

Environmental Pollution and its Effect on Society

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Pollution refers to the contamination of the earth's environment with materials that interfere with human health, quality of living or the natural functioning of the ecosystems. There are numerous ways of pollution like: water pollution, air pollution, noise pollution and soil contamination, thermal pollution and radioactive hazards. To judge which leads to risk to health is difficult as all are harmful in one way or the other to the human kind.

We cannot deny the fact that natural resources had been stored virtually untouched in the Earth for millions of years. But since the start of the industrial revolution vast amounts of these resources had been exploited within just a couple of hundred years at unimaginable rates, with all the waste from this exploitation going straight in to the environment (air, water, land) and seriously damaging its natural processes. If seencarefully we can find that fundamental pollution drivers are Globalization, Industrialization and Population growth. Hence we can say that Environmental pollution is "the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected". It takes place when the environment cannot process and neutralize harmful by-products of human activities (for example, poisonous gas emissions) in due course without any structural or functional damage to its system. The carrying capacity of Earth is significantly smaller than the demands placed on it by large numbers of human populations and overuse of natural resources often results in nature's degradation.

This paper provides an evidence-based insight into the status of air pollution in our country and its adverse effects on health and control measures instituted in the major metro cities of the country to countermeasure such hazards.

Keywords: Environmental Pollution, contamination of air, natural resources, Globalisation, Soil contamination

INTRODUCTION

Pollutants and its many forms: Pollutants don't recognize boundaries, they are transboundary; Many of them can't be degraded by living organisms and therefore stay in the ecosphere for many years; and They destroy biota and habitat.

Biological Decomposition of Environmental Pollutants: Environmental pollutants are biodegradable and non-biodegradable ones, Biodegradable Pollutants are the ones that can be broken down and processed by living organisms, including organic waste products, phosphates, and inorganic salts. For example, if a pollutant is organic, it can be used by a living organism to obtain energy and other material from carbohydrates, proteins etc. Therefore, biodegradable pollutants are only "temporary nuisances" that can be neutralised and converted into harmless compounds. However, it is important to remember

that they can become serious pollutants if released in large amounts in small areas, thus exceeding the natural capacity of the environment to "assimilate" them. **Non-Biodegradable Pollutants.** These are the ones that cannot be decomposed by living organisms and therefore persist in the ecosphere for extremely long periods of time. They include plastics, metal, glass, some pesticides and herbicides, and radioactive isotopes. In addition to that, fat soluble (but not water soluble) non-biodegradable pollutants, ex. mercury and some hydrocarbons, are not excreted with urine but are accumulated in the fat of living organisms and cannot be metabolised.

Generally speaking, there are many types of environmental pollution but the most important ones are: Air pollution & Water pollution, also Soil pollution (contamination). Some of the most notable air pollutants are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, volatile organic compounds (VOCs) and airborne particles, with radioactive pollutants probably among the most destructive ones (specifically when produced by nuclear explosions). Water pollutants include insecticides and herbicides, food processing waste, pollutants from livestock operations, volatile organic compounds (VOCs), heavy metals,

chemical waste and others. Some soil pollutants are: hydrocarbons, solvents and heavy metals. Combustion of fossil fuels produces extremely high levels of air pollution and is widely recognized as one of the most important "target" areas for reduction and control of environmental pollution. Fossil fuels also contribute to soil contamination and water pollution. For example, an oil leak may occur and pollute soil and subsequently groundwater / ocean water.

The use of uranium for nuclear power generation produces extremely dangerous waste that would take thousands of years to neutralize. Common sources of fossil fuel pollution are: Industry:

· Power-generating plants, · Petroleum refineries, · Petrochemical plants, · Production and distribution of fossil fuels, · Other manufacturing facilities, · Transport: · Road transport (motor vehicles), · Shipping industry, · Aircraft. Fossil fuel combustion is also a major source of carbon dioxide (CO₂) emissions and perhaps the most important cause of global warming.

From the findings, the observation is : As per the of World Bank Development Research Group the average total suspended particulate (TSP) level in Delhi was approximately five-times the World Health Organization's annual average standard. In the metro city like Delhi It is estimated that about 3000 metric tons of air pollutants emits every day in Delhi, with a major contribution from vehicular pollution (67%), followed by coal-based thermal power plants (12%). Vehicular pollution is an important contributor to air pollution in Delhi. According to the Department of Transport, Government of National Capital Territory of Delhi, vehicular population is estimated at more than 3.4 million, reaching here at a growth rate of 7% per annum. The PM₁₀ standard is generally used to measure air quality. The PM₁₀ standard includes particles with a diameter of 10 µm or less (0.0004 inches or one-seventh the width of a human hair). These small particles are likely to be responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract. According to the Air Quality Guideline by the World Health Organization, the annual mean concentration recommended for PM₁₀ was 20 µg/m³, beyond which the risk for cardiopulmonary health effects are seen to increase. Major concerns for human health from exposure to PM₁₀ include effects on breathing and respiratory systems, damage to lung tissue, cancer and premature death.

Elderly persons, children and people with chronic lung disease, influenza or asthma are especially sensitive to the effects of particulate matter.

Besides these, non-respiratory effects were also seen to be more in Delhi than in rural controls. The prevalence of hypertension was 36% in Delhi against 9.5% in the controls, which was found to be positively correlated with respirable suspended particulate matter (PM₁₀) level in ambient air. Delhi had significantly higher levels of chronic headache, eye irritation and skin irritation.

Several other community-based studies have found that air pollution is associated with respiratory morbidity. Numerous studies have reported an association between indoor air pollution and respiratory morbidity. Some of these studies have concentrated on children's respiratory morbidity. Other studies in children have found similar correlations between particulate matter in ambient air and attention-deficit hyperactivity disorder between vehicular air pollution and increased blood levels of lead (a potential risk factor for abnormal mental development in children and between decreased serum concentration of vitamin D metabolites and lower mean haze score (a proxy measure for ultraviolet-B radiation reaching the ground).

Studies that have examined the compounding effect of meteorological conditions on air pollution found that winter worsened the air quality of both indoor air and outdoor air. They also found a positive correlation between the winter weather and rise in the number of patients with chronic obstructive airway disease in hospitals.

There was a relative paucity of studies that measured outdoor air pollutant levels first hand and then tried to objectively correlate them to adverse health effects. However, some studies measured air pollutant levels and found a correlation with health-related events.

WE CAN MAKE A BIG DIFFERENCE

Many great scholars from Charaka to Hippocrates have stressed the importance of environment in the health of the individual. Therefore, all those who play a role in modifying the environment in any way, for whatever reason, need to contribute to safeguard people's health by controlling all those factors which affect it. Every action or inaction of any person has an effect on the environment—be it good, neutral, or negative. By becoming aware and

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Study and year	Variable	Findings
Goyal <i>et al.</i> , 2011 ⁽⁶⁾	Indoor air pollution in classrooms close to heavy traffic roads	Vehicle exhaust emissions are the only significant contributor to indoor concentrations of PM _{2.5} and PM ₁₀
Kumar <i>et al.</i> , 2009 ^A	Indoor air lead pollution	Lead loading for floor and interior window sill samples was 19.7 pg/ft ² and 75.5 pg/ft ² , respectively
Kumar <i>et al.</i> , 2001 ⁽⁸⁾	Outdoor air	Inhalable particulates in the ambient air increased due to industrial activities up to 320,168 and 546%, and due to commercial activities up to 406, 198 and 140% in Ahmedabad, Mumbai and Delhi, respectively. There was seasonal variation also
Balachandran <i>et al.</i> , 2000 TM	Outdoor air	Coarse PM ₁₀ - 68.3 ± 17 pg/m ³ ; fine PM ₁₀ 71.3 ± 15 pg/m ³ . Three major sources were vehicular emissions, industrial emission and soil re-suspension

Source: http://www.who.int/phe/health_topics/outdoorair/databases/en.

Study and year	Variable	Findings
Siddique <i>et al.</i> , 2011 ⁽²⁰⁾	Vehicular air pollution effects in children	Ambient PM 10 level was positively correlated with ADHD in children (OR = 2.07; 95% CI, 1.08-3.99)
Rajaratnam <i>et al.</i> , 2011 ⁽²³⁾	Outdoor air	It was found that every 10 pg/m ³ change in PM ₁₀ was associated with 0.15% increase in total all-natural-cause mortality
Kumar <i>et al.</i> , 2008 ⁽¹⁵⁾	Indoor air pollution	Indoor SO ₂ , NO ₂ and suspended particulate effects in children matter levels were high in houses with family history of smoking. Indoor air pollution was associated with respiratory function of children
Kulshreshtha <i>et al.</i> , 2008 ⁽¹⁶⁾	Indoor air	High levels of indoor airborne pollutants during winter were associated with respiratory problems for women and children.
Jayaraman, 2008 ⁽¹³⁾	Outdoor air	10 pg/m ³ rise in pollutant level led to statistically significant relative risks (RR) for respiratory morbidity: 1.033 for O ₃ , 1.004 for NO ₂ , 1.006 for RSPM
Nidhi <i>et al.</i> , 2007 ⁽²⁴⁾	Outdoor air	The relative risks of hospitalization due to respiratory diseases were 1.07-2.82
Kumar, 2007 ⁽¹⁹⁾	Indoor air pollution	Indoor SPM level was also significantly effects in children higher in homes of children with a history of respiratory illness
Agarwal <i>et al.</i> , 2006 ⁽¹²⁾	Outdoor air	SPM (r = 0.474; P<0.01) and RSPM (r = 0.353; P<0.05) showed a significant positive correlation with the number of COPD cases. Winter months had higher risk
Pande <i>et al.</i> , 2002 ⁽²⁵⁾	Outdoor air	Emergency room visits for asthma, COAD and acute coronary events increased by 21.30%, 24.90% and 24.30%, respectively, due to higher than acceptable levels of air pollutants

doing the right thing, we choose to be part of the solution. Here are some things you can do: Stop smoking or don't throw your butts on the ground. Cigarette butts are not biodegradable and contain extremely toxic soluble chemicals. One butt thrown on the ground can remain for up to 25 years, leaking chemicals like arsenic, ammonia, acetone, benzene, cadmium, formaldehyde, lead, and toluene into the environment. • Drive an electric or hybrid car or at least one that uses unleaded gasoline. • Keep the car in good running condition to avoid emissions. • Share a ride or carpool. • Choose to walk or ride a bicycle whenever possible. • Never use open fires to dispose of waste, especially chemicals and plastic. • Adopt the 3 Rs of solid waste management: reduce, reuse, and recycle.

It is always recommended to Use sustainable, reclaimed, or recycled building materials. Composting leaves and clippings from yard and food scraps from can be used in the kitchen to reduce waste while improving soil. Use the power supplied abundantly and freely by wind and sun. Hang the laundry to dry to minimize the use of gas or electricity and open a window or put on a sweater rather than turning on the air conditioner or heater. In this manner, the use of fuel for transporting goods can be minimized. Look around the house or place of business for ways of conserving water. Use and buy products that are eco-friendly or made with biodegradable materials. Avoid plastic. Always bring a bag to shop. Get rid of the lawn: Plant bee-friendly, drought-tolerant, native plants instead. Plant more trees. They clean the air, provide oxygen,

and beautify surroundings. Take care to properly dispose off pet's waste. Do not litter. Start an anti-litter campaign to educate the community. Even in business, our contribution can impact environmental. Say a big "NO" to pesticides and GMOs (genetically modified organisms).

Control measures to be taken

Shutdown of hazardous, noxious industries and hot-mix plants and brick kilns which are killing the nature, introduction of unleaded petrol (1998), catalytic converter in passenger cars construction of flyovers and subways for smooth traffic flow, Environmental awareness campaigns are also carried out at regular intervals.

Industrial Policy

Benefits Accrued as a Result of Control Measures

As the literature revealed since the first act on pollution was instituted, huge progress has been made in terms of human resource, infrastructure development and research capability. Some studies tried to gather evidence for the effectiveness of control measures by comparing pre- and post-intervention health status. The study conducted by the Central Pollution Control Board demonstrated that spending 8-10 h in clean indoor environment can reduce health effects of exposure to chronic air pollution. A recent study found significant improvement in the respiratory health following large-scale government initiatives to control air pollution. It was reported that use of lower-emission motor vehicles resulted in a significant gain in disability-adjusted life-years in Delhi. Another study found significant evidence for reduction in respiratory illness following introduction of control measures.

Most of the studies were ecological correlation studies, which are severely limited in their ability to draw causal inferences. But, considering the context that demanded the research, these were probably the best available designs to produce preliminary and, sometimes, policy-influencing evidences, as any other methodology would be unethical or operationally impossible.

Participation of the community is crucial in order to make a palpable effect in the reduction of pollution. The use of public transport needs to be promoted. The use of Metro rail can be encouraged by provision of an adequate number of feeder buses at Metro stations that ply with the desired frequency.

More frequent checking of Pollution Under Control Certificates needs to be undertaken by the civic authorities to ensure that vehicles are emitting gases within permissible norms. People need to be educated to switch-off their vehicles when waiting at traffic intersections. Moreover, the "upstream" factors responsible for pollution also need to be addressed. The ever-increasing influx of migrants can be reduced by developing and creating job opportunities in the peripheral and suburban areas, and thus prevent further congestion of the already-choked cities like Delhi & Mumbai.

CONCLUSION

Although the earth seems to be at brink of catastrophe but still we have a possible way to minimize the degradation. The various pollutants which human activities release into the environment is growing at an alarming rate. However, a few simple steps can be taken at an individual level to combat it. If we start from this very moment we might be able to live in harmony with mother nature, and this process needs to be started at the earliest possible if we have to.

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