

Effect of Pollution on Environment, Ecosystem, and Biodiversity

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Abstract—Pollution at various levels such as air, water, noise, radioactive, thermal, soil pollution etc. has resulted in a major effect on our environment, ecosystem and biodiversity. It is estimated that pollution only accounts for approximately 70% loss of biodiversity with its effect on various biotic and abiotic components of ecosystem. Various human practices such as urbanization, commercialization, industrialization, rapid and better mode of transportation, extensive agricultural practices, deforestation, mining activities, construction of dams, farm houses, apartment, mall, mining etc. has resulted in vast increased level of pollution both at urban and rural areas. Decentralization of resources, afforestation, use of alternate food items such as multigrain, oats etc., organic farming, reduce, recycle, reuse of waste (foods, paper, organic products), awareness, education and enforcement of air, water, noise, and other pollution laws and acts can be some of the effective measures that need to be taken at national, state and regional level for reducing the effect of pollution.

Keywords: pollution, environment, ecosystem and biodiversity.

1. INTRODUCTION

Whatever surrounds us is called our environment. Out of the several new seen effects such as global warming, green house effects, climate change, pollution has emerged as a serious curse to the environment [1]. Several greenhouse gases such as carbon dioxide(CO₂), methane (CH₄), nitrous oxide (N₂O), fluorinated gases and ozone get collected in earth's atmosphere and cause serious effect [2]. Pollution at different levels such as air, water, noise, soil, radioactive, thermal etc. has caused a serious effect on our environment, ecosystem and biodiversity. This mini review paper tries to summarize some of the effects of pollution in a broad sense.

2. EFFECTS ON ENVIRONMENT

Our surroundings is our environment, since prehistoric times living organism including humans had tried to modify our surrounding to make it more suitable to our self and for the neighboring species. In an advent to make surrounding more suitable humans had started cultivating crops, making their life more civilized comparison to nomadic. In 17th and 18th century plenty of resources were there and population was less so the attitude is to 'Use up and Move on' but with the advent of 19th century erosion of soil started, trees start disappearing etc. Excessive use of natural resource resulted in the origin of word pollution. Pollution in a true sense is not merely the presence of an substance in excess to the normal threshold limit but its presence creates personal discomfort to us such as eye irritation, tears in eye, effect on visibility, skin rashes etc. As we are moving toward development we are exploiting the various component of our ecosystem in excess to what we need, resulting in a rapid decline and emergence of pollution. Use of rapid and easy mode of transportation such as buses, motor vehicles, etc. using petrol, and diesel has intensified the effect of pollution on our environment. There is an urgent need us to find some alternate and clean mode of transportation such as metro, electric buses, e – rickshaws, electric engines. With the use of CNG as an alternate to diesel and petrol the pollution level of major cities have come down resulting in a cleaner and safe environment.

3. EFFECTS ON ECOSYSTEM

The term ecosystem is coined by A.G. Tansley in the year 1935 includes both biotic and abiotic component. The biotic components includes all living organisms, plants, animals, bacteria etc. the abiotic components includes several climatic

conditions such as light, heat, temperature, moisture, rainfall etc. which constantly affects us. The interactions of both biotic and abiotic components are termed as ecosystem. Pollution has disturb the ecological balance of nature resulted in adverse effects on various components of ecosystem. The effect on pollution can be seen on all type of ecosystem such as forest, grassland, desert, aquatic, terrestrial, marine etc. if the current trend of increase in pollution continues it is estimated that all the major types of ecosystems will suffer a major loss in terms of their productivity and its identity.

Table 1: Various parameters for analyzing the effect of pollution and effects on various components of environment [3][4][5.]

S. No.	Pollution	Parameters	Effects
1.	Air	PM. 2.5	Congestion, difficulty in breathing, headache, vomiting, nausea, eye irritation, asthma etc.
		PM 10	
		Visibility	Smog, difficulty in air and vehicular traffic
		NO2	Acid rain effecting diversity and distribution of plants and animals, skin rashes, skin cancer, skin etc.
		SO2	
		CO2	Greenhouse effect, global warming, melting of glaciers, sea level rise.
CO	Congestion, difficulty in breathing, headache, vomiting, nausea, eye irritation, asthma etc.		
2.	Water	pH	Effect on distribution and diversity of plants and animals, dominance of invasive plants, eutrophication, loss and threats to biodiversity. loss of nutrients, keystone species etc.
		Conductivity	
		Colour	
		Odour	
		Transparency	
3.	Soil	Microbial count	Soil erosion, nutrient loss and effect on biodiversity.
		pH	
		Na	
		K	
4.	Noise	Decibel	Short term and long term deafness, headache, effect on distribution and diversity of plants and animals.
5.	Thermal	Temperature	Distribution and diversity of plants and animals
6.	Radioactive	Radiation	Skin rashes, cancer and plant burn, effect on distribution and diversity of plants and animals.

4. EFFECTS ON BIODIVERSITY

The variation and variability in life forms is known as biodiversity. The term biodiversity was coined by E. O. Wilson in the year 1986. A word HIPPO was assigned to measure the threats to biodiversity. Out of these threats pollution has emerged as one of the serious threats to biodiversity. Pollution determines the diversity and distribution of plants and animals with area rich in biodiversity having less pollution and vice versa. It has been estimated that if the current trend of loss of biodiversity continue by the year 2050 we will lose half of the world biodiversity. High level of pollution in addition to day night temperature difference accounts for low level of biodiversity in several places.

5. OPTIONS AVAILABLE

Pollution has resulted in a wide range of impact on environment, ecosystem and environment. Several measures need to be taken at national, state and regional level to reduce its long term impacts. Sustainable development, use of clean and green mode of transportation such as metro, e- rickshaw, CNG, organic farming vermicomposting, 3R's (reduce, recycle and reuse) are some of the options available for reducing pollution in the environment.

Besides this technical and industrial development and innovative research are few other options. Formulations of various pollution act (air, water, wildlife, noise etc.), imposition of fine, penalty, imprisonment, education, research, awareness, use of social media are some of the other options available.

6. CONCLUSION

At the end I can conclude that pollution has resulted in a great loss to environment, ecosystem and diversity. The increased population and its demand have intensified the effects of pollution. Sustainable development, use of clean and green mode of transportation, education, awareness research, can play an important role which needs to be further improved and analyzed so that it can be applied at national, state and regional level.

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