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# A Study on Role of Individuals to Reduce Pollution in Metropolitan Cities

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***Abstract*: In a highly populated country like India, environmental degradation has outsmarted other developed countries. Growing population in the metropolitan cities has contributed to huge pollution in the ecosystem. It was noticed through a research that out of world's top 20 polluted cities, Indian cities tend to be 13 in numbers. However other countries have the capabilities to manage the impact of pollution better than our country. Pollution is considered to be one of the major killer elements in the atmosphere putting public health into stake as per Environment Performance Index. The EPI sends clear picture to the policymakers of the state to develop measures to build solutions for the threats we face in protecting our eco system. However, government alone cannot control pollution through its rigid regulation; each citizen has got equal role of responsibility in maintaining the hygiene environment and protecting the gift of nature by adopting self-regulations. This paper is an attempt to focus mainly on identifying the different forms of pollution, causes of pollution, major problems faced by metropolitan cities due to pollution, and the measures which individuals could take-up to control pollution.**

***Keywords*: Reduce Pollution, Metropolitan Cities**

## 1. Introduction

In India, a metropolitan city is defined as one having a population of 1 million and above. As of 2011 census of India, there are 46 metropolitan cities in India and the top ten are, Mumbai, Delhi, Kolkata, Chennai, Hyderabad, Bengaluru, Ahmedabad, Pune, Surat and Visakhapatnam.

The national capital region is the designation for a metropolitan area in India. NCR (Delhi, Haryana, Rajasthan, Uttara Pradesh) is India's largest agglomeration. It is noted that in spite of urban developments, cities tend to suffer more from pollution in various forms. The more advanced life led by city people results in more consumption of energy which tends to add to more pollution.

As per a three-year analysis of the water quality test done on 290 rivers, the central pollution control board could identify that about 66% of the stretches were noticed to have high organic pollution. Around 8400kms of these rivers are found to be heavily polluted and is not fit to be supporting aquatic life.

Central pollution control board chairman, Sri Shashi shekhar, in his interview specified that increasing flow of untreated waste water from cities into these rivers is the reason for rivers getting polluted.

As per Lancet study in 2012 on "the impact of rising toxins in the air is clearly visible on an average Indian's life", Air pollution was ranked to be the sixth biggest killer with an annual estimated life of 66 million people.

As per 2015 report by the Centre for Science and Environment, a Delhi-based NGO, the decline in the country's overall environmental standards was due to river pollution. This pollution is noticed to be worse now than it was three decades ago. They also highlight accumulation of piling garbage in cities and increasingly toxic urban air.

As per research air pollution slashes life expectancy by 3.2 years for the 660 million Indians who live in cities. The ganga and Yamuna are ranked among the world's 10 most polluted rivers.

It was recently reported in the Hindustan times that Vapi in Gujurat and Sukinda in Odisha are among the top 10 most environmentally degraded zones in the world

According to the UN Environment programme executive director Ached Steiner, "Marine Debris – Trash in our oceans is a symptom of our throwaway society and our approach to how we use our natural resources." It has been found that an average person produces half a pound of plastic waste every day.

All the above mentioned environmental hazards create a strong necessity for each individual to understand their responsibilities towards keeping the environment clean and safe for the future generations.

## 2. Research methodology

This paper mainly concentrates on the role of individuals in protecting the environment by controlling pollution in metropolitan cities. It is an attempt made to discuss on contributions of individuals towards harmful pollutants, its causes and consequences on public health & environment. This is a descriptive study based on secondary data collected from already published data in newsletters and other research reports.

## 3. Objectives of the research

- To understand what are the different forms of pollution
- To know how individuals & organizations pollute the

ecosystem.

- To know the problems suffered due to various forms of pollution.
- To know how individuals can join hands with government by adopting some simple practices which can reduce pollution in metropolitan cities

*A. Different types of pollution faced by metropolitan cities in India*

Anything that is contaminated in its quality and threatening the environment in an adverse way is treated to be pollution. There are hundreds of different forms of pollution. However, following are the most common types of pollution faced by many metropolitan cities:

1. Air pollution
2. Liquid pollution
3. Noise pollution
4. Solid pollution

In addition, there is contribution of

1. Vehicular pollution
2. Domestic pollution
3. Industrial pollution
4. Plastic pollution

## 4. Review of literature

- Most studies have focused on the effects of air pollution on adult mortality and respiratory morbidity, as per Dockery et al 1993, Schwattz and Marcus 1990 some age groups appear to be more susceptible than others.
- Saldiva 1995 has studied that the effects are larger in elderly than in the general adult population.
- Studies on childhood health risks, such as respiratory symptoms or hospital admissions for asthma, suggest that the opposite end of the age spectrum is also more vulnerable to air pollution than is the general population (Dockery and Pope 1994; Heinrich et at. 1999; Schwattz et al. 1994)
- K.R. Smith 4 September 2002, focused on a research "Indoor air pollution in developing countries: recommendations for research" indicates that indoor air pollution (IAP) from household cooking and space heating apparently causes substantial ill-health in developing countries where the majority of households rely on solid fuels (coal or biomass as wood, crop residues, and dung), but there are many remaining uncertainties. To pin down impacts in order to effectively target interventions, research is particularly needed in three areas: (1) epidemiology: case–control studies for tuberculosis (TB) and cardiovascular disease in women and randomized intervention trials for childhood acute respiratory diseases and adverse pregnancy outcomes; (2) exposure assessment: techniques and equipment for inexpensive exposure assessment at large scale, including national level surveys; (3) interventions: engineering and dissemination approaches for improved stoves, fuels, ventilation, and behavior that reliably and economically reduce exposure.
- In addition to these "traditional" end points in children, there is now emerging evidence that air pollution is also associated with elevated risk of adverse pregnancy outcomes (Glinianaiaet 2004; Maisonet. 2004)
- In May 2005, Kunwar P. Singh, Amrita Malik, Sarita Sinha, studies on Multivariate statistical techniques, such as cluster analysis (CA), factor analysis (FA), principal component analysis (PCA) and discriminant analysis (DA) were applied to the data set on water quality of the Gomti river (India), generated during three years (1999–2001) monitoring at eight different sites for 34 parameters (9792 observations). This study presents usefulness of multivariate statistical techniques for evaluation and interpretation of large complex water quality data sets and apportionment of pollution sources/factors with a view to get better information about the water quality and design of monitoring network for effective management of water resources.
- Carpooling can reduce the amount of hydrocarbons, nitrogen, oxides, carbon monoxide, and carbon dioxide, says Florida's Department of Air Resources Management. The number of miles driven and the number of trips taken greatly affects the air quality.

Source: Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE).The Lancet Oncology. 2013.

*A. Causes of pollution*

Each one of us in our day to day life with or without our knowledge contributes towards polluting our environment in the following ways:

1. Wood burning in fire camps, land-clearing fires, wood stoves & agricultural burning leading to high level of unconditioned breathing air.
2. Burning toxic substances such as plastics, tubes and tires, garbage and similar such products which produces chemical pollutant to air.
3. Usage of appliances such as refrigerators, air conditioners and freezers, fire extinguishers and other such appliances which releases ozone depleting substances.
4. Emission of Smoke from chimneys of factories during production.
5. Highly haphazard and unplanned development of industries and factories leads to air pollution
6. Rise in vehicular population contributes to heavy air pollution due to high sulphur and benzene content fuels used.
7. In most of the cities, sewage is discharged into major drains without any treatment. These drains discharge both domestic and industrial waste which ultimately joins some river.

8. Ever growing population of the cities adds deterioration of the environment.
9. Without proper method to disposal and treatment of wastes, there is accumulation and dumping of more and more garbage in the city.
10. In few cities where there is an established sewage treatment plant, the sewage water overflows from pumping stations and join the rivers due to inadequate system causing water pollution
11. Use of adulterated fuel, bad quality filter in silencer, no maintenance of engine causes vehicular pollution.

*B. Problems of pollution*

1. Continuous dumping of waste in a specific land will decline fertility of it and will not be suitable for the life of flora and fauna. It may result into non nutrient crops as well.
2. Plastics release toxic chemical elements of hydrogen and carbon when burnt. It produces a highly toxic chemical called dioxin which creates cancer, affects both immune system and reproduction system.
3. When wood in fire camps or stoves or fireplaces is not burnt properly, it will release smoke. When smoke is created it releases over 100 hazardous chemicals that are toxic causing cancer and lung problems. Breathing air which contains wood smoke can lead to a number of dangerous respiratory and heart problems.
4. Old refrigerators and air conditioners when used will release ozone depleting substances known as chlorofluorocarbons into the atmosphere contributing to heavy pollution. CFCs can cause nausea, vomiting, diarrhea or other upset to the digestive tract, skin diseases, etc.
5. Unplanned factory production pollutes air, land and water in a wide range. Carbon dioxide is one of the most harmful emissions released into the atmosphere and the environment. Other emissions contribute to acid rain formation and the depletion of ozone.
6. All noise above tolerable limits of 90 decibel (Extremely unpleasant loudness) of music players, machineries, vehicles and construction work will decline the hearing ability of people, results in irritation in their temperament, weakness in nerves, and brain hemorrhage in extreme cases
7. Discarded computers, monitors, CDs, laptops, computer accessories, cell phones results in the decline of soil features.
8. Oil spillages from ships, leakage of toxic water waste hits on marine life, decline in seafood production, skin and lungs diseases to port workers
9. Plastic pollution is harmful to animal, marine life and also affects human health. PCBs, DDT and PAH are the harmful chemicals realized out of plastics. Marine life and animals get consumed with this plastic peaces transfers the toxins in the food chain to human.
10. More energy used in day to day activities means more carbon dioxide emission from power plants that help produce such energy. The products which consume more energy results in burning of more fossil fuels which results in more pollution in the air.

*C. Role of individuals in reducing pollution in the metropolitan cities*

1. Consuming less energy at home is one of the easiest ways to reduce air pollution. It is important to switch off all appliances and lights if not in use.
2. Carpooling with regular travelers and a proper planning of car share program are the best way to reduce vehicular pollution on road.
3. Using public transportation and minimizing the usage of personal vehicles can help reduce air pollution.
4. Walking or bicycling to locations of short distance is even greater option than taking public transportation. It reduces air pollution and also helps human stay fit.
5. Filling gas or fuel of tank can be idle in the evening or at the early morning when it's cool outside. This prevents evaporation of gas and fuel in the heat of the day and helps in both reducing pollution as well saving energy.
6. Maintaining vehicles in good condition with proper emission certificate.
7. Using raw ingredients to cook food than depending on pre-packed convenience foods can eliminate industrial emissions that pollute the air, water and land.
8. Avoid shopping from commercial shops and online which results into pollution as it involves a long chain of transportation to the place of consumer. Instead the best way is to shop from farmer's markets and from local shops.
9. Try to choose items that have less packaging. If so packed items, prefer to have quality glass containers used for packaging. Such glass containers are not harmful and can be reused for different purposes.
10. Stitch your own cloth bags for shopping from the stores instead of depending on plastic bags.
11. Segregate wet waste such as vegetable peelings and other food scraps in your yard, which can be used as compost or manure to fertilize the garden.
12. Terrace gardening and planting good number of deciduous plants will help absorb carbon dioxide and help reduce air pollution.
13. Plastic waste can be distributed to the right recyclers for its recycling of product.
14. Residents are encouraged to separate Household Hazardous Waste from their household garbage and dispose of it in an appropriate manner, instead of spilling it into toilets or drain or on soil absorption.
15. It's highly impossible to get away from the noise, when located in a traffic area. In such cases, it's better to build noise proof windows and walls.

16. Usage of earplugs and headphones can avoid noise pollution to the maximum.
17. When industrial violation of local laws and creation of heavy noise pollution is noticed, filing a complaint to the pollution control board is necessary.
18. Instead of buying expensive dish soap, laundry detergent and bathtub cleaner with toxic chemicals, purchase some locally available nontoxic products. This results in less water pollution.

## 5. Conclusion

In a busy metropolitan city, along with fast developments we could notice increasing pollution. Compare to other countries, India seems to be very slow in recovery of polluted environment, as a result of which many rivers are converted into drainages. Delhi the main national capital region is suffering due to heavy air pollution. Toxins released out of plastics are transferred through marine life and animals through food chains to human, complicates health.

The manmade and natural pollutant has an adverse effect on the health of living beings and the ecosystem at large. However, it is a very hard and challenging task to protect the environment. It is highly impossible to eliminate pollution. Through continuous planning, government policies and effort of public, quality environment can be maintained. This paper helps in understanding the simple human activities which can reduce pollution to the maximum possible extent. It is the responsibility of each individual to be aware on issues arising due to pollution; and the duty to save our quality ecosystem to the future generations.

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