

# Changing Quality of Urban Air : Future of Indian Air Quality and Its Impact on Health

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**Abstract:** Ambient air is highly vulnerable to environmental changes resulting in the loss of air quality for the sustenance of life. With growing uncontrolled industrialization and increasing vehicular density with little or no concern for the environment the first affected environmental factor is also air. Only when the health hazard is noticed in a large population some concern is expressed by the authorities to look in to the quality of air. Since the corrective measures are too complicated and expensive, the inexpensive preventive measure is the only solution. With a detailed study on the deterioration of the air quality in urban cities things have become easier for the developing countries to implement the policies from the lessons already learnt by developed countries. The major factors concerned are vehicular exhaust, industrial gases, cottage industries, burning of urban waste and stone crushing are considered as major air polluting activities in an urbanized society resulting in variety of health hazards. The terrain of the city also plays a major role in aggravating the ill effects of polluted air on health. Land and hill locked cities, cities with troughs and crests have added greter problem compared to coastal and well spread plain cities. The future of air pollution in Indian cities depends upon the right type of implementable policies drafted in time much before any damage is noticed. In India with good human resources and developing technologies it would be easier to maintain good air quality.

## Introduction

*“Unlike food, water and shelter, we have not yet reached the stage of paying for the ambient air we breathe. Perhaps the day we have to buy the air to breathe, we may develop some concern for the quality of air around us”.*

Air pollution is threatening to not only human health it has a deleterious impact on the life system as a whole. The World Bank Technical Report 381 on the Urban Air Quality Management Strategy in Asia (*Urban Air Quality Management Strategy in Asia WB Technical report 381 Ed by Jitendra J Shah and Tanvi Nagapal 1997*) highlighting the Greater Mumbai report has observed that many Asian cities are on the threshold of a major environmental crisis in the form of Air pollution. However the deteriorating quality of the air we breathe is attributed to various causes such as rapid economic expansion, rise in population, increased industrial output and unpredicted growth in the number of vehicles burning fossil fuel. One of the natural biological markers of the air quality is the presence of many sensitive bird species which moved away from urbanized areas as the air quality deteriorated.

There are no scientific records or observations to support that animals and plants cause any kind of land air or water pollution in the environment they live, which eventually become hostile for its survival. On contrary man has been responsible for various types of pollution on this earth resulting in various irreversible damage to his environment and to himself. Any limited pollution caused by man is to large extent is reversible by nature around him. With uncontrolled pollution the change in nature reaches irreversible stage. Permanent damage to nature occurs resulting in hostile environment for life to sustain. Under natural hostile conditions all forms of life undergoes genetic modifications, which is termed as adaptation. On contrary unnatural hostile condition as a result of pollution becomes unpalatable and detrimental to life. Nature also has hostile conditions at several places but ideal for

some form of life to sustain. Amongst various forms of pollution air pollution seem to be most sensitive one for all forms of life. Urbanization has added to the additional problems of waste management resulting in the changing environmental conditions. Similar studies conducted in various parts of the world have concluded that the growing concentrations of air pollutants have led to increased cases of respiratory disorders such as chronic bronchitis, colds and general decline in lung function. People living in and around the polluting factories are having higher incidence of cardiac diseases, respiratory tract infections, skin allergies as a result of reduce antioxidant status in their system. In Greater Mumbai alone the estimated health damage cost is around 18 billion a year mainly due to 2800 cases of excess mortality, 60 million respiratory symptom days and 19 million restricted activity days. There are no records available from other metros in India.

## Present Scenario in India : Air Quality and Vehicular Pollution

Considering the vehicular exhaust and emission as the main source of reducing the ambient air quality, abatement of air pollution with appropriate measures in Mumbai since 1990 resulted in effectiveness in terms of both emission reduction and reduced impact of the general respiratory problems. Similar studies in Delhi after the introduction of CNG and subsequent abatement of lead in gasoline throughout the country in March 2000 implemented soon after the International Conference on Lead Poisoning, Prevention and Treatment in Bangalore in 1999 as an outcome of The George Foundation studies, the air quality started improving in our country. Still with high levels of well known carcinogenic material Benzene in our gasoline the scenario is not very palatable.

Amongst many pollutants lead in Gasoline seems to have special attention. Unleaded gasoline addresses the ambient lead problem in any urban area. Lowering the maximum allowed lead in gasoline as priority many countries have successfully implemented this as a policy by replacing lead with oxygenated compounds such as MTBE (Methyl-Tetra-Butyl-Ether). With catalytic converters many toxic exhaust compounds were further oxidized.

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However the number of vehicles with catalytic converters is negligibly small in Indian cities. Improving the diesel fuel quality will result in reduced mortality, decreased respiratory problems. Strict legislation on the prevention of adulterated gasoline (such as mixing gasoline with kerosene) to be implemented to ensure the air quality. Oil industry being the main player in this area need to be monitored by the Governmental agencies. Parts of many cities have become literally gas chambers.

At present in most of our other Indian cities Ambient Air Quality Air Quality Management System requires an integrated mechanism for the continual air quality monitoring. Recommended requirement are :

- 1 An inventory of air pollution activities and emissions and documentation. *This would help in monitoring the degree of air pollution and to have a check from time to time.*
- 1 Monitoring of Air Pollution and dispersion parameters with accredited procedures. *Unfortunately the monitoring facilities are limited and do not have wide scope for example we do not measure the toxic lead levels in air in many cities. For the lack of appropriate technology*
- 1 Calculations of Air pollution using internationally accepted procedures. *In order to place our self where we stand in terms of international requirement national data base is to be generated to evaluate the effectiveness of the action taken from time to time.*
- 1 Population and infrastructural impact assessment in the area. *It is only in recent time the health impact is being evaluated to correlate with the changing air quality with International organizational support.*
- 1 Follow-up of the abatement and control measures. *This being a long term plan is very much needed to see the effective measures taken.*
- 1 Continual modifications for improvement to be ensued and achieved.

All the above require the governmental infrastructure with total freedom to implement the policies with public awareness and stress on its Public Health impact.

All over the world most of our cities in developing countries in the name of development have become garbage dumps & gas chambers. It is possible to totally prevent air pollution with timely corrective and preventive action. It is unfortunate that we have failed to restore pure and clean air what nature has gifted for the survival of plants and animals. "Urban Air" is *under pressure with developmental activities*. Efforts are made to understand the status of our urban air at huge expenditure. Large amount all over the world is spent for monitoring, testing, treating and cleaning urban air. Probably less than 1/1000th of this amount is enough to prevent air pollution. Apart from this the annual budget to rectify the health hazard to its citizens in any society caused by air pollution is enormous. Rise in respiratory diseases, cancer, cardiac problems and numerous antioxidant related diseases are all associated with pollution in air. In many parts of highly congested cities oxygen bunkers are established. Facemasks are becoming part of human body in many cities. *It appears as if man is covering his face with shame (mask) for the heinous act of pollution caused by him!* Over 80% of garbage generated in urban areas is subjected to incomplete burning which result in the production of toxic gases. There are reports on the burning of plastic resulting in the

production of dioxane which is known to bring about the sex change from male to female of a child while it is in the womb.

Major sources of air pollution in urban environment. (Few examples are given below)

**Vehicular exhaust - 1st major amongst contributor of air pollution** (Ref: Baker J, Santiago R., Villareal T., and Walsh M (1998) *Vehicular emission control in Metro Manila Draft final report ADB (PPTA 1723)*)

- 1 Several tons of vehicular exhaust is constantly getting in to our urban air. This comprises of suspended particulate matter, oxides of nitrogen, lead, sulfur dioxide, benzene and many other unidentified toxins.
- 1 In Bangalore alone with over 16,48,943 vehicles which is 1/3 of the total vehicles in the State of Karnataka, one can visualize the air pollution going on every day. Many other metros have higher vehicular density and more intensified air pollution.
- 1 Adulteration of different kinds of fuel, poor maintenance of the vehicular conditions and poor quality roads demanding higher fuel demand are some of the causes of increased air pollution in cities. The dust emanating from the ground rich in toxic particles from the vehicular exhaust is another major source of air pollution.
- 1 Wearing masks will not solve the problem in hot and humid conditions. The quality of mask is also poor in majority of cases. The impact of long term exposure of breathing this kind of polluted air is not clearly understood even in urban areas of developed countries.
- 1 Apart from this there are no public health impact studies undertaken in developing countries correlating the changing air quality and its health impact.
- 1 Respiratory and skin disorders are very often attributed to allergy of unknown origin and given symptomatic treatment.

**Industrial gases - 2nd major cause**

- 1 Most of the industries have not complied with OSHA regulations in India and as a result we have unacceptable environment for our workers apart from polluting their surroundings. Couple of years ago few workers at Najangud pharmaceutical industry died due to Hydrogen sulphide poisoning as a result of total negligence on part of management system.
- 1 At one of the cement factories in Karnataka several workers suffered due to carbon monoxide poisoning.
- 1 The unforgettable Bhopal Gas Tragedy is still fresh in our memories.
- 1 Textile industry using cotton and other synthetic fibers are also known to cause several respiratory disorders due to its impact on the quality of air.

**Burning of urban waste - third major source**

- 1 Every day tons of urban waste including plastics are taken and burnt in the outskirts of our cities and are burnt. Even in a small town of Udupi at Indrali area which is thickly habited by people of South Canara heaps of garbage is slowly burning for several years. The toxic fumes cause health problem. In India most of

the urban waste is burnt in the outskirts of the cities.

- 1 Residents collect the garbage in their residential sectors and lit it with fire. This is 100% avoidable.

#### **Cottage industries - to small extent but locally causing devastating health hazard.**

- 1 Large numbers of people living in the area where agarbathies are dried on pavement have been suffering from respiratory disorders. This is due to usage of synthetic aromatics such as nitro benzene etc. Cottage industries do not come under the folds of regulating authority.
- 1 Stone crushing emission in cities and the neighborhood is known to be a serious health hazard not only to the workers but to the habitants in and around the quarry industry. Suspended dust emission ranges from 0.05 in primary crushing to 2.25 fines mill resulting in varying silicosis.

#### **Open sewage and polluted storm drains**

- 1 Many toxic organic gases generated in the open drainage system is known to cause several health problems such as mild to severe headache.

**Since dilution is not the solution for any form of pollution,** only remedial step towards reduction of pollution is towards preventing it. All forms of air pollution are preventable.

Let us look at the results of the recent studies on the blood lead levels of in large population in our country. Following conclusions are made as result of one of the largest scientific study sponsored by Dr. Abraham George under the George Foundation. Admiral Dawson chairman of the Project lead free was great inspiration in the study. (*Ref: Proceedings of the International Conference on the Lead Poisoning prevention and treatment 1999 published by The George Foundation*)

- 1 Over 50% children below 12 years of age in seven major cities have unacceptable level of lead in their blood. This will result in the reduction of their IQ. Damage at the CNS by lead is irreversible.
- 1 Amongst these cities Bangalore children born in last 12 years are the greatest victims of lead poisoning as the vehicular density increased in geometric progression in Bangalore. However in other cities lead free petrol was introduced much earlier.
- 1 It is unfortunate to note that the lead in the blood of Indian population is not from Indian Lead mines. This is established by isotope dilution method.

As a result of the study and the white paper submitted to the Government lead free petrol is made available in most of our cities.

The above observation clearly indicates that is possible to eliminate any kind of pollution from the environment in which we continue to live.

#### **Non-invasive simple methods to reduce air pollution in cities.**

- 1 In order to reduce acidic fumes in the air alkaline fountains at several places will help. One such fountain is at present working in front of St. John's Hospital in Bangalore. Air scrubbers are other means of reducing toxic gases in air.
- 1 Coating road dividers with limewater regularly (in stead of paints which are expensive) will absorb vehicular gases to some extent.
- 1 Catalytic converters in vehicles to reduce carbon monoxide.
- 1 High quality scrubbers in industries to reduce toxic gases getting into our environment.
- 1 Strict rules to curb usage of public places for burning urban waste.
- 1 Implementing policies for sale of lead free paints.
- 1 Increasing public transport system and preventing private vehicle to congested and crowded areas identified in cities.
- 1 Displaying air quality at various places for the benefit of public.
- 1 Regularization of cottage industries and monitoring the use of quality aromatics, which does not cause any air pollution.

Internal Air Quality monitoring in residences is becoming popular in most of the developed countries. Bio-aerosol assessment control is of great health significance an aerosol in residential sector is known to cause many kinds of respiratory problems. Many cosmetic insecticide sprays are found to be toxic. Apart from this carpets and curtain mites and dust, mycotoxins, endotoxins, volatile organic solvents from freshly applied paints is known to affect the air quality. Many studies are needed in this direction. ([www.aerotechlabs.com](http://www.aerotechlabs.com))

*With increased awareness and also the availability of technology in India the future of urban air quality is likely to improve with reduced ill effect and impact on the health. This being a slow process governmental agencies will have to work in tandem with the NGO's to achieve early results. We can not afford to wait and have huge expenditure on corrective measures.*

***"By law of nature man has no right to disturb any part of his environment, once disturbed beyond some limits, results in irreversible damage to all forms of life. Man's presence on this earth is only towards sustenance of all forms of life in our environment. It is unfortunate that with mans efforts for easy life and comforts he can be hold totally responsible endangering not only his environment but every thing around him" - Air Pollution is 100% preventable with little concern and timely action to assure our next generation quality life.***

#### **Do You Know?**

- (i) 66.06% households do not have toilets.
- (ii) 78.01 rural and 26.03% urban households have no toilet facilities and practice open defecation.
- (iii) 7.0 mill children die of diarrhoea/dehydration every year.
- (iv) Rivers get polluted mostly by the sewage from cities; open defecation adds to environmental pollution.