etc.

Recycling of Paper

Today over half of the total paper used by humans is collected and recycled. Paper is considered to be the major component of solid waste and makes 50% of the garbage in landfills. Paper is recycled by taking it to the recycling plant where it is separated and then the separated paper is cleaned and washed with soap to break it down. After breaking down, it is exposed to heat and after some time it breaks down into cellulose. Recycle is an essential method to minimize waste accumulation and reduce pollution. We can recycle old newspapers, notebooks and used envelops but paper contaminated with food, carbon paper, and stickers cannot be recycled. This method is an excellent and cost-efficient way of conserving the environment and saving energy.

Recycling of Plastics

Recycle of plastic is very important. If plastics are not recycled at the proper time, then they get mixed with other chemicals or materials and hence become more difficult to recycle and become a source of pollution. Plastics are non-biodegradable and they do not get decomposed by the microbial action. To avoid this, it is important to use biopolymers or biodegradable polymers.

Benefits of Waste Recycling

- Recycling helps in protection of the environment: Recycling helps in reducing air, land, water and soil pollution.
- Recycling helps in conserving natural resources
- Recycling helps in saving energy: If not recycled it takes more energy to produce items with raw materials and as a result price of products can now be cheap and energy efficient.

CONCEPT OF GREEN BUILDING

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A ‘green’ building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life.

There are a number of features which can make a building ‘green’. These include:

- Efficient use of energy, water and other resources
- Use of renewable energy, such as solar energy
- Pollution and waste reduction measures, and the enabling of re-use and recycling
- Good indoor environmental air quality
- Use of materials that are non-toxic, ethical and sustainable
- Consideration of the environment in design, construction and operation
- Consideration of the quality of life of occupants in design, construction and operation
- A design that enables adaptation to a changing environment

Any building can be a green building, whether it’s a home, an office, a school, a hospital, a community centre, or any other type of structure, provided it includes features listed above.

However, it is worth noting that not all green buildings are – and need to be - the same. Different countries and regions have a variety of characteristics such as distinctive climatic conditions, unique cultures and traditions, diverse building types and ages, or wide-ranging environmental, economic and social priorities – all of which shape their approach to green building.

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