For Anthropology (EVS) (9:40am-10:40am) Thursday (26-03-2020)

Chapter 5: Environmental Pollution (Continued…..)

Topics to Cover

Noise Pollution

Introduction

"Sound is mechanical energy from a vibrating source. A type of sound may be pleasant to someone and at the same time unpleasant to others. The unpleasant and unwanted sound is called noise".

There is a wide range of sound pressures, which encounter human ear. The noise measurements are expressed as Sound Pressure Level (SPL) which is logarithmic ratio of the sound pressure to a reference pressure. It is expressed as a dimensionless unit, decibel (dB). The international reference pressure of 2×10^{-5} Pa is the average threshold of hearing for a healthy ear. Decibel scale is a measure of loudness. Noise can affect human ear because of its loudness and frequency (pitch).

Source of Noise Pollution

There are several sources of noise pollution that contribute to both indoor and outdoor noise pollution. Noise emanating from factories, vehicles, playing of loudspeakers during various festivals can contribute to outdoor noise pollution while loudly played radio or music systems, and other electronic gadgets can contribute to indoor noise pollution. The noise generated by firecrackers is much higher than the prescribed levels. The permitted noise level is 125 decibels, as per the Environment (Protection) (second amendment) Rules, 1999.

Effects of Noise Pollution

The most direct harmful effect of excessive noise is physical damage to the ear and the temporary or permanent hearing loss often called a temporary threshold shift (TTS). Noise pollution causes the following effects:

1 **Interferes with man's communication:** In a noisy area communication is severely affected.

2 **Hearing damage:** Noise can cause temporary or permanent hearing loss. It depends on intensity and duration of sound level.

3 **Physiological and psychological changes:** Continuous exposure to noise affects the functioning of various systems of the body. It may result in hypertension, insomnia (sleeplessness), gastro-intestinal and digestive disorders, peptic ulcers, blood pressure changes, behavioural changes, emotional changes etc.

Control of Noise Pollution

There are four fundamental ways in which noise can be controlled: Reduce noise at the source, block the path of noise, increase the path length and protect the recipient. In general, the best control method is to reduce noise levels at the source.

1.*Reduction in sources of noise*: Sources of noise pollution like heavy vehicles and old vehicles may not be allowed to ply in the populated areas.

2. Noise making machines should be kept in containers with sound absorbing media. The noise path will be uninterrupted and will not reach the workers.

3. Proper oiling will reduce the noise from the machinery.

4. *Use of sound absorbing silencers*: Silencers can reduce noise by absorbing sound. For this purpose various types of fibrous material could be used.

5. Planting more trees having broad leaves.

6. *Through law*: Legislation can ensure that sound production is minimised at various social functions. Unnecessary horn blowing should be restricted especially in vehicle-congested areas.

Thermal Pollution

Introduction

"Thermal pollution is the presence of waste heat in the water which can cause undesirable changes in the natural environment"

It occurs when an industry removes water from a source, uses the water for cooling purposes and then returns the heated water to its source.

Source of Thermal pollution

Heat producing industries i.e. thermal power plant, nuclear power plants, refineries, steel mills etc. are the major sources of thermal pollution. Power plants utilize only 1/3 rd of the energy provided by fossil fuels for their operation. Remaining 2.3 rd is generally lost in the form of heat to the water used for cooling. Excess of heat reaching to water bodies causes thermal pollution of that water bodies.

Effect of Thermal pollution

1. The dissolved oxygen content of water is decrease as the solubility of oxygen in water is decreased at high temperature.
2. High temperature becomes barrier for oxygen penetration into deep cold water
3. Toxicity of pesticide, detergent and chemicals in the effluents increases with increase in temperature.
4. The composition of flora and fauna changes because the species sensitive to increased temperature due to thermal shock will be replaced by temperature tolerant species.

Control of Thermal Pollution

Thermal pollution can be controlled by passing the heated water through a cooling pond or a cooling tower after it leaves the condenser. The heat is dissipated into the air and the water can then be discharged into the river or pumped back to the plant for reuse as cooling water. There are several ways in which thermal pollution can be reduced.

The following methods can be employed for control of thermal pollution-

1. Cooling ponds: Water from condensers is stored in ponds where natural evaporation cools the water which can then be recalculated or discharged in nearby water body.

2. Spray ponds: The water from condensers is received in spray ponds. Here the water is sprayed through nozzles where fine droplets

are formed. Heat from these fine droplets is dissipated to the atmosphere.

3. Cooling towers:

a. Wet cooling tower- Hot water is sprayed over baffles. Cool air entering from sides takes away the heat and cools the water. This cool water can be recycled or discharged.

b. Dry cooling tower- The heated water flows in a system of pipes. Air is passed over these hot pipes with fans. There is no water loss in this method but installation and operation cost of dry cooling tower is many times higher than wet cooling tower.