

A COMPREHENSIVE STUDY OF AIR POLLUTION

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Abstract :

Anything added into the environment that results in producing harmful or poisonous effect on living things is called pollution. Pollution is the process that makes nature's resources such as land, water, air or other parts of the environment unsafe or unsuitable to use. Pollution can be of many types: soil, air, water, thermal, radioactive, noise, and light. Air pollution is one of these serious problem of our society. It have negative impacts in every living and non living creatures. So, the object of this research paper is to find out the sources of air pollution and search its effects on the atmosphere, human and non-living creatures.

In this situation we have to plan how control the air pollution. It is not only duty of government but also project and plans of non-governmental agencies have plays a significant role to control air pollution.

Keywords:

Pollutants, Causes of Air Pollution, Air Quality Index, Consequence of Air Pollution, Control of Air Pollution.

Introduction:

Air is the mixture of gases that fills the atmosphere, giving to the plants and animals that make earth such a vibrant place. Air pollution can generally be defined as release of pollutants into the air which are detrimental to human health and to the entire environment. Today, it has emerged as a global public health problem and is identified as a major environmental health hazard by agencies such as the World Health Organization (WHO) and governments around the world. The sources of air pollution are in the form industrial activities, urbanization and transportation mainly on account of energy use and production. Burning fossil fuels releases gases and chemicals into the air in the form of CO₂, CO, Sox, NO_x, Pb, benzene, acid fumes, methane, carbon sulfide, fluorine based gases, ozone and so on so forth along with particulate matter. It is also harmful for the health of people or other animals, kill plants or stop them growing properly, damage some other aspect of the environmental contents.

Pollutants:

Air pollutant is a material in the air that can have adverse effects on humans and the ecosystem. Pollutants are classified as primary and secondary .

Primary pollutants are pollutants that are put directly into the air by humans or natural sources. Such as ash from volcanic eruptions, dust stons, particulate matter (PM₁₀ and PM_{2.5}), hydrocarbons, carbon monoxide, sulphur dioxide etc.

Secondary pollutants are pollutants that are made from chemical reactions when pollutants mix with other primary pollutants or natural substance like water vapor. Many secondary pollutants are made when a primary pollutant react with sunlight. Ozone and smog are secondary pollutants.

A pollutant can be natural origin or man-made

Natural air pollution:- Forest fires, erupting volcanoes and gases released from radioactive decay of rocks inside Earth dust, Methane are just examples of natural air pollution.

Man-made air pollution:- Man-made air pollution comes from many things like- transporation, automobiles, industrial power plants etc. substances emitted into the atmosphere by human activity include.

Carbon dioxide: Carbon dioxide is also a greenhouse gas released by engines and powerplants. It has been described as “the leading pollutant” and “the worst climate pollution”.

Carbon monoxide: It is very dengerous gas when fuels have too little oxygen to burn completely. Vehicular exhaust contributes to the majority of carbon monoxide emitted into the atmosphere from gas boiler, stove, fuel-burning etc.

Sulfur dioxide: Coal and petroleum often contain sulfur as well as organic compounds. When sulfur burns with oxygen from the air, sulfur dioxide is produced. Coal-fired, power plants, volcanoes and in various industrial processes are sources of Sulfur dioxide.

Nitrogen oxides: Nitrogen oxides pollution comes from vehicle engines and powerplants. It plays an important role in the formation of acid rain, ozone and smog. Nitrogen oxides are also “indirect greenhouse gases”.

Particulate matter/ particles: Aerosal refers to combined particles. Some particles are naturally, originating from volcanoes, duststorms, forest and grassland fires, human activities such as the burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of aerosols.

Causes of Air Pollution:







There are large amounts of sources in Air Pollution like-

- Combustion of fuels such as natural gas, petroleum, coal and wood in industries, automobiles, aircrafts, railways, thermal plants, agricultural burning, kitchen etc.
- Chemical industries including pesticides, fertilizers, fungicides.
- Processing industries like cotton textiles, wheat flour mills and asbestos.

Air Quality Index:

Air Quality Index (AQI) is a tool to showcase air quality status. AQI has six categories of air quality. These are: Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe. The measurement of air quality is based on eight pollutants, namely- Particulate Matter(PM₁₀), Particulate Matter(PM_{2.5}), Nitrogen Dioxide(NO₂), Sulphur Dioxide(SO₂), Carbon Monoxide(CO), Ozone(O₃), Ammonia(NH₃), Lead(Pb).

The AQI values and their associated health impacts are as follows:-

Remark	AQI	Possible Health Impacts
 Good	0-50	Minimal impact
 Satisfactory	51-100	Minor breathing discomfort to sensitive people
 Moderate	101-200	Breathing discomfort to the people with lungs, asthma and heart diseases
 Poor	201-300	Breathing discomfort to most people on prolonged exposure
 Very Poor	301-400	Respiratory illness on prolonged exposure
 Severe	401-500	Affects healthy people and seriously impacts those with existing diseases

Consequence of Air Pollution:

Air pollution can harm on the health of people and animals, damage crops.

Children, elderly (old) people and people with allergies especially, can have a lot of problems because of air pollution. Over two million children – half the children in Delhi have abnormalities in their lung function, according to the Delhi Heart and Lung Institute. Historical disasters happened by air pollution – Great Smog in London(1952), England . For every person who dies, hundreds or thousands more suffer breathing problems such as asthma, bronchitis, lung cancer. The problem is more in the developing world “Children under age 5 in lower-income countries are more than 60 times as likely to die from air pollution in high-income countries”. Acid rain are also caused by air pollution. Acid precipitation can kill living things like fish and trees, reduces the fertility of soil, damage buildings made of limestone and concrete etc.

It has also been reported by WHO that an alarming death toll of 7 million people every year caused by ambient (outdoor) and household (Indoor) air pollution. Moreover, over 3 billion people out of which mostly women and children are still breathing poisonous smoke every day from using polluting stoves and fuels in their homes. It has also been reported by WHO that around 4.2 million deaths every year has been caused as a result of outdoor air pollution whereas 3.8 million deaths every year from indoor air pollution . Air pollution causes life threatening diseases like - Burning, scratchy eyes, Coughing and hard breathing, lung cancer and lung diseases, Chest pains and allergies etc.

Measures to control Air Pollution:

The problem of air pollution is controlled by technological solutions, laws and regulations and people’s awareness.

Technological solutions: Power plants, factories, vehicles are also polluted atmosphere. So need to some technological changes- uses solar panels, wind turbines and other forms of renewable energy, marking gasoline engines in electric car than fuel cells to produce less pollution. Power plants are fitted with electrostatic smoke precipitators etc.

Laws and Regulations: There are two types of air quality standards. The first class of standards in U.S.National ambient Air Quality Directive and the second class North American Air Quality Index.

The Air (prevention and control of pollution) Act 1981, This is the first act formulated for the prevention, control and abatement of air pollution. The Environment (protection) act, 1986 provided for the protection and improvement of environment. Montreal Protocol 1987 designed to protect the ozone layer. Motor Vehicle Act, 1988 this act deals with control of automobile emissions and species vehicular emission standards. Kyoto protocol 1997 signed to reduce greenhouse gas emissions. India, on October 2, 2016 ratified the Paris Agreement to deal with greenhouse gases emissions mitigation.

People’s awareness: Planting trees as much as possible to tackle air pollution, never burn household waste, participate in social forestry program. Schools, colleges students are also participated in tree plantation program. People use bicycle and public transport instead of using their own vehicles. It is in line with this idea that the government has set an ambitious target to achieve 175,000 MW of green energy by 2022 including one lakh MW of solar power, 60,000 MW of wind energy, 10,000 MW of biomass and 5000 MW of small hydro projects. Accordingly, several incentives and policy initiatives at the Central and State levels have been put in place both for grid connected and off-grid renewable energy.

Conclusions:

Air Pollution is a complicated issue and it’s negatively impacts not only the health of citizens but also the economy of the country. Outdoor air pollution in urban centres, indoor air pollution due to biomass burning. Though it is not totally controlled, But some of the ways of effective measures should be taken to control air pollution:-

- (A) Planting trees and shrubs along road sides, badland areas, hospitals, schools, colleges and residential areas.
- (B) Maintenance of vehicles & factories.
- (C) Environmental protection campaign, general awareness, environmental study is necessary to maintain the air pollution.
- (D) We have need to control NOX, SO₂, CO₂, Mercury which creates a lot of chronic and acute diseases in human body.
- (E) Conserve energy.
- (F) Reduce-reuse-recycle method use.
- (G) Improve domestic, industrial and municipal waste management

Air pollution is growing fast at global level on account of industrial, urban, commercial, and house hold activities causing death of millions of people every year. Research and developmental research needs to be encouraged at all levels to involve sustainable solutions different ministries and departments, is drawn to address the issue, reduce air pollution and ensure that citizens breathe clean air.

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