

## Status Report of Air Pollution with special reference to their major issues and challenges in Indian Metropolitan City

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### ABSTRACT

The air in the urban and industrial locations is being steadily polluted and the air pollution load is increasing with increase in the number of industrial units and vehicles in the urban centers. The phenomenal increase in the number of vehicles in the country is the most significant polluting factor of urban air especially metropolitan cities. The major air pollutants are sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>2</sub>), suspended particulate matter (SPM), carbon monoxide (CO), benzene, lead, hydrocarbons etc.

### INTRODUCTION

Air Pollution in Metropolitan Cities is heavily polluted but Chennai has comparatively cleaner air than other metropolitan cities. According to WHO's report Delhi ranked 4th most polluted city in the world in 1980-84 while Kolkata, Delhi and Mumbai ranked 5th, 7th and 15th among the most polluted cities in the world in 1990. Delhi's air is polluted through four sources viz. automobiles, thermal power plants, industries and households which contribute 64, 17, 12 and 7 per cent of air pollution (Debasish Bandyopadhyay, Debosree Ghosh, Aindrila Chattopadhyay. 2014) The number of automobiles in Delhi registered rapid increase between 1982 (0.593 million) and 1996 (2.63 million) suggested by Bull A. (2003).

It was estimated that the share of air pollution through automobiles would increase to 72 per cent beyond 2000 A.D. but the introduction of metro-rails in Delhi has reduced air pollution. Similarly, the introduction of CNG-operated buses and auto-rickshaws has also contained air pollution in the capital city. Automobiles contribute 52 per cent of total air pollution load in Mumbai, industries and thermal power plants contribute 48 and 33 per cent of emissions of sulphur dioxide, and fumes coming

out of huge dumps of garbage are also increasing and these are aggravating air pollution problem in Mumbai. Automobiles account for 30 per cent of air pollution load in Kolkata Metropolitan District. The major pollutants of Kolkata's air are suspended particulate matter (SPM) and carbon (Gurjar, B.R., K. Ravindra, and A.S. Nagpure. 2016) The concentration of SPM in Kolkata's air increased from 237 ug/cum in 1990 to 354 ug/cum in 1995, which far exceeded the national standards. The concentration of CO exceeded 10 times the permissible level of 2 ug/cum in 1996.

### Major Air Pollutants:

#### Sulphur Dioxide (SO<sub>2</sub>)

Emission of sulphur dioxide (SO<sub>2</sub>) is closely related to industrialization and phenomenal growth in urban automobiles as SO<sub>2</sub> is emitted mainly from the combustion of sulphur-rich fossil fuels e.g. coal and mineral oil. It is significant to note that SO<sub>2</sub> was found to be significant air pollutant upto 1980 but thereafter concentration of SO<sub>2</sub> slightly declined due to switch over from firewood, coal and kerosene as cooking fuel

to liquefied petroleum gas (LPG). The eastern and western industrial belts recorded relatively higher level of so, between 1990-95. Gajroula (in Western U.P.), Howrah, Ankleshwar, Baroda (Vadodra) and Surat recorded higher level of SO<sub>2</sub> than the national standard for residential areas (60 ug/cum). In most parts of the country annual average of SO<sub>2</sub> concentration remained well below national standards for SO<sub>2</sub>.

## Nitrogen Oxides (NO<sub>x</sub>)

The five-year data (1990-95) of mean annual level of nitrogen oxides indicate sharp rise but the level remained well within national standards for NO, (60 ug/cum, mean annual) except in Gajroula (Western Uttar Pradesh), Pondicherry, Howrah, Jabalpur, Alwar (Rajasthan) and Kota which recorded NO, above national standards. Howrah recorded highest mean annual concentration of 204.35 ug/cum in 1995 whereas maximum annual concentration remained above 200 ug/cum since 1990. Though mean annual concentration of NO, in the industrial belt of the western region of the country registered increase but remained below national standards e.g. industrial towns of Surat, Vapi, Rajkot, and Ankleshwar but Ahmedabad accounted for very high level of maximum annual value of 490 ug/cum in 1991. Similarly, the mean annual concentration of No, in Delhi though steadily increased but remained below national standards but the sudden spurt in the maximum levels from 47 ug/cum in 1991 to 324 ug/cum in 1995 is, in fact, a matter of serious concern. The introduction of CNG-operated buses and three

wheelers and metro-rails in Delhi has now brought down the level of air pollution by almost all of the ingredients.

## Suspended Particulate Matter (SPM)

The national standard for SPM concentration is 140 ug/cum in the residential area. It is a matter of concern that SPM has emerged as one of the most dangerous air pollutants and its concentration has substantially increased since 1990. The concentration of SPM has registered constant increase between 1990-95 when the SPM level was recorded 2 to 3 times higher than the national standard in the northern, western, eastern and southern regions but comparatively southern region remained less polluted. Most of the SPM recording stations in the northern region recorded more than 300 ug/cum of SPM during 1990-95. Delhi recorded maximum concentration of above 1000 ug/cum in 1987 whereas mean annual level remained well above 400 ug/cum during 1990-95. In the southern region, Hyderabad and Vishakhapatnam (Andhra Pradesh), Kottayam, Ernakulam and Thiruvananthapuram (Kerala), Mysore (Karnataka) and Pondicherry recorded higher level of SPM concentration than national standard between 1990-95. In the eastern region Kolkata and Howrah have reached critical SPM level as it consistently remained above 1000 ug/cum between 1987-95. Most of the cities in the western region including Ahmedabad, Baroda, Surat and Rajkot in Gujarat, Bhopal, Indore in Madhya Pradesh, Mumbai and Nagpur in Maharashtra, Alwar and Jaipur in Rajasthan recorded SPM concentration above national standard level between 1990-95.

### Estimated vehicular emission of pollutants in metropolitan cities of India

City	Vehicular emissions (tones per day)					
	PM	SO <sub>2</sub>	NO <sub>x</sub>	HC	CO	Total
Delhi	10.30	8.96	126.46	249.57	651.01	1046.30
Mumbai	5.59	4.03	70.82	108.21	469.92	659.57
Bangalore	2.62	1.76	26.22	78.51	195.36	304.47
Kolkata	3.25	3.65	54.69	43.88	188.24	293.71
Chennai	2.34	2.02	28.21	50.46	143.22	226.25

Source : Central Pollution Control Board (1995), PM = particulate matter, SO<sub>2</sub> = sulphur dioxide, NO<sub>x</sub> = nitrogen oxides, HC = hydrocarbons, CO = carbon monoxide

## National ambient air quality standard (annual average)

Pollutants	Sensitive areas	Indian air quality standard Residential rural and other areas	Industrial areas	WHO recommendations
Sulphur dioxide( $\mu\text{g}/\text{cum}$ )	15	60	80	40-60
Nitrogen oxide ( $\mu\text{g}/\text{cum}$ )	15	60	80	150(24 hr average)
Ozone ( $\mu\text{g}/\text{cum}$ ) (8 hours average)	-	-	-	100-200
Suspended Particulate matter ( $\mu\text{g}/\text{cum}$ )	70	140	360	60-90
Lead ( $\mu\text{g}/\text{cum}$ )	0.50	60	120	-
Carbon monoxide ( $\mu\text{g}/\text{cum}$ )	1.0	2.0	5.0	10

**Note:**  $\mu\text{g}$  = microgram, cum = cubic meter

### Air Pollution Management:

The Govt. of India has taken a number of measures to mitigate the ever-increasing problem of air pollution in India. A few legislative measures have been adopted to protect the quality of environment including air quality such as (1) Air (prevention and control of pollution) Act 1981, (2) Environment (Protection) Act, 1986, (3) adoption of Male Declaration on Control and Prevention of Air Pollution and its Likely Trans boundary Effects for South Asia (1998) etc. The Government has laid down ambient air quality standards for different categories of areas such as industrial, residential/rural/ other, and sensitive areas for the concentration of certain air pollutants such as SO<sub>2</sub>, NO<sub>2</sub>, SPM, RPM (PM 0), NH, etc. for short-term (24 hourly) and long-term (yearly) periods. The concerned units and authorities have to follow the norms of air quality standards Norms have been fixed for the emission of maximum possible limits for various pollutants emitted from different categories of industries. Under the provision of 'environment audit' every polluting industrial unit has to submit 'environment statement to the concerned State Pollution Control Board (SPCB). This is mandatory for polluting industries. It is mandatory for the industries to use pollution control technologies. Stringent emission norms have been fixed (1991, 1996 and 2000) for automobiles, such as Euro I (Bharat I), Euro II (Bharat II). Provision for cleaner fuel quality for the automobiles. Identification of pollution problem areas and implementation of action plans for the mitigation of air pollution problems under the supervision of Ministry of Forest

and Environment (MEF). Monitoring of implementation of action plans by the Environment Pollution (Prevention and Control) Authority for the National Capital Region (NCR)

It may be concluded that in spite of several measures adopted for the control of air pollution mainly in urban areas, the serious problem of air pollution could not be mitigated up to satisfactory level. It is also true that certain measures such as introduction of CNG- operated automobiles mainly buses and auto-rickshaws, and metro-railways in Delhi has certainly contained air pollution.

### Conclusion:

Government of India has already taken several measures to prevent and control air pollution in the country.

- Environment audit of polluting industrial is mandatory
- Pollution control technologies are mandatory for the industries.
- For the automobiles industry needed provision for cleaner fuel quality.
- Air pollution problems must be under the supervision of MEF.
- Environment Pollution controlling authority is strictly monitoring on metropolitan cities as per act.

### REFERENCES

Bull A. *Traffic Congestion: The Problem and How to Deal With It*. Santiago: Naciones Unidas, Cepal (2003).  
Debasish Bandyopadhyay, Debosree Ghosh, Aindrila Chattopadhyay. Lead Induced Oxidative Stress



Mediated Myocardial Injury: A Review. Int. J. Pharm. Sci. Rev. Res., 29(2), November – December 2014; Article No. 13, Pages: 67-71.

Debosree Ghosh, Pratap Parida. Lead Poisoning and California Condor. Journal of New Science Biotechnology,1(1):7-9,2015.

Gurjar, B.R., K. Ravindra, and A.S. Nagpure. 2016. Air pollution trends over Indian megacities and their local-to-global

<http://time.com/3608534/india-new-delhi-worlds-mostpolluted-city/>

WHO. *Air Pollution*. WHO. Available online at: <http://www.who.int/airpollution/en/> (accessed October 5, 2019).