

## **Chapter XII**

### **ENVIRONMENT**

Sustainable cities are fundamental to social and economic development. As stated in the tenth plan document of the National Planning Commission, sustainability is not an option but imperative. For a better world to live in, we need good air, pure water, nutritious food, healthy environment and greenery around us. Without sustainability, environmental deterioration and economic decline will be feeding on each other leading to poverty, pollution, poor health, political upheaval and unrest. The environment is not to be seen as a stand-alone concern. It cuts across all sectors of development. We have to improve our economic growth rate, provide basic minimum life support services to large section of our population and deal with the problems of poverty and unemployment. At the same time, we have to pay attention to conserving our natural resources and also improving the status of our environment.

12.02 Environmental deterioration is not a necessary or inescapable result of urbanization; what needs to be done is striking a right balance - in making development in such a way that they are more effectively attuned to environmental opportunities and constraints.

12.03 The metropolitan environment can be looked comprising of mainly two components viz. (i) environment per se, and (ii) the habitat. The environment per se relates to natural features and resources including the air, noise, water and land (open spaces, forests etc.). The habitat is related to built environment and infrastructures such as water supply, sewerage and solid waste disposal.

12.04 The conservation of natural resources includes management of air, noise, water & land.

#### **Air:**

12.05 Air pollution is a matter of concern in metropolitan cities. Increasing urban activities mainly the industrial and transportation have resulted in increased emission into the air and the Tamil Nadu Pollution Control Board (TNPCB) has identified the major source of air pollution in Chennai is the emissions from vehicles.

12.06 Under the Air (Preservation & Control of Pollution) Act, 1981 and in the Environment (Protection) Act 1986, the National Standards for ambient air quality have been notified.

<b>Table No: 12.01 National Ambient Air Quality Standards</b>				
Pollutant (micrograms per m <sup>3</sup> )	Time-Weighted Average	Concentration in Ambient Air		
		Industrial	Residential	Sensitive
Sulphur Dioxide (SO <sub>2</sub> )	Annual Average	80	60	15
	24 Hours	120	80	30
Oxides of Nitrogen as NO <sub>2</sub>	Annual Average	80	60	15
	24 Hours	120	80	30
Suspended Particulate Matter (SPM)	Annual Average	360	140	70
	24 Hours	500	200	100
Respirable particulate matter (Size less than 10 micron)	Annual Average	120	60	50
	24 Hours	150	100	75
Lead	Annual Average	1	0.75	0.5
	24 Hours	1.5	1	0.75
Carbon Monoxide (in mg/m <sup>3</sup> )	8 Hours	5	2	1
	1 Hour	10	4	2

Source: TNPCB

12.07 The monitoring of air quality in Chennai is undertaken by TNPCB in their own Ambient Air Quality Monitoring Programme (CAAQM) and also under the National Ambient Air Quality Monitoring Programme.

12.08 TNPCB in its Environment Management plan for Chennai city, 2003 has identified that the major pollutant generated in the City are the particulate matter, sulphur dioxide, oxides of nitrogen, carbon monoxide, hydrogen sulphide, and ammonia gas. The major sources of air pollution are domestic (fuels for cooking), commercial (fuel consumed by commercial establishments, trade, industry, hotels etc.), industrial (due to wood, coke, furnace oil LPG, kerosene etc.) vehicular (petrol & diesel fuels), generator sets (diesel and kerosene fuels), natural sources (odour pollution due to gases emanated from polluted stretches, waterways – 'B' Canal, Adyar, Cooum). The TNPCB estimation of the pollution load in different sectors in Chennai City is given in Table No.12.02.

<b>Table No: 12.02 Calculated Pollution Load in Different Sectors in Chennai City</b>							
Sources	Pollutant (T/day)						
	SPM	SO <sub>2</sub>	NO <sub>2</sub>	HC	CO	Total	Percentage
Domestic	0.032	0.170	1.049	0.101	0.243	1.865	2.65%
Commercial	0.875	1.466	0.731	0.120	0.087	3.279	4.66%
Gen Sets	0.296	0.509	0.268	0.039	0.026	1.138	1.61%
Industrial	2.510	4.565	6.085	0.3119	0.4320	13.9039	19.78%
Vehicular	9.300	0.200	10.250	10.240	20.100	50.090	71.28%
Total (T/d)	13.280	6.910	18.380	10.810	20.880	70.260	100

12.09 The major contribution to Chennai air pollution load is vehicular sector (71.28%) followed by industrial sector (19.70%). TNPCB has mapped the air pollution impact areas and listed the impact areas as follows:

Impact Areas	Areas
Impact Area I (high)	T. Nagar, Part of Saidapet, Choolaimedu, Vadapalani, Royapettah, Egmore, Part of Adyar, Tenampet, some part of Tondiarpet, Koyambedu, Purasawalkam, Mandaveli, Mylapore, George Town
Impact Area II (medium)	Korattur, Anna Nagar, Velachery
Impact Area III (low)	Other than above areas

The following are the observations of TNPCB:

(i) Out of the 8 monitoring points, 4 points recorded low, 2 points medium and 2 points high rating.

(ii) The vehicular sector is the major source of air pollution in Chennai City (followed by the industrial sector).

(iii) In addition to the pollution caused by the vehicles, the untidy roads and gathering of sand on the sides of the roads causes rise of dust.

### **Water pollution:**

12.10 Chennai is traversed by three rivers (viz. Kosasthalaiyar, Cooum and Adyar), B' canal and other natural and man-made canals & drains. The waterways of Chennai are not perennial in nature and receive flood discharge only during monsoon season; in the rest of the year it acts as a carrier of wastewater from sewage treatment plants and others.

12.11 The TNPCB monitors the discharge of sewage and trade effluents generated by local bodies and industries into the water bodies / waterways. The basin-wise sewage generation during the year 2000 is given in the table 12.03.

Sl.No.	Waterways Basin	Drainage Area (sq.km)	Sewerage Generation (MLD)
1	Adyar River	12	87
2	Cooum River	20	92
3	Buckingham Canal		
	North Buckingham Canal	10	83
	Central Buckingham Canal	5	46
	South Buckingham Canal	2	29
4	Captain Cotton Canal	10	47
5	Otteri Nullah	24	129
6	Mambalam Drain	6	19
	Total	89	532

Source: TNPCB

12.12 The outfalls identified by the TNPCB in waterways are given in table no.12.04.

<b>Table No: 12.04 Source-wise Details of Wastewater Outfalls in Chennai City Water ways During year 1994 and 1999</b>									
Sl.No.	Outfalls source	No. of Outfalls in Waterways							
		River Adyar		River Coovum		Buckingham Canal		Otteri Nullah	
		1994	1999	1994	1999	1994	1999	1994	1999
1	Industries	20	11	18	1	14	13	13	4
2	Commercial Institutions	38	38	18	11	21	21	3	3
3	Sewage Treatment Plants	1	1	1	1	1	2	-	1
4	Sewage Pumping Stations	4	1	2	-	9	4	2	1
5	Sewer/Storm Water Drain Overflows	148	147	281	276	63	64	43	43
6	Discharges from Slum settlements	17	17	24	24	20	19	5	5

Source: TNPCB

12.13 However, the recent data collected by TNPCB during 2003 has shown that certain industries have plugged their outfalls and provided effluent treatment plants (ETP) and were using the treated trade effluent inside their premises itself. Pollution Control Board observed that the institutions such as slaughter houses (2 nos.), Central Railway station, water treatment plant (at Kilpauk) and S.T.P's contribute a major quantity of pollution level to the waterways.

12.14 TNPCB under the MINARS programme periodically monitors the water quality of the city waterways. Water samples are collected and analysed by TNPCB every month at 'B'canal (at north, central and south stretches), Otteri Nallah, Adyar River and Cooum River. According to TNPCB, all these water bodies in the City are polluted and not suitable for any designated uses (viz. drinking, bathing, propagation of wild life like animal husbandry & fisheries, industrial, cooking and washing and agriculture); level of contamination is relatively high in 'B' canal followed by Otteri Nullah and Cooum River.

#### **Flood Alleviation Project, 1998**

12.15 Government of Tamilnadu have sanctioned a project with an outlay of Rs.300 Crores for Macro and Micro drainage improvements to alleviate flood problems in Chennai Metropolitan Area which was implemented by PWD, Chennai Corporation and Tamilnadu Slum Clearance Board.

### **Chennai City River Conservation Project (CCRCP), 2000**

12.16 In order to improve the conditions of waterways in Chennai a comprehensive package of projects with an estimated outlay of Rs.1700 Crores was prepared. The projects proposed included sludge removal and disposal from waterways, relocation of slums and encroachments, structural works and strengthening of waterway banks, improvement of macro drainage network in the catchments, improvements of micro drainage network in the City, improving the water quality of rivers and waterway, strengthening urban drainage network in the City, construction of sewage flow interceptors and treatment facilities. It was posed to Government of India for funding under National River Conservation Programme (NRCP). Out of the proposed package of projects the Government of India had approved in 2000 the schemes for interception, diversion and treatment in Chennai City at a cost about Rs.491.52 Crores under NRCP and it was taken up for implementation by CMWSSB. In addition, the remaining works to the cost of Rs.228.63 Crores was also taken up by CMWSSB to improve environment.

### **Ground Water:**

12.17 Chennai is underlain by various geological formations from ancient Archaeans to recent Alluviums. It can be grouped into three viz. (i) Archaean Crystalline Metamorphic rocks (ii) Upper Gondwanas comprised of sandstones, siltstones and shales, tertiary (Eocene to Pliocene) sandstones and (iii) coastal and river Alluvium.

12.18 Central Ground Water Board has taken up the task of long term monitoring of ground water levels and quality. The State PWD and CMWSSB are also monitoring the ground water level fluctuations.

12.19 The agencies have observed that the chemical quality of ground water in Chennai City is generally brackish and not suitable for drinking purposes. In general it is alkaline with pH value from 7.8 to 9.0 and many pockets have high chloride and sulphate; very few selected pockets have potable quality at Besant Nagar, Greenways Road, Nungambakkam, Kilpauk etc. and also good fresh water aquifer is found in the stretch between Thiruvanmiyur and Uthandi along the coast. In areas like K.K. Nagar, Ashok Nagar, Sastri Nagar, Mylapore, Anna Nagar etc. excess iron has been found resulting in reddish colour of water, chocking pipes with yellowish - brown precipitate and also disagreeable taste.

12.20 The quality changes due to seawater intrusion in the past are evident in Triplicane, Mandaveli and other areas along the coast. Mandatory provision of

rainwater structures within the City has improved the recharging potential for the ground water and also the water quality and ground water table in the recent past.

**Noise Pollution:**

12.21 Under the Air (Prevention & Control of Pollution) Act, 1981, noise is a pollutant. Noise is described as an unwanted sound that produces deleterious effect on health and affects the physical and psychological well-being of the people. In the recent times, public concern about noise pollution also increased.

12.22 Ambient air quality standards in respect of noise for different use zones notified by TNPCB under the Environment Act is given in the Table No 12.05.

<b>Table No.12.05 Ambient Noise Standards</b>			
Sl.No.	Zone	Limits in decibels	
		Day	Night
1	Industrial area	75	70
2	Commercial area	65	55
3	Residential area	55	45
4	Silence zone	50	40

*Source: TNPCB*

12.23 The noise level survey conducted by the TNPCB reveals that noise level exceeded the limits mostly in commercial areas, mainly due to vehicular movement.

12.24 During festive seasons in Chennai, the noise levels were noted high and particularly during Diwali it exceeded 120 dB (A).

**Natural features:**

12.25 Sea coast and beaches are a gift of nature to mankind. The coastal line of Bay of Bengal in the east throughout its length bound Chennai Metropolis. We are bound to maintain the aesthetic qualities and recreational utility of the same. Conservation of this gifted coastline may require application of precautionary principles and also the principles of sustainable development and inter-generational equity. The precautionary principle requires the government agencies to plan and prevent the environmental degradations particularly by non-conforming developments in this area. Prudent use of the natural resources sustaining economic growth and preserving the cultural and national heritage inherited from the previous generation for the next generation is also required to be done.

12.26 Earlier, the developments in the coastal stretches were regulated under the building rules of the local bodies concerned and the development control rules of planning authorities. The first Central Government initiative came when the then Prime Minister Tmt. Indira Gandhi wrote to the state Chief Ministers as follows:

" I have received a number of reports about the degradation and mis-utilisation of beaches in our coastal states by building and other activity. This is worrying as the beaches have aesthetic and environmental value as well as other uses. They have to be kept clear of all activities at least upto 500 metres from the water at the maximum high tide. If the area is vulnerable to erosion, suitable trees and plants have to be planted on the beach sands without marring their beauty.

Beaches must be kept free from all kinds of artificial development. Pollution from industrial and town wastes must be also avoided totally.

Please give thought to this matter and insure that our lively coastline and its beaches remain unsullied."

12.27 The Government of India in their notification dt.19.11.1991 under the Environment (Protection) Act, 1986 declared the costal stretches of seas, bays, estuaries, creeks, rivers and back-waters which are influenced by tidal action (in the landward side) upto 500 m. from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and HTL, as Coastal Regulation Zone; and imposed restrictions (stated therein) on setting up and expansion of industries, operations or process etc. in the said CRZ. It was also stated that the distance from the HTL shall apply both side in the case of rivers, creeks and backwaters and may be notified on a case by case basis for reasons to be recorded while preparing the CRZ management plans and however, this distance shall not be less than 100 m. or the width of the creek, river or backwater whichever is less.

12.28 In CMA, developments in the coastal stretches are regulated as per the CRZ management plan approved by the Government of India on 27.9.1996 and the CRZ regulations notified by the Government of India under the Environment (Protection)) Act.1986.

**Rivers:**

12.29 Rivers which traverse through the CMA, are Adyar, Cooum and Kosasthalaiyar and these rivers are monsoon-fed; as stated (in earlier parts of this chapter), in the

remaining period it accommodates only the wastewater flows from the STPs and urban areas. Pollution levels in these waterbodies needs to be monitored and needs to be reduced to the level that it could be used for recreational purposes, in the longer term. Measures need to be taken include, eviction & rehabilitation of encroachments, strengthening of banks and other structured measures for flood alleviation, desilting, introducing green cover on its banks, etc.

12.30 Chennai Metropolitan Area is also dotted with a large number of lakes; some of them encroached. They mainly act as flood accommodators during monsoon. These also require desilting, improvements and conservation.

12.31 A detailed study on conservation and exploring the feasibility of developing the waterbodies (including rivers, estuaries, creeks, swamps, lakes & large ponds) as recreational areas may be done, planned and implemented.

**Green Areas:**

12.32 Chennai City has only about 2% of the area as declared parks. In Chennai Metropolitan Area, the declared forest cover is about 24 sq.km, which is about 2 percent of the CMA area. However, satellite imageries show that green cover over the City due to trees along roadside and within the sites is of considerable extent. There is ample scope for further development of this green cover within the City and also in the rest of CMA, particularly along roads drains, riverbanks etc. Increase in green cover in urban habitats becomes necessity not only to alleviate the problems of pollution, but also to ensure ecological stability.