What is Environmental Pollution?

The dictionary explains pollution as “the presence in or introduction into the environment of a substance which has harmful or poisonous effects.” Wiki explains pollution as “the introduction of contaminants into the natural environment that cause adverse change.” Simply put, Environmental Pollution is something that brings harm to our environment and in turn to the people who exist based on the environment.

How does Environmental Pollution occur?

Environmental Pollution occurs when pollutants contaminate the surroundings; which brings about changes that affect our normal lifestyles adversely. Pollutants are the key elements or components of pollution which are generally waste materials of different forms. Pollution disturbs our ecosystem and the balance in the environment. With modernization and development in our lives pollution has reached its peak; giving rise to global warming and human illness.

What are the different types of Pollution?

Environmental Pollution occurs in different forms; air, water, soil, radioactive, noise, heat/ thermal and light. Every form of pollution has two sources of occurrence; the point and the non-point sources. The point sources are easy to identify, monitor and control, whereas the non-point sources are hard to control.

Toxic environmental pollution affects more than 200 million people worldwide, according to Pure Earth, a non-profit environmental organization. In some of the world’s worst polluted places, babies are born with birth defects, children have lost 30 to 40 IQ points, and life expectancy may be as low as 45 years because of cancers and other diseases.Let us discuss the different types of pollution, their causes and effects on mankind and the environment as a whole.

Sources and Causes of Environmental Pollution

The sources and causes of environmental pollution includes the following:

- **Industrial activities:** The industries all over the world that brought prosperity and affluence, made inroads in the biosphere and disturbed the ecological balances. The pall of smoke, the swirling gases, industrial effluents and the fall-out of scientific experiments became constant health hazards, polluting and contaminating both air and water. The improper disposal of industrial wastes are the sources of soil and water pollution. Chemical waste resulting from industry can pollute lakes, rivers and seas and soil too as well as releasing fumes.
- **Dumping solid waste:** Household and commercial waste pollutes the environment when not disposed of properly.
- **Vehicles:** The smoke emitted by vehicles using petrol and diesel and the cooking coal also pollutes the environment. The multiplication of vehicles, emitting black smoke that, being free and unfettered, spreads out and mixes with the air we breathe. The harmful smoke of these vehicles causes air pollution. Further, the sounds produced by these vehicles produces causes noise-pollution.
- **Rapid urbanization and industrialization:** The urbanization and the rapid growth of industrialization are causing through environmental pollution the greatest harm to the plant life, which in turn causing harm to the animal kingdom and the human lives.
- **Population overgrowth:** Due to the increase in population, particularly in developing countries, there has been surge in demand for basic food, occupation and shelter. The world has witnessed massive deforestation to expand absorb the growing population and their demands.
- **Combustion of fossil fuels:** The combustion of fossil fuels pollutes the air, the soil and the water with noxious gases such as CO2 and CO.
- **Agricultural waste:** Fertilizers and pesticides used in agriculture are key causes of environmental pollution.

Types & Causes of Pollution:

Air Pollution

It is the most prevalent and dangerous form of pollution especially considered to go hand in hand with urbanization. There are many reasons to it. Primary among these is the excessive fuel combustion which has become a basic necessity for cooking, transport and other industrial activities. This releases umpteen no. of chemicals to the

air which are far from being removed from it. These are directly affecting our existence.

Smoke releases SO_2 into the air making it toxic. It is caused mainly due to chimneys, factory stacks, vehicles or something as common as 'burning of wood'. Release of SO_2 and other greenhouse gases into air causes global warming and has capacity to cause acid rain. Global warming or emission of these gases has increased temperatures, erratic rains and droughts worldwide. This has heavily increased the cases of Asthma, Bronchitis and the more dangerous lung cancer, mainly in the metro cities.

Air pollution is believed to end lives of over 20 lakh people every year – a study, published in the journal Environmental Research Letters, says.

One of the major and unfortunate examples of what can air pollution lead to is the Bhopal Gas Tragedy of 1984. It was a direct result of release of methyl isocyanate gas at Union Carbide plant in Bhopal. It killed over 2,000 people, and over 200,000 suffered respiratory problems. An irritant (e.g. particulates less than 10 micrometers) may cause respiratory illnesses, cardiovascular disease and increases in asthma. Even today there are birth defects in the babies borne, which are believed to be because of the tragedy.

"*The very young, the old and those with vulnerable immune systems are most at risk from air pollution. The air pollutant may be carcinogenic (e.g. some volatile organic compounds) or biologically active (e.g. some viruses) or radioactive (e.g. radon). Other air pollutants like carbon dioxide have an indirect impact on human health through climate change*" – Prof. Harry Sealy, in an interview, to the 'Live Science' journal.

Learn more about the Causes of Air Pollution here in detail.

Water Pollution

Every living being depends, directly, on water so this has taken a heavy toll on the entire living population. Other than direct dependencies, more than 60% of the species live in some form of water. Thus water pollution is another major type of pollution that needs to be curbed.

It can be attributed to many factors -industrial effluent dumped into the rivers and sea causes a huge imbalance in the water properties which renders the water bodies unfit for aquatic lives. Water pollution is also a major cause of diseases caused to the non-aquatic species.

Insecticides, pesticides which are sprayed on the plants, pollutes the ground water system and oil spills in the oceans have caused irreparable damage to the water bodies. Eutrophication is another big source; it occurs due to daily activities like washing clothes, utensils near lakes, ponds or rivers; this forces detergents to go into water which blocks sunlight from penetrating, thus reducing oxygen and making it inhabitable.

According to National Oceanic and Atmospheric Administration (NOAA), 80 percent of the pollution in marine environments comes from the land through sources such as runoff. Water pollution can severely affect marine life. For example, sewage causes pathogens to grow, while organic and inorganic compounds in water can change the composition of the precious resource. According to the EPA, low levels of dissolved oxygen in the water are also considered a pollutant. Dissolved oxygen is caused by the decomposition of organic materials, such as sewage introduced into the water.

Water pollution not only harms the aquatic beings but it also contaminates the entire food chain by severely affecting humans dependent on these. Water-borne diseases like cholera, diarrhoea have also increased in all places.

Soil pollution

Also known as Land Pollution, this occurs due to incorporation of unwanted chemicals in the soil due to human activities. Use of insecticides and pesticides absorbs the nitrogen compounds from the soil making it unfit for plants to derive nutrition from. Release of industrial waste, mining and deforestation also exploits the soil. Since plants can’t grow properly, they can’t hold the soil and this leads to soil erosion.

Food is a big contributor to landfill waste. Up to 40 percent of food produced in the United States is trashed each year, according to the Natural Resources Defense Council.

Commercial or industrial waste is a significant portion of solid waste. According to the University of Utah, industries use 4 million pounds (1.8 million kg) of materials in order to provide the average American family with needed products for one year.

Much of it is classified as non-hazardous, such as construction material (wood, concrete, bricks, glass, etc.) and medical waste (bandages, surgical gloves, surgical instruments, discarded needles, etc.). Hazardous waste is any liquid, solid or sludge waste that contain properties that are dangerous of potentially harmful to human health or the environment. Industries generate hazardous waste from mining, petroleum refining, pesticide manufacturing and other chemical production. Households generate hazardous waste as well, including paints and solvents, motor oil, fluorescent lights, aerosol cans, and ammunition.

While the above three are most common forms of Pollution that we hear about, there are few other forms of Pollution that have seemed to grow at an alarming pace these days. Let us briefly look at what they are.

Noise pollution
It is caused when a noise which is of higher intensity than 85 db reaches our bare ears. It may lead to psychological problems like stress & hypertension. It can also lead to permanent hearing impairment, which is worse. It is mainly caused by loud pumps and compressors in the chemical industries. Even marriage functions and rock music concerts are often ignored contributors to this type of pollution.

Radioactive pollution
This is considered one of the most dangerous pollution because of its permanent effects. An unarrested upset in a nuclear plant , careless nuclear waste disposal, etc. It can cause cancer – skin, blood, infertility due to exposure, birth defects and blindness; It has the ability to permanently change soil, air and water – the major sources of life. It can even cause mutation in species which can propagate for ages.

Thermal/heat pollution: This is caused as a result of excessive heat release in the environment. This leads to irreversible and undesirable changes of almost permanent nature. Industries and Vehicles are direct contributors to this. Deforestation is an indirect contributor.Other than the greenhouse gases,zyada this has increased the earth's temperature, and has potential to cause drastic climatic changes; and wildlife extinction.

Light pollution
Whenever illumination available is more than what's required in an area, this pollution kicks in. It is more noticeable in big cities, on advertising boards and billboards, mainly during large scale events, vis-a-vis Concerts, sport events & even

mariiages, at the night. It mainly affects the astronomical observations by making the stars very difficult to observe & study.

Effects of Pollution?

Environment Degradation: Environment is the first casualty for increase in pollution weather in air or water. The increase in the amount of CO2 in the atmosphere leads to smog which can restrict sunlight from reaching the earth. Thus, preventing plants in the process of photosynthesis. Gases like Sulfur dioxide and nitrogen oxide can cause acid rain. Water pollution in terms of Oil spill may lead to death of several wildlife species.

Human Health: The decrease in quality of air leads to several respiratory problems including asthma or lung cancer. Chest pain, congestion, throat inflammation, cardiovascular disease, respiratory disease are some of diseases that can be causes by air pollution. Water pollution occurs due to contamination of water and may pose skin related problems including skin irritations and rashes. Similarly, Noise pollution leads to hearing loss, stress and sleep disturbance.

Global Warming: The emission of greenhouse gases particularly CO2 is leading to global warming. Every other day new industries are being set up, new vehicles come on roads and trees are cut to make way for new homes. All of them, in direct or indirect way lead to increase in CO2 in the environment. The increase in CO_2 leads to melting of polar ice caps which increases the sea level and pose danger for the people living near coastal areas.

Read all about global warming in this article.

Depletion of the Ozone Layer: Ozone layer stops ultra violet rays from reaching the earth. UV exposure in excess can lead to skin cancer. Due to release of CFCs & aerosols in the atmosphere which contributed to the depletion of ozone layer. This removes the sheet that protects us from the harmful UV-rays which is more than just threatening.

Infertile Land:Constant use of pesticides, insecticides & other chemicals causes the soil to become infertile. Soil is the major and in some cases the only source of nutrition for plants & vegetables. Importance of these can never be overstated. But

due to infertile soil, plants will not be able to grow properly. Industrial waste also affects the fertility of the soil.

Pollution not only affect humans by destroying their respiratory, cardiovascular and neurological systems; it also affects the nature, plants, fruits, vegetables, rivers, ponds, forests, animals, etc, on which they are highly dependent for survival. It is crucial to control pollution as the nature, wildlife and human life are precious gifts to the mankind.

Effects of Environmental Pollution

Environmental pollution has negatively affected the life of both human-beings and animals. Almost all of our gains in the fields of industrial progress, science and technology had so far been realized at the cost of our health. Even our flora and fauna were found to be threatened with extinction.

All this really leaves us wondering if all our achievements and industrial civilization really help us climb the peaks of prosperity or simply take us down the blind alleys of adversity. It is not only in India, but all over the world – even in Europe and U.S.A. – that the question is being raised whether all is well with our industrial growth and progress in the field of science and technology. Many crusaders against environmental pollution are vehemently protesting against the indiscriminate violations committed daily in the name of development.

The environmental pollution is not caused by the fall-out from nuclear tests or industries alone. The smoke left behind the automobiles and other vehicular traffic, the increasing use of synthetic detergents, nitrogen fertilizers and insecticides contaminate both air and water.

- The water we drink the vegetables are all contaminated to-day. As a result of this contamination our world is afflicted with a quite a number of incurable diseases.
- Environmental pollution affects water sources which mean that there is less fresh water available for drinking, washing, cooking and irrigating crops.
- Nothing in this world is immune, no life is safe and the future of this world is bleak.
- The factories are mostly built in populated areas and the smoke-emitting vehicles ply through the congested areas. Besides causing immense disturbances, there are

increasing case of pulmonary tuberculosis and thrombosis and various sorts of brain and heart complications.

- Air-pollution may cause severe lungs-diseases, asthma, brain-disorder diseases, etc.
- Soil-pollution may have negative effect on farm output ratio. It can also contaminate the ground water.
- Noise-pollution have negative effects on hearing or auditory sense organs. It can also cause deafness, tiredness, and mental losses.
- The heat generated by industries and vehicles causes thermal pollution by raising the environmental temperature of the nearby areas.
- Many scientists believe that we are living in an era of mass extinction, due to human made environmental pollution.
  The birth of mills and factories is the result of the growth of industry in this machine-predominated age. As long as they will be there, they must emit smoke, pollute the air and hasten our end by slow-poisoning.

The worst industrial environment tragedy occurred at Bhopal on December 3, 1984 as a result of toxic and poisonous leakage of methyl isocyanate (MIC) gas from a multi-national Union Carbide pesticides manufacturing plant. Over 2000 people including woman and children were killed, and hundreds were severely hurt.

How is Environmental Pollution in India?

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1. India’s high air pollution, ranked by the World Health Organisation among the worst in the world, is adversely impacting the lifespan of its citizens, reducing most Indian lives by over three years, a new study has said.
2. Over half of India’s population – 660 million people – live in areas where fine particulate matter pollution is above India’s standards for what is considered safe, said the study by economists from the University of Chicago, Harvard and Yale published in this week’s ‘Economic & Political Weekly’.
3. Of the world’s top 20 polluted cities, 13 are in India compared to just three in China. Air pollution slashes life expectancy by 3.2 years for the 660 million Indians who live in cities, including Delhi. In China, the corresponding dip is marginally lower at three years, according to a report in The Hindustan Times.

4. In 2014, a global analysis of how nations tackle environmental challenges has ranked India 155 among 178 nations and labelled the country's air quality among the worst in the world, tying it with China in exposing its population to hazardous air pollution.
5. The Environmental Performance Index 2014, generated by researchers at Yale University in the US, has bracketed India among "bottom performers" on several indicators such as environmental health impact, air quality, water and sanitation. Although India is an emerging market alongside Brazil, China, Russia and South Africa, its environment severely lags behind these others," Angel Hsu, the lead author of the report at Yale University said.
6. The Ganga and Yamuna are ranked among the world's 10 most polluted rivers. China has just one. An evaluation in February ranked Vapi in Gujarat and Sukinda in Odisha among the 10 most environmentally-degraded zones in the world. China had no entries on the list.
7. Mindless concretization of ground and green belts and booming real estate has led to heat island effect which is burning the Capital as short-wave radiations emanate from concrete surfaces at night time. Concretization prevents ground water recharge thus depleting green cover. Tall buildings also block winds thereby reducing their cooling effect. Excessive concretization also leads to weakening of trees.
8. Despite the directives of the National Green Tribunal, civic agencies continue to allow concretization in green belts. Massive green cover is destroyed in the name of development. Booming real estate and demand for housing units is leading to change of land use and shrinkage of natural conservation zones such as forests, water bodies, wastelands, sanctuaries, groundwater rechargeable areas, Aravallis and wetlands in the National Capital Region including Delhi, Haryana, Rajasthan and Uttar Pradesh.
9. A 2015 report by the Centre for Science and Environment, a Delhi-based NGO, says the decline in the country's overall environmental standards was because of river pollution, which is worse now than it was three decades ago, piling garbage in cities and increasingly toxic urban air.
10. According to a report in The Economic Times citing research by environmental economists from Chicago, Harvard and Yale that finds that well over half of the Indian population may be set to lose three years of their lives due to the adverse effects of breathing air with highly excessive levels of pollutants. It has been known for some time that the air that people breathe in Indian cities is among the worst in the world.

"Of course we're doing our part to save the planet.
All of my employees are biodegradable!"

It is time we start doing something to save the air we breathe, the water we drink & the land that we live in. It is time to stop increasing environmental pollution any more, before time runs out.

Solutions to Environmental Pollution

- Gas emission pollution is being mitigated in a variety of ways with car emission control, **electric and hybrid vehicles and public transportation systems**. Not all major cities have successful implementation and decent public transportation in place, but the world is working on this issue constantly and we have managed to reduce emissions profoundly over the last decade. There is much catching up to do.

- The cost of radioactive power plants is becoming apparent and the days of coal power plants are nearly dead. The radiation is a serious issue. Radioactive leakage from power plants and nuclear testing have already contaminated oceanic life to such a degree that it will take hundreds of years to return to normal. More radiation solutions are in the works with various **ecologically friendly power technologies**being built every day.

- **Solar power is a fantastic solution**. Now that solar radiation is at a climactic peak, we can reap power from the sun using solar panel systems. These range from home systems to larger scale systems powering entire communities and cities.

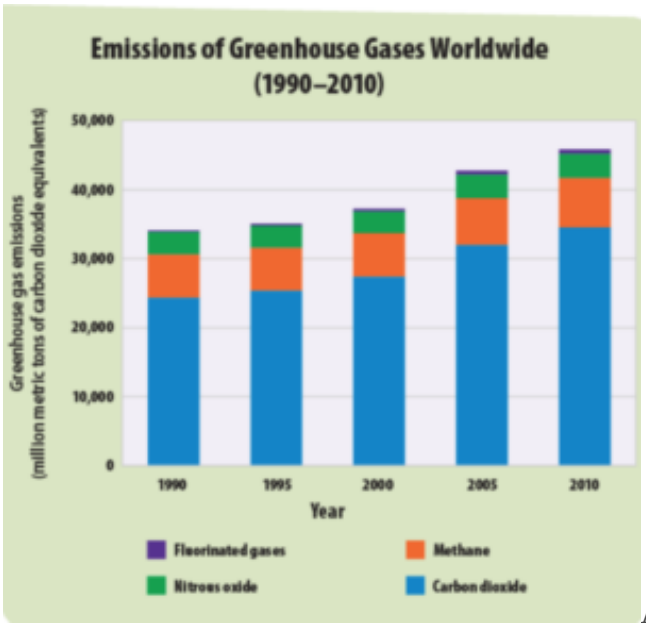
- **Wind power is coming into play**. This may not seem like much at first, but when you get about 100 feet off the ground, there is a great deal of wind up there. By building wind turbines to harvest natural wind energy, electricity is produced. Wind turbine power and solar power are both powerful forces against fossil fuel power and radioactive power. The one problem here is power companies. They want to stay with radioactive power plants because they actually can't be removed. It has become the

crusades of many individuals and small corporations to make the switch and there are plenty of people following this as populations cry out for help.

- **Electromagnetic radiation (ER) reduction**. Once major manufacturers of computers and electronic devices realized the blatant potential for huge ER emissions directly into the eyes and brains of users, they started to implement hardware protocols to minimize risks and reduce ER production significantly. Newer devices are in the lead to knock this problem out and, fortunately, this is working.
  Also, the Environmental Protection Agency (EPA) is well aware of all leaks and tricks industries are using to dump wastes. This agency now has extremely strict protocols and testing procedures implemented against such facilities so populations are not affected. Additionally, the EPA is measuring air pollution and implementing regulatory procedures for vehicle emissions. They also monitor pollen issues and, with the help of the Centers for Disease Control (CDC), they implement solutions to reduce pollen in the air.

  Dropping pollen counts is a major focus for EPA and CDC activities. Asthma and other allergic conditions are flooding medical care facilities and pharmaceutical companies with serious public health problems. The response has been swift and various methods to control emissions and reduce pollen counts are in the works. Children and elderly people are at the highest risk for environmental pollution related health problems. The good news is we are directly on the horizon to cut down the causes and risks while providing practical health solutions for the general public throughout the world.

What is a Greenhouse Gas



A ***greenhouse gas*** (often abbreviated as GHG) is a gas that both absorbs and emits radiation in the **infrared**range, commonly called thermal radiation or heat. When present in the atmosphere, these gases trap radiation in the form of heat, causing a warming process called the ***greenhouse effect***. The presence of four major greenhouse gases, namely water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) in the Earth's atmosphere keeps the average temperature of 15º C (59º F), whereas without the greenhouse effect the average temperature would be a frosty -18º C (0º F).

Some concentration of greenhouse gases in the atmosphere is normal, and in fact necessary for life on Earth as we know it. It is normal for the concentrations of these gases to fluctuate over time, causing the average global temperature to vary over a period of hundreds of thousands or millions of years. These natural fluctuations are slow, especially in comparison to the ***atmospheric lifetime*** of GHGs, or the time it takes for a gas emitted to the atmosphere to be removed by the ocean, the biosphere (the living systems of Earth), or by other means. Because the changes in GHG concentrations are slow and buffered, life on Earth has time to adapt to the corresponding changes in temperature, for the most part avoiding mass extinction of other catastrophic events.

Global warming The gradual increase in the overall temperature of Earth's atmosphere due to the greenhouse effect. This effect is caused by increased levels of carbon dioxide, chlorofluorocarbons and other gases in the air, many of them released by human activity.

Most Polluted Places on Earth

 Chernobyl, Ukraine

Chernobyl is the infamous site of the worst nuclear disaster in history. On April 26, 1986, a fiery meltdown of the nearby nuclear reactor's core released 100 times more radiation than the atom bombs dropped over Hiroshima and Nagasak.

 Dzerzhinsk, Russia

Until the end of the Cold War, Dzerzhinsk was one of Russia's principal manufacturing sites of chemical weapons. Nearly 300,000 tons of chemical waste were improperly disposed of there between 1930 and 1998, leading the Guinness Book of World Records to name it the most chemically polluted city in the world.

Sukinda, India

Sukinda contains more than 97 percent of India's chromite ore deposits. Twelve mines operate without environmental controls, leaching hexavalent chromium into drinking water supplies. More than 30 million tons of waste rock are spread over the surrounding areas, and untreated water is discharged by the mines into the river.

Chromite mine workers are constantly exposed to contaminated dust and water, and gastrointestinal bleeding, tuberculosis and asthma are common ailments. Local research suggests nearly 25 percent of the inhabitants roughly a half-mile (1 km) from the sites are suffering from pollution-induced diseases.

Pollution control

Pollution control, in environmental engineering, any of a variety of means employed to limit damage done to the environment by the discharge of harmful substances and energies. Specific means of pollution control might include refuse disposal systems such as sanitary landfills, emission control systems for automobiles, sedimentation tanks in sewerage systems, the electrostatic precipitation of impurities from industrial gas, or the practice of recycling. For full treatment of major areas of pollution control, *see* air pollution control, wastewater treatment, solid-waste management, and hazardous-waste management.