

Impacts of Environmental Air Pollution on Human Health

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Abstract: *In this present study Examined to control the pollutants coming from different industries. To maintain the environmental sustainability by controlling the pollutants. All living organisms damage caused by pollution. This is coming from most of chemical industries. It is an unwanted impact in the physical, chemical and biological characteristics of air, water and soil that may harmfully affect the human life and it creates a potential health hazard of any living organism. Industrialized countries of the world such as United states of America, India ,Germany, Japan, Dubai, Nigeria, Saudi Arabia, China, Texas released NO_x , SO_2 gas, pesticides, detergents, plastics, solvents, fuels, paints, dyes, food additives, CO , CO_2 in to environment. These are very hazardous to human being as well as plants and animals. There are a number of industrial effluents emissions of poisonous gases in to the atmosphere. Mining activities also added to this problem, particularly as solid waste. The unsafe conditions created by man himself and cause to unsustainable of environment. The man made activity leads to damage not only human survival nature but also all other living organisms.*

Keywords: Pollutants, industrial effluents, global warming, environment, greenhouse , natural resources, pollution control

1. Introduction

The atmosphere is an insulating blanket around the earth. It is source of essential gases, maintains a narrow difference of day and night temperatures and provides a medium for long distance radio communication. It also acts as shield around the earth against lethal UV radiations. Without atmosphere, there will be no lightening, no wind, no clouds, no rains, no snow and no fire. Air is one of the most important constituents of man's environment. An average human being requires about 12kg of air each day, which is nearly 12 to 15 times greater than the amount of food consumed. Clean and pure air is very essential for human health and survival. Any change in the natural and normal composition of air that may adversely affects the living system, particularly the human life invariably causes air pollution . Air pollution is generally defined as the presence in the outdoor atmosphere of one or more contaminants such as fumes, dust, gases, mist, odour, smoke, smog or vapours in considerable quantities and duration of which is injurious to human, animal and plant life or which unreasonably interferes with the comfortable enjoyment of life and property. Thus air pollution is generally disequilibrium condition of air caused due to the introduction of foreign elements from natural and manmade sources to the air so that it becomes injurious to biological communities . The World Health Organization (WHO) defines air pollution as limited to situations in which the outer ambient atmosphere contains materials in concentrations which are harmful to man and his environment. A substance in the air that can cause harm to humans and the environment is known as an air pollutant and air pollutants are expressed as a ppm or $\mu\text{g}/\text{m}^3$ which is subjected to change to variations of temperature and pressure . Air pollution is a problem that is directly related to the number of people living in an area and the kinds of activities they engaged in. In a place where the population is low and their energy usage is also low, the impact of people in creating pollution is minimal. However where the population is high, the area urbanized and industrialized with high energy usage large quantities of pollutants are

released into the environment. It is clearly obvious that the greater the concentration of people in one area, the greater the amount of pollution and the greater the sophistication of a society the more intricate and poignant its pollution.

2. Sources of Air Pollution

Air pollution results mainly from gaseous emissions of industry thermal power stations, automobiles, domestic combustions, smoke from the fire etc. From the different sources of air pollution, a variety of pollutants are released in to atmosphere. The main air pollutants emitted from these different sources and how these pollutants affect the human and other living organisms on the planet are described:

- 1) Carbon compounds: These are CO_2 and CO , the former is released by complete combustion of fossil fuels, and the latter by automobile exhausts.
- 2) Sulfur compounds: These include SO_2 , HS and H_2SO_4 mostly released by fossil-fuel-based power generating plants, thermal plants, and refineries.
- 3) Nitrogen oxides: These include NO , NO_2 , HNO_3 mostly released by automobiles, power plants and industries.
- 4) Ozone: Its level may rise in astrosphere due to human activities.
- 5) Fluorides: These come from industries, insecticides spray etc.
- 6) Hydrocarbons: These are chiefly benzene, benzpyrene etc. which are released by automobiles and industries.
- 7) Metals: These include lead, nickel arsenic, beryllium, tin, vanadium, titanium, cadmium, etc. present in the air as solid particles or liquid droplets or gases. They are produced mostly by metallurgical processes, automobiles, sea spray, etc.
- 8) Photochemical products: These are photochemical smog, PAN, PB₂N, etc. released by automobiles.
- 9) Particulate matter: These are fly ash, dust, grit and other suspended particulate matter released from power plants and industries (stone crushers)

- 10) Biological particulate matters: Bacterial cells, fungal spores and pollens in air.
- 11) Toxicants other than heavy metals: These are complex chemical substances released during manufacture of other goods.
- 12) Carbon Compounds The two important pollutants are CO₂ and CO.

Carbon Dioxide (CO₂): Major amount of CO₂ is released in the atmosphere from burning of fossil fuel (coal, oil, etc.) for domestic cooking, heating, etc. and the fuel consumed in furnaces of power plants, industries, hot mix plants, etc. Another reason is the destruction of the forest in the tropical regions of the world. These ecosystems are efficient in removing CO₂ and storing the C atoms in the structure of the plant. From fossil fuels alone more than 18 x 10² ton of CO₂ are being released into atmosphere each year. This gas is also emitted during volcanic eruptions. An increase in CO₂ concentration in atmosphere may result into disastrous effects as greenhouse effect.

Greenhouse Effect and Global Warming: Since CO₂ is confined exclusively to the tropo sphere; its higher concentration may act a serious pollutant. Under normal conditions the temperature at the surface of the earth is maintained by the energy balance of the sun rays that strike the planet and heat that is reradiated back in to space. However, when there is an increase in CO₂ concentration, the thick layer of this gas prevents the heat from being reradiated out. This thick CO₂ layer thus functions like the glass panels of a greenhouse (or the glass windows of a motorcar), allowing the sunlight to filter through but preventing the heat from being radiated in outer space. This is the so-called Greenhouse Effect.

Thus, most heat is absorbed by CO₂ layer and water vapour in the atmosphere, which adds to the heat that is already present. The net result is the heating up of the earth's atmosphere. Thus increasing CO₂ levels tends to warm the air in the lower layers of atmosphere on a global scale. Nearly 100 years ago the CO₂ level was 275 ppm. Today it is 350 ppm and by the year 2035 and 2040 it is expected to reach 450 ppm. CO₂ increases the earth temperature by 50% while CFCs are responsible for another 20% increase. There are enough (CFCs up there to last 120 years)



Air pollution from a coking oven



Dust storm approaching Stratford, Texas



Air pollution from different chemical industries

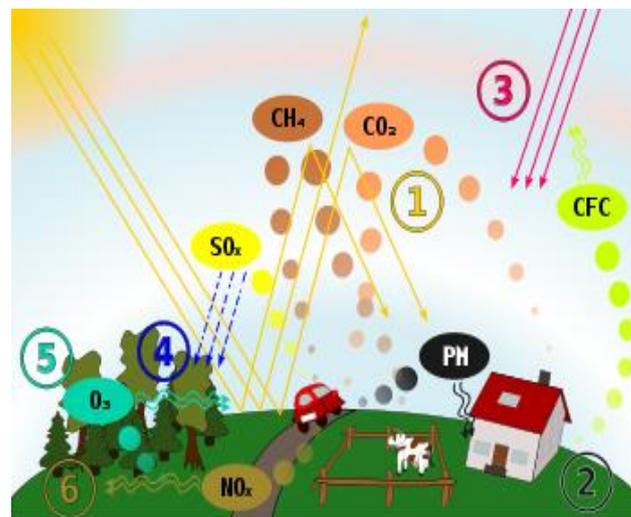
3. Non-biodegradable Synthetic Organic Compounds

Synthetic organic compounds are plastics, synthetic fibres, synthetic rubber, modern paint like coatings, solvents, pesticides, wood preservatives and hundreds of other products. These products are toxic because they are absorbed in to the body, there they interact with the particular enzymes, but their non biodegradability prevents them from being broken down or processed further. The result is that they upset the system. When a person ingests a high dose, the effect may be an acute poisoning and death. With a low dose over extended periods, the effects are insidious and can be mutagenic, carcinogenic, or teratogenic (birth defect). They may cause liver and kidney dysfunction, sterility and numerous other physiological and neurological problems. The troublesome class of synthetic organics is the halogenated hydrocarbons. It is organic compounds in which one or more of the hydrogen atoms have been replaced by atoms of chlorine, bromine, fluorine, or iodine. These four elements are classed as halogens. Of the halogenated hydrocarbons, the chlorinated hydrocarbons are the most common. Organic chlorides are used in plastics, pesticides, solvents electrical insulation, flame retardants and many other products.

4. Air Pollution Effects

Air pollution is a significant risk factor for a number of pollution-related diseases and health conditions including respiratory infections, heart disease, COPD, stroke and lung cancer. The health effects caused by air pollution may include difficulty in breathing, wheezing, coughing, asthma and worsening of existing respiratory and cardiac conditions. These effects can result in increased medication use, increased doctor or emergency room visits, more hospital admissions and premature death. The human health effects

of poor air quality are far reaching, but principally affect the body's respiratory system and the cardiovascular system. Individual reactions to air pollutants depend on the type of pollutant a person is exposed to, the degree of exposure, and the individual's health status and genetics. The most common sources of air pollution include particulates, ozone, nitrogen dioxide, and sulphur dioxide. Children aged less than five years that live in developing countries are the most vulnerable population in terms of total deaths attributable to indoor and outdoor air pollution.



Schematic drawing, causes and effects of air pollution: (1) greenhouse effect, (2) particulate contamination, (3) increased UV radiation, (4) acid rain, (5) increased ground level ozone concentration, (6) increased levels of nitrogen oxides.



Beijing air on a 2005-day after rain (left) and a smoggy day (right) v Equipment used to control Air Pollution:

Air pollution can be reduced by adopting the following approaches. Ensuring sufficient supply of oxygen to the combustion chamber and adequate temperature so that the combustion is complete thereby eliminating much of the smoke consisting of partly burnt ashes and dust.

To use mechanical devices such as scrubbers, cyclones, bag houses and electro-static precipitators in manufacturing processes. The equipment used to remove particulates from the exhaust gases of electric power and industrial plants are shown below. All methods retain hazardous materials that must be disposed safely. Wet scrubber can additionally reduce sulphur dioxide emissions.

The air pollutants collected must be carefully disposed. The factory fumes are dealt with chemical treatment.

5. Remedial plans to air Pollution Problems

The control measures for air pollution in the environment not substantially reduced air pollution. It was particularly noted that most commuters and urban dwellers are constantly exposed to the hazards of air pollution on daily basis. It is based on this that the paper put forward preventive measures/sustainable solutions as listed below: Vehicle inspection is an important preventive measure that will ensure drivers not only service their cars periodically but also old vehicles that emit too much smoke are taken off the roads and only vehicles in good condition ply the roads. Improvement in electric power supply will drastically reduce the use of gasoline generators that are found at home, business premises, offices and industries. The use of fuel wood can be reduced by providing readily available alternative means of cooking and heating both for homes and small scale industrial use. Biogas is an alternative energy source that can be promoted and subsidized to the people to reduce the use of fuel wood that is a source of indoor and outdoor air pollution. The regular waste collection and disposal will also ensure that there is no time for the waste to decompose and generate bad odour which

pollutes the air. Manufacturing industries operating in the urban centers should be compelled to adhere strictly to the various pollution control legislations that are enacted in the country.. Enforcement of air pollution legislations across the country will ensure that people, organizations and groups that carryout activities that are sources of air pollution are reduced. It is important to enforce pollution control legislations as the laws are there for many years but not fully enforced. There is the need to continuously enlighten and educate the public about the causes and effects of air pollution so that they realize the dangers and health hazards of living in polluted environment awareness about environmental issues but also pressurize the government to take action against those who pollute the environment.

6. Conclusion

Today we have both knowledge and technology for a sound ecological management. We know how to control pollution, how to recycle materials and nutrients and harness solar energy. What is required is only a matter of desire and will as individuals and societies to put what is known in to practice. By this information we can maintain the environment sustainability. We can protect our natural resources. We can give these natural resources to future generations without pollution involved in the environment.

References

- [1] Garg, S. K., Garg, R. and Garg, R. (2006), Environmental Science and Ecological Studies Delhi, Khanna Publishers Hyderabad India.
- [2] Anjaneyulu, Y. (2005), Introduction to Environmental Science BS Publications Hyderabad India.
- [3] Das, R.C. and Behera, D.K. (2008), Environmental Science Principles and Practice Prentice Hall of India New Delhi India
- [4] Enger, D.E.; and Smith, B.F. 2000. Environmental Science. A Study of Interrelationship, 8th ed. McGraw-Hill, New York, NY, USA. Nebel, B.J.; and Wright, R.T. 1998.
- [5] Environmental Science, 6th ed. Prentice Hall, Upper Saddle River, NJ, USA. Sharma, P.D. 1998.
- [6] Ecology and Environment, 7th ed. Rastogi Publ., Meerut, New Delhi, India.