

CHAPTER 8

ENVIRONMENTAL CONCERNS

After Independence, the city of Delhi became a major centre of commerce, industry and education. The growth of Government departments and office complexes has also contributed to the spread of the city. Unabated in-migration has also compounded the problem. Overpopulation and the ensuing overuse of scarce resources such as water put heavy pressure on the environment in Delhi. Rapid rise in population and speedy economic development has also raised the concern for the environmental degradation. The economics of environmental pollution, depletion and degradation of resources did not get as much attention as compared to the issues of growth and development. This chapter dwells upon the various dimension of pollution including sources, past and present status and efforts made to reduce the pollution level in Delhi. The city suffers from air pollution caused by transportation, road dust, industries and domestic air emissions. Noise pollution comes mainly from industries, transportation, aircraft etc. Water pollution and a lack of solid waste treatment facilities have caused serious damage to the river on whose banks Delhi grew, the Yamuna. Besides human and environmental damage, pollution has caused economic damage as well. Sustained efforts by the Government of Delhi along with 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

2.1 Year-wise annual mean ambient air quality levels in Delhi during 1997 to 2014 is presented in Statement 8.1.

Statement 8.1
AMBIENT AIR QUALITY LEVELS IN DELHI: 1997-2014

S. No	Years	Ambient Air Quality ($\mu\text{g}/\text{m}^3$)			
		SO ₂	NO ₂	CO	RSPM (PM ₁₀)
1	1997	18.7	44.9	4410	--
2	1998	20.4	42.2	5450	--
3	1999	19.5	40.1	4241	--
4	2000	18.0	41.8	4686	191
5	2001	14.1	41.8	4183	150
6	2002	11.3	50.8	3258	192

S. No	Years	Ambient Air Quality ($\mu\text{g}/\text{m}^3$)			
		SO ₂	NO ₂	CO	RSPM (PM ₁₀)
7	2003	9.5	55.8	2831	170
8	2004	9.3	57.4	2581	160
9	2005	8.8	55.9	2541	168
10	2006	10.2	55.9	2531	177
11	2007	4.0	38.0	2460	161
12	2008	5.0	43.1	2461	201
13	2009	5.0	4703	1768	248
14	2010	5.0	46.0	1937	249
15	2011	15.0	66.0	2020	281
16	2012	18.2	82.4	2020	293
17	2013	20.1	77.5	2100	282
18	2014	16.9	79.0	1700	318
	Standard	50	40	2000	60

Source: - Department of Environment, GNCTD/CPCB & DPCC

2.2 The values for 1997 to 2010 are of the monitoring stations of CPCB while the values of 2011 to 2014 are of the monitoring station network developed by Delhi Pollution Control Committee. DPCC presently monitors air quality through six online continuous ambient air quality monitoring stations at 6 locations. The stations can be classified in two categories i.e. residential (R.K. Puram, Mandir Marg & Punjabi Bagh) and hot spots (I.G.I Airport and Anand Vihar). Civil Lines is also influenced by traffic emissions. Statement 8.2 shows the annual average of critical pollutants in Delhi for the Year 2014.

Statement 8.2

ANNUAL AVERAGE OF CRITICAL POLLUTANTS AT SIX STATIONS IN DELHI (in $\mu\text{g}/\text{m}^3$) FOR THE YEAR 2014

Locations	SO ₂	NO ₂	PM ₁₀	PM _{2.5}	O ₃	CO (mg/ m ³)
R. K. Puram	13.6	51.6	263	140	41	1.45
Mandir Marg	12.5	87.4	203	125	51	1.28
Punjabi Bagh	17.3	106.4	248	139	39	1.86
IGI Airport	17.7	66.8	289	176	85	1.48
Anand Vihar	20.4	84.5	583	191	32	1.73
Civil Lines	19.7	79.4	318	141	96	2.64

2.3 Sulphur Dioxide (SO₂): No significant variation was observed in the annual average value between 2011 to 2014. The values monitored were always within the prescribed limits of 50 $\mu\text{g}/\text{m}^3$ at all stations. The minimum value was observed at Mandir Marg and maximum was observed at Anand Vihar.

- 2.4 Nitrogen Dioxide (NO₂): Annual average of NO₂ concentration has shown the marginal increase as compared to year 2011. The highest annual average was observed in 2012 (118.2µg/m³). In 2014, the average value was 79µg/m³. The minimum value was observed at R.K. Puram and maximum at Punjabi Bagh. The higher values may be due to high vehicular density in the area. At all the monitoring locations annual average exceeded the prescribed standard of 40 µg/m³.
- 2.5 Carbon Monoxide (CO): The value of CO in 2014 varied from 1.28 mg/ m³ to 2.64 mg/m³. The minimum was observed at Mandir Marg and maximum at Civil lines. Except Civil Lines, at all other locations, CO is under the prescribed standard of 2 mg/ m³.
- 2.6 Particulate Matter for measuring Pollution: One way of measuring pollution is by the measure of particulate matter. Particulate matter is basically a mixture of extremely small particles and liquid droplets like acids, chemicals, gas, water, metals, soil dust particles, etc, the measurement of which gives an ideas of the pollution of a city. It is also known as particle pollution or PM.
- 2.7 Particulate Matter (PM₁₀): The Particulate matter concentration shows an increase as compared to previous years. The values at R.K. Puram, Punjabi Bagh and Mandir marg shown a decrease though at other three stations it shows marginal increase which may be attributed to localized conditions as they are hotspots and influenced by transport emissions The high values at Anand Vihar may be attributed to vehicular emission road re-suspension dust in the area. It is worth mentioning here that this station is situated inside the ISBT and very near to exit road. These values shows the vehicular load on ISBT, Metro station and Railway terminal and by interstate transport of pollutants, as this location is separated by neighboring state by Ring Road and receive lane emissions from Sahibabad Industrial Area.
- 2.8 Particulate Matter (PM_{2.5}): Concentration of PM_{2.5} varied from 125 µg/m³ to 191 µg/m³. The minimum was observed at Mandir Marg and maximum at Anand Vihar.
- 2.9 Ozone (O₃): The concentration of ozone varied from 32 µg/m³ to 96 µg/m³ in 2014. The minimum was observed at Anand Vihar and maximum at Civil lines. The maximum value was observed during the summer months at Civil line station which exceeds the prescribed limits of 100 µg/m³.
- 2.10 National Ambient Air Quality Standards fixed by the Central Pollution Control Board are presented in Statement 8.3

Statement 8.3
NEW NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No	Pollutant	Residential, Industrial, Rural & Other Areas		Ecologically Sensitive Areas	
		24 Hourly Standard * ($\mu\text{g}/\text{m}^3$)	Annual Standard * ($\mu\text{g}/\text{m}^3$)	24 Hourly Standard* ($\mu\text{g}/\text{m}^3$)	Annual Standard* ($\mu\text{g}/\text{m}^3$)
1	SO ₂	80	50	80	20
2	NO ₂	80	40	80	30
3	PM ₁₀	100	60	100	60
4	PM _{2.5}	60	40	60	40
5	Ozone	180 [#]	100 ^{##}	180 [#]	100 ^{##}
6	Lead	1.0	0.50	1.0	0.50
7	NH ₃	400	100	400	100
8	CO	04 [#]	02 ^{##}	04 [#]	02 ^{##}
9	As	-	06	-	06
10	Benzene	-	05	-	05
11	BaP Particulate phase only	-	01	-	01
12	Ni	-	20	-	20

Source: Delhi Pollution Control Committee (DPCC)

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

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

1 Hourly, ##8 Hourly.

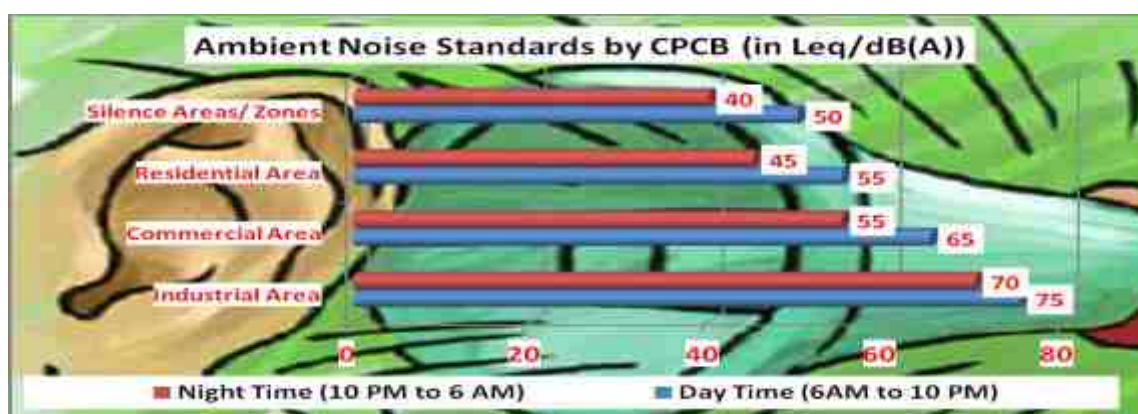
- 2.11 Public Awareness: GNCT of Delhi has taken steps to create awareness about burning of fire crackers and has run the Anti Fire crackers campaign since last 10 years. This is done association with Eco club schools.
- 2.12 Comprehensive study on Air Pollution: a study entitled “Comprehensive study on Air Pollution and Green House Gases in Delhi” has been awarded to IIT Kanpur by Department of Environment, GNCTD, for studying various measures to improve the quality of air.
- 2.13 High Power Committee on Air and Water Pollution was set up as per direction of Hon'ble Lt Governor vide order U.O.No. RN/2014/11336 dated 13.05.2014 under the Chairmanship of Chief Secretary, Govt. of NCT of Delhi, to look into:
- The pollution level in the City of Delhi created by the number of vehicles on the road.
 - The pollution level in the Yamuna because of outpouring of industrial and sewer waste in Yamuna.

Short term and long term measures for reducing air and water pollution were prepared in consultation with concerned Departments of GNCTD and GOI.

3. Noise Pollution

3.1 Delhi witnesses excessive noise on account of large number of vehicle of all sorts including those who come from other areas where CNG is not the fuel, construction activities, diesel generating sets, etc. Use of high sound loudspeakers during festivals and many social gatherings in public place directly increases the noise pollution in the affected areas. GNCTD 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. The Central Pollution Control Board published the information regarding permitted ambient noise levels in different areas. The prescribed ambient noise levels are presented in Chart 8.1.

Chart 8.1
AMBIENT NOISE STANDARDS BY CPCB (IN LEQ/DB(A))



Source :- Noise Pollution (Regulation and Control) Rules, 2000, Ministry of Environment, Forests and climate change Government of India.

Notes:- 1. Day Time from 6AM to 10 PM and Night Time from 10 PM to 6 AM.
2. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other areas which is declared as such by the competent authority.

4. Water Pollution

4.1 The river Yamuna, the reason for Delhi's existence, has suffered heavily from pollution. The 48 kilometer stretch of the Yamuna River in Delhi is highly polluted due to the flow of untreated sewage and also the discharge of inadequate treated industrial effluents.

- DPCC has been conducting monthly water quality monitoring of river Yamuna (at 9 locations) and major drains (24 drains) falling into river Yamuna. Statement 8.4 (at 9 locations) and 8.5 (24 drains) indicates annual average water quality of River Yamuna from April 2014 till March 2015. Recent water quality monitoring reports of river Yamuna indicate that the water quality parameters, BOD & DO, are in the desirable/prescribed norms, with respect to Water Quality criteria of "C" class, at Palla, which is upstream of Wazirabad Barrage. However, the water quality of River Yamuna at the downstream of Wazirabad barrage after confluence of Nazafgarh Drain is not meeting the desirable/ prescribed norms.
- The annual average of DO has ranged from 0.20mg/l at Shahdara (Downstream) to 8.48 mg/l at Palla. The annual average of BOD has ranged from 1.99 mg/l at Palla to 60.33 mg/l at Khajuri Pantoolpul. The water quality standards for DO and BOD as per CPCB norms are 4mg/l and 3mg/l respectively for class 'C' of river water. The water quality monitoring results in Delhi stretch clearly indicates river water is grossly polluted.

Statement 8.4

ANNUAL AVERAGE WATER QUALITY OF RIVER YAMUNA AT DIFFERENT LOCATIONS : APRIL 2014 TO MARCH 2015

S. No.	LOCATIONS	pH (mg/l)	COD (mg/l)	BOD (mg/l)	DO (mg/l)
	Water Quality Criteria	6.0- 9.0		3(max)	4(min)
1	PALLA	7.63	14	1.99	8.48
2	SURGHAT	7.5	22.66	4.51	5.78
3	KHAJURI PANTOOL POOL	7.40	200.33	60.33	Nil
4	KUDESIA GHAT	7.45	125.67	37.00	Nil
5	ITO BRIDGE	7.53	100.67	31.80	Nil
6	NIZAMUDIN BRIDGE	7.30	88.70	27.10	1.00
7	AGRA CANAL OKHLA	7.50	96.20	29.90	0.90
8	SHAHDARA (DOWN STREAM)	7.45	138.67	38.80	0.20
9	AGRA CANAL JAIPUR	7.45	108.83	28.83	0.60

Source: - Delhi Pollution Control Committee.

- 4.2 Water quality monitoring results of the drains indicate that most of the drains are not meeting the standards with respect to Bio-chemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS).

Statement 8.5

ANNUAL AVERAGE WATER QUALITY OF DRAINS AT DIFFERENT LOCATIONS IN DELHI: APRIL 2014 TO MARCH 2015

S.No	Drains	pH	TSS (mg/l)	COD (mg/l)	BOD (mg/l)
1	Najafgarh Drain	7.39	269.67	241.00	70.75
2	Metcalf House Drain	7.53	113.17	85.58	24.00
3	Khyber Pass Drain	7.51	40.17	42	10.30
4	Sweeper Colony Drain	7.33	55.83	100.83	27.42
5	Magazine Road Drain	7.39	212.83	298.33	87.92
6	ISBT Drain	7.40	148.00	283.33	87.92
7	Tonga Stand Drain	7.55	161.33	333.50	114.17
8	Moat Drain	No Flow	No Flow	No Flow	No Flow
9	Civil Mill Drain	7.42	167	302	94.42
10	Power House Drain	7.43	268.33	350.17	117.83
11	Sen Nursing Home Drain	7.48	302	389.33	132.08
12	Drain No. 12A	No Flow	No Flow	No Flow	No Flow
13	Drain No. 14	7.54	58.67	45.67	11.97
14	Barapulla Drain	7.37	163.67	164.50	49.08
15	Maharani Bagh Drain	7.25	454.67	395.50	135
16	Kalkaji Drain	No Flow	No Flow	No Flow	No Flow
17	Sarita Vihar Drain (Mathura Road)	7.34	272.00	438.00	146.67
18	Tehkhand Drain	7.34	289.67	470.08	150
19	Tuglakabad Drain	7.34	265.67	314.75	98.83
20	Drain Near LPG Bottling Plant	No Flow	No Flow	No Flow	No Flow
21	Drain Near Sarita Vihar Bridge	7.43	102.00	130.17	39
22	Shahdara Drain	7.44	376.33	509.67	151.67
23	Sahibabad Drain	7.31	606.33	817.58	271.67
24	Indrapuri Drain	7.42	355.33	476.33	128.42

Source: Delhi Pollution Control Committee

- 4.3 As sewerage system is not provided in unplanned habitats, the waste water generated in unplanned area is discharged into drains. Non-utilization of installed capacity (613.72 MGD) of sewage Treatment Plants is another important issue. Delhi Jal Board has prepared a plan to provide sewerage facilities in unauthorized colonies, however, subject to feasibility.
- 4.4 Delhi Jal Board initiated the process of laying of interceptor sewers along 3 major drains (Najafgarh Drain, Supplementary Drain and Shahdara Drain). Sewage generated from the

colonies will be trapped before reaching the major drains and the same would be diverted to the existing unutilized STPs/new STPs. At present, 19 STPs are being monitored on monthly basis for the compliance of standards. Recent data of STPs shows that most of the STPs are meeting the standards.

- 4.5 Delhi Pollution Control Committee, being pollution control statutory agency and regulator, collects samples of treated effluents from all operational STPs on monthly basis. Deficiencies and analysis reports are sent to Delhi Jal Board (DJB) for rectification so as to meet the norms stipulated.
- 4.6 Interceptor Sewer is being implemented by DJB in a 59 km length along three major drains (i.e. Najafgarh, Supplement and Shahdara) to intercept sewage flowing from subsidiary small drains convey it to nearest sewage treatment plants for treatment to ensure that only treated sewage is discharged into drains and Yamuna river. Mandatory provision of installation of on-site decentralize wastewater treatment system (ETP) by industries, hotels, construction projects etc with treated wastewater reuse in flushing, cooling, horticulture etc. More than 1750 /ETPs have been installed so far.
- 4.7 One of the main sources of water pollution is the waste material discharged by industrial units. Waste materials like acids, alkalies, toxic metals, oil, grease, dyes, pesticides and even radioactive materials are poured into the drains by many industrial units. Some other important pollutants include polychlorinated biphenyl (PCB) compounds, lubricants, etc. The pollutants unloaded into the drains usually dissolve or remain suspended in water. Sometimes, they also accumulate on the bottom of the drains. All industrial units in Delhi have been directed to ensure linkage to conveyance system in 13 Common Effluent Treatment Plants (CETPs). These 13 CETPs are functioning at industrial areas of Lawrence Road, Wazirpur, Mangolpuri, Mayapuri, Nangloi, Badli, SMA, GTK, Okhla, Jhilmil, Narayana, Narela and Bawana. Recent data of CETPs shows that Lawrence Road & Okhla CETPs are not meeting standard w.r.t. BOD mostly. These are also being checked for their water quality every month and necessary corrective measures also being ensured.
- 4.8 Green Hotel Guidelines: Green movement launched for conserving natural resources by 5 Star hotel, by way of signing MOU in the presence of Hon'ble Chief Minister of Delhi on 3rd June, 2013. All the 5 Star Hotels are required to comply with green hotel guidelines apart from installing sewage treatment plants. Memorandum of Understanding in which the parties pursue the activities mutually agreed upon and to implement it in a manner consistent with the terms set forth in the MOU, was signed by the Authorized person from the 32 Five Star Hotels with the Deptt. of Environment, Govt. of NCT of Delhi.

5. Industrial Waste Water

- 5.1 The industrial waste water generated in Delhi is more than 40 MGD. All industrial units have

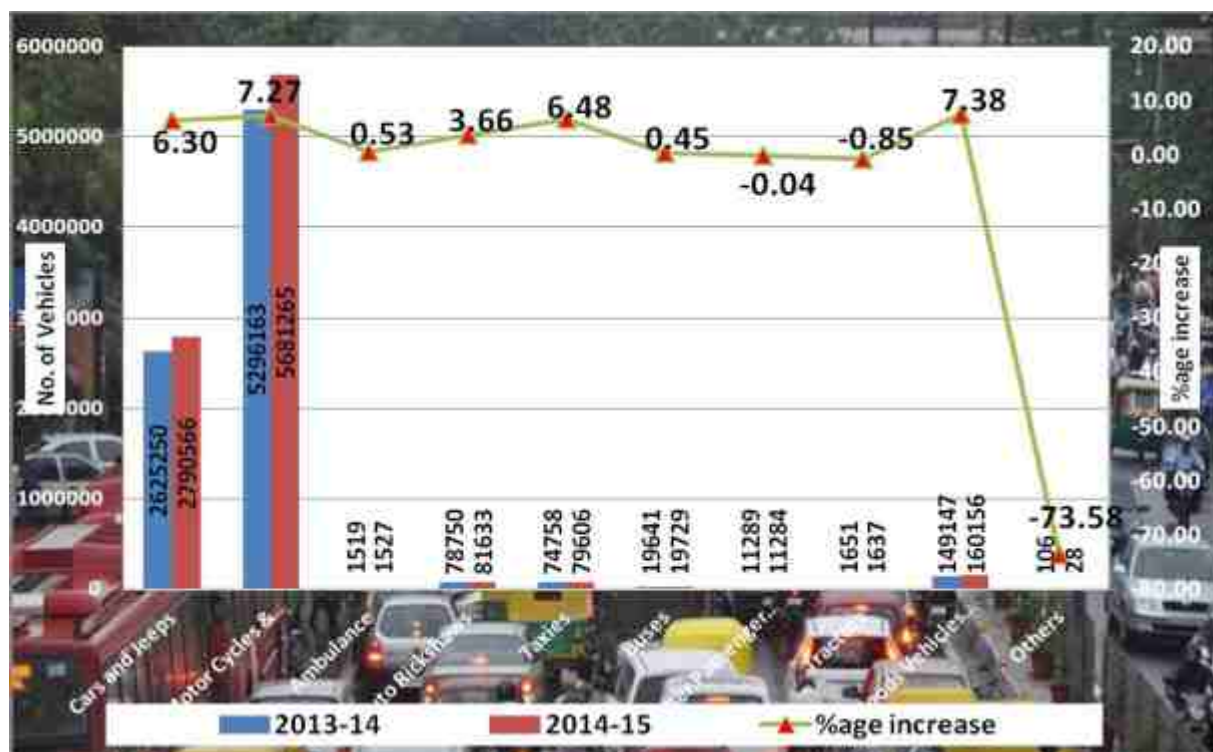
been directed to ensure linkage to conveyance system in Common Effluent Treatment Plants (CETPs). These are also being checked for their water quality every month and necessary corrective measures also being ensured. More than 1500 industrial units have installed ETPs to treat industrial wastewater, and thereafter it is sent to CETPs for further treatment. Total of 13 CETPs are operational for treating industrial waste water.

5.2 Apart from collecting treated effluent samples from all operational CETPs, detailed CETPs for rectification.

6. Vehicular Pollution

6.1 The number of vehicles registered in Delhi has increased from 31.64 lakh in 1999-2000 to 88.27 lakh in 2014-15. The highest increase observed in Taxis from 8545 in 1999-2000 to 79606 in 2014-15. During the same period, the percentage of increase was observed in cars & jeeps and motor cycles & scooters at 219 per cent and 173 per cent respectively. Similarly increase in vehicles observed in number of auto rickshaws, buses and goods vehicles. This has automatically enhanced the pollution levels of Delhi by the emission of pollutants by these vehicles. There were 82.58 lakh registered vehicles in Delhi in 2013-14 which increased to 88.27 lakh in 2014-15. The increase in various Vehicles in Delhi in 2014-15 as compared to 2013-14 is shown in chart 8.2.

Chart 8.2
REGISTERED VEHICLES IN DELHI 2013-14 AND 2014-15



7. Solid Waste

- 7.1 Solid waste includes commercial and residential waste generated in municipal or notified areas and is governed by the Municipal Solid Wastes (Management and Handling) Rules, 2000. As per the data available with DPCC records, solid waste generation in Delhi was around 8360 MTD. This is slated to increase due to economic and population growth. 700 MGD sewage is also generated, which generates organic sludge. Municipal waste of Delhi is disposed in three landfill sites namely Bhalswa GT Road, Ghazipur and Okhla.
- 7.2 Waste to Energy Plants: DPCC has granted Consent to Establish to three Waste to Energy Plants at Okhla, Ghazipur & Bawana having capacity 16 MW, 12 MW & 24 MW respectively. Timarpur Okhla Waste Management Co. Pvt. Ltd., Okhla is operational and other two are under installation.

8. Bio-Medical Waste

- 8.1 Bio-Medical Waste (BMW) means any waste, which generated during the diagnosis, treatment or immunization of human being or animals or in research activities and is governed by the Bio-Medical Waste (Management and Handling) Rules, 1998 and amended as to date. Government of NCT of Delhi in its notification dated 6th July, 1999 has authorized Delhi Pollution Control Committee (DPCC) to grant authorization for collection, reception, storage, treatment and disposal of bio medical waste. To implement the Bio Medical Waste Management Rules, 1998, Government of NCT of Delhi has also constituted an Advisory Committee and an Appellate Authority, in exercise of powers conferred under Bio Medical Rules. With the increase in the number of hospitals and nursing homes in Delhi, hospital waste has become another area of concern. Delhi is having 3 CBWTF operators who collect the waste from HCEs of Delhi and dispose the BMW after its treatment.

9. Hazardous Waste

- 9.1 Hazardous waste means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, and is governed by the Hazardous Wastes (Management and Handling) Rules, 1989 and amended to date.

10. Electronic Waste

- 10.1 Electronic Waste, means any waste, which is generated due to product obsolescence and discarded electronic items, and may include data processing, telecommunications or entertainment in private households and businesses. The Ministry of Environment and Forest, Government of India has issued Electronic Waste Rules for handling electronic

waste which is effective from 1st May 2012.

- 56 number of producer of Electronic and Electrical Equipments have obtained authorization under E-waste (Management and Handling) Rules, 2011.
- 21 numbers of collection Centres have obtained Consent to Establish, Consent to Operate and Authorization under E-waste (Management and Handling), 2011 for the activity of collection, segregation and storage of E-waste.

11. Measures to Combat Air Pollution

- 11.1 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.
- 11.2 An amount of ₹ 385.65 Crore has been collected as Air Ambience Fund till March 2015 (₹ 2.79 crore till March 2008, ₹ 35.53 Crore in 2008-2009, ₹ 30.56 Crore in the 2009-2010, ₹ 20.47 Crore in 2010-2011, ₹ 26.69 Crore in 2011-2012, ₹ 28.16 Crore in 2012-13, ₹ 31.25 Crore in 2013-14 and ₹ 210.20 crore in 2014-15).
- 1.3 Till March 2014, ₹ 49.57 Crore (₹ 4.12 Crore in 2008-09, ₹ 14.00 Crore in 2009-10, ₹ 12.58 Crore in 2010-11, ₹ 8.88 Crore in 2011-2012, ₹ 3.28 Crore in 2012-13 and ₹ 6.71 Crore in 2013-14) has been spent from Air Ambience Fund for reimbursement of concession and DVAT on purchase of Battery Operated Vehicles (electric vehicles) in the City.
- 11.4 VAT refund of 12.5 per cent allowed from Air Ambience Fund for conversion of vehicles to clean fuel.
- 11.5 It is estimated that air pollution generated from industrial activity in Delhi is about 20 per cent of total air pollution. Although several steps have been taken, industrial pollution may be reduced further. More than 1300 industrial units that should not have been operating as per the MPD 2021 norms, have been closed. A scheme has been prepared to relocate industrial units that currently operate in residential areas. About 26,000 industrial plots have been allotted at new industrial estates being developed at Bawana, Narela and Bhorgarh industrial estates. Emission control systems have been installed in about 600 industrial units.
- 11.6 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.

- 11.7 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 is also required.
- 11.8 The main pollutants from coal based thermal power plant are stack emissions, fly ash generation and fugitive emissions in coal handling. There are 2 Coal Based power plants namely Badarpur Thermal Power Station (705 MW), Rajghat Power Station (67.5x2 MW). Apart from this, there are 4 Gas Based Power Plants namely Pragati Power Station (330 MW), I.P. Gas Turbine Power Station (282 MW), Combined Cycle Power Station at Sector-11, Rohini, Delhi by NDPL (108 MW) & Pragati Power Station, Bawana (1500 MW) (partially at operational stage). Another 2 Gas Based Power Plants namely Pragati Power Corporation Ltd., Bamnauli (750 MW) & Badarpur Combined Cycle Power Plant (1050 MW) are proposed. IP Thermal Power Plant has closed its operations. Coal based thermal power plants located in Delhi have installed pollution control systems and are adhering to the national standards of 150 mg/Nm³ for which Thermal Power plants are in process of upgrading their pollution control system. However, Rajghat Power Station is not meeting the standards. Rajghat Power Station is allowed to operate only during the peak load requirement only.
- 11.9 The Fly Ash notification of Government of India regarding utilization of fly ash within the radius of fifty kilometres from coal or lignite based thermal power plants, being implemented in Delhi by different departments/user agencies, is being monitored by the Environment Department.

12. Yamuna Action Plan (Phase II & III)

- 12.1 Yamuna Action Plan- Phase II (YAP II) is one of the major programme, implemented in Delhi by Delhi Jal Board. It is being implemented in three states of the country (Haryana, Delhi and Uttar Pradesh). During the first phase of the programme, it came out that the river water pollution cannot be lowered down without the active participation of the citizens. Therefore in YAP phase II, a special component named as Public Participation and Awareness has been brought in wherein Non Governmental Organisations (NGOs) are partnering to work at the community level on different identified themes. These themes include;
- Socio-economic up-gradation of the Community Toilet Complexes neighbourhood as the name suggests, the NGOs involved have to improve the lives and environment of the community residing in the neighbourhood of the community toilets.
 - School health and hygiene programme wherein school going children have been targeted to sensitise upon the need for maintaining personal hygiene and sanitation
 - Town Specific innovation programme wherein NGOs are given a flexibility to design and develop a programme specific to the town requirements and could be one of the most innovative approaches and not necessarily duplicating the target groups.
- 12.2 Total cost is ₹ 387.17 Crore for the schemes under “Yamuna Action Plan Phase –II” in Delhi.

The cost is shared between Government of India and GNCTD on 85:15 bases. Funds have been released to Delhi Jal Board (DJB) and Municipal Corporation of Delhi (MCD) by the Government of India for implementation of scheme.

- 12.3 Yamuna Action Plan phase-III has been approved for implementation of the selected projects involving cost of about ₹ 1656 corers by DJB. GOI will provide 85% of the cost and 15% will be provided by GNCTD.
- 12.4 The entire area 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.

13. Hazardous Waste Management

- 13.1 Hazardous Waste (Management, Handling and Trans Boundary Movement) Amendment Rules, 2008 specifies various types of hazardous waste generating process as well as type of hazardous waste. Under the rules, it is the responsibility of all 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.
- 13.2 As per Hon'ble Supreme Court order, Treatment, Storage and Disposal Facility (TSDF) is to be set up in each state. Department of Environment has decided to prepare the plan for development of its own facility site within Delhi at Gumanhera in Najafgarh Block. But the development of 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. However, the Kanjhawala site proposal also could not materialize.

14. Solid Waste Management

- 14.1 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, processing and disposal of Municipal Solid Waste. Implementation of these rules is being taken care of by concerned local bodies in respective areas. Besides the above, the Municipal Corporations of Delhi, which are 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 eight zones has already been awarded and for other four, 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) In Delhi there are 5 Municipal Authorities responsible for Municipal Solid Waste management. Total municipal waste generation is 8360 MTD as is presented in Statement 8.6.

Statement 8.6
SOLID WASTE MANAGEMENT IN DELHI

S. No	Name of Corporation	Quantity (MTD)
1	North Delhi Municipal Corporation	3100
2	South Delhi Municipal Corporation	2700
3	East Delhi Municipal Corporation	2200
4	New Delhi Municipal Council	300
5	Delhi Cantonment Board	60
	Total	8360

14.2 Status of the Landfill Site(s) are as under:

There are 3 landfill sites namely Bhalswa, Ghazipur and Okhla. Bhalswa landfill site was commissioned in the year 1994, Ghazipur in 1984 and Okhla in 1996. All three landfill sites are not designed as per the schedule 3 of the MSW Rules which came into effect in 2000. DPCC has not granted authorization to all three landfill sites. All the five corporations have informed that they have no other option but to use these sites for disposal of MSW as land is not available in Delhi. They have also informed that request has been made to DDA to allot land for landfill sites. Further, South Delhi Municipal Corporation and North Delhi Municipal Corporation have informed that these landfill sites being continued at the risk of human life. Statement 8.7 shown data regarding pattern of disposal of municipal solid.

Statement 8.7
PATTERN OF DISPOSAL OF MUNICIPAL SOLID

S. No	Name of Corporation	Quantity of the MSW generated (MTD)	Bawana Waste Processing Site (MTD)	Waste to Energy Plant, Okhla (MTD)	Bhalswa Landfill Site (MTD)	Okhla Landfill Site (MTD)	Ghazipur Landfill Site (MTD)	Compost Plant Okhla (MTD)
1	North Delhi Municipal Corporation	3100	1550*	400	1150	-	-	-
2	South Delhi Municipal Corporation	2700	-	1300	1000	250	-	150
3	East Delhi Municipal Corporation	2200**	-	-	-	-	2200	-
4	New Delhi Municipal Council	300	-	300	-	-	-	-
5	Delhi Cantonment Board	60	-	-	-	60	-	-
	Total	8360	1550	2000	2150	310	2200	150

* The capacity of processing will increase to 3000 MTD after commissioning of the Waste to Energy Plant at Bawana which is under installation. At present, the construction work is not going on due to some dispute between North Delhi Municipal Corporation and project proponent. Residue of processed MSW is being disposed of at Secured landfill site within the plant itself. About 15%-20% residue (inert material) is generated from the process.

** 1300 out of 2200 MTD MSW shall be processed in the upcoming Waste to Energy Plant at Ghazipur but no proposal for the remaining. Waste to Energy Plant is likely to be commissioned by mid of 2015.

14.3 Status of Waste to Energy Plant:

There are three Wastes to Energy plants at Okhla, Bawana & Ghazirpur. Waste to Energy Plant at Okhla is operational and other two are under installation. Details are as under:

Statement 8.8
WASTE TO ENERGY PLANTS

S. No.	Name	Capacity of Electricity Generated (MW)	Capacity of Waste processing (MTD)	Status of operation
1	Timarpur-Okhla Waste Processing Company Okhla Compost Site	16	1950	Operational
2	East Delhi Waste Processing Company Pvt. Ltd. Ghazipur	12	1300	Under Installation
3	Delhi MSW Solutions Ltd. Narela Bawana Road	24	3000	Under Installation.
	Total	52	6250	

15. Bio Medical Waste Management

- 15.1 About 13.9 M.T. Bio-medical Wastes is generated each day in Delhi. Delhi Pollution Control Committee has authorised three operators (Common Bio-medical Waste Treatment Facility) (CBWTF) for collecting the waste from the individual generators and treatment and disposal at their facility. With the commencement of facility from three operators, a number of major hospitals, who had installed incinerators, have closed down their incinerators and started availing the services of CBWTFs.
- 15.2 10 incinerators, 22 autoclaves and 3 microwaves are in place for effective management of the Bio-Medical Waste (Management & Handling) Rules 1998. Besides, about 3800 individual Health Care establishments have made an agreement with the operators (CBWTFs) who have the facility for the treatment and disposal of Bio-Medical Waste.

16. Construction & Demolition Waste Management

- 16.1 Construction & Demolition (C&D) waste consists of the materials generated during the construction, renovation and demolition of building and other structure. The management of C&D Waste is a major concern due to the increasing quantum of demolition rubble, continuing shortage of dumping sites, increase in transportation and disposal cost.
- 16.2 M/s IL & FS Waste Management & Urban Services Limited has been granted consent to establish for the Processing of Construction and Demolition Waste debris at Jahangir Puri (Adjacent to Block-31, Gate No.1, Hanuman Mandir Road, Near MCD Colony, Jahangir Puri, Delhi – 33). The said facility is a Pilot Project for processing & recycling of 2000 Tonnes per day of Construction & Demolition Waste. Another Construction and Demolition Waste processing plant of capacity 500 MTD is under installation at Shastri Park by M/s IL & FS.

17. Plastic Waste Management

- Delhi Government has issued a notification dated 07.01.2009 forbidding use of plastic bags in the markets and shopping centres.
- Despite massive awareness campaigns and the notification dated 7.1.2009 also, the plastic bags continue to create nuisance. Keeping this in view, Cabinet has decided for blanket ban on plastic carry bags in Delhi. Accordingly, Delhi Govt. had issued a Notification on 23.10.2012 imposing ban on manufacturing, sales storage, usage, import & transport of plastic carry bags in the NCT of Delhi.
- All India Plastic Industries Association has challenged the said Notification dt 23.10.12 in the Hon'ble High court of the Delhi and the matter is sub judice at present.

18. Climate Change Mitigation Measures

- 18.1 On the issue of Combating Climate Change, Delhi is the first city in the country to set a mandate and brought out a detailed Climate Change Agenda, on the lines of National Action Plan for Climate Change released by the Government of India.
- 18.2 65 important point climate change agenda have been identified for the city of Delhi under following sectors:
- a) Enhanced Energy Efficiency
 - b) Sustainable Habitat
 - c) Green India
 - d) Water Mission
 - e) Strategic Knowledge
 - f) Solar Mission
- 18.3 Delhi State Action Plan on Climate Change (SAPCC) is being prepared on the lines of National Action Plan on Climate Change (NAPCC).

19. Solar Lighting & Heating System

19.1 Energy Efficiency and Renewable Energy Management Centre, Department of Environment, Govt. of Delhi has taken no. of steps to promote solar water heating systems in Delhi such as providing Rebate/Incentive of ₹ 6000/- for Domestic consumer (Residential accommodation) and up to ₹ 60000 to Non Commercial institutes depending on capacity of system. Capital Subsidy @ ₹ 3300/- per sq. m. for Flat plate collector and @ ₹ 3000/- per sq. m. for Evacuated tube collectors for domestic as well as commercial and non commercial establishments is provided through Ministry of New & Renewable Energy. The installation of Solar Water Heater has also been made mandatory in different categories of buildings like Industries, Hotels, Hospitals, Canteens, Corporate and residential building having area of 500 sq. meters or above, Government buildings, etc

- Lightening & illumination through Solar photovoltaic Power plant of 10.4 kwp at Safdarjung Tomb, New Delhi & 9.0 kwp at Jantar Mantar, New Delhi have been commissioned.
- Various important Project are being undertaken namely Demonstration of Renewable Energy Systems/Devices at Tihar Prison Complex, SPV Plant of 30 KWp at Delhi Secretariat Building under SADP of MNRE, SPV Power plant of 100 KWp at Vikas Bhawan –II under Off Grid Scheme of MNRE, 130KWp SPV Plant at Kashmere Date and SPV Power Plant of 465 KWP by BSES & NDPL. During 2013-14 & 2014-15, Energy Efficiency and Renewable Energy Management Centre take the project of installation of Solar Photovoltaic Power Plant in 4 Govt. Hospitals & 4 Govt. Schools under Jawaharlal Nehru National Solar Mission, Off Grid and Decentralised Solar Scheme of MNRE, GOI through DSIIDC Energy Ltd.
- Presently EE&REM Centre setting up of Solar Photovoltaic Power Plants at 22 Govt. Schools Buildings through M/s DSIIDC Energy Ltd. in CAPEX Model under the “Grid Connected Rooftop & Small Power Plants Programme”.

19.2 Energy Efficiency: Initiatives taken by EE&REM Centre towards energy efficiency are as follows:-

- Adoption of mandatory Energy Conservation Building Code in New Government Buildings.
- Mandatory use of Compact Fluorescent Lamp and Electronics Chokes in Govt. Building/Govt. aided institution/Boards, Corporations.
- Mandatory use of ISI marked Motor pump sets, Power capacitor, and foot/Reflex valves in Agriculture Sector.
- Project on promotion of Energy Efficient LED at Jawahar Lal Nehru University is under progress.

20. Rain-Water Harvesting Structure

- 20.1 Installation of Rain-Water Harvesting System has been made mandatory for plots having area of 100 Sq. Meters and above. The financial assistance of the 50 per cent of the project cost or 1 lakh whichever is less, is provided by Delhi Government / Delhi Jal Board to the Resident Welfare Associations or Schools for this purpose.
- 20.2 For Hotels / Malls / Construction Projects etc, installation of Rain Water Harvesting System has been made mandatory through contract mechanism.

21. Other measures to control pollution and improve the Environment

- 21.1 Some of the important measures adopted by the Government / DPCC to control pollution and improve the environment are as follows;
- Re-use of treated waste water for gardening and cooling purposes.
 - Making use of Bio-degradable kitchen solid waste for Vermi Composting at community level and utilizing compost for gardening purpose.
 - Environment Department has supported Schools for putting up paper re-cycling equipments/plants.
 - Development and Protection of the Ridge Area.
 - Development of Wild Life Sanctuary at Bhatti, Asola.
 - Development and Preservation of lakes and water bodies.
 - Air Ambiance Fund created by levying a fee on the sale of diesel at the rate of ₹ 0.25 per litre in NCT of Delhi, is being utilized for providing upto 29.5 percent concession in purchase of battery operated vehicles.
 - For ground water regulations and management in the city, a notification containing directions under section 5 of Environment Protection Act has been issued on 12th July 2010.
 - Massive plantation drive is being organised each year with the involvement of some Government Departments, Municipal bodies, NGO, Civil Society Organisations, Citizens, RWAs, Schools & Colleges, etc.
 - New City forests are being developed to increase the green cover area in Delhi.
 - Improvement of parks and gardens and their maintenance is being taken care of by providing adequate funds to local bodies and RWAs.
 - Providing Sewerage System in unplanned habitats i.e. unauthorised colonies and rural villages.

22. How can the citizens of Delhi help in reducing pollution?

22.1 Pollution in Delhi is a perpetual problem which needs to be looked upon as a serious issue not only by the Government but also by the citizens of Delhi:

- One of the easiest ways is that there should be an efficient involvement of Resident Welfare Associations in various localities in collection, segregation of garbage from houses and the societies.
- Citizens can take steps to covered the garbage into compost in their localities.
- More and more trees must be planted in every locality.
- Every individual should keep a proper check on the pollution level of their vehicles.
- Making more use of CNG.
- One of the best ways to control pollution is to manage wastes of all types in a proper manner.
- Each and every citizen should use buses and metro instead of cars and scooters, as they can carry a lot more people in one journey. Car pool is also a good option.
- Controlling the use of energy and making use of electricity in an efficient manner.
- One can also reduce water pollution by reducing the use of chemicals, cleaning agents, pesticides, herbicides, fertilizers etc.

It is the duty of every citizen to think in a broader perspective to control pollution. We really don't want our future generations to live in an unhealthy environment in Delhi.

23. Forest in Delhi

23.1 With a population of 16.75 million i.e. 1.38% of the country's population, development has always been a dynamic process in Delhi. However, activities carried, out by the State Government, Forest Department and greening agencies have helped a lot in striking a balance between ecology and development. The vegetation of Delhi is thorny scrub, which is found in arid and semi-arid zone. As per classification of Champion and Seth (1968), the Ridge forest falls in the category of 'Tropical Thorn Forest' and more especially as 'Semi-Arid Open Scrub'.

23.2 The National Forest Policy, 1988 provides that a minimum of 1/3rd of the total land area of the country should be under forest or tree cover. Taking the above in view, the Govt. of NCT of Delhi is making all endeavours to meet the national goal as set by the Central Govt. and is constantly adding to the green cover of the State which is reflected in the change in forest and tree cover given as follows:

Statement 8.9
FOREST AND TREE COVER AREA OF DELHI 1993-2013

(Sq. Km)

S. No.	Year	Forest and Tree Cover	Absolute Increase In Area	% of Total Area
1.	1993	22	--	1.48
2.	1995	26	4	1.75
3.	1997	26	--	1.75
4.	1999	88	62	5.93
5.	2001	151	63	10.2
6.	2003	268	117	18.07
7.	2005	283	15	19.09
8.	2009	299.58	16.58	20.20
9.	2011	296.20	-3.38	19.97
10.	2013	297.81	1.61	20.08

Source: Forest Survey of India, Ministry of Environment and Forests, GOI

23.3 Government of NCT of Delhi has taken initiatives to increase forests and tree cover area to keep the environment green in Delhi. As a result of the initiatives taken by Government of NCT of Delhi, forest and tree cover area has been increasing steadily since 1993 (Statement 8.9). The forest and tree cover area increased to 297.81 sq km in 2013 increasing thereby the share of forests in the total area to 20.08 per cent. The growth of forests and tree cover has particularly been monumental post 1999. Of the total 297.81 sq km of forest area in NCT of Delhi, nearly 272 sq km has been added during the period 1999 to 2013.

Statement 8.9 (a)
CHANGE IN FOREST AND TREE COVER IN DELHI BETWEEN 2011 AND 2013

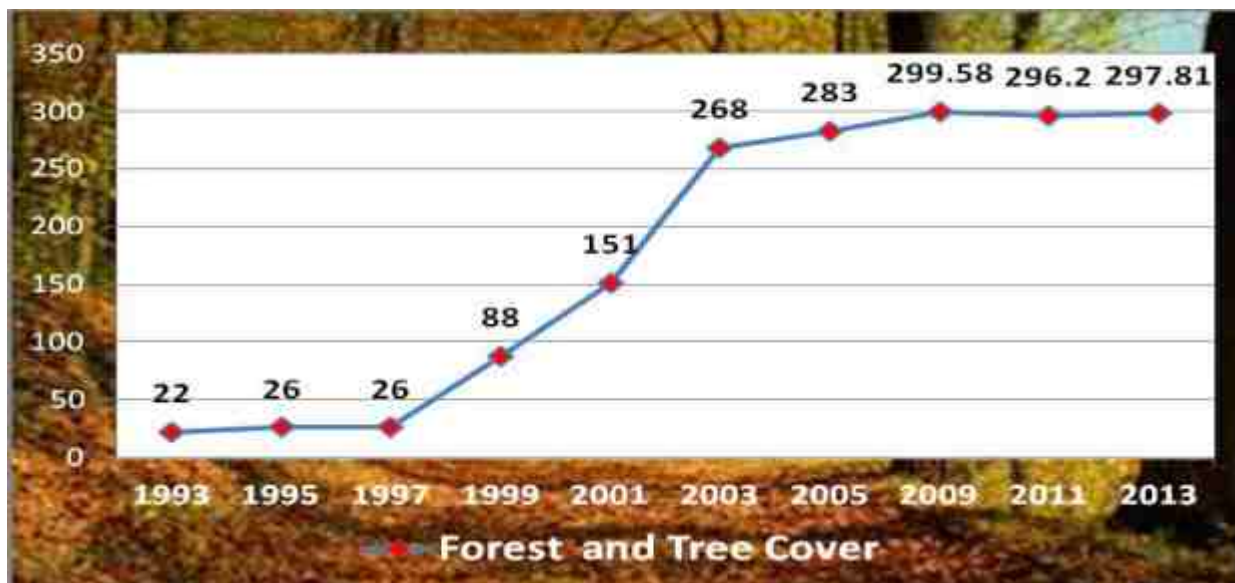
(Area in Sq Km)

Change in Forest Cover in Delhi			
	2011 Assessment	2013 Assessment	Change
Geographical Area	1483		
Very Dense Forest	6.76	6.76	0.00
Moderate Dense Forest	49.48	49.38	-0.10
Open Forest	119.96	123.67	3.71
Total Forest	176.2	179.81	3.61
Percent of Geographical Area	11.88	12.12	Change is due to More plantation
Change in Tree Cover in Delhi			
	2011 Assessment	2013 Assessment	Change
Total Tree cover	120	118	-2.00
Percent of Geographical Area	8.09	7.94	

Source: State Forest Report, 2013

23.4 It may be observed from Statement 8.9 that the growth of forest and tree cover area of Delhi increased from 22 Sq. Km in 1993 to 297.81 Sq. Km in 2013. The percentage of forest and tree cover area to the total area of Delhi has increased manifold from a mere level of 1.48 per cent in 1993 to 20.08 per cent in 2013. Forest Cover in Delhi also increased from 2011 to 2013 due to the plantation drive in Delhi as shown in statement 8.9 (a)

Chart 8.3
FOREST AND TREE COVER AREA OF DELHI 1993-2013



23.5 The information regarding the district-wise forest cover area and total geographical area of Delhi is presented in Statement 8.10.

Statement 8.10
DISTRICT-WISE FOREST COVER IN DELHI - 2013

(Sq. Km)

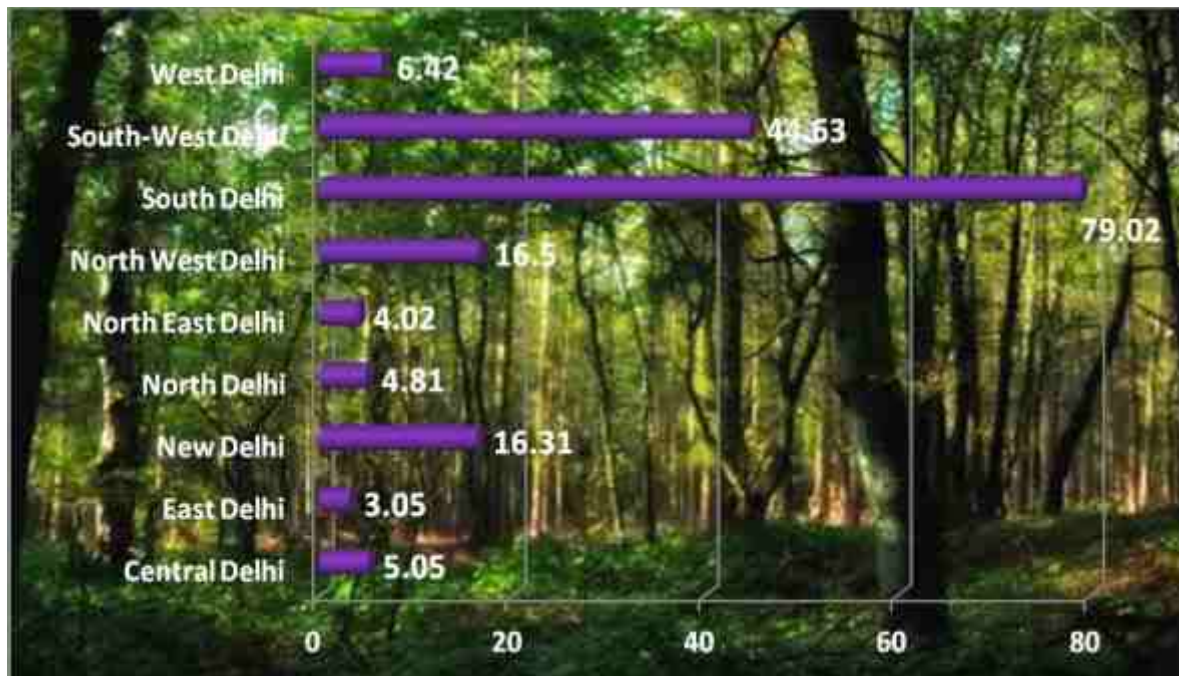
Sl. No.	Districts	Geographical Area	Forest Cover Area	% of Geographical Area
1.	Central Delhi	25	5.05	20.20
2.	East Delhi	64	3.05	04.77
3.	New Delhi	35	16.31	46.60
4.	North Delhi	59	4.81	8.15
5.	North East Delhi	60	4.02	6.70
6.	North West Delhi	440	16.50	3.75
7.	South Delhi	250	79.02	31.61
8.	South-West Delhi	421	44.63	10.60
9.	West Delhi	129	6.42	04.98
	Total	1483	179.81	12.12

Source: State Forest Report, 2013

23.6 It may be inferred from Statement 8.10 that the forest cover area of Delhi is 179.81 sq. km i.e. 12.12 per cent of the total area of Delhi. South Delhi constitutes the highest forest cover area at 79.02 sq. km, South West Delhi at 44.63 sq. km, North West Delhi at 16.50 sq. km, New Delhi at 16.31 sq. km, respectively. On the contrary the lowest forest cover observed in North-West Delhi at 3.75 sq. Km. The information regarding district-wise forest cover in Delhi is depicted in Chart 8.4.

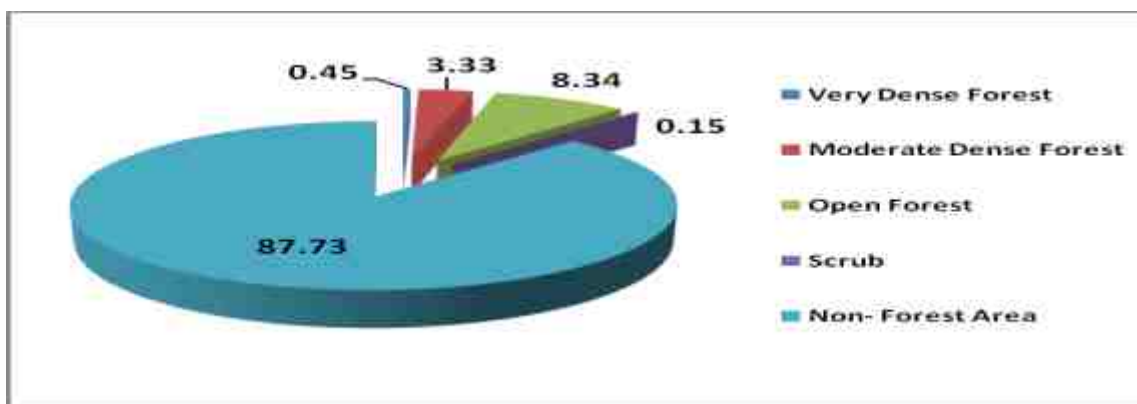
Chart 8.4
DISTRICT-WISE FOREST COVER IN DELHI - 2013

(Sq. Km)



23.7 Composition of forests in terms of its density is shown in Chart 8.5. Out of the total geographical area of NCT of Delhi, very dense forest is spread over 0.45 per cent, moderately dense forest is spread over 3.33 percent, open forest is spread over 8.34 per cent and scrub is spread over 0.15 per cent, which is almost negligible.

Chart 8.5
COMPOSITION OF FOREST COVER (%AGE) IN NCT OF DELHI IN 2013



Source: State Forest Report, 2013

24. Asola Bhatti Wild Life Sanctuary

24.1 Asola Bhatti Wildlife Sanctuary spread over 4845.57 acres is situated near Tughlakabad Fort in South Delhi. The Wildlife Sanctuary is considered the breathing lung of the cosmopolitan city of Delhi. It was established in 1992 with the aim to protect the wildlife in the area between Delhi and Surajkund (Delhi-Haryana border). The Asola Bhatti wildlife sanctuary actually lies in South Delhi District, all along Delhi Haryana Border along Faridabad and Gurgaon.

24.2 The sanctuary is located on the Southern Ridge which is part of the northern terminal of Aravalli Hills (Aravallis are one of the oldest mountain system of the world). The reason for the biodiversity significance of the Ridge lies in its merger with Indo-Gangetic Plains. The legal Status of the Southern Ridge was considered uncertain till 1986 when the community land of villages Asola, Sahurpur and Maidangari (2679.29 Acre) were notified and land of Bhatti village area (2166.28 Acre) was notified in 1991 as Sanctuary. Few Check dams have been constructed at Asola Wild Life Sanctuary as conservation measure for soil and water. These check dams have proved to be very effective for ground water recharge and creation of water bodies for the sustenance of Wild Life in the Sanctuary.

25. Reclamation of Bhatti area of Asola Bhatti Wild Life Sanctuary through ECO Task Force (ETF)

25.1 Forest Department, Government of NCT of Delhi is implementing the project of rehabilitation of about 2100 acres of Bhatti Mines area since October 2000 through ETF, which is a part of Asola-Bhatti Wild Life Sanctuary. Project period for five years was approved in 2000 at a cost of ₹ 8.23 crore, was extended for a further period of 3 years up to 8.10.2008 with an additional cost of ₹ 4.93 crore. The project was extended for one more

year with the final estimated cost of ₹25.55 crore up to 8th October 2009. Further the project was extended till 31st March 2012 with the total revised estimated cost of ₹33.37 crore of the project. The project period for Rehabilitation of degraded forest land in Asola Bhatti Wildlife Sanctuary and Dera Mandi area through Eco-Task Force was again extended for the period 01.04.2012 to 31.03.2017 with the cost of ₹44.82 crore (₹31.39 crore for Establishment cost of ETF and ₹ 13.43 crore for Project Stores cost which includes plantation work & its maintenance for five years). In all, total project cost of ₹76.83 crore already approved by the EFC for the period w.e.f. 09.10.2000 to 31.03.2017.

25.2 The information regarding the area and plantation rose under this project up to 2014-15 is presented in Statement 8.11.

Statement 8.11
RECLAMATION OF AREA AT ASOLA BHATTI PROJECT

S. No.	Years	Area (in acre)	Plantation Raised (Number)
1.	2001-02	300	58,800
2.	2002-03	600	92,400
3.	2003-04	400	1,51,500
4.	2004-05	400	1,26,000
5.	2005-06	400	1,30,267
6.	2006-07	400	1,40,000
7.	2007-08	427	2,00,000
8.	2008-09	429	1,41,703
9.	2009-10	400	1,50,000
10.	2010-11	563 & Enrichment	1,50,000
11.	2011-12	200 & enrichment	1,30,017
12.	2012-13	200	1,00,890
13.	2013-14	200	1,00,958
14.	2014-15	375	1,50,000
	Total	5294	18,22,535

Source: Forest Department, Government of National Capital Territory of Delhi

25.3 It may be observed from Statement 8.11 that after the reclamation of Bhatti area at Asola, 18.22 lakh plantations took place during the last fourteen years. Like-wise area covered under the said project increased to the tune of 5294 acres of land. In addition to plantation in Bhatti Mines area, plantation has been raised by Eco Task Force (ETF) on 1400 acres of notified forest land in village Dera Mandi handed over to the ETF in the year 2006-07. For improving the green area cover in Delhi, 500 acres of Gram Sabha land in village Dera Mandi would be brought under forestation through ETF.

25.4 For enhancing the green area in Delhi, Action Plan is prepared in consultation with various stakeholders namely Forest Department, Unified MCD, NDMC, CPWD, DDA, PWD and Army etc. The information regarding targets and achievements during the last decade is presented in Statement 8.12.

Statement 8.12
PLANTATION UNDER GREEN DELHI

S. No.	Years	Target (Lakh Plantation)	Achievement (Lakh)			
			No. of Plantation done	Plantation by Forest Department	Plantation by Other Department	Free Distribution of Seedlings
1.	2000-01	9.30	9.38	3.35	2.13	3.90
2.	2001-02	9.00	9.10	3.39	3.86	1.85
3.	2002-03	9.85	9.16	2.69	4.01	2.46
4.	2003-04	10.50	11.44	3.27	5.17	3.00
5.	2004-05	12.54	13.30	3.01	6.03	4.26
6.	2005-06	15.66	16.34	3.53	6.64	6.18
7.	2006-07	17.11	18.58	3.50	8.29	6.79
8.	2007-08	18.90	17.62	3.93	8.67	5.02
9.	2008-09	18.48	16.38	3.15	8.18	5.05
10.	2009-10	18.07	21.38	3.65	10.01	7.72
11.	2010-11	17.34	18.04	4.33	7.96	5.75
12.	2011-12	15.96	17.34	2.81	6.76	7.77
13.	2012-13	14.21	17.17	4.62	4.53	8.02
14.	2013-14	14.10	10.43	1.43	4.41	4.59
15.	2014-15	12.83	16.12	3.64	6.01	6.47

Source: Forest Department, Government of National Capital Territory of Delhi

25.5 Plantation has almost doubled over the last decade in Delhi. Achievement under the plantation has been higher than the target from 2000–01 till previous financial year which is a tremendous achievement by the government of NCT of Delhi.

26. Development and Management of Ridge area

26.1 The Delhi Ridge, an extension of the Aravali Mountains acts as the green lungs of the city. About 7784 hectares of the Ridge area have been notified as a reserve forest. The Ridge is divided into five portions. The details regarding the management of Delhi Ridge and area in each portion is presented in Statement 8.13.

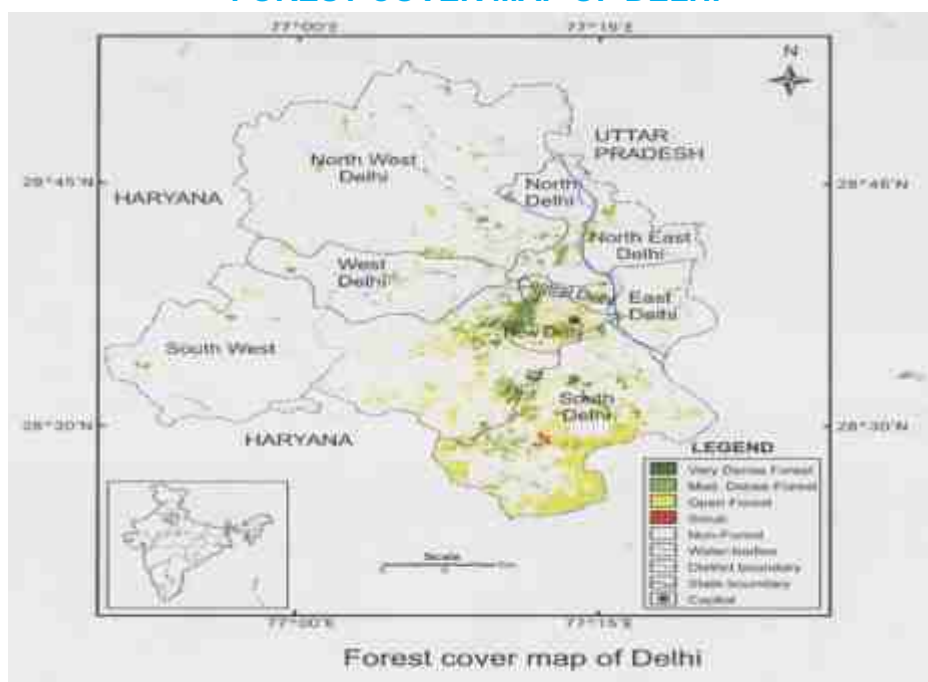
Statement 8.13
MANAGEMENT OF DELHI RIDGE

S. No.	Ridges	Managing Agency	(Area in Ha)
1.	Northern Ridge	Delhi Development Authority, United Municipal Corporation of Delhi & Forest Department	87
2.	Central Ridge	Forest Department, Delhi Development Authority, Army, Unified Municipal Corporation of Delhi, Central Public Works Department, New Delhi Municipal Council.	864
3.	South Central Ridge (Near Mahrauli)	Delhi Development Authority	626
4.	Nanakpura South Central	Delhi Development Authority	7
5.	Southern Ridge	Forest Department, Delhi Development Authority, Sports Authority of India	6200
Total			7784

Source: Forest Department, Government of National Capital Territory of Delhi

26.2 It may be observed from Statement 8.13 that southern ridge occupies major area and it constitutes nearly four fifths of the total area of ridges in Delhi.

Chart 8.6
FOREST COVER MAP OF DELHI



27. Development of City Forests in Delhi

27.1 Delhi has 42 city forests. Fifteen city forests are in South-West district, Ten in North-West district, Five each are in North-East and South districts, three each in East and North districts and one in West district. The information regarding the city forest in Delhi is presented in Statement 8.14 and chart 8.7.

Statement 8.14
CITY FORESTS IN DELHI- AREA AND DISTRICTS

S.No.	Name of City Forest	Area (Hectare)	District
1	Nasirpur City Forest	28.00	South-West
2	Alipur City Forest	16.80	North
3	Hauzrani City Forest	28.80	South
4	Mitraon City Forest	40.00	South-West
5	Sultanpur City Forest	48.00	North-West
6	Ghoga City Forest	10.40	East
7	Shahapur Garhi City Forest	8.00	North-East
8	Mamurpur City Forest	56.00	North-East
9	Jindpur City Forest	47.60	North-East
10	Mukhmelpur City Forest	53.00	North-East
11	Bawana City Forest	32.00	North-East
12	Garhi Mandu City Forest	300.00	East
New City Forests in Delhi			
2007-08			
13	Issapur	66.25	South-West
14	Rewla Khanpur	22.85	South-West
15	Kharkhari Jatmal	50.00	South-West
16	Sultanpur Dabas	24.76	North-West
17	Auchandi	0.50	North-West
18	Mungeshpur	13.50	North-West
19	Qutubgarh	27.77	North-West
20	Hindon Cut Ghazipur	5.00	East
21	Harewali	24.80	North-West
2008-09			
22	Rewala Khanpur-II	20.00	South-West
23	Shikarpur	109.00	South-West
24	Rajokari	15.50	South-West
25	Najafgarh Drain	29.64	North-West
26	Qutubgarh-II	20.00	North-West
27	Mukhmelpur	13.00	North-West
28	Raj Vidya Kendra, Sahurpur	37.00	South
29	Aya Nagar	25.00	South
2009-10			
30	Rewala Khanpur-III	6.47	South-West
31	Kharkhari Jatmal-II	18.62	South-West
32	Daurala	12.95	South-West
33	Malikpur	12.95	South-West
34	Goyla Khurd	5.67	South-West
35	Pendwala Khurd	16.19	South-West
36	Jaunapur	12.14	South
2010-11			
37	ITO Chungi	30	North
38	Jaunapur-II	84	South
39	Jainpur	70	West
2011-12			
40	Salimgarh Bypass	9.50	North
41	Jaffarpur	4	South-West
42	Qutubgarh-III	8	North-west
TOTAL		1463.66	

Source: Forest Department, Government of National Capital Territory of Delhi

Chart 8.7
District Wise Number & Area under the City Forests

