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**SAI RAM**  
ENGINEERING COLLEGE  
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**SAIRAM**  
DIGITAL RESOURCES

YEAR  
**II**

SEM  
**IV**

**GE8291**

**ENVIRONMENTAL SCIENCE AND ENGINEERING**

**UNIT NO 2**

**ENVIRONMENTAL POLLUTION**

- Role of an individual in prevention of pollution
- Pollution case studies

**SCIENCE & HUMANITIES**



## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

- Use stairs instead of elevators.
- Use public transportation walk or ride a bicycle.
- Plant trees around the building.
- Turn off lights, television sets and computer when not in use.
- Pay immediate attention to leaks in pipes.
- Install waste saving equipment.
- Recycle glass metal and paper.
- Compost garden waste.
- Segregate waste and recycle.
- Buy locally made long lasting material.

## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

- Buy environmentally degradable products.
- Take some bag from home to market to purchase.

Each individual should change his or her lifestyle in such a way as to reduce environmental pollution. Help more in pollution prevention than pollution control.

- Use eco-friendly products.
- Cut down the use of chlorofluorocarbons (CFCs) as they destroy the ozone layer.
- Use the chemicals derived from peaches and plums to clean computer chips and circuit boards instead of CFCs.

## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

- Use CFC free refrigerators.
- Reduce your dependency on fossil fuel, especially coal or oil.
- Save electricity by not wasting it when not required because electricity saved is electricity generated without polluting the environment. Put on warm clothes rather than switching on a heater.
- Adopt and popularize renewable energy sources.
- Improve energy efficiency. This will reduce the amount of waste energy, i.e. more is achieved with less energy.
- Promote reuse and recycling wherever possible and reduce the production of wastes.

## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

- Use a mass transport system. For short-visits, use a bicycle or go on foot. Decrease the use of automobiles.
- Use pesticides only when absolutely necessary and that too in right amounts. Wherever possible integrated pest management, including alternate pest control methods (biological control), should be used.
- Use rechargeable batteries. Rechargeable batteries will reduce metal pollution.
- Use less hazardous chemicals wherever their application can be afforded. Baking soda, vinegar and borax can help in cleaning, bleaching and softening. Baking soda can replace modern deodorants.

## 2.4.1 ROLE F INDIVIDUAL IN PREVENTION OF POLLUTION

- The solid waste generated during one manufacturing process can be used as a raw material for some other processes.
- Use low phosphate, phosphate-free or biodegradable dishwashing liquid, laundry detergent and shampoo. This will reduce eutrophication of water bodies.
- Use organic manure instead of commercial inorganic fertilizers.

### Role of Women in Environmental Protection:

Women play an important role in environmental protection, considering their status in social production, consumption and their influence to future generations at home.

## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

**Various roles of women are**

- In rural areas, women plant trees and grass, grow vegetables with the drip-irrigation method in order to save water.
- In urban areas, they go shopping using cloth bags to reduce white pollution.
- Women refuse to use disposal products to save energy and resources,
- Women choose green products instead of poor quality that harm the environment.
- Women reduce the amount of trash they dispose off so as to recycle natural resources.



## 2.4.1 ROLE OF INDIVIDUAL IN PREVENTION OF POLLUTION

- Women buy non-phosphate detergents to reduce the incidence of water pollution.
- They refuse to eat the meat, so a variety of animals are preserved.
- They value paper and thus protection.
- Women bring the concept of environmental protection into families and thus plant a green seed in the heart of children.

<https://youtu.be/eJqO7GrGLDc>



## 2.4.2 POLLUTION CASE STUDIES: BHOPAL GAS TRAGEDY

- The careless siting of industries and relatively poor regulatory controls leads to ill health in the surroundings.
- The Bhopal gas tragedy on December 2nd 1984, where Union Carbide's Plant leaked 43 tons of Methyl Isocyanate and other substances, used in the manufacture of pesticides is one of the worst industrial accidents in the recent past.
- Of the 5,20,000 people who were exposed to the gas - 8,000 died during the first week and another 8,000 later.
- The impact of the survivors is visible even today.

## CHERNOBYL REACTOR INCIDENT

- On April 25, 1986, Russian engineers and scientists began preliminary tests on Chernobyl power plant's 4th reactor.
- In order to control the experiment, the automatic control system was shut down. After some work, stability was reached at very low power outputs.
- Unfortunately, manual control of the water pressure wasn't maintained.
- The reactor began to create excess heat. Without the automatic control, the control rods couldn't be reinserted in time; a deadly chain reaction had begun.
- Within a matter of 3-4 seconds, the reactor went from 5% output to 100 times its normal level.

## CHERNOBYL REACTOR INCIDENT

- The water in the reactor flash-boiled, creating an explosion that leveled thousands of tons of concrete and steel, including the housing for the reactor.
- Several thousand volunteers died on the scene, and it is estimated that 7,000 to 10,000 volunteers died in total, considering short and long-term effects.
- Thousands of miles from the birth defect rate became double the world average.
- It is also estimated that 150,000 were put at risk for thyroid cancer, and over 800,000 children were put at risk of contracting leukemia.

## CHERNOBYL REACTOR INCIDENT

- 2 million acres of land (1/5 of the usable farmland in the Ukraine) was, and still is, completely unusable.
- It remains difficult to determine the scope of the disaster; radiation resulting from the event was detected all over the globe.
- It is estimated that it may cost up to \$400 billion and will take up to 200 years to correct the damage done to the area, and to compensate those affected by the meltdown.

## GROUNDWATER POLLUTION IN INDIA

- An example of groundwater pollution caused by excessive extraction is that fluoride contamination.
- It has spread across 19 states and across a variety of ecological regions ranging from the Thar desert, the Gangetic plains and the Deccan plateau.
- Source: When the bedrock weathers the fluoride leaches into water and the soil surface during the last three decades extraction of groundwater which has resulted in the tapping of aquifers with high fluoride concentrations was noticed during 1970s and the 1980s when there was massive state investment in rural water development for irrigation as well as for drinking.

## GROUNDWATER POLLUTION IN INDIA

- Encouraged by state subsidies on diesel and electricity, people invested in diesel and submersible pumps in a bid to extract groundwater through borewells
- This policy aggravated the fluoride problem.
- Effects: combines with the bones as it has an affinity for calcium phosphate in the bones.
- Excess intake of fluoride can lead to dental fluorosis, skeletal fluorosis or non-skeletal fluorosis.
- Correction: Defluoridation plants and household water treatment kits are stop-gap solutions.

## MARINE POLLUTION IN TAMIL NADU: OCEANS NOT SPARED

- Industrial pollution has threatened the natural habitats of pearls in the pearl banks of Tuticorin coast in the Gulf of Mannar.
- It has affected fish and other organisms as far as 30 kms south of Tuticorin due to effluents released from chemical industries.
- Tannery wastes have caused the pollution of coastal waters from Chennai to Vedaranyam.
- The effect of diversity of phytoplankton ecology of mangrove estuaries of Tuticorin is greatly affected by industrial effluents.
- The Chennai coastal waters showed high levels of pesticides like DDT, lindane, endosulfan and heptachlor.



## NOISE HITS WHALES IN HONG KONG

- Studies have shown that shipping traffic in Hong Kong, which is one of the busiest ports in the world with approximately half a million oceanic vessels traveling through its waters every year (including over 10,000 transits by high speed ferries) has caused changes in the dolphin and whale behavior especially in response to fast moving vessels.
- A special sanctuary was established by the Hong Kong government in 1995, surrounding the islands of Sha Chau and Lung Kwu Chau, an important place occupied by the humpback dolphins.
- At any given time approximately 200 vessels surround this sanctuary.

## NOISE HITS WHALES IN HONG KONG :

- The sanctuary was a measure to mitigate boat traffic and tremendous noise produced. Adjacent to the sanctuary is an airport, where 700 planes descend and take off every day, directly over the sanctuary.
- All the above activities have caused high noise input into the natural whale habitat. Noise, a major anthropogenic stress factor has caused a general decline in the whale populations.

## THE MINIAMATTA EPIDEMIC (MARINE POLLUTION 1953):

- Miniamatta is a small coastal village in Japan. The Chisso Chemical Company, which produces vinyl polymer plastics uses organomercurial compounds.

## THE MINIAMATTA EPIDEMIC (MARINE POLLUTION 1953):

- The industry released its effluent into Miniamatta sea. The effluent containing mercury ions is converted into methyl mercury, which is highly toxic.
- The marine organisms like phytoplankton and zooplanktons easily absorb the toxic methylmercury compound.
- These organisms are consumed by small fishes and these are in turn consumed by large fishes.
- Finally the large fishes are consumed by human beings. Thus the poisonous chemical enters the body of human beings through the food chain.

## GULF WAR

- The Gulf war took place in Kuwait from January 16 to February 26 1991 between Iraq and the USA.
- During the war American fighters dropped nearly a lakh of bombs, and forced the Iraqi army to withdraw from Kuwait.
- During the retreat of Iraqi they have set fire on nearly 700 oils wells of Kuwait. Since most of the oil wells are on shore of the sea, oil from the oil well spills out into the sea.
- The floating oil over sea water covered nearly 80 km long and 25 km wide area.

- The burning of the oil wells continued nearly for 10 months. The burning of oil wells released huge amounts of pollutants like  $\text{CO}_2$  and  $\text{SO}_2$  into the atmosphere.

### SOFT DRINK BOTTLING UNIT(COCA COLA):

- The coca cola bottling unit at plachimada, Palakkad district, Kerala, discharged large amounts of sludges.
- These sludges are used as fertilizers by the nearby farmers. But analysis of the sludge showed that it contains toxic metals like cadmium and lead.
- The scientists warned that the level of these toxic elements would pollute the land, local water supplies and the food chain.

## PALAR RIVER POLLUTION

- Palar river originates in Nandidurgam of Karnataka state and flows for about 350km through Karnataka, Andhra Pradesh and Tamil Nadu.
- Palar supplies drinking water for several municipalities, towns and villages in Vellore district, Tamil Nadu.
- Now the pallar is polluted by the effluent of various leather industries which in turn affecting the agricultural productivity in 40,000 hectares of croplands.
- **Type of pollutants:** Chrome tanning industries discharge large amounts of chemicals like chromium ,calcium,ammonium salts, organic dyes and acids.

## YOUTUBE LINK

<https://youtu.be/MYghEiGojk4>

<https://youtu.be/e6rglsLy1Ys>

<https://youtu.be/ihFkyPv1jtU>



THANK YOU