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## Environmental Pollution and Global Issue (With special regard to air pollution)

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**Abstract-** Environmental pollution is a serious problem of the present era, which is becoming more severe day by day. In fact, pollution is not the problem of any one country but a global problem, with which the entire world community is struggling. Increasing pollution has damaged the environment and made it unbalanced and its adverse effects are also being seen in many forms. The biggest threat due to pollution is to human health. The trends presented by the World Health Organization (WHO) show that in about half of the cities of the world, the amount of carbon monoxide has reached a level harmful from the health point of view, while lead has reached this dangerous level in one-third of the cities. All living beings depend on a balanced environment for their growth, development and well-organized life. Generally, various components are present in the environment in a certain quantity and proportion and equilibrium is maintained between these various components. Under specific circumstances, the dominance of unwanted and harmful components increases in the environment. As a result, the environment becomes polluted and living beings have to suffer its adverse effects. We can also say it this way that when the purity of natural resources is affected in such a way that their life utility itself starts getting destroyed, then this process is called pollution. When any component of the environment such as air, water, land etc., mixes with any other unwanted substance and brings about a change in its physical, chemical and biological properties, then it is no longer usable or causes harm to health, then that effect and result is called pollution. The literal meaning of pollution is 'to make dirty or unclean, to make impure'. The main cause of pollution is considered to be human activities. In the present research study, a detailed description of environmental pollution and global problem has been presented.

**Key-words-** Environmental Pollution, Pollutants, Global issue, Degradation of Environment.

### **Introduction-**

Any change in the environment which causes any kind of decline or deterioration in it is called environmental pollution and the thing which causes this decline is called a pollutant. Any kind of unwanted interference in the system and environment provided by nature creates imbalance due to which the environment starts disintegrating and its result comes in the form of environmental pollution. Our rapidly increasing population, uncontrolled urbanization and industrialization, indiscriminate destruction of forests, unbalanced use of chemical fertilizers and pesticides, acid rain, modern lifestyle and the race of materialism and greed for money, uncontrolled exploitation and storage of natural resources on the basis of scientific research and technical knowledge is promoting environmental crisis and due to this the existence of biological community is being questioned.

Environmental pollution means the excess of some such elements in the environment, which harm human life. In the race to fulfill his needs, man has exploited substances at a rapid pace ignoring the environmental balance, which has caused environmental crisis. Extreme selfishness gave rise to a conflict between nature and man. As a result, neither man has remained human nor the natural environment has remained a gift of nature. With the development of civilization, the entire human race has exploited natural resources to the fullest to fulfill its needs. With the development of modern civilization, the pace of exploitation increased. Population growth, industrialization, urbanization, increase in demand for resources and imbalance of land consumption and replenishment emerged as factors of pollution. The results of this are the decline in the quality of environment, biological production and use of its capabilities etc.

Our lithosphere, hydrosphere and atmosphere, besides being natural resources, are also the disposal sites of all kinds of waste materials. These waste materials disturb the normal functioning of various living components according to their quantity and capacity and sometimes cause irreversible environmental changes. Pollution is that which causes unwanted changes in the physical, chemical or biological properties of our water, land and air. This pollution is caused by excessive mixing of polluting substances in it. Environmental pollution adversely affects the life of all types of biological species including humans and damages our biological, natural and cultural heritage. In a way, it can be said that pollution is the unpleasant result of the beloved activities of mankind. Pollution is an undesirable situation when air, water and land lose their natural quality due to physical, chemical and biological changes and start proving harmful for living beings. This disrupts the process of life, stops progress and damages cultural life. It is clear that pollution is an abnormal situation when pollutants get absorbed in the environmental elements beyond the limit and start destroying its quality. Due to their effect, biological difficulties start increasing for other living beings including humans.

According to the National Environmental Research Institute, the harmful changes in the natural environment due to the release of matter and energy in the form of wastes generated by human activities are called pollution. It is clear that

pollution is an undesirable situation for living beings arising from environmental degradation, whose effect makes life dangerous. It is like Bhasmasur who is hell-bent on destroying his creator. This is the biggest tragedy of human economic-cultural development.

While defining pollution in the United Nations Human Environment Conference, it was said that pollution is all those substances and energy which directly or indirectly harm human health and resources. It is the unwanted effect of desired human activities. Pollution can be in any form- solid, liquid, gas, chemical energy, radiation etc. When undesirable substances enter the natural environment in any form, it is called pollution. In the real sense, if nature does not need any substance but due to man-made reasons, such substances are delivered to nature in excess quantity or proportion, then it is unacceptable to nature. It is natural that there will be erosion in the balanced interrelationship of the elements of nature.

This erosion itself creates adverse conditions. Undesirable elements also enter due to natural reasons. Pollution is generated due to two reasons. On this basis, there are two types of pollution: 1. Nature Based 2. Human Based

The causes of natural pollution are volcanic activity and volcanic eruptions, methane formation by paddy fields and rumination of animals, carbon formation by organisms, soil erosion due to natural causes, floods, droughts, cyclones, tsunamis, etc. Human-made pollution is the main cause of environmental pollution. Due to human activities, the amount of various types of unwanted and harmful elements increases in the environment of the earth system. Due to human activities, poisonous elements in the form of various types of gases, elements and solid substances mix with various components of the environment, due to which pollution problems arise. These toxic elements include carbon monoxide (CO), sulfur dioxide, nitrous oxide, methane, chlorofluorocarbon (CFC), various chemical elements, nuclear decay, pollutants entering the natural environment due to industrialization and urbanization, pesticides, chemical fertilizers, etc.

The factors which pollute the environment are called pollutants. They are found in all forms, solid, liquid and gas. When the amount of pollutants exceeds the normal, they start affecting the environment adversely. How dangerous they are is determined by their quantity and nature.

**1. Degradable or temporary pollutants-** Such pollutants are destroyed by natural effects such as heat, pressure, rain, humidity and the effect of microorganisms. That is, they decompose naturally at a fast pace. Discarded vegetables, dirty water coming out of houses, etc. are considered pollutants of this category.

**2. Slowly Degradable or Persistent Pollutants-** Such pollutants, whose disintegration is not possible through natural methods or biological processes, are called slowly degradable or permanent pollutants. These remain present in the environment in their original form for a long time. Plastic and pesticides etc. are pollutants of this category.

**3. Non-degradable Pollutants-** These are the most dangerous types of pollutants, which once enter the environment, it is very difficult to free the environment from them. Their accumulation keeps on increasing continuously. Such pollutants do not disintegrate through natural processes and remain present in the environment for decades and keep leaving harmful effects. Pollutants like



nuclear waste, mercury and lead come in this category.

According to another method, pollutants are classified as primary pollutants and secondary pollutants. Primary pollutants are those pollutants which remain present in nature in their original form and have harmful effects. Such as carbon dioxide. Secondary pollutants are those pollutants whose original state is something else, but later their original form changes due to reaction and change. Such as sulphur dioxide and nitrogen dioxide, which react with atmospheric moisture to give rise to acid rain. Generally, secondary pollutants are considered more destructive and deadly. The process of transformation into secondary pollutants is called synergism.

**Air pollution-** Environmental pollution is a major problem in almost all countries of the world. In India, especially after independence, the level of environmental pollution has increased rapidly due to the population explosion, intensive agriculture, industrialization and urbanization. Pollution is an undesirable change in the physical, chemical or biological properties of water, air or land, which causes or creates the possibility of harm to humans, other organisms, industrial processes or cultural and natural resources. Air is a desired mixture of various atmospheric gases which is necessary for all living beings including humans. Humans can survive without food for a few weeks, without water for a few days but without air they can survive only for a few minutes. Normally a person breathes 22,000 times a day and takes in 16 kg of air from his surroundings. When the normal composition of air becomes unbalanced under the influence of natural or man-made or both types of factors, it is a sign of pollution. Air is called polluted when it contains gases, liquids and solid substances harmful to humans.

Sl No.	Air Pollutants	Main Sources
01	Sulphur dioxide	Fossil fuels, thermal power plants, industrial and chemical processes, diesel waste, oil refineries, smelters etc.
02	Nitrogen oxide	Vehicle pollution, thermal power plants, industrial boilers, chemical processes, smelters etc.
03	Fragile substances	Fossil fuels, construction processes, industrial processes, diesel vehicles, thermal power plants, burning of domestic wood etc., mining and stone crushing etc. Dissolved particulate matter (SPM) has a size less than 100 microns Respirable suspended particulate matter (RSPM) has a size less than 10 microns.
04	Carbon monoxide	Burning of fossil fuels, industrial processes, solid waste etc.
05	Ozone	Smog Vehicle pollution by photochemical reaction on conditions,
06	Ozone	chemical processes, solvents, fuel vapours Products from burning petrol, petrol pumps, chemical processes Fuel burning,

		industrial emissions
07	Benzene	Smog Vehicle pollution by photochemical reaction on conditions
08	Polynuclear aromatic hydrocarbons (PAH)	Fuel burning, industrial emissions
09	VOCs	Solvents used in industrial and domestic sectors and transport sector
10	Trace metals	Burning of fossil fuels, transport, metal production and refining process and chemical processes
11	Lead	Burning of fossil fuels, metal industries in which cadmium substances are extracted and modified

In India, the problem of air pollution is more in industrial and urban areas than in rural areas. Air pollutants are divided into primary pollutants and secondary pollutants. Pollutants that retain the same chemical form in the atmosphere after being emitted from identifiable direct sources are called primary pollutants and those that undergo chemical changes in the atmosphere after being emitted are called secondary pollutants. Pollutants such as sulphur dioxide, nitrogen dioxide and suspended particles are the major primary air pollutants. Their presence in urban air is common. Apart from these, carbon monoxide, lead, benzene, polynuclear aromatic hydrocarbons (PAH), smoke and ozone are also included. Most air pollutants are obtained from industries, vehicles and thermal power plants. (Table 1)

Air pollution is the cause of many types of diseases. This increases the number of people suffering from many diseases like cough, asthma and other respiratory diseases, cold, fatigue, pneumonia, lung infection, anemia, skin diseases, high blood pressure, angina, inflammation of the respiratory tract, heart disease, liver disease, irritation in the eyes, nose, ears and throat and many types of cancer etc. In the context of cancer, benzene pollutant has the most important role. A similar role is also played by volatile organic compounds (VOC), so they are called air toxins. Lead has a negative effect on everyone and it is most prevalent on pregnant women and infants. It develops mental diseases in children. Along with humans, the chemical and physical effects of air pollutants are also seen on buildings and structures. Air pollution causes damage by corrosion action with water or moisture combination. Such an effect has also been seen on the Taj Mahal of Agra. Air pollutants play a negative role by combining with rainwater through 'acidic discussion'. Air pollution also has a deep negative effect on vegetation.

Air pollution in the country is not limited to metros only but its effect is also clearly visible in many medium and small towns and rural areas. Apart from industrialization, urbanization, thermal power plants and vehicles, air pollution is also caused by cultural reasons. Suspended particulate matter whose size is less than 2.5 microns is extremely harmful and is also called PM 2.5 while the size less

than 10 microns is called PM 10. After Diwali 2014, the level of PM 2.5 was recorded at 985 ug/m<sup>3</sup> in Delhi while the safe limit is 60 ug/m<sup>3</sup>. Similarly, the safe limit of PM10 is 100 ug/m<sup>3</sup> while even a week after Diwali festival, it was found at 500-600 ug/m<sup>3</sup> level.

### **Sources and Typology of Air Pollution-**

Air pollution is becoming such a crisis for many living beings including humans that it is becoming a complicated question to get relief from it. Therefore, it is necessary to consider the sources of air pollution and its prevalence and ill effects. The main sources of air pollution are as follows-

**1. Air pollution by vehicles-** The smoke emitted from transport vehicles has reached a dangerous point for air pollution. In developed countries, the expansion of motor vehicles and trains has increased so much that their waste material has exceeded the tolerance limit of air. The smoke of these vehicles contains various types of poisonous gases which pollute the lower atmosphere and destroy the quality of air. Lead, mono oxide, sulfur oxide, sulfuric acid are especially notable among such dangerous pollutants. The increasing population in the metropolises of the world is causing the most pollution. In Kanpur city, there were only 9258 motor vehicles in 1963 which increased to 55 thousand by 1980 and more than one lakh in 2001 and their increase is continuing. Such a critical situation is also in cities like Delhi, Mumbai, Kolkata, Ahmedabad, Chennai, Bangalore etc. It is being said that soon Delhi will pollute the air like Tokyo and will force its citizens to buy oxygen cylinders to breathe.

**2. Air pollution by industrial institutions-** The waste material of industries, especially chemical industries, cement, steel, fertilizer factories, leather industry etc. comes out in the form of toxic water and garbage, the elements contained in which reach the atmosphere in the form of gas and pollute the air. Among such dangerous gases, carbon mono-oxide, sulphur dioxide and carbon dioxide are especially noteworthy. All living beings have to suffer their ill effects. They not only affect the lower layer of the atmosphere but also the air of the upper layer is becoming unbalanced. The increasing percentage of carbon dioxide in the upper air is increasing the atmospheric temperature, which has created a danger of the deterioration of the greenhouse effect. Chloro-fluoro-carbon is also an industrial pollutant.

**3. Thermal and nuclear power-** Plants are also playing a major role in increasing pollution- Due to the increasing demand for energy for industries, the number of energy institutions is increasing day by day. When dirt, excreta, waste material and such discarded material generated from various sources accumulate in open places, it becomes the cause of air pollution. The poisonous gases produced by the rotting of this material keep getting mixed in the air which increases pollution. Such material also accumulates in large quantities in the rural areas near the cities. The movement of villagers in the United States of America is taking a dangerous form, because they do not want the garbage of the city to pollute their air. Therefore, the question that is arising before the cities is where should such material be sent.

**4. Pollution caused by accidents-** Pollution caused by accidents can cause a great disaster, because nuclear stations, chemical factories, and ammunition factories contain so much toxic material that a small mistake can cause a crisis.



Recently, the accident at the ammunition depot in Rawalpindi, Pakistan has affected the air and population of a large area. A large part of the land and air has been polluted due to the explosion at the ammunition depot in Addis Ababa. The Bhopal gas tragedy and the Chernobyl nuclear leakage incident are the best examples of this. The air here has been so damaged by the Bhopal gas tragedy that it may take a long time to improve. Isonite methyl gas leaked from this pesticide factory, mixed with water and turned into sulfuric acid and spread in the air and started causing destruction. It had such a widespread effect on the human body that even unborn children could not survive.

**5. Increasing amount of carbon dioxide gas-** Increasing amount of carbon dioxide gas in the atmosphere is increasing pollution. Excessive energy use in industrial countries is the main reason for this. Due to the increase in this gas, the temperature of the atmosphere is increasing which is harming the greenhouse effect.

**6. Air pollution from Natural Sources-** Natural sources such as volcanoes, meteorites, microbes etc. are also factors of air pollution. To some extent nature controls it itself but sometimes their quantity becomes excessive. Due to which the quality of air decreases.

**7. Indoor Air Pollution-** Such activities have started happening inside the house also due to which the air gets polluted and as a result it becomes difficult to breathe. The air becomes suffocating due to the use of coal, wood, cow dung cakes, kerosene oil, husk, bidi, cigarette, dirt etc. in the houses. Smoke produced by the use of these things. Carbon monoxide, carbon dioxide and sulphur dioxide are particularly dangerous pollutants due to which children, women and elderly people have to suffer from respiratory diseases, cancer, heart diseases and eye diseases. Studies have shown that the effect of air pollution on pregnant mothers is manifesting in the form of giving birth to unhealthy babies. Domestic air pollution is proving to be more fatal in the slums of the metropolitan cities of India. In such areas, stifling air has become the fate of the residents.

#### **Classification of Air-Pollution-**

Air pollution can be classified on the basis of its origin, chemical composition and polluting substances. On the basis of the origin of pollutants, air pollution can be divided into two categories-

- i. Primary-Pollutants Chemical pollutants released in the atmosphere for a long time after long processes come under this category.
- ii. Secondary-Pollutants produced in the atmosphere due to the reaction of two pollutants or a single pollutant come under this category. This reaction is produced by photo chemical and non-photo chemical.

#### **Air pollution can be classified as follows on the basis of chemical composition-**

- i. Organic Pollutants such as organic and hydrogen etc.
- ii. Inorganic Pollutants such as nitrogen etc.

#### **Causes of Air Pollution:**

There are many types of air pollution, such as it can occur at personal,

occupational or community level. Coming under the influence of air pollutants due to personal activities is called 'Personal Air Pollution' and coming under the influence of harmful concentration of air pollution at one's workplace is called 'Occupational Air Pollution'. Many people or the entire community being affected by various types of sources and contaminants is called 'Community Air Pollution', which damages the entire environment of a person as well as vegetation, animals, buildings and properties. One of the main causes of air pollution is indiscriminate cutting of forests.

Actually, the amount of oxygen in the atmosphere remains balanced due to the oxygen released by plants through photosynthesis, but due to the destruction of forest wealth and increasing industrialization, 24 lakh tons of oxygen has been lost from the atmosphere in the past years, while in its place 36 lakh tons of carbon dioxide has been produced in the atmosphere. If the amount of carbon dioxide continues to increase like this, the earth will become hotter than necessary and the existence of all living beings will be in danger. Due to the increase in gases like carbon dioxide, chlorofluorocarbon, nitric oxide, methane etc. in the atmosphere, the temperature of the earth is increasing, which also causes a radical change in the climate.

The ozone layer, made up of three atoms of oxygen gas in the upper atmosphere of the earth, is extremely important for human safety, but carbon dioxide, nitric oxide and chlorofluorocarbon gases have created holes in the ozone layer over the Arctic and Antarctica. The ozone layer, located at a height of 30 km from the surface of the earth, does not allow the ultraviolet rays of the sun to reach the earth. Ultraviolet rays, besides being the cause of skin cancer, are extremely harmful for life on earth. The solution to control and solve the problem of atmospheric pollution is to protect trees and plants and plant more and more trees. It is also necessary that the developed countries, whose indiscriminate exploitation of natural resources has made the problem more serious, should provide environmentally balanced technology to the developing countries and also give them financial aid to reduce pollution.

**Regional pattern of air pollution-** Air pollution is a global problem, but its more severe form is seen in industrial areas, industrial towns, mining areas and slums. High air pollution is found in the developed industrial countries of the world such as Western Europe, Russia, North America, Japan and Australia, whereas in developing countries, medium and underdeveloped countries have the least air pollution. In this too, maximum air pollution is found in cities where vehicles and factories are found. In the United States alone, there are more than 10 crore vehicles which every year add 60 lakh tons of carbon, 120 lakh hydrocarbons, 60 lakh tons of deadly micro particles and 2 thousand tons of lead to the air.

### **Effects of air pollution-**

Air pollution poses a threat to all living beings including humans, due to which plants and animals are losing their quality and oxygen gas essential for human life is getting polluted and giving rise to many diseases. The stifling air of metros is becoming a question mark for human health and property. Acid rain is having a widespread effect on plants and animals, due to the use of which human health is deteriorating day by day. Toxic gases in the upper atmosphere are destroying the ozone layer, which is creating the danger of increasing temperature. The increasing



amount of carbon dioxide gas in the atmosphere is destroying the greenhouse effect. Air pollution is also having an ill effect on houses, metal plants and weather.

**Effect on human health-** Pure air is called Prana Vayu, because oxygen is the basis of life. In normal conditions, 21 percent oxygen is found in the atmosphere. Even if its amount decreases to 12 percent, there is no special danger. But less than this or the presence of poisonous gases, dust particles or microbes in the air gives rise to various types of diseases. Among such diseases, suffocation, mental fatigue, insomnia, restlessness, slow heart rate, headache, asthma, bronchitis, tonsils, TB, eye disease and skin diseases are especially noteworthy. Microbes increase so much in the air that sometimes they spread epidemics. Cold, flu, meningitis, influenza etc. are related to atmospheric viruses. Acid rain gives rise to many diseases, of which skin diseases are the main ones. In Kanpur metropolis alone, due to air pollution, in the year 1976, 40 thousand people were suffering from asthma, 30 thousand from tonsils, 24 thousand from bronchitis and 1000 from TB (tuberculosis) (B.K. Kumara). Similar is the situation in other metropolises too. Studies show that due to cement factories, the surrounding areas have the highest number of respiratory patients. It has been told earlier that now due to air pollution, the foetuses are being born with diseases.

**Acid Rain-** This is the destructive effect of air pollution. Sulphur oxide (SO) gas emitted from factories, vehicles and oil refineries dissolves in the air and turns into sulphuric acid through a chemical reaction. This element mixes with water droplets and comes to the surface with rainwater, which corrodes organic and inorganic elements by exerting an acidic effect. This process is called acid rain. Generally, the pH value of rainwater is 5, but when sulphur oxide gas gets mixed in it, sulphuric acid is produced which reduces the pH value of water. When this value decreases to less than 4, the acidity in it increases, which is fatal for all living and non-living things. Sulphur oxide is mainly produced from factories and vehicles. Therefore, in countries where there are more such industries and vehicles, this gas remains dissolved in the atmosphere in large quantities and causes acid rain with water droplets. It spreads far and wide from the production area and pollutes the air. As a result, acid rain occurs even where there are no factories. This acid is obtained in the form of snow by mixing with snowflakes. Many industrial countries of the world are afraid of acid rain. In Norway, Sweden, Germany, Britain etc., such rain has posed a threat to the biosphere. The lakes there are most affected by such rain, because acidic water destroys aquatic life due to being stagnant. Its ill effects have started appearing in Canada and the United States of America as well. In these countries, acid rain has started being called lake killer, because most of the lakes have been destroyed or are being destroyed.

**Air pollution and weather-** The mood of the weather is also changing due to air pollution. Polluted air is being blamed for the increase in untimely fog, haze, flood, drought etc. It is also being said that the natural quality of the atmosphere is getting destroyed due to polluted air, especially due to high concentration of carbon dioxide. Recently, a sponsored research has shown that polluted fog in the atmosphere of the Ganga plain has started affecting the weather, especially in the winter season.

**Effect of air pollution on vegetation-** Air pollution is also having a bad effect on vegetation. Poisonous gases released in the air - sulfuric acid etc. are having a

fatal effect. Smoke coming out of chimneys, gas coming out of brick kilns and similar materials are proving to be harmful for crops. Fruit trees are being affected the most. Mango crop has suffered a lot in many districts of western Uttar Pradesh.

### **Air Pollution Control Policy:**

Euro Normes I, II, III & IV have been adopted to prevent toxic emissions from motor vehicles in metropolitan cities. Euro-1 came into existence in Europe in 1992 itself, currently Euro VI is in existence. Euro norms determine the limit of emissions from motor vehicles. BS IV is applicable in India just like Euro IV. BS VI is going to be implemented in April 2019. In April 2019, only BS VI standard vehicles will not be sold. Under this, limits have been set for 4 types of emissions.

I. Carbon monoxide (CO) II. Hydrocarbon (HC) III. Nitrogen oxide (NO) IV. Suspended Particulate Matter In order to control air pollution, the "Air Pollution Prevention and Control Act" was enacted in India in 1981. It was amended in 1988. The jurisdiction of this Act is all over India. The main objectives of this Act are as follows:

1. Provisions for prevention, control and abatement of air pollution
2. Provisions for the establishment of central and state boards,
3. Provisions for providing powers to such boards and for deciding their activities.

Apart from this, filling of unleaded fuel in vehicles and a limit of 80,000 km. are also prescribed.

**Protection from air pollution:** Controlling air pollution has become a primary need today. The issue of controlling it is being raised from many forums in the world. But the factors responsible for it are such that it is difficult for modern society to abandon them. Still, efforts can be made to reduce it through law and social awareness. Such laws are being made in many countries so that vehicles, factories etc. can cause minimum air pollution. Tree plantation is also necessary to improve the quality of air, because this will reduce carbon dioxide and increase oxygen gas. Such equipment is being installed in smoke emitting chimneys and vehicles, so that minimum pollutants can get into the air. It is also necessary to control the space mission program, because it is causing a lot of damage to the upper atmosphere. Industries are being controlled to overcome the damage caused by chloro-fluoro-carbon and a substitute chemical is being developed for this chemical. Bag filters are being installed in chimneys emitting smoke and poisonous gas. Similarly, various types of devices have been developed to avoid particulate pollution. Improvements are being made in vehicle engines so that they emit less poisonous substances. CNG is being used in vehicles instead of diesel. This is providing relief in the metropolis of Delhi.

Air pollution can be controlled by the following important methods-

-Use of environment friendly or suitable fuel, such as low sulphur and lead free fuel and its complete use and combustion is necessary to reduce the pollution level generated by it.

- It is necessary to select and use industrial methods and/or equipment that reduce gaseous emissions and keep modifying and upgrading them as per the need.

- Proper selection of the site of establishment of industries and creation of industrial establishment areas for disposal of pollution sources is necessary.

-To eliminate the pollutants or reduce them to acceptable levels, it is necessary to destroy the pollutants by heat or catalytic combustion or to transform the pollutants into less toxic substances or to collect the pollutants by using equipment to prevent them from reaching the atmosphere.

**Control of Particulate Pollutants:** Various settling chambers or collectors are used to control the large particles emitted from large industries and power plants. This work is done through a special type of equipment, where they have to be landfilled for disposal. These particles present in the gases are allowed to settle at that place. These chambers are called Gravity Settling Chambers. These devices separate the particulate air pollutants. For this, the particulate matter present in the contaminated air is separated using equipment like arresters or collectors. After that, they are passed through scrubbers (dry or wet packing materials), where the dust and gas settled in the emission get separated and the air gets clean. The particulate matter caught in this process can be of many types. Cyclonic Separators and Trajectory Separators are used to separate particulate matter coming out from industries with minimum moisture. These separating devices separate particles on the principle of centrifugal force and are more suitable for large sized particles. Fine sieves or filters are often used to collect very fine particles.

Nowadays, many types of filter materials are available according to their suitability for particulate matter of different sizes and properties. Static precipitator is an effective device for removing particulate pollutants from smoke gases, which is considered a standard device for power generation plants and large industries. It works on the principle of electro-charge of particulate matter, which is collected on different charged surfaces. Both types of dry and wet scrubbers are also useful for separating dust particles.

In fact, this device is more suitable for separating gaseous pollutants, so it is rarely used for separating particulate matter from emissions. The thickness of a human hair is 25 to 100 microns, the smallest sand particle on the beach is about 90 microns in size and the size of tobacco smoke particles is 0.01 to 1 micron. One micron is equal to one millionth of a meter. Scientists believe that these particles are more dangerous than 10 micron particles, these are ultrafine particles.

**Control of gaseous pollutants:** Combustion, absorption and adsorption methods are more useful in controlling gaseous pollutants. In the combustion method, gaseous pollutants capable of oxidation at high temperature are completely destroyed. Controlled combustion method is used to reduce gaseous pollutants in petrochemical, fertilizer, paint and varnish industries. In the absorption method, gaseous pollutants are absorbed in suitable absorbent substances. When the above two methods prove ineffective, adsorption method is used to control toxic gases, vapors and flammable compounds, in which air pollutants are adsorbed on these large solid surfaces.

Strategies for reducing pollution and improving the environment:

As industrialization is taking place in the country, along with the increase in population, urbanization is also taking place, pollution is increasing. Along with this, environmental degradation is also taking place due to agricultural work and domestic activities. Therefore, to reduce pollution, Environment Protection Act, Wildlife Protection Act have been made. But these acts are not being followed completely to reduce pollution.



To improve the environment, the government formed a committee in the light of the decision taken in the Stockholm Conference of the United Nations in 1972, which was named 'National Committee on Environment Planning and coordination'. After this, it was renamed as National Committee on Environmental Planning. In consultation with this committee, environment boards were established in the states. To make this work more meaningful, a high power committee was formed in 1980, which has given many suggestions for environmental management in India. On the basis of the report of this committee, the Department of Environment was established. Thus, work to stop pollution was started.

In view of the environmental difficulties, in 1985, the Government of India formed the Ministry of Environment, Forest and Wildlife, which was entrusted with the responsibility of works like conservation of vegetation and wildlife, pollution control, tree plantation etc. In 1986, Environmental Protection Acts were made which were implemented in the whole country and the Central and State Environment Departments are controlling pollution from industries, sometimes independently and sometimes with the help of Pollution Control Board.

In 1986, Environmental Protection Acts were made which were implemented in the whole country and the Central and State Environment Departments are controlling pollution from industries, sometimes independently and sometimes with the help of Pollution Control Board. Apart from this, many voluntary organizations (NGOs) are working to improve the environment and are engaged in controlling pollution by spreading awareness. Public awareness is being created among the people to stop pollution. Seminars, dramas, radio, television, newspapers, magazines, etc. are proving useful in promoting public awareness. Therefore, along with implementing the Environmental Protection Act, environmental elements can be protected through public awareness and it can be prevented from degradation and pollution.

**Conclusion:** Development and environmental pollution are considered to be two sides of the same coin. While increasing industrialization has led to development on one hand, on the other hand it has also harmed the environment in many ways. Pollutants released from industries have polluted air, water and land. Increasing pollution becomes a matter of concern for humans and other living beings in some form or the other. Various types of problems are emerging in the world due to pollution. Today's global issues include climate change, global warming, greenhouse effect and the continuous weakening of the ozone layer. When any component of the environment such as air, water, land etc. combines with other plant substances and brings about changes in its physical, chemical and biological properties and it either becomes unusable or harms health. Both this process and the result are called pollution. Thus, environmental pollution means the change in the physical, chemical and biological properties of the components of the environment or the presence of undesirable substances in the environment which may cause imbalance in the environment or loss of life. Many types of global problems are arising due to environmental pollution. Global warming is a global problem which is affecting human life. Many types of diseases are arising due to the increase in pollution. If environmental pollution is not stopped, many problems will arise at the global level. A time may come when the organisms of the biosphere

will be destroyed due to environmental pollution.

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