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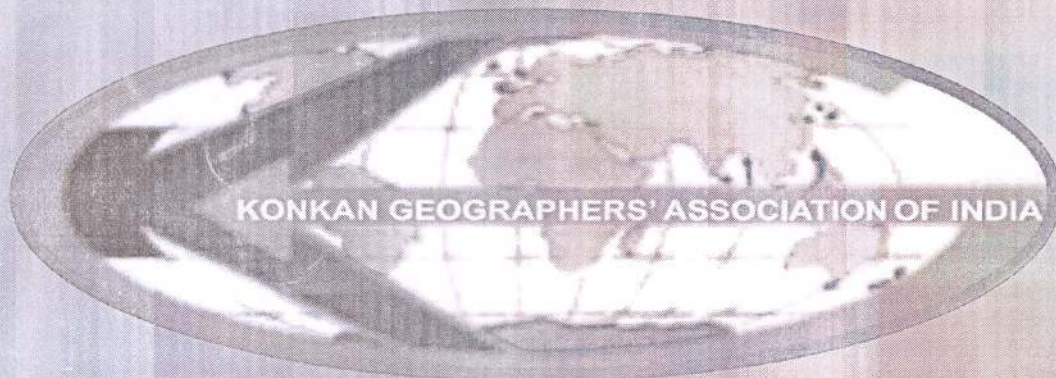
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Consequences, control and Challenges of Air Pollution

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Abstract

Air pollution is the Introduction of Particulates, Biological Molecules or there harmful material into the earth's atmosphere, possibility causing disease, Death to human's damage to other living organism such as food crops, nature or environment. The atmosphere is a complex natural gaseous system that is essential to life on planet earth. in the industrial age, air pollution cannot be eliminated completely , but step can be taken to reduce it. The government has development has developed, and continues to develop, guideline for air quality and ordinances to restrict emissions in an effort to control air pollution. On an individual level also, we can reduce our contribution to the pollution problems by carpooling or using public transportation. Additionally, buying energy-efficient light bulbs and appliances or otherwise reducing our electricity use will reduce the pollutants released in the production of electricity, which creates the majority of industrial air pollution. And on this research paper, discussion and suggestion on solution, challenges and control for the future.

Keyword - Energy efficient, Pollutants, Gases, Chlorofluorocarbons.

Introduction

Air pollution is a term applied to any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. Worldwide air pollution is responsible for large numbers of deaths and case of respiratory disease. While major stationary sources are often identified with air pollution the greatest sources of emission are actually mobile control technologies worldwide and urban planning strategies available to reduce air pollution however worldwide costs of addressing this issue are big.

Objective -

1. To understand pollutant product.
2. To understand future challenges.
3. How to control air pollution.

Data Base and Methodology -

- The proposed study is mainly based on secondary data. It will be collected from various government offices, government institutes and organizations.
- Publish report, district census handbooks, district gazetteer, published maps, district statistical abstracts, various serve report of different institution will be collected and required data will be filtered out for further use. It will be categorized in to spatial and non spatial data as per the need.

Need of study -

Air pollution affects kids more than adults due to higher concentrations of polluted air in their systems per body size. India is the country with the worst air quality in the world. The European Union would save 161 billion Euros a year if deaths caused by air Pollution were diminished. In large cities, over 80% of fatal pollutants that cause lung damage come from cars, buses, motorcycles and other vehicles on the road. According to the World health Organization, there are as many deaths (1.3 million per year) in the world due to air pollution as there are deaths due to car accidents. The average adult breathes 3,000 gallons of air every day. That's why the need to study to control Air Pollution.

Major pollutants -

Major primary pollutants produced - by human activity include:

- Sulphur oxides (SO_x) - especially sulphur dioxide, a chemical compound with the formula SO₂. SO₂ is produced by volcanoes and in various industrial processes. Since coal and petroleum often contain sulphur compounds, their combustion generates sulfur dioxide. Further oxidation of SO₂, usually in the presence of a catalyst such as NO₂, forms H₂SO₄, and thus acid rain. This is one of the causes for concern over the environmental impact of the use of these fuels as power sources.
- Nitrogen oxides (NO_x) - especially nitrogen dioxide are expelled from high temperature combustion, and are also produced naturally during thunderstorms by electric discharge. Can be seen as the brown haze dome above or plume downwind of cities. Nitrogen dioxide is the chemical compound with the formula NO₂. It is one of the several nitrogen oxides. This reddish-brown toxic gas has a characteristic sharp, biting odor. NO₂ is one of the most prominent air pollutants.
- Carbon monoxide (CO) - is a colourless, odorless, non-irritating but very poisonous gas. It is a product by incomplete combustion of fuel such as natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide.

-
- Volatile organic compounds - VOCs are an important outdoor air pollutant. In this field they are often divided into the separate categories of methane (CH₄) and no methane (NMVOCs). Methane is an extremely efficient greenhouse gas which contributes to enhanced global warming. Other hydrocarbon VOCs are also significant greenhouse gases via their role in creating ozone and in prolonging the life of methane in the atmosphere, although the effect varies depending on local air quality. Within the NMVOCs, the aromatic compounds benzene, toluene and xylene are suspected carcinogens and may lead to leukemia through prolonged exposure. 1, 3-butadiene is another dangerous compound which is often associated with industrial uses. Particulates, alternatively referred to as particulate matter (PM), atmospheric particulate matter, or fine particles, are tiny particles of solid or liquid suspended in a gas. In contrast, aerosol refers to particles and the gas together. Sources of particulates can be manmade or natural. Some particulates occur naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation, and sea spray. Human activities, such as the burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of aerosols. Averaged over the globe, anthropogenic aerosols—those made by human activities – currently account for about 10 percent of the total amount of aerosols in our atmosphere. Increased levels of fine particles in the air are linked to health hazards such as heart disease, altered lung function and lung cancer.
 - Persistent free radicals connected to airborne fine particles could cause cardiopulmonary disease.
 - Toxic metals, such as lead and mercury, especially their compounds.
 - Chlorofluorocarbons (CFCs) - harmful to the ozone layer emitted from products currently banned from use.
 - Ammonia (NH₃) - emitted from agricultural processes. Ammonia is a compound with the formula NH₃. It is normally encountered as a gas with a characteristic pungent odor. Ammonia, either directly or indirectly, is also a building block for the synthesis of many pharmaceuticals. Although in wide use, ammonia is both caustic and hazardous.
 - Odors – such as from garbage, sewage, and industrial processes
 - Radioactive pollutants – produced by nuclear explosions, nuclear events, war explosives, and natural processes such as the radioactive decay of radon.

Secondary pollutants include:

- Particulates created from gaseous primary pollutants and compounds in photochemical smog. Smog is a kind of air pollution; the word "smog" is a portmanteau of smoke and

fog. Classic smog results from large amounts of coal burning in an area caused by a mixture of smoke and sulphur dioxide. Modern smog does not usually come from coal but from vehicular and industrial emissions that are acted on in the atmosphere by ultraviolet light from the sun to form

- Secondary pollutants that also combine with the primary emissions to form photochemical smog.
- Ground level ozone (O₃) formed from NO_x and VOCs. Ozone (O₃) is a key constituent of the troposphere. It is also an important constituent of certain regions of the stratosphere commonly known as the Ozone layer. Photochemical and chemical reactions involving it drive many of the chemical processes that occur in the atmosphere by day and by night. At abnormally high concentrations brought about by human activities (largely the combustion of fossil fuel), it is a pollutant, and a constituent of smog.

- **Causes: Factors Responsible for Air Pollution**

Air pollution can result from both human and natural actions. Natural events that pollute the air include forest fires, volcanic eruptions, wind erosion, pollen dispersal, evaporation of organic compounds and natural radioactivity. Sources of air pollution refer to the various locations, activities or factors which are responsible for the releasing of pollutants into the atmosphere.

- **Man-made sources** mostly related to burning different kinds of fuel. "Stationary Sources" include smoke stacks of power plants, manufacturing facilities (factories) and waste incinerators, as well as furnaces and other types of fuel-burning heating devices. In developing and poor countries, traditional biomass burning is the major source of air pollutants; traditional biomass includes wood, crop waste and dung.
 - "Mobile Sources" include motor vehicles, marine vessels, aircraft and the effect of sound etc.
 - Chemicals, dust and controlled burn practices in agriculture and forestry management. Controlled or prescribed burning is a technique sometimes used in forest management, farming, prairie restoration or greenhouse gas abatement. Fire is a natural part of both forest and grassland ecology and controlled fire can be a tool for foresters. Controlled burning stimulates the germination of some desirable forest trees, thus renewing the forest.
 - Fumes from paint, hair spray, varnish, aerosol sprays and other solvents.
 - Waste deposition in landfills, which generate methane. Methane is highly flammable and may form explosive mixtures with air.
 - Military, such as nuclear weapons, toxic gases, germ warfare and rocketry.

Reasons for increasing rate of air Pollution-

- 1. Deforestation.**
2. Increased use of chemical and petrochemical pollution concentration in cities.
3. Poisons gases and other particles emitted from industries without treatment.
4. Heavy increase in the number of automobiles and their emission.
5. Test of experiments of atomic, chemical and biochemical weapons.

Currents and future challenges of air pollution -

1. Numerous toxic pollutant from diverse sources -

Hazardous air pollutants also called air toxics, included 187 pollutants listed in the clean Air Act. EPA can add pollutants that's are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or to cause adverse environmental effects. For Example of air toxics include benzene, which is found in gasoline, chloroethylene, which is emitted from some dry cleaning facilities and methylene chloride which is used as a solvent and paint stripper by number of industries. Other example of the air toxics included dioxin, asbestos, and metals such as mercury, cadmium, chromium and lead compound.

2. Impact on public health and welfare -

The risks to public health and the environment from climate change are substantial and far-reaching. Scientists warn that carbon pollution and resulting climate change are expected to lead to more intense hurricanes and storms, heavier and more severe wildfires- events that can cause deaths, injuries and billions of dollars damage to property and the nation's infrastructure. Some of these impacts already have been observed.

3. The toll on public health and environment -

Higher levels and ultraviolet radiation reaching earth's surface lead to health and environmental effects such as a greater incidence of skin cancer, cataracts and impaired immune system. Higher levels of ultraviolet radiation also reduce crops yield.

4. Protecting Ozone layer -

The ozone layer in the stratosphere protect life on earth by filtering out harmful ultraviolet radiation from the sun. The chlorine and the bromine they contain initiate chemical reaction that destroy ozone.

Control: Measures to reduce Air Pollution

Solution efforts on pollution are always a big problem. This is why prevention interventions are always a better way of controlling air pollution. These prevention methods can either come from government (laws) or by individual actions. In many big cities, monitoring equipments have been installed at many points in the city. Authorities read them regularly to check the quality of air.

Individual Level Prevention

- Encourage your family to use the bus, train or bike when commuting. If we all do this, there will be fewer cars on road and less fumes.
- Use energy (light, water, boiler, kettle and fire woods) wisely. This is because lots of fossil fuels are burned to generate electricity, and so if we can cut down the use, we will also cut down the amount of pollution we create.
- Recycle and re-use things. This will minimize the dependence of producing new things. Remember manufacturing industries create a lot of pollution, so if we can re-use things like shopping plastic bags, clothing, paper and bottles, it can help.

Government (or community) level prevention

- Governments throughout the world have already taken action against air pollution by introducing green energy. Some governments are investing in wind energy and solar energy, as well as other renewable energy, to minimize burning of fossil fuels, which cause heavy air pollution.
- Governments are also forcing companies to be more responsible with their manufacturing activities, so that even though they still cause pollution, they are a lot controlled.
- Companies are also building more energy efficient cars, which pollute less than before.

Control various devices -

The following items are commonly used as pollution control devices by industry or transportation devices. They can either destroy contaminants or remove them from an exhaust stream before it is emitted into the atmosphere.

- Bag houses:** Designed to handle heavy dust loads, a dust collector consists of a blower, dust filter, a filter-cleaning system, and a dust receptacle or dust removal system (distinguished from air cleaners which utilize disposable filters to remove the dust).
- Mechanical collectors** (dust cyclones, multi-cyclones)
- Electrostatic precipitators:** An electrostatic precipitator (ESP), or electrostatic air cleaner is a particulate collection device that removes particles from a flowing gas (such as air) using the force of an induced electrostatic charge. Electrostatic precipitators are highly

efficient filtration devices that minimally impede the flow of gases through the device, and can easily remove fine particulates such as dust and smoke from the air stream.

□ **Particulate scrubbers:** Wet scrubber is a form of pollution control technology. the term describes a variety of devices that use pollutants from a furnace flue gas or from other gas streams. In a wet scrubber, the polluted gas stream is brought into contact with the scrubbing liquid, by spraying it with the liquid, by forcing it through a pool of liquid, or by some other contact method, so as to remove the pollutants.

□ The Great Smog of London in 1952 was one of the worst air pollution events in history with over 8,000 deaths.

Conclusion -

The deferent kind of natural and manmade activities like power plants, industries, space heating etc. source are all over the creation on air pollution problem in world. Air pollution can be prevented only if individuals and businesses stop using toxic substances that cause air pollution in the first place. This would require the cessation of all fossil fuel-burning processes, from industrial manufacturing to home use of air conditioners. This is an unlikely scenario at this time. However, we have to make rules which set stringent regulations on industrial and power supply manufacturing and handling. The regulations are to be designed to further reduce harmful emissions into the Earth's atmosphere.

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