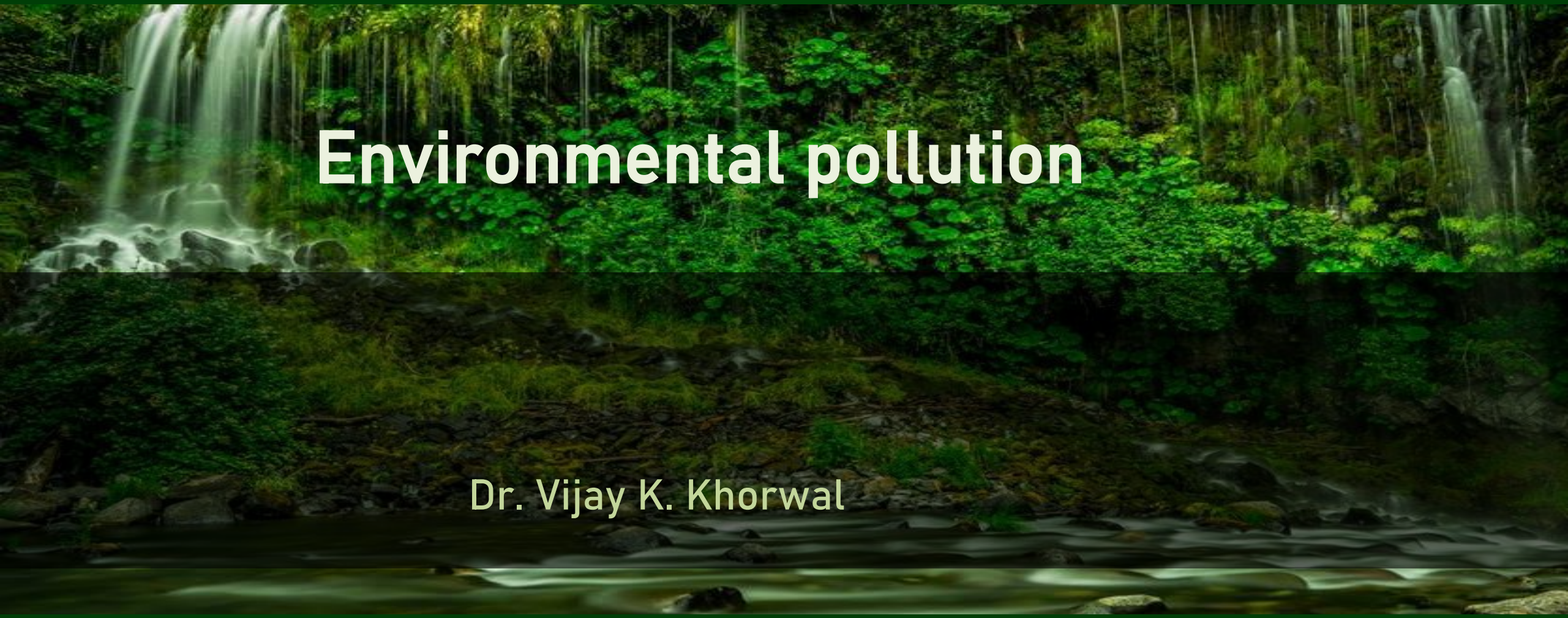

Environmental pollution

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CHE 110: Environmental Studies

Unit - 4

Environmental pollution

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Eutrophication

- Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams receive excess nutrients that stimulate excessive plant growth (algae, periphyton attached algae, and nuisance plants weeds).
- This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die.
- Nutrients can come from many sources, such as fertilizers applied to agricultural fields, deposition of nitrogen from the atmosphere; erosion of soil containing nutrients; and sewage treatment plant discharges.
- Cultural eutrophication :- Cultural eutrophication is an increase in biological productivity and ecosystem succession caused by human activity

Biomagnification

- Biomagnification is the increase in concentration of a substance, such as the pesticide, that occurs in a food chain.
- The pollutant enters the first organism in a food chain.
- When the second organism in the chain consumes the first one, the pollutant too moves into the second organism
- As we go up the levels of the ecological pyramid, there is energy loss.
- Hence, at each succeeding level, the predator consumes more of the prey.
- As a result, the organisms at higher levels have greater concentrations of the pollutant.

Control of Water Pollution

- ✓ Treatment of domestic and industrial waste
- ✓ Control on excess use of fertilizers and pesticides in agriculture
- ✓ Strict enforcement of rules
- ✓ Public awareness
- ✓ Industrial waste should be treated before it is discharged into the pond or lake.
- ✓ Paper, plastic, food material etc. should not be thrown in rivers.
- ✓ Human activities like bathing and washing must be stopped.
- ✓ The laws of pollution should be implemented strictly.
- ✓ Washing of trucks, tractors and other heavy vehicles in the water bodies should not be allowed.
- ✓ Use of harmful chemicals such as pesticides and fertilizers must be controlled in agriculture

The Minamata Story

- The long-term and indirect effects of the prolonged of chemical pollutants in the water best illustrated by the Minamata episode.
- In Japan, near the bay of Minamata, people began suffering from the mysterious disease.
- The culprit was traced to mercury.
- It is deposited in the river stream from the industrial waste, which meets in bay of Minamata.
- The accumulation of mercury is increased day by day, in the all local inhabitants, whomsoever consumed the poisoned fishes, rich with the accumulation of mercury.
- This result death of the several people, neurological disorder, loss of senses etc…

Marine Pollution

- The presence of undesirable materials in the ocean environment added directly or indirectly by humans that adversely affect biological resources and human health is called *marine pollution*.

- **Causes of Marine Pollution**
  - Oil and petroleum spillage
  - Toxic chemicals
  - Hazardous wastes (Radioactive Waste)
  - Raw sewage
  - Thermal pollution

Continue…

❑ Effects of Marine Pollution

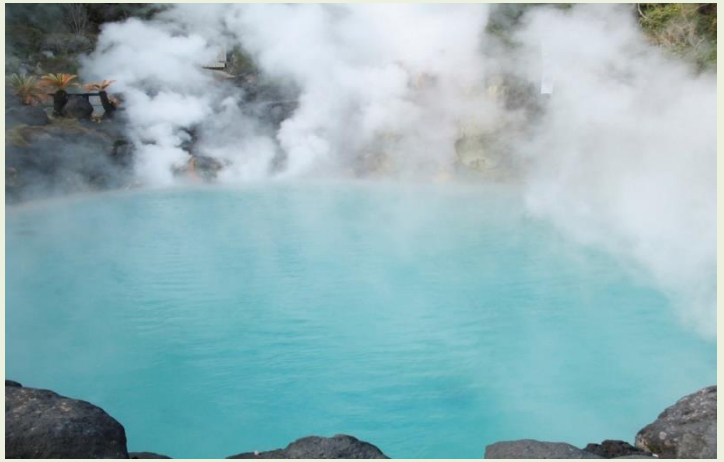
- ➢ Reduction in photosynthetic rate in marine plants, as polluted water allow less sunlight to go in.
- ➢ Decline in volume of dissolved O_2 affecting the survival of marine organisms
- ➢ Toxicity of water by heavy metals such as mercury, arsenic, cadmium, cyanide, etc.
- ➢ Consumption of marine food collected from polluted waters causes various diseases

❑ Control of Marine Pollution

- ✓ By using oleic and stearic acid which help in concentrating and removing oil pollutants
- ✓ By recycling solid waste such as plastic, glass, metal, papers, etc.
- ✓ By establishing marine protected areas, bioregional management approach, and negotiation of international agreements
- ✓ By ensuring maintenance and proper security of ships
- ✓ Removal of pollutants by using Microbes.

Thermal Pollution

- The rise in the temperature of water due to discharge of warm water, which is used to cool machines in factories and in nuclear and thermal power plants, is called *thermal pollution*.



- **Sources of Thermal Pollution**
  - **Electric Power Plant**
  - **Industries**

- A major cause of thermal pollution is deforestation.
- Soil erosion and contamination of water also cause retention of heat.

❑ Effects of Thermal Pollution

- Increase in temperature of water decreases the concentration of dissolved oxygen in water making it unsuitable for the survival of aquatic life.
- Activities of certain pathogenic microorganisms accelerate due to increase in temperature.
- Toxic pollutants as cadmium, copper, and arsenic present in heated effluents make the water unsuitable for any purpose.

❑ Control of Thermal Pollution

- Establishment of cooling towers in industries
- Construction of ponds for collecting hot water
- Construction of artificial lakes for the discharge of hot effluents from where cool water can be extracted later

Environmental Impact of Thermal Power Stations

- Air pollution:
  - pollutant (SO_2, CO, NO_2, VOC) are emitted from power plant.
- Water pollution: From thermal pollution
- Land Degradation:
  - Ash produced from burning coal in thermal power station, need to be disposed to the land which cause degradation of land quality.
  - It needs 1 acre area to dispose the amount of ash produced for generation of just 1 MW electricity
- Noise pollution y equipment used in thermal power plant cause noise pollution.

Noise Pollution

- Refers to loud sound created by humans or machines that disrupt the environment and normal living of organism in it.
- The unwanted noise dumped into the atmosphere that leads to discomfort and health hazards called *noise pollution*.

❑ Sources of Noise Pollution

- ➢ Natural phenomena such as violent volcanic eruptions, thunder, fierce storms,
- ➢ Domestic appliances such as mixers, washing machines, telephones, etc.
- ➢ Industries such mills and factories
- ➢ Automobiles –music system n constant honking by drivers.
- ➢ Noise by Trains, ships, and aircrafts
- ➢ Bursting of crackers and playing loud music
- ➢ Entertainment devices such as radio, television, etc.