

(c) **Various chemical compounds** : Aldehydes, arsines, hydrogen fluorides, detergents etc.

(d) **Metals** : Lead, iron, zinc etc.

(e) **Economic poison** : Herbicides, pesticides, insecticides etc.

(f) **Fertilizers** (g) **Sewage** (h) **Radioactive substances** (i) **Noise and heat.**

Classification of Pollutants : From ecosystem point of view the pollutants are classified into two basic types — (1) **Nondegradable**, (2) **Degradable**. — Odum (1971)

(1) **Nondegradable pollutants** : The materials and poison such as aluminium cans, mercuric salts, long chain phenol compounds, and DDT that either do not degrade or degrade very slowly in that natural condition, are termed as nondegradable pollutant.

(2) **Degradable** : Biodegradable pollutants are those which can be rapidly decomposed by natural processes that enhance nature's great capacity to decompose and recycle. Problems arise with the biodegradable pollutants when their input in the environment exceeds the dispersal capacity.

Types of pollution : Generally pollution is classified according to the environment (air, water and soil) in which it occurs or according to the pollutant (lead, mercury, solid waste, biocides etc.) by which pollution is caused. Pollution thus may be (a) **Natural** and (b) **Artificial pollution** originated due to activities of man.

AIR POLLUTION

Definition of Air Pollution :

When due to human activities or some natural processes amount of solid wastes or concentration of gases other than oxygen, increases in the air more than normal percentage that can be tolerated by atmosphere's regulatory cycles, the air is said to be polluted and the phenomenon is known as air pollution.

When due to human activities or some natural processes amount of solid waste or concentration of gases other than O_2 increased in the air more than normal percentage, the air is said to be polluted and the phenomenon is known as air or atmospheric pollution. Air pollution is one of the most dangerous and common kind of environmental pollution that have been reported in most industrial towns and metropolitan cities of India and abroad.

Sources of air pollution : Various gaseous emissions are continually being injected into the atmosphere from different sources and the important sources are i) **Industrial chimney emission**, ii) **Thermal Power stations**, iii) **Automobiles exhaust**, iv) **Domestic Combustion**.

(i) **Emission from industrial chimney** : There are many industries which act as the major sources of air pollution. Of those petroleum refinery, cement factories, stone crushers and hot mix plants, food and fertilizer industries, chemical factories etc emit gases through the chimney of the factories. Of these petroleum refineries are the major sources of SO_2 and NO_2 . Mathura based petroleum refinery continually emitting SO_2 and NO_2 which are posing threats to Tajmahal as well as monument of Fatepur Sikries, similarly dusts releasing from cement factories causing health hazards. Stone crusher plants also create a menace, suspended particulate matter (SPM) is five times more in the area than the normal. Smoke of fertilizer and food factories continuing various poisonous gases. Acid vapour coming continuously from the chemical factories. In this emission of different types are polluting the air continuously.

(ii) **Thermal power stations** : Both normal thermal plants and super thermal plants are present in our country and coals are used as fuels at these plants. The fly ash, SO_2 , and other gases and hydro carbons are regularly released in the air and these making the air polluted and unhealthy.

(iii) **Automobiles exhaust** : Automobiles exhaust containing CO, SO_2 , NO_2 , CO_2 and other toxic substances are the most dangerous emissions that pollute the air continuously.

(iv) **Domestic Combustion** : In rural area fire woods and coals are used as fuels. Combustion of these fuels produce CO, CO_2 , NO_2 , SO_2 , hydrocarbons which though in lesser amount, still pollute the air though the degree is less than the other three sources.

Air Pollutants :

The air pollutants released from different sources are -

- (i) **Carbon Compound** - CO_2 and CO
- (ii) **Sulphur Compound** - SO_2 , H_2S , H_2SO_4 etc.
- (iii) **Nitrogen oxides** - NO , NO_2 , HNO_3 etc.
- (iv) **Ozone** - O_3
- (v) **Fluro carbons**
- (vi) **Hydro carbons**
- (vii) **Metals and metallic compounds**
- (viii) **Photo chemical Substance** - Smog, PAN, Pb_2N etc.
- (ix) **Suspended particulate matter** - Fly ash, dust and other suspended particles.

Carbon dioxide (CO_2) : Carbon dioxide is one of the gaseous substances present in the atmosphere and CO_2 contents of air is 0.03% approximately and when it is present at this level CO_2 could not be regarded as pollutant. But due to urbanization of town and cities increase use of diesel and petrol have taken place tremendously. CO_2 is a byproduct of these combustion and its amount in air has been increased far from the normal and the over increase of CO_2 in air have become a serious pollutant. Though a major part of CO_2 in air is increasing at an increasing rate, **Sorthwick (1976)** has shown the increase of atmospheric CO_2 responsible for the increases of atmospheric temperature.

Green House effect : When CO_2 is present in the atmosphere in normal percentage then incidental long wave radiation of the sun returns back to stratosphere from earth's surface. As a result an optimum temperature in which lives are sustained, prevails on the earth's surface. When CO_2 increases in the atmosphere beyond far normal then it forms a covering layer over earth's surface as a result long wave heat radiations cannot reflect back to stratosphere. Infra red heat radiations reflected back to earth's surface from the CO_2 layer regularly and as a result the earth's surface becomes over heated. This process of overheating of the earth's surface by infra red heat radiation waves due to presence of over hanging CO_2 layer is known as **atmospheric effect** by the **Turk (1974)**, **Lee (1974)**. **Smith (1977)** said this as **Green house effect**. There are plants which are very costly but require diffused light and height temperature for growth and blooming. They are cultivated in green glass houses. The characteristics of green glass is that it reflects the reflected rays constantly. As a result the room becomes very hot. Like green house the reflected infra red radiation are reflected back to earth's surface from the CO_2 layer over earth's surface constantly. This CO_2 layer is compared with the green glass of the glass house and its heating effect of the earth's surface is known as **Green house effect**. Due to over heating climate, rainfall etc. become irregular and directly influence the crop production and on the life of the living beings. As a result flood occurs some where and drought prevails in another place. The green house effect create **heat islands** in towns and cities.

Global warming : The CO_2 present in the environment in normal percentage (0.03) is responsible for sustenance of life on earth, makes the earth green and fresh and these helps in the evolution and is also responsible for maintenance a life-sustaining temperature on earth. In **Mars** very little amount of CO_2 is present and it is so small that the atmosphere there condenses to form ice every where. Similarly in **Venus** there are maximum amount of CO_2 in the atmosphere so atmosphere there always burns like heated oven. Normally some excess CO_2 is absorbed by the water but due to global industrialization the amount of CO_2 in the atmosphere is increasing at an increasing rate and the amount of CO_2 far in excess than it can be absorbed by sea water. As per estimate of the scientists it is revealed that from the middle part of nineteenth century upto two thousand years there has been a 25% increase in CO_2 in the atmosphere and by 2030 its amount will increase more than twenty times. This increase will lead to a rise of global temperature by 2°C above average. Beside CO_2 other green house gases like SO_2 , NO_2 , CFC etc will also be increasing and will be the major reason for global temperature increase. This increase of 2°C will destroy the heat budget of the globe and may bring about global catostrophies.

According to the opinions of the environmental scientists, if present situation are allowed to continue then by 2030 the average global temperature will increase by 4°C to 5°C . This rise of temperature will influence less the tropical regions but will have a serious influence on polar regions and countries like Norway, Greenland, Sweden, Finland, Siberia, Alaska etc will face serious problems of existence. Because the ice will melt here and for a rise of 5°C the huge amount of ice that will melt will raise the sea surface by 5 meters and as a result the densely populated coastal cities, from Shanghai to San Francisco, will face terrible disaster. According to Wood well of America due to rise of such temperature sea level will rise by 200ft. and low lying coastal cities like Venice, Bangkok will be submerged. If the sea level rise by 50-100 ft. then the low lands of Bangladesh and West Bengal will be immersed for ever and will cause hurricanes several times in a year.

United Nations Environmental Project (UNEP) : UNEP have postulated 5-environmental detrimental elements which are –

(1) **New Technology**, (2) **Red tide** (3) **Diesel pollution**, (4) **Acid fog** and (5) **Antarctical catastrophies**. Beside these UNEP are seriously concerned with **Green House effect** and **Global warming**. If these are not checked then in near future the change of temperature, rise of sea level, effects on rain fall will exercise serious effect on human population. On 5th June 1989 UNEP proposes a slogan of **global warming** a world's environmental day. According to UNEP both developed and developing countries will face serious problems because 2/5th of the total carbon of the environment is injected by these countries. Global warming will exercise bad influence over the countries.

Carbon monoxide (CO) : Exhaust of automobiles like buses, lorries, small cars, auto rickshaws are the sources of CO. Beside these furnace stoves, burning coal mines, forest fire, power plants are other sources of CO. In very busy cities like Kolkata, Delhi, Mumbai etc if there occur a traffic jam for an hour then from each city 670 kg of CO will be injected into the atmosphere by that time. Normally in atmosphere 0.5 ppm CO will be present but in the atmosphere of cities and towns it is about 5.50 ppm and if this quantity increase to 100 ppm it became dangerous because it disturbs in breathing, creates headache and excites the mucous membrane of the organs. If CO ppm rises to 1000 then it will cause senseless within an hour and death within four hours.

Peeling of Ozone Umbrella : In the stratosphere of the atmosphere of the earth there is a very thick layer of **ozone** which covers the earth as a thick blanket. This ozone blanket prevents short wave radiation of UV to reach the earth and prevents the earth's surface being over heated and that is why sustenance of life is possible on earth. As a result of byproducts of factories and plants some **Chloro fluoro carbon (CFC)** or **freon** as they are called, are being produced regularly and are being injected into the atmosphere. Physically and chemically this **freon** behave like an inert product. But in stratosphere this CFC is broken down by UV rays and form chlorine atoms. The chains of chlorine atoms react with O_3 atoms and converts the ozone into oxygen. When this happen continuously the thick ozone layer becomes thin and UV-rays are directly incidental on earth's surface. This incidental UV-rays not only overheats the earth's surface but according to the opinion of Brodeur (1975) and Russel (1975) it also creates skin cancer, kill many microbes and creates mutation and man himself can not escape from its deleterious effects.

Ozone – the destroyer : It is known that in troposphere with a rise of 8-16 km height temperature begins to lower down but in stratosphere just opposite events take place, ie in the stratosphere there is an increase of temperature with increase of height and this rise of temperature is due to presence of ozone layer. This ozone layer performs two important function as –

(1) The ozone layer absorbs UV radiation and protect all lives of earth from UV radiation effects.

(2) By absorbing UV-rays the stratosphere is overheated and **Temperature inversion** takes place.

Due to temperature diversion vertical mixing of the pollutants could not take place, pollutants spread horizontally on the atmosphere. As a result in the atmosphere over the industrially developed countries. **Pollutant Clouds** are formed. So there is no way to save the Ozone layer over the pollutant cloud. Ozone problem has become a global problem now a days.

Vertical mixing of the pollutants though takes place very slowly still some CFC may enter the stratosphere and may remain there for many years till they are converted into another compound.

Ozone lying in the atmosphere near troposphere creates pollution problem. Ozone is created by photochemical reaction from PAN, NO_2 and hydro carbon under the influence of UV-rays. All these pollutants form photo chemical smog. Ozone directly interferes with health of the human beings. Ozone layer lying at far distance protect us, lying nearer to us, harm us.

CFCs - Threat to Ozone protection : In the atmosphere Ozone is present as 0.02 - 0.07 ppm. It's presence protect us from UV radiation on one hand and influences the living world on the other. It sieves all radiations below 3000\AA and helps to sustain life on earth. Depletion of Ozone layer will influence the living beings directly. This ozone layer is becoming thin due to pollution effect created by man themselves for last several years.

Now the question has arisen throughout the globe who and how are responsible for such ozone depletion.

It has been mentioned earlier that vertical mixing pollutants takes place very slowly. Entering into the stratosphere CFCs, NO_2 , hydrocarbon etc destroy the ozone layer. It has been estimated that CFCs destroy 14%, NO_2 destroys 3.5% of ozone per year. Due to ozone depletion the temperature of the earth's surface will rise to a great extent and will extend its harmful influence on living being. It has been estimated that 1% depletion of Ozone will increase 2% rise in UV-radiation and increase skin cancer and 10% depletion of ozone will increase skin cancer 20 folds.

Global efforts to protect Ozone layer :

Government of India has not yet taken any programme to protect this ozone layer. A team of British scientist has discovered in 1985 a ozone hole over Antarctica and the area of this hole is equal to the area of whole N. America. In 1985 International congress for protection of Ozone layer was held in Vienna (Austria). In 1987 Montreal protocol requested all developed and developing countries to cut CFC production by 90%. IN 1989 another International congress was held in London. The slogan of the congress was save the ozone layer. The main aim was to reduce the production of CFC on global basis and to device new methods by which CFC production is stopped for ever and alternative is discovered. In 1989 Mitsubishi Electric and Taijo-Sanyo Gas company have discovered a technique of CFC cleaning and in future all countries may have to use this technique. The urge for protection of Ozone layer is one of the most important global ecological and environmental problems today and the whole world has realized this and taking serious steps to protect the ozone layer.

Hydrocarbons : Among the hydrocarbons benzene, benzpyrine and methane are most important air pollutants. Petrol and diesel are the main sources of these and they comprise 65% of air pollutants. These hydrocarbons react with nitrogen oxides through UV-rays and create PAN and O_3 which is known as photochemical smog. This smog creates irritation of nose, eyes and throat and cause breathing troubles.

Metals : Of all the metals lead, cadmium and zincs are important as pollutants.

Lead : From automobile exhaust 75% of lead are discharged as lead halides. Of these 40% mixed with the soil and 60% mix with the air. According to guide lines of WHO the tolerable range of lead is $2\text{ }\mu\text{g}/\text{m}^3$. But in most of the cities of India it is more than $8.3\text{ }\mu\text{g}/\text{m}^3$ which are treated as highly pollutants. Lead compound entering the body interfere with haemoglobin production, destroy RBC, disturb the function of liver and kidney.

Cadmium : Cadmium is released as cadmium vapour from the refineries, electroplating plants, metal extraction plants etc and goes to atmosphere where it soon is converted into

chloride, oxide and sulphates. Traces of cadmium is highly toxic and deposited in the kidney and liver. It may also cause cancer.

Zinc : In every hour 20-35 gms of Zinc are released into atmosphere from galvanized plants. Oxides of Zinc are very toxic to human system.

Sulphur Compound : Among the various compounds of Sulphur in the atmosphere, oxides of sulphur are highly pollutants. Other harmful sulphur compounds are carbonyl sulphide (COS), carbon disulphide (CS₂) and dimethyl sulphide (CH₃)₂S are very harmful pollutants. Petroleum, burning of coals, thermal power plants, smelting plants, automobile exhausts are the sources of sulphur oxides.

Sulphur dioxide (SO₂) : The main sources of SO₂ are coal burning, thermal power plants, smelting plant, fertilizer plants, sulphuric acid manufacturing plants. In our country SO₂ production is increasing every year. In 1976 production of SO₂ was 6.75 million tons but by 2000 the production has been increased to 14 million tons. The irritation of eyes, excess mucous secretion, breathing troubles etc caused by SO₂. Beside these building materials, refineries, historical monument are damaged by SO₂. they mix up with water vapour of the atmosphere and is converted into H₂SO₄ which affects breathing 4-20 times more than SO₂.

Hydrogen Sulphide (H₂S) : The main source of H₂S is decomposed organic matter of plants and animals. Beside this hot springs, volcanic eruptions, burning coal etc are also the sources of H₂S. The tolerable range of H₂S in air is upto 20 ppm but if it exceeds more than 500 ppm then it will cause serious breathing trouble which may lead to fatal condition.

Oxides of Nitrogen (NO_x) : In the atmosphere very little amount of N₂O, NO, NO₂ are found of which NO is very important because by photochemical reaction it produces PAN, O₃, smog and carbonyl compound.

In the Atmosphere electric sparks help to join N₂ and O₂, NH₃ is reduced in the soil etc help to produce various oxides of nitrogen in the atmosphere. NO reacts with O₃ of the atmosphere and produces NO₂ and this NO₂ reacts with the water vapour of the atmosphere and produce HNO₃.

Acid Rain : It is evident from the discussion of the above text that oxides of sulphur and Nitrogen are the most important gaseous pollutants. Their sources have also been mentioned. These atmospheric pollutants are drifted by wind to a long distance of more than thousand and thousand kilometers. The more they stay in the atmosphere more they are reduced to their respective acids. Sulphuric and nitric acids are two important acid that dissolve in vapour and deceduate as acid rain or they may condense as clouds or fogs and hang over the earth's surface.

The acid rain is the result of scientific activities of human beings. Acid rain is due to the simultaneous effect of H₂SO₄ and HNO₃ of which H₂SO₄ is 60-70% and HNO₃ is 40-30%. Unscientific and rapid industrialization are increasing this acid rain day by day. Every year several million tons of SO₂ and NO₂ are being injected into the atmosphere so acid rain has been a global problem. These oxides travel a long distance in the atmosphere and involve in many physical and chemical reaction to change the nature of the atmosphere.

The atmospheric acids are drifted to a long distance from the source of origin and can cause acid rain there. In this way oxides produced in one place come down as acid rains in other places. This event has taken place in Canada and Sweden. The oxides liberated by the petrochemical factories of USA come down as acid rain in Canada. Similarly oxides liberated by different factories in Britain and France cause acid rains in Sweden. Similar thing are also happening in Norway, Denmark and West Germany where 90% acid rain is cause by wind drifted oxides. The developing countries will face the problem of acid rain very seriously because in tropical countries the acid rain will lead to the production of barren land gradually.

It has been verified that P^H of acid rain of Calcutta is 5.8, of Delhi 6.21, of Mumbai 4.80 and of Chennai 5.85. It has been reported that production of SO₂ in India was 1.39 million tons in 1996 and has increased to 3.20 million tons in 1999 and has crossed 6 million tons by 2000. If immediate preventive measure are not taken then whole atmosphere over Indian sub

continent will be acidic and whole crop lands will be barren and future danger could not be averted.

Effect of acid rain : In the future acid rain will create long term complicated problems whose effects will be far reaching. As -

1. Acidity of the soil of the crop land will be increased and the land will be barren in future
2. It will spread its influence over plants and animals.
3. The acidity of the pond and lake water will be increased and the aquatic lives will be in danger.
4. There will be a reduction in the crop production.
5. It will influence the health of the animals including man.
6. Historical monument, building and building material, fencing, relling bridges will be seriously effected and damaged.

Photochemical Smog : A mixture of fog and smoke is called smog. This smog is filled up with air pollutants like O_3 , PAN, NO_2 , H_2O_2 etc. These are formed due to chemical reactions between NO_2 , hydrocarbons and O_2 . This reaction is called photochemical reaction : photochemical smog is a serious type of oxidizing pollutants and main ingredient are O_2 , NO_x , H_2O_2 , organic peroxides, Pb_2N , PAN (Peroxy acetyl nitrate). These are formed by the photochemical reaction between NO_x , O_2 and hydrocarbons. At night and in cloudy days the smog in formed densely. In our country in the cites like Delhi, Mumbai, Calcutta, Chennai, Ahmedabad, Kanpur the smog formation is increasing by an increasing rate. Automobile exhaust, industries and various plants are the sources of this smog. In 1987 Mumbai was covered by such smog for continuous ten days. If the O_3 of the atmosphere become more than 0.115 ppm then photochemical smog is formed. Some sulphates and nitrates are formed in photochemical smog. By the oxidation of H_2S , SO_2 such sulphates are formed. Similarly by the oxidation of N_2O_5 , NO_2 nitrates are formed. The presence of nitrates and HNO_3 in the smog cause irritation of the eyes and throat and create breathing trouble. The smog also cause great damage to the building, monument, plants and animals.

Suspended Particulate Matter or SPM : Except pure water particle any particle of diameter 0.001 μm to hundred μm are known as suspended particles. These particles are produced by human activities or by natural activities and then join to the atmosphere. The natural sources of this particulate matter are soil, rock, dust, sand, volcanic eruption, forest fire and various chemical reactions of the natural gases. other sources are the factories as plants. Of these the thermal plants where water is burnt as fuel, Rock broken factories are other sources of this SPM. The tolerable standard SPM in industrial area is 500 $\mu g/m^3$ and in domestic area 100 $\mu g/m^3$. But in industrial areas in India it is above 1200 $\mu g/m^3$ to 800 $\mu g/m^3$. In this way our atmosphere is being damaged by SPM created by human activities.

Detection and Measurement of Air pollution : Air pollution is usually measured by sampling of air by thermal and electrostatic precipitation by sonkin inspector, electrostatic dust collectors. The particulate pollution is measured by the instrument called depositgauze or by Owen's dust counter. The thickness of smoke is measured by Liegian sphere and Ringelman chart.

Common air pollutants, their sources and pathological effect on man

Ecology of air pollution : Once injected into the atmosphere air pollutants reach the biogeochemical cycle through different routes with the movement of air over the cities the pollutants are dispersed to long distance but it air masses over cities become stagnant, pollutants accumulate quickly and detoriate air quality which cause many respiratory disease in man and animals due to temperature inversion. Vertical rise of pollutant are presented and dispersal of pollutants are held near the ground. This is found in the cites surrounded by mountains.

Further a portion of pollutants may reach the soil a dry pollutants and enter food cycles through food chain via soil and water. Other react with an photochemically to produce PAN,

Pollutants	Source	Pathological effect on man
1. Aldehydes	Thermal decomposition of fats oils or glycerol.	Irritate nasal and respiratory tracts.
2. Ammonias	Chemical processes, dye making, explosive, lacquer, fertilizer.	Inflammation of upper respiratory passage. Breakdown red cells in blood, damages kidney, cause jaundice.
3. Arsenic	Metals or acids containing arsenic soldering	Reduce oxygen carrying capacity of blood.
4. CO	Gasoline motor exhaust, burning of coal.	Attack entire respiratory tract and mucous
5. Chlorines	Bleaching cotton and flour, and many other chemical process.	membrane of eyes, cause pulmonary edema.
6. Hydrogen Cyanide HCN	Fumigation, blust furnace metal plating, chemical manufacturing.	Attack nerve cells produce dry throat, indistinct vision, headache.
7. Hydrogen fluorides	Petroleum refining, glass etching, aluminium and fertilizer factories.	Irritate and corrode all body passages.
8. H ₂ S	Refineries and chemical industries, coal fuels.	Cause nasuis, initiate throat eyes.
9. Nitrogen oxides	Automobile exhausts soft coal.	Inhibit cilia action so that soot and dust penetrate far into the lung.
10. Carbon-ylchloride (Phosgenes)	Chemical and dye manufacturing.	Induce coughing irritation and some time fatal pulmonary edema.
11. SO ₂	Coal and oil combustion.	Cause chest constriction, headache, vomiting and death from pulmonary ailments.
12. SPM (ash, soot, Smoke etc)	Almost all factories and plants.	Causing emphysema, eye irritations and possibly cancer.

O₂, H₂SO₄, HNO₃ etc. whose harmful effect have less mentioned earlier. According to Beker et al 1968 workers of the coalmine suffer from **black lung** disease cause by air pollution, those who work on pipe factories suffer from **asbestosis**, beside these polluted air create **emphysema, chronic bronchitis, lung cancer** etc.

Control of air pollution : On the light of modern technological advancement air pollution can be controlled by various means as –

1. In order to prevent of smokes of automobile exhaust to be released free in the atmosphere each and every motor car should be fitted with crankage ventilation and catalytic converter.

2. In order to remove dust and smoke from air electrostatic precipitation could be used.

3. By spraying water through scrubber NH₃ and SO₂ could be separated from air.

4. By fitting absorbant or filter in the chimney of the factories many air pollutants could be separated before the smoke of the factories being released in the air.

Air Pollution in Kolkata City

(A Report - adopted from Ananda Bazar Patrika)

A recent analytical report of the observation of the central pollution control board says

that the tolerable rate of different air pollutants are- the tolerable range of SO_2 per cubic meter of air should not exceed 60 microgramm, NO -140,mg, CO -2mgs, and suspended particles 140 mg. But the School of Environment Science have analysed the air sample of several busy areas of Kolkata and the report they have published is a serious threat to people of Kolkata. The amount of SO_2 present in air at Shyambazar area is 114 mg pm^3 . B. B. D. Bag it is 123 mg/m^3 and at Gariahat it is 125, Oxides of nitrogen are present as 180 gm/m^3 at Shyambazar, 170 mg/m^3 at BBD Bag and $164 \text{ } \mu\text{g/m}^3$ at Gariahat. That is SO_2 is present twice the tolerable amount and Nitrogen oxides are present at 1.5 more than the tolerable amount. From another report it has been known a car covering a distance of 100 km in the city burn that amount of O_2 which is equal to the amount of O_2 inhaled by a person for one full year. The burning of one ton of coal utilized that amount of O_2 which is equal to the O_2 utilised by 10 person in a year. Entire Kolkata city has remained sunken in a black sea of CO_2 .

Air pollution has reached such an alarming stage that a thermal inversion may take place any time like that took place at Donara in 1948 and in London in 1952 which killed several thousand person. So Kolkata has now become a city of death as emphasized by pollution control board. As a result of thermal inversion Kolkata city remain covered by a thick blanket of smog specially in the evening and in the early morning and so morning walk is also not healthy here.

Only automobile exhaust is not responsible for thermal inversion and formation of smog but all the small and large factories developed in unplanned manner and un scientific ways in around the city are also responsible for it. The generators of these factories are run by kerosene, diesels and petrol. In the bakeries wood and coal are used as burning fuel. Chemical manufacturing factories in and around the city inject million of molecules into the air above. At present diesel is used only in developing countries but not in the developed countries.

The school of environment science of Jadabpur University has shown in their survey that 51% of population of Calcutta still use coal as fuel. In the winter evening it is common sight that people are warming themselves by burning tyres and plastic materials. The smoke emitted by their burning containing benzoapryrin which is seriously carcinogenic. Smoke emitted by burning rubber goods is also very dangerous. Fire works and crackers inject heavy amount of sulphur which is a serious air pollutant.

Activities of municipalities and corporation are also responsible for an air pollution. In a busy working day road and streets are pitched by burning coal, gas originated from water spots, reservoirs jheels that existed on either side of the river Bidyadhari have been dwindled according to plan to reclaim land for rehabilitation. Everybody knows that these water reservoirs and jheels are the lungs of Calcutta city.

Planned and unplanned high-risers have cut the normal wind speed from 20-30 km to 5-6 km per hour. But to maintain the fresh air rain as well as high wind speed are required together. Fly ashes from thermal electric power station of Bandle, Titagarh etc are being spreaded over Calcutta city regularly. The establishment of these plants and the height of the chimney are both unscientific says environmental commission. The trees and plants of Calcutta city area are less refreshed than those present in the village and cities, because the automobile exhaust contain adhesive hydrocarbons which close the stomatal opening and these will kill the green.

If inspite of knowing about all air pollutants their causative agents and their influences on human health if we are don't take any immediate preventive measure, then we ourselves should be responsible for the future serious consequences. Planning should be done to remove the gas chamber above the city, pollutants creating vehicle should be banned, modern eco-friendly instruments should be used, water spots, water reservoir, jheels should be preserved. Construction of unscientific multi stories should be banned, social forest are to be developed more, URO laws should be made obligatory etc may save us from serious consequence to be fetched in near future from air pollution of the cities.