FACULTY OF ENGINEERING AND TECHNOLOGY

Lecture- 21

Environmental Pollution-Part 1

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Subject : Environmental Studies and Disaster Management
Course: B.Sc. Ag. (Ist year)
Subject Code: PPY-211
Semester: IInd sem.

Environmental Pollution

Pollution

Pollution is the undesirable change in the physical, chemical and/or biological characteristic of the environment due to the addition of unwanted materials.

It can also be defined as addition of foreign material to water, air or soil, which may change immediately or after some time, the natural properties of these basic constituents further causing some unfavorable change by making them unfit and injurious.

Sources: https://images.app.goo.gl/stbWtMimBuwKybuY7; https://images.app.goo.gl/SXzHHMjFjUQqfsuX7

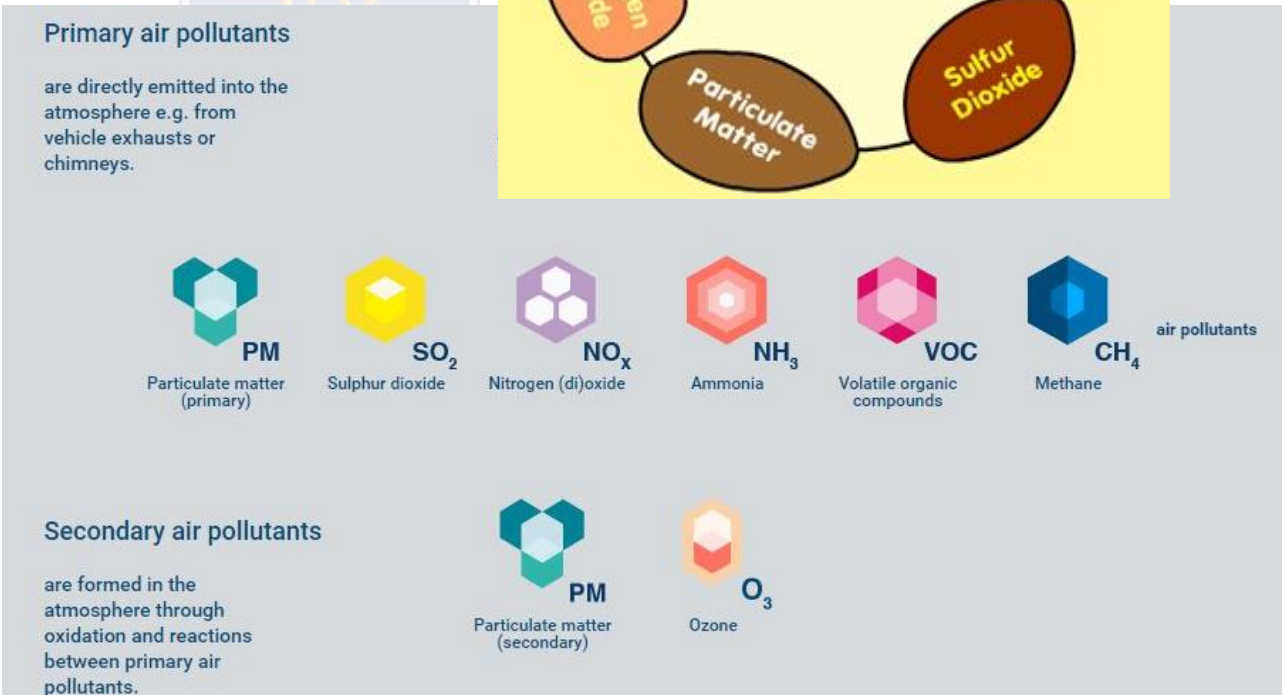
Pollutant

The foreign or unwanted materials that alter natural characteristics of the environment are called pollutants.

Pollutants are of two types:

<u>Primary pollutants:</u> pollutants that directly originates form source. **E.g., *carbon dioxide, sulphur dioxide, carbon monoxide***.

<u>Secondary pollutants:</u> pollutants formed when primary pollutants react in environment. **E.g., *ground level ozone, peroxyacetyl nitrate (PAN), acid rain, etc.***



Sources https://images.app.goo.gl/AtZr5KBjQK62xzrn7; https://images.app.goo.gl/12ETeixgtwxvnoD97

Types of pollution

Major forms of pollution include:

Air pollution

Water pollution

Soil/Land pollution

Marine pollution

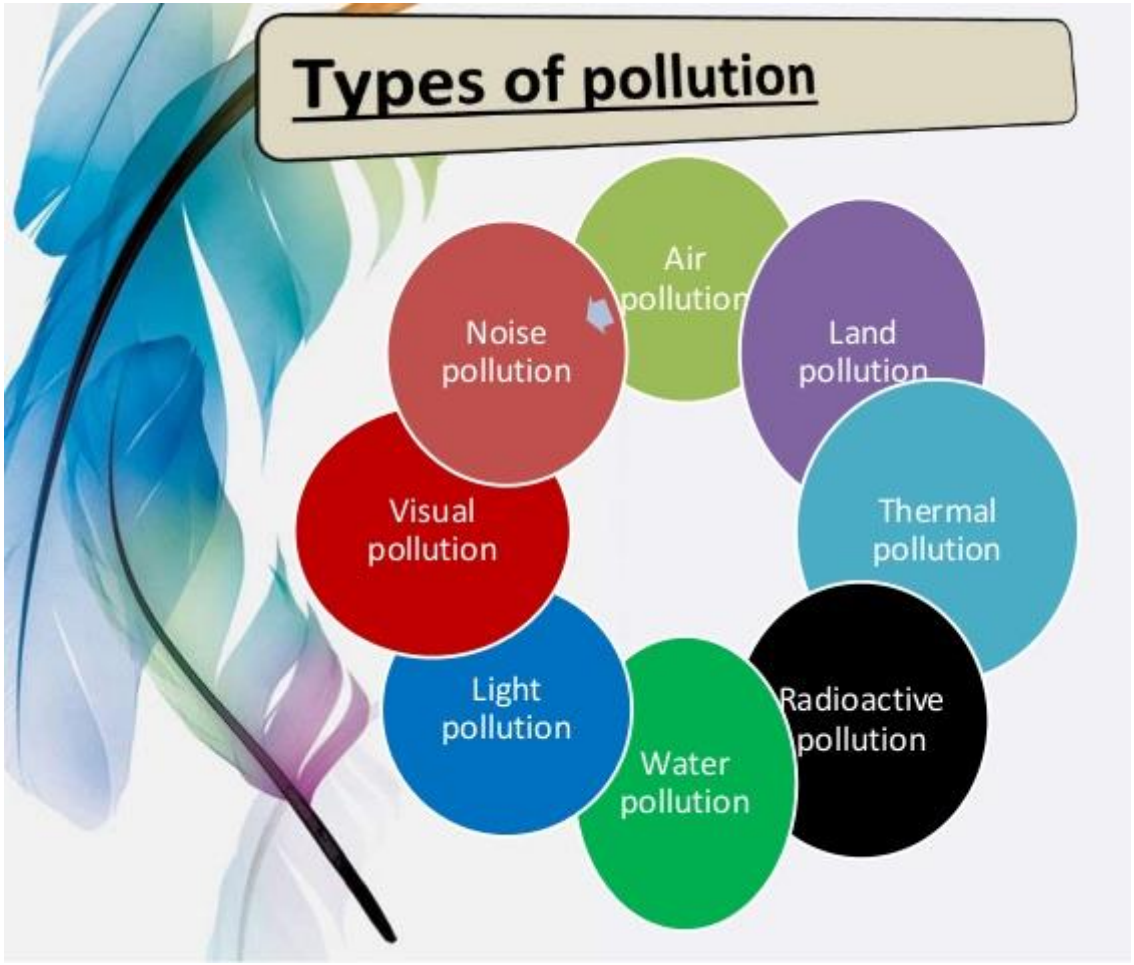
Noise pollution

Thermal pollution

Nuclear/Radioactive pollution

Light pollution

Visual pollution



Sources https://images.app.goo.gl/MnbY5o7Fcj9PZ4956

Air pollution

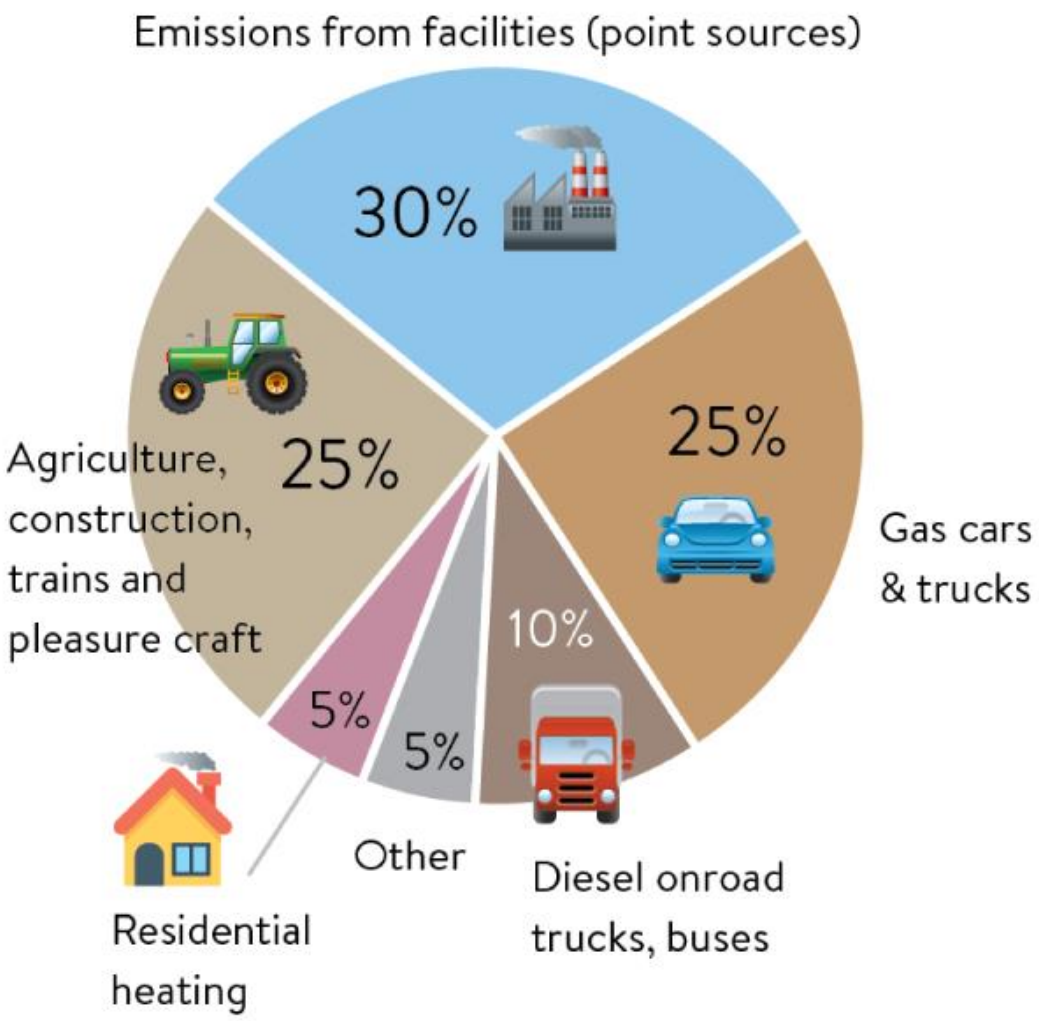
Air pollution

Air pollution is the introduction of chemicals, particles, or biological materials into the atmosphere in quantities that are harmful to human health and the environment i.e., cause discomfort, disease, or death to humans, damage to other living organisms such as food crops, natural environment or built environment.

Sources https://images.app.goo.gl/bXEhBNzy2kQLKS2T9; https://images.app.goo.gl/kxVkY64ESLGvnjT36

The major sources of air pollution are:

- Industrial emissions
- Vehicular emissions
- Domestic emissions
- Agricultural activities
- Other activities like wind blown dust, etc.



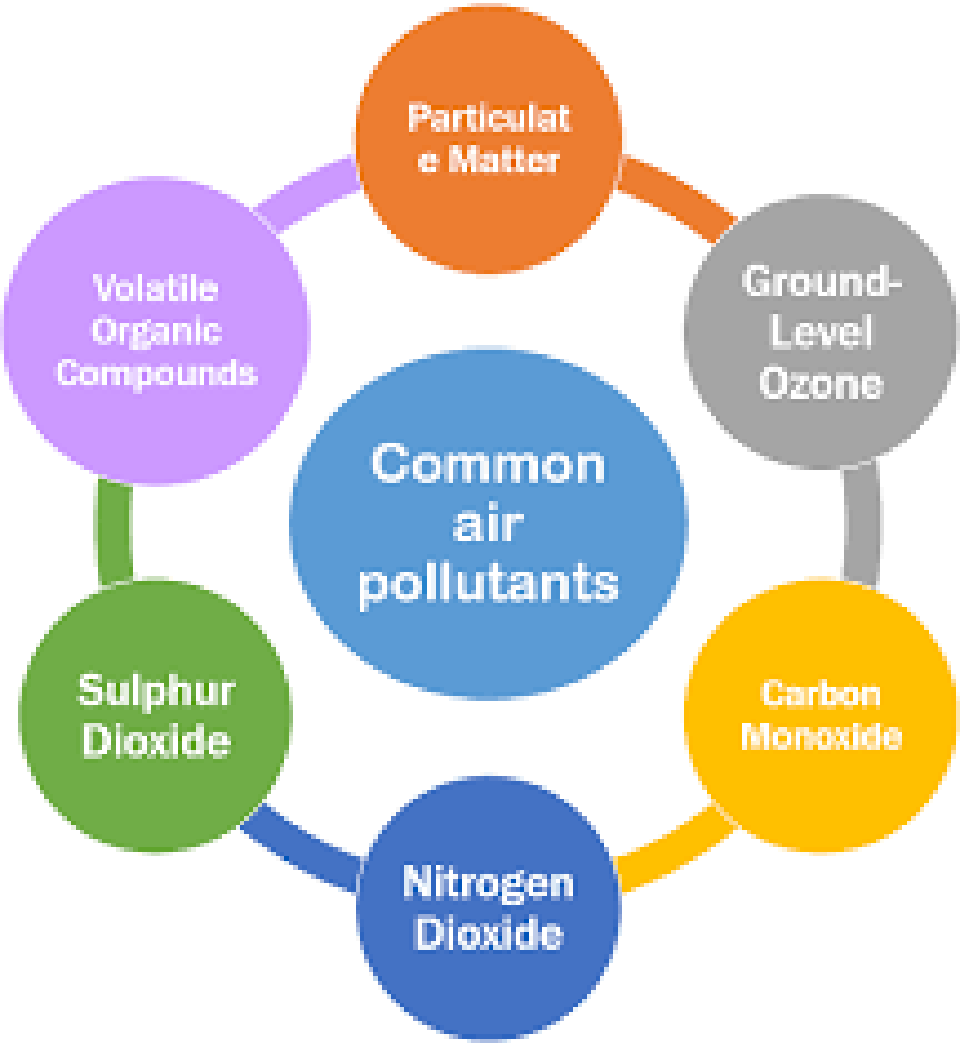
Sources https://images.app.goo.gl/dMH6YuRznE8EvRrF6

Types of air pollutants

There are five primary pollutants that together contribute about 90 percent of the global air pollution.

These are **carbon oxides** (CO and CO_2), **oxides of nitrogen, sulphur oxides, volatile organic compounds** (mostly hydrocarbons) and **suspended particulate matter**.

Pollutants that are produced in the atmosphere when certain chemical reactions take place among the primary pollutants are called secondary pollutants. **E.g.: sulphuric acid, ground level ozone, etc.**



Sources https://images.app.goo.gl/7hRjFRBEchd9mqAH6

Effects on Environment

Air pollution causes problems like

Greenhouse effect

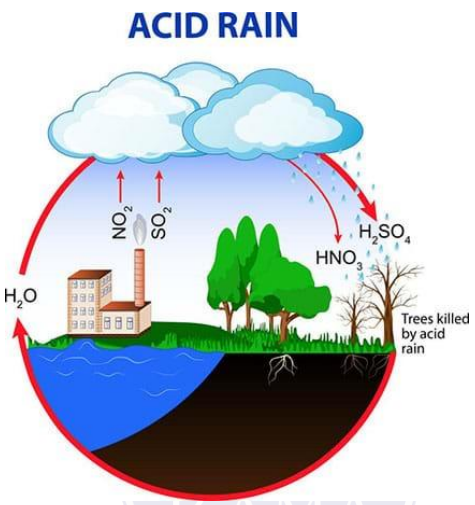
Global warming

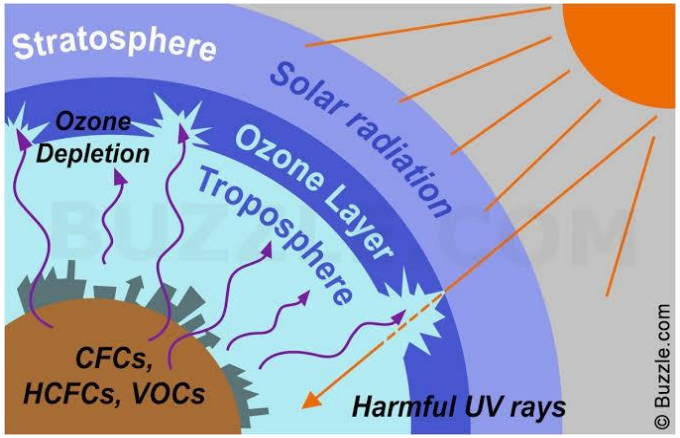
Climate change

Smog

Acid rain

Ozone layer depletion





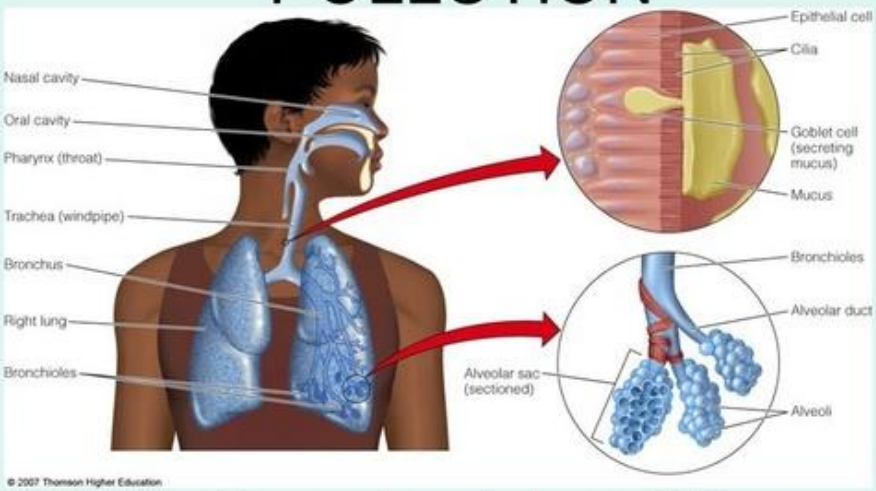
Sources: https://images.app.goo.gl/myYrPp4jzqTxYDN57; https://images.app.goo.gl/efWsF5K4hs9qhx3N9; https://images.app.goo.gl/zi2hYoervbkrEkwm6; https://images.app.goo.gl/HAJ593EkURsP1Jpq5;

Effects of air pollution

Effects on humans

Prolonged exposure to air pollutants can overload or breakdown our natural respiratory defences causing or contributing to diseases such as **lung cancer, asthma, chronic bronchitis and emphysema**.

Elderly people, infants, pregnant women and people with heart disease, asthma or other respiratory diseases are especially vulnerable to air pollution.



Sources https://images.app.goo.gl/nbMHmZ9SUcShhpwV6

Control measures

Air pollution can be controlled by two fundamental approaches: preventive techniques and waste control.

✓Air pollution can be controlled by using proper equipment at the source of pollution.

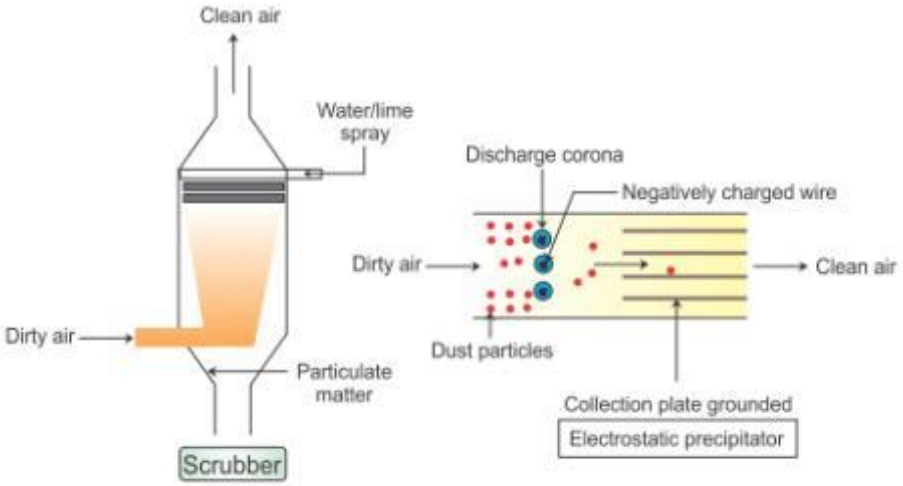
✓This includes devices for removal of pollutants from the flue gases though scrubbers, dry and wet collectors, filters, electrostatic precipitators, etc.

✓Providing a greater height to the stacks can help in facilitating the discharge of pollutants as far away from the ground as possible.

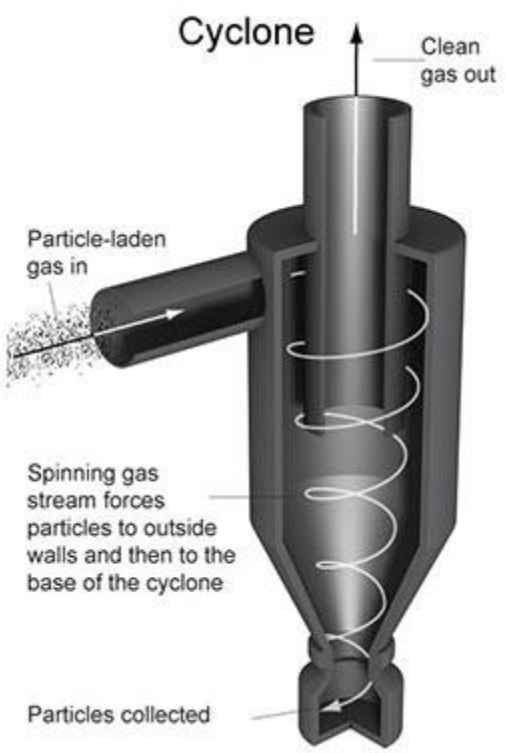
✓Industries should be located in places so as to minimize the effects of pollution after considering the topography and the wind directions.

✓Substitution of raw material that causes more pollution with those that cause less pollution can control production of air pollutants.

✓Minimize consumption of resources that contribute to air pollution.



Electrostatic precipitator



Sources https://images.app.goo.gl/ZSib4A3888aWEhcN8; https://images.app.goo.gl/3hSV5i8PKsHSAbfA7; https://images.app.goo.gl/yMPhCRYhjsneuQ9S9;


THANK YOU :)