

What is Environmental Pollution & discuss Air pollution?

Term Origin:

Term, Pollution originates from "Polluere" means to contaminate. Any substance that exceeds from the average limit and disturbs normal ~~the~~ atmosphere, water, soil and living beings, is pollution.

Pollutants:

Any agent or substance that causes pollution is called Pollutants.

According to Pakistan Environment Protection Act, 1979: Pollutants can be in solid, liquid or gaseous form. It contaminates environment. It can occur in many forms such as soot, gaseous, aerosols, haze or mist, smoke or smog.

Types of Environmental Pollution:

① On the basis of form:

Primary Pollutants: Substance that emits

from ^{Progenies directly} ~~natural~~ substances, such as volcanic eruption, earth crust degradation and factories emission.
Examples: CO_2 , SO_2 etc.

Secondary Pollutants:

Those substance that react with other materials in the environment and cause pollution.

For instance: Oxides of nitrogen react with moisture in atmosphere and form nitric acid.

② On the basis of Degradation:

Biodegradable

• Pollutants can be degraded by microbial action.

E.g., Organic matter
Sewage

Non-biodegradable

• Pollutants that not be degraded by microbial action.

E.g., Plastic, glass, radioactive substance.

3 On the basis of their existence in Nature:

Qualitative: They are not naturally

occurring but by human-activities introduced into the environment.

E.g., DDT, Green house gases

Quantitative: Naturally occurring in

the environment but once it exceeds its level beyond threshold level, cause pollution. E.g., CO_2

On the basis of state of matter:

1. **Gaseous:** Pollutants that occur in gaseous form such as CO_2 , SO_2 , NO_2

2. **Particulate Matter:** Mixture of gaseous particles with liquid droplet, form PM. It can be found in two forms: PM_{10} & $\text{PM}_{2.5}$

PM_{10} : These are large particles containing carbon.

$\text{PM}_{2.5}$: Smallest particles, containing water with acid forming chemicals such as sulphuric and nitric acid.

Particulate matter are of different forms such as:

Smoke, Dust, Mist, Haze, Soot etc.

Air Pollution

Definition:

It is the contamination of air or atmosphere by the introduction of pollutants, that exceeds normal level or threshold. It disturbs the whole ~~ent~~ atmosphere and air. According to World Health Organization: 'Air pollution is the contamination of indoor and outdoor environment by the any physical or chemical agents which stays in the atmosphere and disturb the environment.'

Broad division of Air Polluting Substances:

A: Anthrogenic Pollution that is caused by man activities. It could be static or in dynamic form.

Static: It means those stationary places which cause pollution. For example; factories, kilns, incenerators, furnaces and coal burning devices.

Dynamic

Those things which are in motion and cause pollutions, such as: automobiles, marine vessels, aircraft etc.

^{pe} It took only 5 days for China jet stream to carry air pollutants to the U.S. ⁹⁹

B: **Natural Causes**: Pollutions which is caused by naturally occurring events, such as:

- Volcanic eruptions → emit sulphuric element
- Wind and storms → Carry large particles of rocks weathering, sands etc from one place to another.
- Radioactive decaying → Radon gas emitted
Process from nature radioactive elements.

⇒ **Common Air Pollutants and its impacts:**

Ozone O_3

→ Emitted from automobiles, ozone generators, Aircraft cabins. It causes breathing problems, lungs problems. Among children lead to asthma.

Sulphuric Acid → Emitted from oil refineries, burning fuels, motor vehicles, Home heaters, metal smelters.
→ It causes serious respiratory problems.

Silicon → Produced from stone cutting, cement making or glass making.
→ Lead to Silicosis.

Asbestos → Produced while mining activities
→ Lead to lung cancer and asbestosis.

Lead → Emitted from batteries manufacturing, paints, metal refineries
→ It lead to Brain and Nervous System problems, lung damage and digestive problems.

Air Quality Index (AQI):

- It is a standardized system for measuring or reporting air pollution. It actually aware people about the level of pollution and potential damage to humans.
- It is a scale of 0-500,

which signifies pre advice to sensitive people.

**Index
Value**

Advisory

0-100

Sensitive people should limit prolonged exposure.

101-150

Sensitive people; children, aged ones, one having respiratory diseases should avoid prolonged exposure

150-300

It's very Unhealthy, should be avoided.

301-500

Everyone should avoid it.

Control Measures : Measures should be taken to avoid immense and prevailing air pollution.

a. Source Control → In order to avoid excessive air pollution, we should give priority to the sources which emanate air pollutants.

i) Substitution of raw material
Substance which causes

great deal of pollution should be replaced with purer grade new material which is less risky or polluting.

→ Low Sulphur fuel should be replaced with high Sulphur fuel which is less polluting.

→ More refined gaseous ~~gas~~ or petroleum should be used, such as: LNG and LPG.

b. Process Modification: During making or generation process most materials emit higher polluting substances, but if the process is slightly modified, it could minimize pollution.

For. Instance: During Pulverization, when coal is washed, it could reduce air pollution.

c. Maintenance of Equipment:

If the equipments are look after & taken care after short-time, it could minimize air pollution such as leakages around valves, pipes or ducts.

d. Control Measures for Industrial Centres:

Government should make policy of limited emission of

Industrial units. This would bound Industries & emission could be controlled.

e. Use of Pollution Control Equipment:

1) Electrostatic Precipitators:

With the help of this dust particles would be charged and in this way emitting substance would be attracted towards opposite in a collecting ducts.

2) Filters:

This would help in collecting dust particles easily by using filters of different materials, such as: cloth, granular material, screens etc.