ISBN: 978-93-94570-82-5

6. Air Pollution and Environmental Ethics

Khusboo Agarwal

Assistant Professor,
Jorhat Kendriya Mahavidyalaya,
Jorhat, Assam.

Dimplly Borah

Assistant Professor (Contractual),
Jorhat Kendriya Mahavidyalaya,
Jorhat, Assam.

Abstract:

Human behavior towards the environment has been very brutal since many years. The constant harm caused to nature has resulted in many environmental problems like global warming, ozone layer depletion, etc. The most common and widespread problem is pollution. There are many types of pollution all over the world which has not only degraded the environment, but has also caused severe health issues in human beings. Hence, it is of utmost importance to make the environment and its safety our priority.

Keywords: *Environment, pollution, human beings, nature.*

6.1 Introduction:

Over the years, our environment has undergone major changes, most of which are negative. Human activities can be considered as the main reason behind such changes. Deforestation in the name of urbanization, wastage of natural resources, use of excessive chemicals during agriculture, disregard for animals etc. are few of the negligence's of human beings due to which the environment is severely suffering.

Also, domestic sewage and animal waste are the leading sources of organic pollution in our environment. The changes in the environment can be witnessed in the form of various types of pollution, rise in temperature, global warming etc. These changes are detrimental not only for the environment, but for all the living organisms including human beings. In this chapter we shall be discussing one of the concerns that our environment has been facing- "pollution" with special emphasis on air pollution.

6.2 Fundamentals of Pollution:

Pollution can be defined as the presence of unwanted substances in the environment which are harmful for human beings as well as other living organisms. Pollution can be both man-made as well as natural.

This environmental problem has created a havoc not only on the planet but on our health too. The major types of pollution occurring in our environment are given below-

- Air pollution
- Water pollution
- Soil pollution
- Noise pollution
- Plastic pollution
- Thermal pollution
- Radioactive pollution
- Light pollution etc.

The introduction of harmful substances has degraded the quality of air, water, soil. These substances have been named as "pollutants". Pollutants can be both natural as well as man-made.

6.2.1 Pollutants Generated Due to Natural Causes:

- *Volcanic eruption*: Volcanoes are one of the main sources of pollutants as harmful gases are released into the atmosphere in large quantities. The excessive release of carbon dioxide during volcanic eruption leads to rise in temperature which ultimately leads to climate change and global warming. Volcanic eruptions also release toxic substances like arsenic, lead, mercury which are extremely detrimental for the environment.
- *Forest fire*: Forest fire, also known as wildfire, bushfire is an uncontrolled fire that occurs in forests mostly due to natural causes such as lightning. Like volcanic eruption, forest fires also release harmful gases like carbon dioxide and carbon monoxide which are the leading causes behind global warming, air pollution and ozone layer depletion.

6.2.2 Pollutants generated due to man-made causes:

- ***Motor vehicles***: The gases emitted from the motor vehicles are one of the principal causes behind air pollution. Harmful gases like carbon monoxide, hydrocarbons, nitrogen oxide, sulphur dioxide, etc are released from these vehicles leading to degradation of the air quality as well as rise in temperature.
- ***Excessive use of plastic***: The excessive use and manufacture of plastic by human beings has led to pressing environmental issues. Due to the use of single use plastic, there has been a massive hike in the amount of non-degradable waste in the environment. This in turn has given rise to "plastic pollution".
- ***Burning of fossil fuels***: Burning of fossil fuels like coal, gasoline, etc. for various purposes like transportation, generation of energy has led to emission of toxic gases like carbon monoxide, nitrogen dioxide leading to air pollution.
- ***Industrial emission***: With industries set up in every corner of the world, there is uncontrolled emission of air pollutants such as sulphur dioxide, nitrogen dioxide, etc. which has caused numerous health issues in human beings like bronchitis, asthma, eye problems etc.

6.3 Types of Pollution:

Pollution can be defined as undesirable change in physical, chemical, and biological characteristics of land, air or water that occurs due to accumulation of pollutants. It is of five major types namely air pollution, water pollution, land pollution, radioactive pollution, and noise pollution. In terms of origin also it may be categorized as natural or anthropogenic.

- **Air pollution** can be defined as qualitative and quantitative changes in the constituents of the atmosphere due to addition or contamination of some substances that are harmful to man and ecosystem. Over population, increasing urbanization, industrialization, energy consumption etc. are the major causes of air pollution.
- **Water pollution** is defined as the addition of unwanted substances or the change of physical and chemical characteristics of water which makes it unsuitable for human consumption. It is mainly caused by waste products of industries, domestic sewage, oil spillage agricultural and industrial run off etc.
- **Soil or land pollution** results due to addition or removal of substances that decreases soil productivity and the quality of ground water. Modern agronomic practices, artificial fertilizers, farm chemicals etc. can lead to decrease in soil quality.
- **Radioactive pollution** is the result of emission of protons, electrons and electromagnetic radiations that are released by the disintegration of various radioactive substances like radium, thorium, uranium etc. Such pollution can ultimately lead to air, water, and land pollution.
- **Noise pollution** can be defined as any unwanted and unpleasant sound that affects animals and humans badly. Noise level above 120 db. is considered harmful to human beings. High pitch sound produced by automobiles, machines, power plants, trains, helicopters, airplanes, rockets, public broadcasting systems, T.V, explosion of bombs, sound of crackers etc. are the potent source of air pollution.

6.4 Causes of Air Pollution:

Air pollution is mainly caused by various pollutants that includes harmful gases like nitrogen oxide and sulphur dioxide, CFCs, toxic metals such as lead and mercury, radioactive pollutants obtained from nuclear explosions and many other matters. Both human activities as well as some natural actions are responsible for causing air pollution. Various human activities like burning of the fossil fuels, vehicle exhaust fumes, Emissions generated in industries and agriculture leads to the release of air pollutants. Combustion of fossil fuels like coal, petroleum and other products that are extensively used in power plants, manufacturing factories, in vehicles, incinerators and other fuel burning heating devices is a major cause of air pollution. Emission of greenhouse gases from agricultural fields during crop cultivation and by livestock (e.g.: production of methane by cattle) as well as deforestation is also responsible for causing air pollution.

Natural events that pollute the air include forest fires, volcanic eruptions, wind erosion, pollen dispersal, evaporation of organic compounds and natural radioactivity. At the time of volcanic eruptions, a series of toxic gases and particulate matters are released which have negative impact on the environment.

Carbon monoxide, methane etc. that are obtained from wildfires could affect air significantly. Winds and air currents also plays an important role in the spreading of air pollution by mobilizing the pollutants from ground and distribute them over large areas.

6.4.1 Types of Air pollutants:

The pollutants are emitted to the surrounding atmosphere and can be transported from the place of their origin to other nearby regions. We can categorize the pollutants into two kinds: primary and secondary pollutants. The Primary air pollutants are harmful chemicals that are released directly from a source into the atmosphere. The secondary air pollutants are released as a result of complex chemical reactions involving the primary pollutants. There are six primary air pollutants, such as carbon monoxide, nitrogen oxides, sulphur dioxide, Volatile Organic Compounds (VOCs), ammonia and other particulate matters. On the other hand, secondary air pollutants are formed as a result of chemical reactions that occurs in between primary pollutants and other elements. Some important secondary pollutants include ground level ozone, peroxyacyl nitrates, sulphur trioxide etc.

All the pollutants discussed above can be grouped broadly under the following heads-

- Gaseous pollutants (e.g. SO2, NOx, CO, ozone, Volatile Organic Compounds).
- Persistent organic pollutants (e.g. dioxins).
- Heavy metals (e.g. lead, mercury).
- Particulate Matter.

Gaseous pollutants are mainly emitted as a result of combustion of fossil fuels. E.g. CO is produced as a result of incomplete combustion and are produced from the transport. Again, Nitrogen oxides reacts with ozone or radicals in the atmosphere and forms NO2.

Persistent organic pollutants form a toxic group of chemicals that includes pesticides, as well as dioxins, furans and PCBs etc. Dioxin is produced from burning of chlorine containing compounds as well as due to incomplete combustion.

Heavy metals are mainly found on earth's crust. They include lead, mercury, cadmium silver nickel, vanadium, chromium, manganese etc. Human bodies require such elements in a small amount to maintain the normal metabolic reactions. However, at higher concentrations they can become toxic to human health.

Particulate matter is the mixture of complex and other particles of varying shape and sizes that are produced by a wide variety of natural and anthropogenic activities. Major sources of particulate pollutants are factories, power plants, refuse incinerators, motor vehicles, construction activity, fires, and natural windblown dust etc.

6.4.2 Impact of Air Pollution on Human Health:

The air pollutants can affect the human health to a very great extent. A low level of air pollutants irritates the eyes and cause inflammation of respiratory tract.

Air pollution can affect a person having respiratory illness badly and his/her condition may become chronic during later stages. It may lower the immunity system of a person and the body becomes more prone to diseases. The effects of air pollution on human health are discussed below-

1. From various studies it has been found that, a higher concentration of air pollutants as well as long term exposure to lower concentration of pollutants have similar effect on human body. Such pollutants result various health issues like nose and throat irritation, bronchoconstriction, asthma, lung diseases etc.
2. Carbon monoxide, a strong pollutant can cause conformational change in haemoglobin and reduces its capacity to transport oxygen. As a result of this, the functions of various organs also get affected.
3. Some heavy metals like lead, mercury, arsenic etc. can affect the nervous system and may lead to some serious health issues such as memory disturbances, sleep disorders, anger, fatigue, hand tremors, blurred vision, and slurred speech etc.
4. Heavy metals are also responsible for damage of kidney resulting tubular dysfunction.
5. Another important air pollutant named dioxin induces the damage of liver cells as well as other gastrointestinal problems.

6.5 Ethics of the Environment:

Ethics of the environment or "environmental ethics" is a branch of philosophy that examines the conceptual underpinnings of environmental values and the more specific issues of social attitudes, behaviour, and policies for protecting and conserving biodiversity and ecosystems. This field first came into being in the 1970s. This branch studies the relationship between human beings and the environment and the role of ethics in it. According to environmental ethics, every human being is a part of this environment and is associated with the other living organisms in one way or the other. Hence, every human being should follow a code of conduct when it comes to dealing with other beings or this environment as a whole. With the growing human population and excessive use of resources, it has become an absolute necessity for us to follow environmental ethics and treat the planet in a respectable manner. Few of the questions that need to be asked in order to keep the environment healthy are-

- What obligations do all human beings have towards nature?
- How to apportion the benefits and costs of complying with this obligation?
- What strategies and institutional structures should be in place to implement them?
- Is it absolutely necessary to cut down forests for urbanization?

If such above mentioned questions are taken into consideration by human beings before taking any rash decision, the environment will be much healthier.

6.6 Conclusion:

Air pollution occurs due to introduction of various gases, dust particles, fumes (or smoke) or odor into the atmosphere which ultimately threatens the health of humans and other living beings in our planet.

It is responsible for production of smog and acid rain, causes cancer and other various respiratory diseases, reduces the ozone layer atmosphere, and also pays contribution to global warming. It is our responsibility to save our mother nature from deterioration. Although different policies have been introduced as a preventive measure against pollution, but controlling of environmental pollution also requires people who can effectively execute them. People should understand the pollution issues deeply and take the necessary actions for the same. Local governments are also required to provide pollution enquiry centers as well as aware the common people about the control of pollution.

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