CHAPTER 8

ENVIRONMENTAL CONCERNS

1. This chapter dwells upon the various dimension of pollution including source, past and present status and efforts made to reduce the pollution level in Delhi. With the sustained efforts put in by the Government of Delhi alongwith the cooperation of all stakeholders, Delhi is showing signs of improvement in reducing / controlling the pollution level since past few years.

2. AMBIENT AIR QUALITY STATUS

Concentration of various pollutants in the ambient air is showing a declining trend, which is evident from the following statement No 1. It is also noted with concern that there has been some reversal in pollution level of certain elements of air quality which have increased level in 2008 in comparison to 2007. This is being watched so that pollution does not get increased.

Statement-1

YEAR WISE ANNUAL MEAN AMBIENT AIR QUALITY LEVELS IN DELHI

Year	Concentration in ambient air ($\mu g/m^3$)				
	SO_2	No_2	CO	SPM	RSPM
1997	19	45	4810.00	362	-
1998	21	42	5450.00	377	-
1999	19	40	4241.00	375	-
2000	18	42	4686.00	430	-
2001	14	42	4183.00	394	149
2002	11	46	3258.00	455	192
2003	10	56	2831.00	390	169
2004	9.00	57	2581.00	389	164
2005	9.00	49	2541.00	331	139
2006	10.15	55.9	2531.00	433	174
2007	4.4	40.2	2460	378.17	158.25
2008	4.98	50.9	2461	431.8	208.9

Source: Department of Environment, GNCTD

Statement – 2

NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Time Weighted Average	Concentration in ambient Air		
		Industrial Areas	Residential Rural & other Areas	Sensitive Area
1	2	3	4	5
Sulphur Dioxide (SO_2)	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3
	24 hours**	120 µg/m^3	80 µg/m^3	30 µg/m^3
Oxides of Nitrogen as NO_2	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3
	24 hours**	120 µg/m^3	80 µg/m^3	30 µg/m^3
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	140 µg/m^3	70 µg/m^3
	24 hours**	500 µg/m^3	200 µg/m^3	100 µg/m^3
Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average*	120 µg/m^3	60 µg/m^3	50 µg/m^3
	24 hours**	150 µg/m^3	100 µg/m^3	75 µg/m^3
Lead (Pb)	Annual Average*	1.0 µg/m^3	0.75 µg/m^3	0.50 µg/m^3
	24 hours**	1.5 µg/m^3	1.00 µg/m^3	0.75 µg/m^3
Carbon Monoxide (CO)	8 hours**	5.0 mg/m^3	2.0 mg/m^3	1.0 mg/m^3
	1 hour	10.0 mg/m^3	4.0 mg/m^3	2.0 mg/m^3

* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.

Source – Central Pollution Control Board.

2.1 **Sulphur Dioxide (SO_2):** Statement 1 shows that level of SO_2 has drastically come down in the ambient air. Annual mean SO_2 level reduced from 18.03 mg/m^3 in the year 2000, to 5.00 mg/m^3 in 2008. As such SO_2 level has decreased by 74% in 2008 as compared to 1997. This tremendous achievement is mainly attributable to conversion of all city buses / Taxis / Autos in CNG mode. The annual mean of SO_2 level in Delhi satisfy the annual average of National Ambient Air quality standard for residential areas which is 60mg/m^3 (Statement-2)

2.2 **Nitrogen Dioxide (NO_2)** Annual average value of NO_2 has decreased significantly (14.00%) in 2007 as compared to previous year but there is an increase in 2008 as compared to 2005. It was 45 mg/ m^3 in 1997 and 55.9 mg/ m^3 in 2008. The annual mean of NO_2 level in Delhi is well within the annual average of National Ambient Air quality standards for residential areas which is 60 µg/ m^3 (micro gram/m3).

2.3 **Carbon Monoxide (CO):** As is evident from Statement -1, annual average CO level has gradually been reducing since 2001. It was 4183 mg/m^3 in 2001, whereas in 2007 and 2008 it came down to 2460 mg/m^3 and 2461mg/m^3 respectively. This could be attributed to the stringent implementation of vehicular emission norms, fuel quality up-gradation and better maintenance of engines through all possible measures i.e. promotional, educational and enforcement.

2.4 **Suspended Particulate Matter (SPM):** As may be seen in Statement -1, annual average SPM level has drastically come down from 455mg/m^3 in 2002 to 331 mg/m^3 in 2005 and 378 mg/m^3 in 2007. SPM level was monitored at 431.8 µg/ m^3 in 2008.

2.5 **Respirable Particulate Matter (RSPM):** Annual average of RSPM level has reduced by 6.8% in the year 2007 as compared to 2006. It was 208.9 mg/m^3 in 2008 as against 158.25 mg/m^3 in 2007.

2.6 **Lead:** Annual average level of lead has significantly reduced after 1996. In 1996, the lead concentration in petrol was brought down from 0.56 g/l to 0.15 g/l. In 1998, lead was totally phased out from petrol. Consequently, this resulted in reduction of lead level in the ambient air.

2.7 Thus ambient air quality has improved significantly which can be gauged from the fact that as compared to 1997, the concentration of Carbon Monoxide has declined by 47% in 2006. Sulphur Dioxide level has reduced by 44% from 1997 to 2006. However, concentration of NO_2 has been showing slightly increasing trend from 2002.

3. NOISE POLLUTION

The other important cause of air pollution in Delhi is excessive noise. The major contributors to noise pollution are industries, vehicular traffic, festivals, construction activities, Diesel generating sets etc. DPCC conducts monthly Ambient Noise Monitoring

at 40 locations in Delhi and issues notice to concerned units to take concerned units to take corrective action. Noise levels ranged from 59.0 to 65.0 dB(A) in day time while the night time ranged from 51.8 to 59.2 dB(A), which slightly exceeds the norms. Government of Delhi has notified an area of 100 metres around the hospitals with 100 beds or more, educational institutions with 1000 students or more, all court complexes, all government complexes as Silence Areas/Zones. Noise levels in Delhi exceed permissible levels in all areas except industrial areas according to a study by Delhi Pollution Control Committee in 1996. Following statement indicates the ambient noise levels permitted by Central Pollution Control Board for different areas: -

Statement - 3

PRESCRIBED AMBIENT NOISE STANDARDS

S.No.	Area	Leq/dB (A)	
		Day Time *	Night Time **
1.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Residential Area	55	45
4.	Silence Zone***	50	40

Notes:

* Day time – 6 AM to 10 PM

** Night Time – 10 PM to 6 AM

*** Silence Zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other areas which is declared as such by competent authority.

Source : The Noise Pollution [Regulation and Control] Rules, 2000, Ministry of Environment and Forest

4. WATER POLLUTION

4.1 The 48-km stretch of the Yamuna River in Delhi is heavily polluted on account of uncontrolled flow of untreated sewage and also of direct discharge of industrial chemical wastewater. The river water upstream of Wazirabad is fit for drinking after treatment.

However, after the confluence of the Najafgarh drain and 24 other major drains which are down stream of Wazirabad barrage, the water quality becomes heavily degraded and is unfit even for animal consumption and irrigation. These 24 major drains pollute Yamuna River for various reasons including due to overflow of untreated sewage from unsewered areas. River Yamuna is monitored for water quality at 9 locations every month and 24 drains are being monitored monthly. DJB has decided to lay interceptor sewers for cleaning Yamuna River. Engineers India Limited has been appointed as Project Management Consultant [PMC] for this project and an escrow account has been created.

4.2 DOMESTIC WASTE WATER (Sewage) Management

In Delhi, the waste water generated in unplanned area is discharged into drains in the absence of sewerage network. The major cause of concern is non-utilization of installed capacity of sewage Treatment Plants as at present only about 341.39 MGD sewage is being treated by all STPs against their installed capacity of 512.40 MGD. With a view to reduce flow of untreated sewage with Yamuna. 23 sewage treatment plants have already been commissioned. Delhi Jal Board has prepared a plan to provide sewerage facilities in unauthorized colonies which are proposed to be regularized shortly. This will, however, be subject to feasibility. In such areas, about 1000 public toilets have been constructed with JBIC funds, in addition to public toilets being constructed by Slum Wing under their plan scheme. Decentralized system of waste water treatment is the only possible solution to this problem. DJB is contemplating to prepare a feasible plan for this purpose. MCD has also appointed consultant under YMP-II for this purpose.

DJB initiated the process of lying of interceptor sewers along 3 major drains (Najafgarh Drain, Supplementary Drain and Shahadra Drain). Sewage generated from the colonies will be trapped before reaching into major drains and diverted to the existing unutilized STPs/new STPs. DPR has been prepared.

All major hotels, hospitals, construction projects have been directed to setup STP/ETP for treatment of their wastewater and its effective usages for toilet flushing, cooling tower and horticulture. As a result, 150 such projects have either installed or are in the process of installing such systems which are expected to reduce load on the DJB network substantially. Many hospitals are also setting up such units and recycling the wastewater for horticulture purpose**.**

4.3 INDUSTRIAL WASTE WATER

The industrial wastewater generated in Delhi is about 40 MGD. All industrial units have been directed to ensure linkage to conveyance system in 11 Common Effluent Treatment Plants (CETPs). These are also being checked for their water quality every month and necessary corrective measures also being ensured. More than 1200 industrial units have installed eight ETPs to treat industrial wastewater.

5 VEHICULAR POLLUTION

Vehicular population has increased from 24.32 lakh in 1994-95 to 56.27 lakh in 2008 till March. Thus, an increase of about 131.37 % has been registered in a period of 14 years. Highest increase occurd from 9.58 lakh in 2000-01 to 17.30 lakh in 2007-08 i.e 80.57% in the category of car / jeeps and 21.88 lakh in 2000-01 to 35.78 lakh in 2007-08 increase i.e 62.72% in respect of scooter / motorcycle. This has resulted in a corresponding increase in pollutants emitted by vehicles.

6. SOLID WASTE

Latest estimates indicate that about 6500-7000 M. Tones of Municipal Solid Waste is being generated each day in Delhi at present. Estimated generation of Municipal Solid Waste by 2010 is 9000 MT per day. In addition, industrial hazardous and non-hazardous waste, such as fly ash from power plants, is also generated. MCD and NDMC could manage to clear about 5500 M. Tones of garbage each day resulting in accumulation of garbage in the city area.

7. BIO MEDICAL WASTE

With the increase in the number of hospitals and nursing homes in Delhi, hospital waste has become another area of concern. In-house waste treatment facility in terms of autoclave/incinerators/shredders are available in major hospitals. Small Nursing Homes, Clinics and Dispensaries are disposing off the waste through 'Operator of facility' who collect, treat and transport and dispose off the waste. Two such operators are operating in Delhi at present. Selection of 1 more operator is under process.

8. MEASURES TO COMBAT POLLUTION

8.1 Vehicular Pollution

The main source of air pollution in Delhi is vehicular exhaust. Therefore, a strategy for use of cleaner fuel, reduction in fuel consumption, efficient maintenance of engines and installation of pollution control devices was adopted.

Efforts are being made to reduce sulphur content in Diesel upto 50 PPM by the Year 2010 and also to use 350 PPM Sulphur Diesel within a radius of 500 km of Delhi.

500 Pollution under Control Certificate Centres are being linked on the website by March 2009 to generate daily reports for monitoring air emissions.

Creation of Air Ambience Fund of Rs. 40 crore by March 09 by levying a fee on the sale of diesel at the rate of Rs 0.25 litre in the NCT of Delhi, will get Rs. 80 crore in next year with a proposed hike in Delhi budget for next year.

VAT refund of 12.5 % allowed from Air Ambience fund for conversion of vehicles to clean fuel.

8.2 It is estimated that air pollution generated from industrial activity in Delhi is about 20% of total air pollution. Although several steps have been taken, industrial pollution may be reduced further. More than 1,300 industrial units, that should not have been operating as per the MPD-2001 norms, have been closed. A scheme has been prepared to relocate industrial units that currently operate in residential areas. About 26000 industrial plots have been allotted at new industrial estates being developed at Bawana, Narela and Bhorgarh industrial estates.

8.3 Unauthorized industrial areas, which meet the norms declared as eligibility criteria for regularization, have been identified. Now these industrial areas may be regularized, if association of these areas comes forward to fulfill the norms by developing infrastructure according to eligibility criteria notified.

8.4 All industries are being advised to control pollution from diesel generating sets. They have been asked to increase the stack height to a level of 2-3 metres above their building height and also take acoustic measures to reduce the noise level from diesel generating sets.

8.5 Mandatory DG sets norms of acoustic enclosures and stack height for 6000 cell phone towers and 600 Nursing Homes being monitored closely. Encouragement to invertors in place of DG sets.

8.6 The main pollutants from coal based thermal power plant are stack emissions, fly ash generation and fugitive emission in coal handling. There are five power plants in Delhi, out of which, two are gas based and three are coal based. All three coal based thermal power plants located in Delhi have installed pollution control systems and are adhering to the national standard of 150 mg/Nm^3. However, DPCC has given new stringent norms for particulate matter emission as 50 mg/ Nm^3 for which all the three Thermal Power Plants are in the process of upgrading their pollution control system. Besides, the Power Plants are using beneficiated coal (ash content less than 34% since 1999).

8.7 I.P. Thermal power plant has completed its life and as such it is now proposed to replace this thermal plant in a phased manner by a Combined Cycle Gas based plant of 1000 MW.

8.8 The Fly Ash notification of Govt. of India, regarding utilization of fly ash within the radius of fifty kilometer from coal or lignite based thermal power plants, being implemented in Delhi by different departments/user agencies, is being monitored by the Environment Department.

8.9 YAMUNA ACTION PLAN (PHASE-II)

The Yamuna Action Plan (YAP) Phase - I, focused on the treatment of partial wastewater discharged from 15 towns till the year 1998 but the pollution from Delhi was not fully addressed. Hence, this project did not contribute fully in improvement of water quality of River Yamuna. Therefore, YAP - II was formulated by Ministry of Environment & Forest, Govt. of India to achieve the desired water quality standards for Yamuna River. The total cost is Rs.387.17 crore for the schemes under "Yamuna Action Plan Phase - II" in Delhi. The cost of the schemes is to be shared on 85:15 bases between the Govt. of India and Govt. of Delhi. A few study projects are also included in YAP - II, which will be implemented under YAP (Phase-III)

Projects under Yamuna Action Plan Phase -II (YAP-II)

Projects finalized by MOEF	**Cost (Rs. in Crore)**
324 MLD (72 MGD) Keshopur, STP rehabilitation, Pumping station and rising main in Keshopur STP pilot plant for electricity generation from biogas	66.36
Okhla STP augmentation with electricity generation plant for 170 MGD STP	85.27
Ring Road trunk sewer rehabilitation	90.07
Wazirabad road trunk sewer settlement	64.20
Bela Road trunk sewer rehabilitation	17.47
DPR Preparation including Pilot Plant implementation for YAP III	35.00
Misc. e.g. Slum Rehabilitation, Public Participation and Awareness and Capacity Building/PR	28.80
Total	**387.17**

Funds have been released to MCD and DJB by the Government of India to initiate the implementation of schemes. The Selection of Project Management Consultants by the project implementing agencies has been completed and now implementation will be speeded up.

The whole of NCT of Delhi has been declared as notified area for regulation of ground water. No drawl of ground water without prior permission of DJB and permission shall be granted subject to the condition of installation of rain water harvesting system/ treatment of all wastewater and effective reuse of treated water.

HAZARDOUS WASTE MANAGEMENT

8.10 Hazardous Waste (Management & Handling) Amendment Rules, 2000, specifies 36 types of hazardous waste generating processes as well as type of hazardous waste. Under the rules, it is the responsibility of all the industrial units who generate specified hazardous waste to ensure that the hazardous waste is properly collected, treated, stored, transported and disposed of in environmentally sound manner.

8.11 As per Hon'ble Supreme Court order, 1 TSDF is to be set up in each state. Department of Environment had decided to prepare the plan for development of its own facility site within Delhi at Gumanhera in Najafgarh Block. But the development of treatment, storage and disposal facility (TSDF) site within Delhi at Gumanhera in Najafgarh Block could not be finalized due to resistance of villagers. Govt. of Delhi has identified a new site near Khanjawala for treatment, storage and disposal facility (TSDF) for Hazardous waste.

SOLID WASTE MANAGEMENT

8.12 The management of solid waste in Delhi is being improved through various measures adopted by concerned agencies. The Govt. of India has notified Municipal Solid Waste (Management & Handling) Rules, 2000 with the objective of collection, segregation, storage, transportation and processing and disposal of Municipal Solid Waste. Implementation of these rules is being taken care of by concerned local bodies in their respective areas. Besides the above, the Municipal Corporation of Delhi, which is managing the solid waste, has taken the following policy level decision to improve the management system:

a. Private Sector Participation in transportation of solid waste in six zones has already been awarded and for other four and a half, it is in the process of award.

b. Setting up of processing facilities through private entrepreneurs.

c. Infrastructure development at the local level collection and at the terminal processing level for segregation of wastes.

d. Delhi Pollution Control Committee has granted consent for following projects for generation of power from garbage (waste to energy project):

1. Timarpur Project: 650 tons per day MSW with output of 255 tons per day RDF(Refuse Derived Fuel).
2. Okhala plant: 1300 tons per day MSW will process 450 tons RDF, from which 16 MW power will be generated.
3. Ghazipur: 1300 tons per day MSW with output of 450 tons RDF. Electricity generation capacity is 10 MW. All above three projects will be operational by 2010.

e Following Waste to compost Projects are operational:

1. Compost plant of 500 TPD capacities at Bhalaswa Sanitary Landfill site.
2. Okhla Compost Plant of MCD has been upgraded to 200 TPD by ILFS Ecosmart.
3. Existing 125 TPD Compost Plant of APMC has been upgraded to 200 TPD.

BIOMEDICAL WASTE MANAGEMENT

8.13 About 8 M.T. Bio-Medical Wastes is generated each day in Delhi. Delhi Pollution Control Committee has authorized two operators for collecting the waste from the individual generators and disposing it off at their facilities. With the commencement of facility from two operators, a number of major hospitals, who had installed incinerators, have closed down their incinerators and started availing the services of the operators.

As on date, 11 incinerators, 17 autoclaves and 2 microwaves are in place for effective management of the Bio-Medical Waste (Management & Handling) Rules, 1998. Besides, more than 2000 individual Health Care establishments have made an agreement with the operators who have the facility for the Management of Bio-Medical Waste.

DPCC has issued an EOI for management of Electronic waste on PPP mode.

Construction and Demolition Waste

- Average generation of C & D waste is 2000 tones per day. MCD has identified 3 acres of land at Burari for development of pilot project.
- Processing C & D waste consists of crushing and grading. C & D waste will be used for land filling and supplied to building industry for use as filler/sub base material.

Plastic Waste

- About 583 MT/ year of plastic waste are generated in Delhi.
- Delhi Govt. has issued a notification forbidding use of plastic bags in the main markets and local shopping centres.

8.14 Following climate change mitigation measures have been taken by Delhi Govt.

Solar Lighting System

- Solar lighting is being encouraged in parks and gardens. NDMC has to install solar light in two famous parks namely Nehru Park and Lodhi Garden. 20 KW solar energy park developed in the Gardens of Five Senses.
- The installations of solar lighting systems/heating systems made mandatory condition in Environment Impact Assessment by MoEF.
- THYAGARAJA STADIUM for Commonwealth Games will generate 650 KVA electricity from solar panels on the roof, providing 18% of the 100 % standby arrangements.
- Solar Powered Street Light can be used in Delhi. This system is an ideal application for campus and rural street lighting. The systems is provided with battery storage backup sufficient to operate the light for 10-14 hours daily.

Rain Water Harvesting Structures

- Installation of Rain Water Harvesting has been made mandatory for plots having minimum area of 100sq. metrs. The financial assistance for 50 % of the projects cost or Rs. One Lakh, whichever is provided by Delhi Govt. /DJB to the RWAs/ schools for this purpose.

8.15 BIO-TECH CENTRE

A Bio Tech Centre at a cost of Rs. 4.91 crore has been constructed at South Campus in collaboration with Delhi University. The Bio-Tech Centre has started functioning.

8.16 OTHER MEASURES:

Several other measures are being taken to control pollution and improve the environment, which are as follows: -

(i) Reuse of treated wastewater for gardening and cooling purposes, which is discharged from Sewage Treatment Plants.

(ii) Making use of bio-degradable kitchen solid waste for Vermi-composting at community level and utilizing compost for gardening purpose.

(iii) The Department of Environment has supported various schools for putting up paper recycling equipment.

(iv) Development and protection of the Ridge area.

(v) Development of wild life sanctuary at Bhatti, Asola.

(vi) Development and preservation of old lakes and other water bodies.

(vii) Bombay Natural History Society (BNHS) has been engaged to perform their activities at Asola Sanctuary for visitors and thus play the role of Environment Resource Centre in Delhi for the public

(viii) Under urban forestry creation of triangular parks with the objective in view, particularly with reference to greening Delhi substantially before the start of Commonwealth Games 2010.