# ENVIRONMENTAL ISSUES.

**Pollution** → any undesirable change that is physical, chemical or biological characteristics of air, land, water or soil.

**pollutants** → agents which bring pollution.

→ Environmental (Protection) Act → 1986

| Primary Pollutant | Secondary pollutant |
|---|---|
| $CO_2$, $NO_2$, $SO_2$. | PAN (Peroxy acetyl nitrate). Ozone |

**Air pollution** → Deleteriously affect the respiratory system of humans and animals.

↓ Reduce Growth, Yield of crops, and cause premature death of plants.

Causes →

Smokestacks of thermal power plants, smelters and other industries release particulate and gaseous air pollutants (such as (Nitrogen, Oxygen) → gets polluted

Harmful effect of pollution depends on →

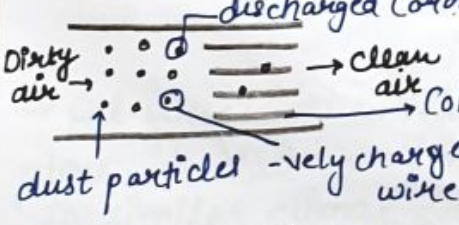
- Conc. of pollutants
- Duration of exposure
- Organisms

## Electrostatic Precipitator →

→ Remove 99% of particulate matter, present in exhaust from Thermal power plant.

→ Electrode wire produce Corona, that release $e^-$. These $e^-$ attach to dust particle, give them -ve charge.

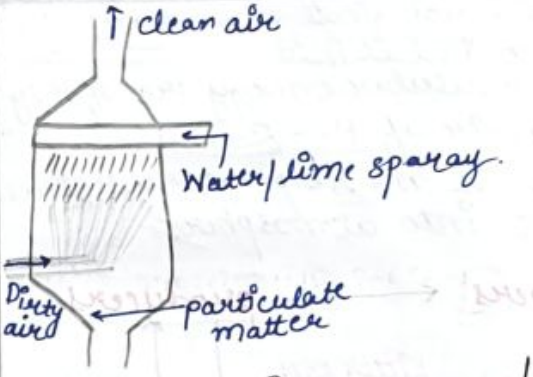
→ Collecting plates are grounded and attract charged dust particles.




## Scrubber →

→ Remove gases like Sulphur dioxide (*)

→ Exhaust is passed through spray of water / lime




Particulate size 2.5 mm / < 2.5 μm (*) acc. to Central Pollution Central Board (CPCB)

→ cause greatest harm to human health.

→ Fine particles inhaled deep into lungs and cause breathing and respiratory systems. → irritation, inflammation, pre-mature death.

→ automobiles are major cause for pollution in metro cities.

## Catalytic Convertor ✓

→ Fitted to Reduce emission of poisonous gases

→ Having platinum, palladium, Rhodium as Catalyst. (*)

→ Vehicles equipped with catalytic convertor should use "unleaded petrol because lead in petrol inactivates catalyst. (*)

→ As exhaust pases through it:

Unburnt Hydrocarbon → $CO_2$ + Water

CO and Nitric acid → $CO_2$ + $N_2$ Gas.

## Noise

→ Undesired high level of Sound

→ 150 dB / more generated by take off of a jet plane or rocket damage ear drums thus permanently impair Hearing ability.

→ Noise Causes. → 1987 (*)

→ Sleeplessness

→ ↑↑ Heart Beat

→ Altered Breathing pattern.

## Controlling Vehicular Air Pollution

↳ All buses of Delhi were converted to run on CNG by end of 2022.

Why CNG Better than Diesel?

→ CNG burns more efficiently, very little of it is left unburnt.

→ CNG is cheaper than petrol/diesel.

→ Cannot be siphoned off by Thives or adulterated.

EURO III Norms → Sulphur Controlled at
- 350 ppm - diesel
- 150 ppm - petrol.

Goal acc. to roadmap is to → Aromatic Hydrocarbons
- Reduce Sulphur — 50 ppm petrol, 42% diesel.
- Aromatic Hydrocarbon — 35%

| Types of Vehicles | Norms | Cities of Implantation. |
|---|---|---|
| 4 Wheelers | Bharat Stage IV | Throughout country since April 2017 |
| 3 Wheelers | 〃 | 1st April 2017 |
| 2 Wheelers | 〃 | April 2017 |

## Domesting Sewage and Industrial Effluents

Water 99.9% — Impurities 0.1%
- ↳ Suspended Solids (eg. Sand, Silt, Clay)
- ↳ Dissolved Materials (eg. Nutrients (nitrates, ammonia, phosphate, Sodium, Calcium))
- ↳ Colloidal Material (eg. Faecal matter, Bacteria, Cloth, paper fibre)

→ Amount of Biodegradable Organic material in Sewage by measuring "Biochemical Oxygen Demand" (BOD).

## Biochemical Oxygen Demand.

→ Amount of Oxygen required by Aerobic bacteria to completely degrade amount of organic matter present in 1L of water.

→ There is sharp decline in Dissolved Oxygen downstream from point of sewage discharge. This causes mortality of aquatic organisms.

**Algal Bloom** → Excessive growth of planktons (free floating algae) in water bodies due to presence of excessive nutrients.

→ Imparts distinct colour Water bodies, Deteriate Water Quality, Cause fish mortality.

## World's Most Problantic Weed

- Water Hyacinth (Eichonia Crassipes)
- Terror of Bengal

→ Introduced in India for it's beautiful flowers, caused Havoc by their excessive growth.

## Sewage from Homes and Hospitals

contain pathogenic microorganisms.

→ disposal to Water w/o proper treatment Can Cause →

Typhoied, Dysentery, Chlora, Jaundice

## Biomagnification

Increase in conc. of toxic substances at successive Trophic level.

e.g. - Mecury and DDT.

→ Toxic substance accumulated by an organism can't by metabolised/excreted. Thus, passed to next level.

High Conc. of DDT in birds - disturb Calcium metabolism → Thinning of egg shell → pre-mature breaking → decline in Bird population.

**Eutrophication** → natural aging of lake by nutrient enrichment of its water.

↳ It takes thousands of years.

## Cultural or Accelerated Eutrophicat.

→ pollutants from Home and Industries can radially accelerate ageing process.

→ prime contaminants are Nitrates and phosphates → plant nutrients.

Pollutants
- Other Pollutants → Poison whole populati" of fish in lake. → Decomposit" of their dead remains further deplete the water dissolved Oxygen → deficiency of $O_2$ to aquatic life → Lake choke to death.
- Nitrates & phosphates (plant nutrients) → ↑↑ growth of algae → Growing algae utilises dissolved $O_2$.

## Heated (Thermal) Waste Water →

↳ flowing out of Thermal Power Plants.
→ Eliminate/Reduce no. of organisms Sensitive to High temp.
→ Damage to indigenous flora and fauna.

## Remedy for Plastic Waste →

Polyblend → Fine powder of recycled modified plastic.

Polyblend + Bitumen
→ Used to lay Roads in Banglore
→ Polyblend enhances Bitumen water Repellant properties (Ahmed Khan)
↓
Increased Road life by 3 times

**Agrochemicals** → Inorganic fertilizers & peticides used for enhancing crop production are Toxic to non-Target organisms.

**Organic farming** → Cyclical → Zero-Waste procedure
↓
Waste products from one process are cycled as nutrients in other process.

## Ramesh Chand Dagar →

→ Bee-Keeping
→ Dairy Management
→ Water Harvesting
→ Composting
→ Agriculture
(Haryana Kisan Welfare Club)

in a chain of processes, which support each other
→ Integrated Organic farming
↓
→ Max utilisation of resources.
→ ↑se efficiency of product.

## Radioactive Waste →

→ Challenges of using Nuclear energy
↓ Accidental Leakage
↓ Disposal of radioactive Waste

→ Three mile Island
→ Chernobyl Incident
→ Bhopal gas Tragedy
} Vimp

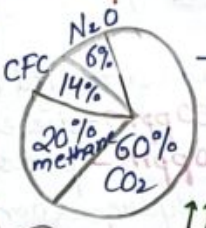
**Radiations from Nuclear Waste**
→ At higher doses → Lethal
→ At lower doses → Causes Cancer
↓
cause mutations at very high rate.

→ Nuclear waste should be pre-treated and then shielded in a container and buried within Rocks (500 m deep Below Earth's Surface)

## Green House Effect and Global Warming →

↓
Green House effect is natural occurring phenomenon, that is responsible for Heating Earth's Surface and atmosphere.

W/o Greenhouse effect, Earth's temp. = -18°C
With Greenhouse effect, Earth's temp = 15°C




→ Greenhouse gases like $CO_2$, Methane, $N_2O$, are responsible for Greenhouse effect.

↑↑ level of Greenhouse gases
↓
Heating of Earth
↓
**Global Warming**
↓ Odd Climatic Change (Elnino effect)
↓ Melting of polar ice caps

→ During past century, Earth temp. has ↑se by 0.6°C.

## How Can We Control Global Warming →

1. Cutting down use of fossil fuel.
2. Improving efficiency of energy usage.
3. Reducing deforestration.
4. Planting more trees.
5. Slowing down use of Human population

## Ozone Depletion

| Bad Ozone | Good Ozone |
|---|---|
| Formed in lower atmosphere. Troposphere | Formed in upper atmosphere Stratosphere |

Ozone act as shield absorbing Harmful UV radiations from Sun.
Thickness of Ozone is measured in Terms of Dobson Unit (DU)
Clorofloro Carbons (CFC's) → ↑se Ozone depletion

**Ozone Hole**
↓
Resulted in formation of Large area of thinned Ozone layer over Antarctica.

## UV-B Radiations
→ Cataract
→ aging of skin
→ Skin Cancer
Inflammation of Cornea (Snow Blindness)

## Deforestation
↳ Conversion of forested area to Non-forested area.
40% → Forest loss in Tropics.
1% → Forest loss in Temperate
→ In beginning of 20th Century forest covered 30% of land of India. By end of 20th century, it shrunks to 21.54%

### Slash and Burn Agriculture / Jhum Cultivation
↓
Farmers cut down trees of forest and Burn plant remains
→ Land used for farming / Cattle Grazying
→ Ashes used as fertilizers.
→ After Cultivation, area left for years to recover.

### Consequences of Deforestration →
1. Loss of Biodiversity
2. Cause Soil erosion and desertification.
3. Disturb hydrologic Cycle.
4. ↑↑ $CO_2$ concentration in atmosphere

### Amrita Devi Bishnoi Wildlife Protection Avvard →
↳ For Individuals / Communities from Rural area, they Shown extraordinary Courage and dedication in protecting Wildlife.

### Chipko Moment → In Garhwal Himalyas, 1974
↓
Local women showed bravery in protecting trees from axe of contractingter by Hugging them.

### Joint Forest Management (1980's) →
→ Govt. of India worked closely with local communities for protecting and managing forest.
→ In Return, communities get benefits of Various forest products.

1. Environmental Protection Act - 1986
2. Air (prevention and Control act) - 1981
↳ amended in 1987 to include noise as air pollutant.
3. Water (Prevention and control of pollution) act - 1974
4. Montreal Protocol → 1987 at Montreal (Canada)
↳ To control emission of Ozone depleting substances.
5. National Forest Policy (1988) of India.
↓
Recommended 33% forest covers plains.
67% forest covers in Hills.

### Integriated Waste Water Treatment
↳ Waste water can be treated in an integrated manner, by utilizing a mix of artificial and natural processes.

**Conventional Sedimentation**
Filtering and chlorine treatment are given.

**Biological Method**
Biologists develops a series of 6 connected marshes over 60 Hectares of Marshland.
→ Appropriate plants, fungi and bacteria were seeded into this area which neutralise, absorb, assimilate pollutants.
→ Marshes also contain a sanctury with high level of Biodiversity

FOAM (Friends of Aracta Marsh)

### Eco-San Toilets
→ Practial, efficient, Hygienic, cost effective sol.n to human waste disposal.
→ Human excretra is recycled into natural fertiliser.
→ Sustainable system using Human Excretra using dry composing toilets.
→ Working in many areas of Sri Lanka and Kerala

### Electronic Waste (e-waste) →
Buried in landfills / incinerated.

### Waste.
→ Biodegradable
→ Recycleable
→ Non-biodegradable.

### Water logging and Soil Salinity →
Irrigation w/o proper drainage of water leads to water logging

Waterlogging draw salt to surface of soil
↓
Salt then start deposited on land surface
↓
↑se salt Content, ↓se crop growth.

Imp—
EL-nino effect – melting of ice caps
Odd climatic Conditions