URBAN ISSUES IN INDIA

Unit 24: Environment and Infrastructure

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Learning Objectives

After reading this unit you will be able to

- describe the process of urbanization and urban environment in India
- discuss the impact of urbanization on environmental quality
- explain the environmental infrastructure
- describe the policy perspectives on urban environment management; and finally
- describe the process of urban governance and highlight the nature of urban environment

SECTION I

Introduction: Urbanisation and Urban Environment in India

India is the second largest population giant in the world with current population of 1.03 billion (Census of India 2001). Of this, about 285 million people or 27.8 percent of the total population reside in the urban areas of the country. India in 2001 had 10.02 percent of the world's urban population and 21.10 percent of Asia's urban population. Infact, India's urban population is larger than the total population of small countries like France and Germany and larger than the total population of the big countries like Brazil and USA. Again it is larger than the total population of parts of continents like Eastern Africa, Western Asia and Western Europe; and larger than the total population of the whole continent of Australia.

The level of urbanization in terms of the proportion of urban population to total population is low in India, but the urban population in absolute terms is very high. Moreover, most of the urban population is concentrated in the Class I cities accounting for 65 percent of the total urban population and these cities are expanding at a faster rate than average population growth. A more disaggregated level of analysis revels that the million plus cities or the metropolitan cities of India are growing very rapidly and their numbers have constantly increased from 12 in 1981 to 23 in 1991 and 35 in 2001. The total population of these metros accounts for nearly one-third of the total population and 10.5 percent of India's total population in 2001. Again, over 50 percent of the population of these metros live in the five giant conglomerates; Mumbai (16.3 million), Kolkata (13.2 million), Delhi (12.7 million), Chennai (6.4 million), and Bangalore (5.7 million). The population in these cities grew by 52 percent higher than the growth of urban population in India, but compared to the last decade, the pace of

metropotalisation has slowed down; and the 12 new cities grew at a faster rate than the existing cities, Surat recording the highest growth of 85 percent.

Rapid urbanisation marked by population explosion in the Indian cities can be largely attributed to the large scale rural to urban migration. Due to the uncontrolled urbanization in India, the **quality of life is under threat** particularly in the big cities. **Environmental degradation** has been occurring very rapidly and causing excessive air and water pollution, water shortage in water scarce regions, problems of disposal of solid and hazardous wastes, noise pollution, housing shortage and mushrooming of slums in most of the metropolises of India.

Today the social environment of the cities is also under threat. On account of peculiar problems like unchecked migration, illegal settlements, diverse socio-cultural disparities, uneven distribution of incomes, the phenomenon of **urban poverty** etc, the metropolitan cities are facing **increased criminal activities**. Organized groups, gangsters, professional criminals and even youth and juveniles find crime as a short cut for a lavish life in these cities. Moreover unabated population increase has also led to a **pressure on the existing physical and social infrastructure** of the cities like power supply, supply of potable water, urban transport, educational and health institutions.

Today, urbanization in India is characterized by unplanned and uncontrolled growth leading to urban sprawl. Landuse planning and the pattern of development, relationship between residential areas and industrial areas, commercial and office complexes have a considerable impact on the environment. Most of all, appropriate infrastructure provision has not kept pace with economic growth. Consequently, the **environment** of urban areas, particularly of larger cities, has been **deteriorating rapidly**. **Urban Local Bodies** (ULBs) in India are faced with a plethora of issues that directly impact their capacities to manage municipal service delivery while simultaneously addressing environmental concerns. These include:

- Multiplicity of organisations;
- Inadequate resource mobilization;
- Lack of capability to adopt proper corporate planning;
- Lack of information and information systems; and inadequate monitoring of policy implementation.

Where the municipalities are struggling to provide the basic amenities, to citizens, issues of environmental pollution of hazard management are not accorded priority till matters reach the proportions of a crisis.

SECTION II

1. Impact of Urbanisation on Environmental Quality

Due to increased human activities in the urban centers arising out of industrialisation and commercialization, there is a copious usage of water, energy and other raw materials, transforming them into goods and services and returning the wastes into the environment in the form of emissions and not usable solid wastes. Therefore the cities are becoming the major contributors to local, regional and global environmental problems.

The extent of resource use by a city can be captured by its ***"ecological footprint"***. The term coined by the Canadian environmentalist **William Rees**, is concerned with defining the amount of land that is required to supply a city with food and natural resources as well as the area of growing vegetation required to absorb its carbon dioxide output (Rees, 1992). Rees described this as the ***"carrying capacity"*** of local and distant ecosystems – an approach that was later adopted by **Herbert Girardet** who was influential in drawing up the British proposals for **Habitat II** (Istanbul, Turkey, 1996).

He argued that while cities occupy only 2 percent of the world's land surface, they consume as much as 75 percent of the world's resources. In presenting his argument Girardet used London as an example to show how its "footprint" extends over more than 125 times the city's actual area. One should, however, compare the ecological footprint of cities with that of alternatives. Possibly, it is not urbanisation per se that stresses the environment, but the **level of living** and affluence, and if combined with stupendous population growth, then the impact could be disastrous.

It has been observed that the large cities of poorer countries are growing at a much faster rate than similar cities in the developed world, and India forms no exception to it. Such a heavy and uncontrolled growth places a heavy burden on the environment and infrastructure. Resource shortages are intensified by ever increasing demands for services that need to be supplied at a rate, which often exceeds the country's economic growth. The current status of environment and infrastructure of the Indian cities raises certain questions in our minds.

- How rapidly are we urbanising?
- What is the impact of rapid urbanization on environment, infrastructure and society at large?
- What should we do to make our urban system sustainable?

In order to address the first question, we should look into the picture of urbanization in India

Pattern and Trend of Urbanisation in India: 1991-2001

The pattern and trend of urban population and the number of towns in India during 1901 to 2001 (Table 1.), shows that the total urban population has increased more than ten times from 26 million in 1901 to 285 million in 2001; whereas total population has increased less than five times from 238 million to 1027 million during the same period. A continuous increase has been noticed in the percentage of urban population from 11 percent in 1901 to 17 percent in 1951 to further 28 percent in 2001. In the same fashion, the number of towns has also increased from 1916 in 1901 to 2422 in 1951 and then to 5161 in 2001. This reveals the process of rapid urbanization in India.

Table 1. Pattern and Trend of Urbanisation in India

Census Years	Number of Towns	Urban Population (millions)	Percent Urban	Annual Exponential Growth Rate	Rate of Urbanisaton
1901	1916	25.9	10.8	--	--
1911	1908	25.9	10.3	0.0	-0.46
1921	2048	28.1	11.2	0.8	0.87
1931	2220	33.5	12.0	1.7	0.71
1941	2422	44.2	13.8	2.8	1.50
1951	3060	62.4	17.3	3.5	2.54
1961	2700	78.9	18.0	2.3	0.40
1971	3126	109.1	19.9	3.2	1.06
1981	4029	159.5	23.3	3.8	1.72
1991	4689	217.6	25.7	3.1	1.02
2001	5161	284.5	27.8	2.7	0.82

Source: Census of India, 1991, 2001

Growth in the Number of Million Plus Cities in India: 1991-2001

Table 2 shows that the growth in the number and population of the million plus cities in India during 1991 to 2001. There was only one million plus city (Kolkata), in 1901 in India that had increased to 35 in 2001. The total population had also increased in the million plus cities from 1.51 million in 1901 to 107.88 million in 2001; showing almost a fifty fold increase. The percentage decadal growth rate in the total population of million plus cities was noticed to be the highest (121 percent) during 1941 to 1951, which may be attributable to partition of the country. The percentage of total population living in the million plus cities had also shown a considerable increase over the years.

Population Growth Rate in the Four Leading Metropolises in India

More than thirty fold increase has been noticed in the population of Delhi in 100 years, from 0.41 million in 1901 to 12.8 million in 2001, whereas, there has been twenty fold increase in Mumbai's population, from 0.8 million to 16.4 million from 1901 to 2001. However, Chennai has experienced more than ten fold increase (0.59 million to 6.4 million) in its total population during the last 100 years, whereas, Kolkata has experienced the lowest increase (less than nine fold) in its total population among the metropolitan cities in the last ten decades.

The maximum growth rate has been noticed during 1941 to 1951, highest in Delhi (90 percent), followed by Mumbai (76 percent), and Chennai (66 percent). However, Kolkata has recorded a comparative lower growth rate (29 percent) during the same period. This was the era of partition in India, when a huge influx of migration has taken place in big cities. After independence, Delhi experienced the highest decadal growth rate (close to 50 percent), in its total population in all the Censuses (1951to 2001), followed by Mumbai where the growth rate was about 40 percent during those Census years. On the other hand Kolkata experienced continuous declining decadal growth rate from 1951 to 2001. Chennai has experienced a mixed pattern of high and low decadal growth rate during last 50 years.

Table 2. Population Growth of Million Plus Cities: 1901-2001

Census Years	Number of million Plus Cities	Population in Millon	Percent Increase	Population of Million Cities as Percent of India's	
				Total population in Million	Urban Population in Million
1901	1	1.51	--	0.6	5.8
1911	2	2.76	82.8	1.1	10.7
1921	2	3.13	13.4	1.3	11.1
1931	2	3.41	8.95	1.2	10.2
1941	2	5.31	5.71	1.7	12.0
1951	5	11.75	21.3	3.3	18.8
1961	7	18.10	54.0	4.1	22.9
1971	9	27.83	53.8	5.1	25.5
1981	12	42.12	51.3	5.2	26.4
1991	23	70.67	67.8	8.4	32.5
2001	35	107.88	52.8	10.5	37.8

Source: Computed from Censuses of India

Initially, Kolkata was the most populous city of India till 1981, but Mumbai surpassed it in 1991 Census. Again, Delhi is expected to cross the population of Kolkata in the next

Census of 2011, if both cities will experience same pattern of growth rate. Thus, it is evident in Table Number 3, that Mumbai and Delhi metropolis are experiencing profuse growth in their population.

Thus the sharp increase in population in urban India, particularly in the metropolitan cities is particularly due to the scope for commercial activities, and significant job opportunities. Facilities such as health, education, infrastructure, for example roadways, telecommunications, airports, railways and ports are also better in metropolitan regions.

Thus the major changes that have occurred in India's urban scene in the post independence period are:

Table 3. Growth of the Leading Metropolitan Cities of India: 1901-2001

Census Years	Mumbai	Growth Rate	Kolkata	Growth Rate	Delhi	Growth Rate	Chennai	Growth Rate	India	Growth Rate
1901	81.3	--	151.0	--	40.6	--	59.4	--	2384	--
1911	101.8	25.2	174.5	15.6	41.4	2.0	60.4	1.7	2521	5.7
1921	124.5	22.3	188.5	8.0	48.8	17.9	62.8	4.0	2513	-0.3
1931	126.8	1.8	213.9	13.5	63.6	30.3	77.5	23.4	2786	11.0
1941	168.6	33.0	362.1	69.3	91.8	44.3	92.1	18.8	3187	14.2
1951	296.7	76.0	467.0	29.0	174.4	90.0	153.1	66.2	3611	13.3
1961	415.2	39.9	598.4	28.1	265.9	52.5	192.4	25.7	4392	21.6
1971	597.1	43.8	742.0	24.0	406.6	52.9	305.8	58.9	5482	24.8
1981	891.7	49.3	919.4	23.9	622.0	53.0	428.9	40.3	6833	24.7
1991	1259.6	41.3	1102.2	19.9	942.1	51.5	542.2	26.4	8463	23.8
2001	1636.8	29.9	1321.7	19.9	1297.1	37.7	642.5	18.5	10270	21.4

Source: Computed from Census of India

- Influx of refugees and their settlements, particularly in the urban areas of Northern India;
- Building of new administrative cities, such as Chandigarh, Bhubaneshwar and Gandhinagar;
- Construction of new industrial cities and townships near major cities;
- Rapid growth of metros;
- Stagnation and in some cases, decline of small towns;
- Massive increase in squatters and proliferation of slums in metro-cities and the dramatic changes in the urban-rural fringes
- Deteriorating urban environment – both physical and social; and finally

- Tremendous pressure on urban infrastructure.

Infact, the positive role of urbanization in India, has been often overshadowed by the deterioration in the environment and quality of life in the cities, often caused by the widening gap between demand and supply of services and infrastructure.

1.1 Physical Environment

A) Air Quality

India's urban areas represent complex problems regarding the physical environment. In particular, the quality of the ambient air in these areas have been deteriorating rapidly over the past few decades, due to vehicular, thermal and industrial and domestic emissions. Motor vehicles, which are the main source of vehicular pollution, have been constantly increasing in number particularly since the 1990s (Table 4). Within 10 years from 1990 to 2000 there has been almost a three-fold increase in the number of motor vehicles in India. On an average a 10 percent increase has been found in each year, which is a serious matter regarding air pollution.

Specific case studies reveal that the number of vehicles in Delhi has increased from 1813 thousand in 1991 to 2630 thousand in 1996, a one and half times increase in 6 years followed by Chennai. This is because a lack of sub-urban trains in Delhi, that also has a huge number of commuting population. On the other hand, increase in the number of vehicles was quite less in Mumbai and Kolkata compared to Delhi and Chennai.

Table 4. Growth in the Number of Motor Vehicles in India, 1999-2000

Years	Number of Vehicles (in thousands)	Percent Increase
1990	19152	--
1991	21374	11.6
1992	23507	10.0
1993	25505	8.5
1994	27660	8.4
1995	30287	9.5
1996	33850	11.8
1997	37231	10.0
1998	43159	15.9
1999	48240	11.8
2000	53100	10.1

Source: Centre for Pollution Control Board, Ministry of Environment and forests, Government of India, New Delhi, 2000

Moreover, over congestion tends to **degrade roads, decrease fuel efficiency**, and exacerbates certain types of **air pollution**. In the industrial areas, fossil fuels, particularly coal, is one of the major sources of energy and contribute to air pollution in the form of **Suspended Particulates**. While large industries are willing to control and monitoring air pollution but small industries lack information, technical expertise to check pollution. Trend analysis predicts a considerable rise in pollutant emissions from **thermal power** as well as **industrial sources** over the next two decades. The urban households generally use LPG while the households of lower income use coal, kerosene and bio-mass fuels, which are highly polluting and due to poor ventilation it deteriorates **indoor air quality** and health.

Table 5. Growth of Vehicles in Metropolitan Cities: 1991-1996 as on 31st March (in 000s)

Metropolitan Cities	1991	1992	1993	1994	1995	1996
Mumbai	629	647	546	608	667	724
Kolkata	475	497	517	545	561	588
Delhi	1813	1963	2097	2239	2432	2630
Chennai	544	604	641	689	768	812

Source: transport Research Wing, Motor Transport Statistics of India, 1997, M/o Surface Transport, GOI, New Delhi.

Vehicular Pollution – Among all the vehicular emission loads, the amount of carbon monoxide (CO) was found highest, followed by Hydro Carbon and Nitrogen Oxide in all the three metropolitan cities of Delhi, Kolkata and Chennai. The total amount of all type of vehicular emission load was found highest in the atmosphere of Delhi (1046 tonnes per day), followed by Mumbai (660 tonnes per day), and Kolkata (294 tonnes per day). Carbon Monoxide contributed to more than 65 percent in all the three metro cities, which is 651 tonnes per day in Delhi, followed by Mumbai (497 tonnes per day) and Kolkata (188 tonnes per day). The amount of Suspended Particulate Matter (SPM) in the air is highest in Delhi (10.3 tonnes per day), followed by Mumbai (5.6 tonnes per day), and Kolkata (3.3 tonnes per day). Since the number of registered vehicles in Delhi is the highest, the vehicular emission load also substantiates it, as all the elements were found highest in Delhi. The components of the vehicular emission load affect the health of the people and deteriorate the quality of life of the residents of metro cities.

State of Ambient Air Quality and Air Pollution in Urban Areas – The most common air pollutants in the urban areas of India are Sulphur Dioxide (SO_2), Nitrogen Dioxides (NO_2) and Suspended Particulate Matter (SPM), (Table 7). In general it has been observed that though the presence of certain pollutants like SPM has been declining in most of the cities of India, but there exists wide differences across different cities.

Table 6. Estimated Vehicular Emission Load in 1994 (tonnes per day)

Emission Load	Delhi	Mumbai	Kolkata
Particulates	10.30	5.59	3.25
Sulphur Dioxide (SO_2)	8.96	4.03	3.65
Nitrogen Oxide (NO_x)	126.46	70.82	54.69
Hydro Carbons (HC)	249.57	108.20	43.88
Carbon Monoxide (CO)	651.01	496.60	188.24
TOTAL	**1046.30**	**659.57**	**293.71**

Source: Centre for Science and Environment 1996

In fact, Delhi shows an increasing trend, from 390 mg/cu.m (milligram / cubic metre), to 410 mg/cu.m from 1991 to 1995. Again the concentration of SO_2 has decreased in Mumbai but it had registered a decline in Kolkata.

Table 7: Ambient Air Quality if Four Metropolises of India: 1991-1995

Metropolitan Cities	Pollutants (mg/cu.m)	1991	1992	1993	1994	1995
Mumbai	SO_2	28	18	22	33	31
	NO_2	29	33	35	34	26
	SPM	244	238	232	231	209
Kolkata	SO_2	63	36	40	48	35
	NO_2	40	27	40	34	29
	SPM	391	307	460	375	354
Delhi	SO_2	20	18	19	25	23
	NO_2	34	30	30	43	47
	SPM	390	364	424	446	410
Chennai	SO_2	14	7	14	16	21
	NO_2	1	3	0	0	0
	SPM	130	74	100	128	127

Source: Anon 1997, Ambient Air Quality Status and Statistics, 1995, NAAQMS/8 1996, Central Pollution Control Board, Delhi.

B) Water Quality:

Pollution, Collection and Treatment – Like air pollution, water pollution is also one of the major problems in the urban areas of India, resulting out of increased human activities and interference with the natural ecosystems. The major water resources of India including both surface and underground resources are not only **diminishing**, but are increasingly getting **polluted** due to human interventions. Wasteful consumption and neglect of conservation of water resources have resulted in the present situation. With rapid urbanisation and industralisation, huge quantities of waste water enter river. At the same time, the available per capita water resources have declined due to falling groundwater tables associated with indiscriminate use of water. About 84.9 percent of the

urban population of India had access to clean drinking water in 1993, as compared to 69 percent in 1985.

In urban areas, water, to a large extent is treated by municipal authorities before supplying to residential areas. However, most Indian rivers today fall short of **Central Pollution Control Board** standards due to excessive pollution by untreated sewage, and domestic and industrial wastes. Increase in urban population and **changing lifestyles** have also **increased the domestic need** for water. Intense competition among users – industry and domestic sectors – is driving the ground water table lower.

Table 8. Changing Pattern of Water Quality (1990-2000)

Cities	Water Quality	pH	DO	BOD	COD	Total Coliform
1. Kolkata	Moderately good	Moderate	Moderate	Moderate	High	High
2. Delhi	Deteriorated	High	Decreased form 9.1 to 5.5mg/l	High	High	High
3. Hyderabad	Worsened	Worsened	N.A.	Worsened	Worsened	N.A.
4. Ahmedabad	Deteriorated	N.A.	N.A.	Decreased	Decreased	N.A
5. Pune	Moderately good	N.A.	Decreased	High	High	N.A.
6. Kanpur	Improved	N.A.	N.A.	N.A.	N.A.	N.A.
7 Lucknow	Good	N.A.	N.A.	N.A.	N.A.	N.A.
8. Patna	No Variation	Permissible	Permissible	Permissible	Permissible	High
9. Ludhiana	Good	Improved	Poor	Improvrd	Improvrd	Improved
10. Agra	Deteriorated	High	High	High	High	permissible
11. Nasik	Good	Permissible	Permissible	High	Permissible	Permissible
12. Jamshedpur	Moderately good	N.A.	N.A.	N.A.	N.A.	N.A.
13. Asansol	Deteriorated	Permissible	Permissible	Permissible	High	High
14. Allahabad	Good	N.A.	N.A.	N.A.	N.A.	N.A.
15. Amritsar	Good	Permissible	Permissible	Permissible	Permissible	Permissible
16. Vijaywada	Very Good	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Central Pollution Control Board, 1999 -2000

The quality of ground water is getting severely affected because of the widespread pollution of surface water. Besides, discharge of untreated waste water through bores and leaching from unscientific disposal of solid wastes also contaminates ground water, thereby **reducing the freshwater resources**.

Four physio-chemical and one biological parameter taken into consideration, i.e. pH (acidity-alkalinity), DO (Dissolved Oxygen), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), and TC (Total Coliform) to analyse the surface water quality of 16 major Indian cities, showing the change that has taken place is given in Table 8. Other water pollutants include Water Temperature and Ammonia. The deteriorating ground water quality due to pollution from pesticide leaching and toxic metal leaching from the industrial effluents **have serious health effects** on population.

The volume of domestic waste water generation is highest in the metropolitan city of Mumbai, which is 2228.1 ml/d (million litres/day), followed by Kolkata (1383ml/d), and Delhi (1270ml/d) and the lowest is in Chennai only 276 ml/d. The generation of industrial waste water is also highest in Mumbai. Again, looking at the percentage of waste water collection from the four leading metropolitan cities, Chennai and Mumbai performs better than Delhi and Kolkata. Regarding the treatment of the collected waste water in all the metro cities, the water is disposed only after primary and secondary treatment. Again, the collected wastewater in Mumbai is mainly disposed in the Arabian Sea, and in Kolkata some amount is disposed in the Hugli river and the rest is used in fish farms. However, in Delhi and Chennai, the wastewater is mainly used for agricultural works and the remaining water is disposed in the Yamuna River in Delhi and in the Bay of Bengal in Chennai.

Table 9. Waste Water Management in Metropolitan Cities of India 1997.

Metropolitan Cities	Volume of Waste Water Generated (mld)			Waste Water Collected		Capacity (mld)	Treatment		Mode of Disposal
	Domestic	Industrial	Total	Volume (mld)	Percent		Primary	Secondary	
Mumbai	2228.1	227.9	2456.0	2210.0	90.0	109.0	Yes	Yes	Sea
Kolkata	1383.8	48.4	1432.0	1074.9	75.1	--	--	--	Hugli River Fish Farms
Delhi	1270.0	--	1270.0	1016.0	80.0	981.0	Yes	Yes	Agri-culture Yamuna River
Chennai	276.0	--	276.0	257.0	93.1	257.0	Yes	Yes	Agri-culture Sea

Source Control of Urban Pollution Series: Cups/42/1997-98, CPCB, 1997.

C) Solid Waste Generation

The problem of municipal solid waste management has acquired alarming dimensions in our country especially over the last decade. Previously, waste management was hardly considered as an issue of concern as the waste could be easily disposed off in an environmentally safe manner. However, with time, due to changing lifestyles of people coupled with rapid urbanisation, and industrialisation the waste has not only increased but have become difficult to be managed.

Urban growth, a concomitant of inadequate infrastructural support, is turning India's major cities into waste dumps. The daily per capita generation of MSW (Municipal Solid Waste) in India ranges from about 100g in small towns to 500g in large cities. An estimated 48 million tonnes of Municipal Solid Waste was produced in 1997, e.g. the population of Mumbai increased form around 12.3 m in 1991 to 16.3 m in 2001, a growth of about 32.5 percent while the Municipal waste generation however grew from 3200 tonnes per day to 5355 tonnes per day in the same period, a growth of about 67 percent. This clearly indicates that the growth in Municipal waste generation in the urban centers has outpaced the growth in population in recent years. The reasons for this trend could be the changing life styles, food habits and changes in the standard of living. The per capita waste generation rate has increased from 375g per day to 490 per day during 1971-1997. This increase along with the population increase has tremendously swollen up the figures total waste generation quantum adding to the problems of local governments responsible for managing it. Analysing the data of MSWgenerated in 35 metro cities between 1994-1995 and from 1999-2000, there has been a 25 percent increase in this time period and Delhi topping the chart with 50 percent increase.

Table 10: Composition of Solid Wastes in Major Cities: 1997 (in Percent)

Cities	Non-Biodegradable					Degradable
	Paper	Plastic	Metal	Glass	Ash & earth	
Mumbai	10.00	2.00	3.60	0.20	44.20	40.00
Kolkata	3.18	0.65	0.66	0.38	34.00	47.00
Delhi	6.29	0.85	1.21	0.57	36.00	35.00
Bangalore	4.00	2.00	1.50	1.00	13.50	78.00
Nagpur	1.88	1.35	1.33	1.34	41.42	34.81

India Development Report: 1997

The annual solid waste generated in Indian cities has increased from 6 million tones in 1947 to 48 million tones in 1997 and is expected to increase to 300 million tones per annum by 2047 (CPCB, 2000).

Urban municipal waste is a mix of paper, plastic, metal, glass, and organic matter. Specially worrying is the increase in non-biodegradable plastic waste: discarded plastic bags choke drains, prevent smoother grass growth and exacerbate the damage-potential by preventing the bio-degradation of waste packed in them. The organic matter has remained almost static at 41 percent in the past three decades; but the recyclables have increased from 9.56 to 17.18 percent. Amongst various recyclables, plastics have had a quantum jump from 0.69 to 3.9 percent; more than a five-fold increase within last 20 years. Disposal is the last stage of the waste management cycle. Pace of industrialisation has resulted in increasing amounts of hazardous wastes every year. In total, at present, around 7.2 million tonnes of hazardous waste is generated in the country of which 1.4 million tonnes is recyclable, 0.1 million tonnes is incinerable and 5.2 m tonnes is destined for disposal of land. (Ministry of Environment and Forests, 2001).

The situation here is also grim in collection and transportation of solid wastes. At present most of the MSW in the country is disposed of **unscientifically**. This has adverse impacts not only on the eco-system but also on the human environment. About 90 percent municipal waste is collected by the civic authorities is dumped in low lying areas outside the city limits which no provision of leaching. Treatment and landfill gas collection and use are not practiced. Heavy metals find their way to the underground water, rendering it unfit for drinking. The landfill gases too escape into the atmosphere adding to the green house emissions and resulting in the loss of utilising the same alternatively, as thermal fuel or for electricity production. The changes in the average waste collection efficiency of the total generation in Indian cities is around 72 percent and 70 percent of Indian cities do not have adequate waste transportation facilities.

In Indian cities, MSW generally remains unmanaged due to various factors—viz. inadequate finances, low political priority, inadequately trained personnel, and the lack of proper disposal sites. As a result, residents are prone to diseases like hepatitis, malaria, dengue fever, elephantiasis, cholera, etc. For the waste that is managed, landfilling is the most commonly utilised method of disposal. However, since this primarily translates to open piles of decaying trash, rather than controlled underground burial, such unscientific

dumping of wastes, poses, a great danger to water resources in the neighbouring areas. The problem is further complicated by the frequent presence of other kinds of wastes, specifically, infectious hospital wastes, slaughter house refuse, and various toxic organic and inorganic materials. All these contaminants find their way into local water bodies and subsequently lead to water pollution.

D) Noise Levels

Unlike air, water, land /soil pollution, noise as a source of pollution has got attention only recently in India. The main factors contributing to noise pollution are vehicular traffic, industrial activities, various electrical appliances, and sources of entertainment such as musical systems, TVs, public addressal systems etc. It is mostly the people living in metropolitan cities, or other big towns or those working in factories who are victims of noise pollution.

Table 11: Noise Level in Few Cities of India: 1998

Cities	Day/Night	Industrial Area	Commercial Area	Residential Area	Silence Zone
Kolkata	Day	78	82	79	79
	Night	67	75	65	65
Mumbai	Day	76	75	70	66
	Night	65	66	62	52
Chennai	Day	71	78	66	63
	Night	66	71	48	49
Bangalore	Day	78	76	67	67
	Night	53	57	50	n.a

Source: Ministry of Environment and Forest (2001)

The menace of noise pollution is prevalent in all the major cities of India. Except for noise pollution, during night time, in industrial zone as most of the industries are closed down during this time, the level of noise far exceeds the standard level in all the other zones of the city and the nuisance is more during the day time and is often at a critical level in residential and silence zones. A study has revealed that noise level in residential, commercial and industrial areas and the silence zones in major cities far exceed the standards prescribed by CPCB. The average noise level is in excess of the recommended level of 55dB. Increase in vehicular traffic, industrialisation and overcrowding of cities is generally attributed for the increase in noise levels.

The Environment Protection Act (1986) made a passing reference to noise pollution. Although a notification was further issued in 1989, on Ambient Quality Standards vive versa Noise, but it hardly made any impact on controlling noise pollution.

Fourteen years later, in February 2000, **Ministry of Environment and Forests** formulated the **Noise Pollution (Regulation and Control) Rules**. The salient features of these rules are that the State Governments being the implementation authority, should initiate the process of controlling noise pollution by classifying the areas into residential, commercial, industrial and silence zones. The rules further provide that the governments should ensure that the noise levels do not exceed the permissible limits.

1.2 Social Environment

A) Urbanisation and Slums –

The Government of India Slum **Area (Improvement and Clearance) Act of 1954** defines a slum as "any predominantly residential area, in which light or sanitary facilities or any combination of these factors are detrimental to the safety, health or morals". According to NSS (National Sample Survey), "a slum is a compact settlement with a collection of poorly built tenements, mostly of temporary nature, crowded together, in unhygienic conditions, usually with inadequate sanitary and drinking water facilities. Such an area is considered as a **Non-Notified Slum** if at least 20 households live in that area. **Notified Slums** are those areas notified as Slums by **Urban Local Bodies** (ULBs) or **development authorities**. The vast majority of the city ward migrants belongs to the working class and finds it difficult to secure accommodation within their means. Therefore they squat on every open space available, nearby their work places and construct huts with cheap temporary building materials. In this way, slums grow in number and population. Total and slum population in India according to size/class of towns during 1991 showed that 41 percent of the total slum population was residing in million plus cities where 27 percent of the total population of India resided. However, cities with population between 0.5 – 1 million have only 9 percent of total slum population, where 20 percent of the total population was residing. Further, cities with population between 0.3 to 0.5 million had only 6 percent of total slum population ; where 19 percent of total population was residing. This shows that cities with population between 0.5 to 1 million and city with population between 0.3 to 0.5 million have very less percentage of slum population whereas million plus cities have more percentage of slum population. It reveals that the opportunity in the medium cities is less than that offered by the million cities.

Table 12. Total Slum Population in India According to Size Class of Towns -1991

Size Class /Cities	Number of Cities/Towns	Total Population (in 00000)	Percent to Total Population	Slum Population (in 00000)	Percentage to total Slum Population
More than 1000000	23	710	26.6	189	41.3
500000-1000000	31	215	19.8	43	9.3
300000-499999	39	151	18.9	29	6.3
100000-299999	207	325	16.8	54	11.9
50000-99999	345	236	20.0	47	10.3
Less than 50000	3052	521	18.3	95	20.9
TOTAL	3697	2158	21.2	457	100.0

Source: A Compendium of Indian Slums, 1996, Town and Country Planning Organisation

Therefore, the unskilled population is more attracted towards the million cities and thus joins the slums for their residence. On the other hand, the towns with population less than 50,000 showed little more percentage of total slum population (21 percent) than their share of total population (18 percent). This shows that the poor housing quality in the small towns and also may be because the semi-pucca and kutcha houses may have been identified as slums.

Table 13. Percentage of Slum Population in the Four Metropolitan Cities of India: (1981-2001)

Metropolitan Cities	1981	1991	2001
Greater Mumbai (UA)	30.8	43.2	48.9
Kolkata (UA)	30.3	36.3	32.6
Delhi Municipal Corp. (UA)	18.0	22.5	18.9
Chennai (U.A.)	13.8	15.3	17.7

Source: Census of India 1981, 1991, 2001.

Slum population is a serious problem of the mega cities of India. A large population of Mumbai, Kolkata and Delhi live in slums, despite several Government housing policies. A continuous increase has been found in the percentage of slum population over the last three decades in the four metropolitan cities of India in which Mumbai was the highest. In 1981, 34 percent of the population of Mumbai were residing in slums, and in 2001, nearly half of Mumbai's population (49 percent) were living in slums. However, Kolkata, Delhi, and Chennai had not shown as severe conditions as Mumbai, but Chennai had shown an increase in the slum population over 1991.

Urban slums are marked by deplorable living environment and of often marked by a lack of civic amenities and facilities leading to environmental degradation and higher incidences of morbidity.

Table 14: Living Environment of Urban Households Living in Slums: 2002

State	% of Households Living in Slums		Mode of Water Access (%)						% With Under - ground Sewage		% Without any Drainage		% Without Latrines	
			NS			NNS								
	NS	NNS	% Tap	% Tube well	% other	% Tap	% Tube well	% Other	NS	NNS	NS	NNS	NS	NNS
J&K	59.6	40.4	100	0	0	98	2	0	0	0	100	100	61	76
Punj	75.6	24.4	43	57	0	0	100	0	34	0	0	95	48	95
Delh	20.5	79.5	100	0	0	71	29	0	0	3	31	24	31	52
Raj	2.2	97.8	100	0	0	27	0	73	0	0	67	98	33	98
UP	50.6	49.4	34	67	0	59	41	0	35	11	1	71	1	51
Bih	37.8	62.2	0	100	0	0	100	0	0	0	34	75	34	100
WB	52.1	47.9	89	11	0	72	18	10	63	23	0	39	0	30
Ori	14.2	85.8	100	0	0	57	44	0	0	0	0	90	100	100
Chat	46.9	53.1	31	69	0	71	25	4	0	0	0	25	69	100
MP	65.7	34.3	68	20	12	75	25	0	24	0	31	38	12	75
Guj	38.7	61.3	33	2	65	74	26	0	83	7	2	73	6	69
Mah	74.7	25.3	95	3	2	91	3	6	34	27	10	23	18	25
AP	85.1	14.9	87	2	11	46	55	0	12	0	21	66	10	68
Kar	65.6	34.4	89	11	0	77	16	7	23	24	36	24	66	53
TN	53.5	46.5	85	0	15	93	3	4	57	11	16	44	15	68
Pond	29.0	71.0	100	0	0	97	3	0	0	7	0	10	29	93
TOT	65.1	34.9	84	10	6	71	22	7	30	15	15	44	17	51

Note: NS- Notified Slum, NNS – Non Notified Slum
Source: NSSO (2003a)

B) Crime in cities

Indian Penal Code (IPC) Crimes in Cities

Due to the increasing disparities in the urban areas of India, particularly the million plus cities, urban crime has been on the rampant in most of the areas. The common types are theft of property, crime against women, crime against children, crime against the aged and cyber crimes.

A total of 297679 cognizable crimes under the IPC (Indian Penal Code) were reported from the 35 million plus cities in 2002, (National Crime Records Bureau, Ministry of Home Affairs, 2002), as compared to 289775 crimes during 2001, thereby reporting an increase of 2.7 percent compared to the national scenario on a marginal increase of 0.6 percent. The Indian metropolises witnessed an **increase of Murder** (5.9 percent), **attempt to commit murder** (6.2 percent), **dacoity** (37.1), **riots** (1.3) and **dowry deaths** (10.1). In addition, the metropolitan centers, had also contributed to 45.9 percent of the total **Auto thefts** cases in the country, 31.5 percent **cheating cases** and 28.6 percent of **counterfeiting** cases of the nation's total crime.

The cities of Delhi and Mumbai contributed 14.8 percent and 8.8 percent of the total crimes reported from the 35 million plus cities. Ludhiana of Punjab, reported the highest increase of 46.8 percent IPC crimes in 2002, followed by Vadodara of Gujarat (41.0), Vijayawada of Andhra Pradesh (34.9) and Faridabad of Haryana (31.5 percent).

Table 15: IPC Crime Rate – Metropolitan Cities Vs Parent State

Sl. No.	City	IPC Crime Rate	
		City	Parent State
1	Agra	425.2	85.5
2	Ahmedabad	320.4	206.0
3	Allahabad	175.0	85.5
4	Amritsar	106.5	116.2
5	Asansol	33.3	72.2
6	Bangalore	512.0	211.8
7	Bhopal	767.4	309.0
8	Chennai	132.7	265.2
9	Coimbatore	223.1	265.2
10	Delhi	345.2	341.6
11	Dhanbad	304.7	114.1
12	Faridabad	408.1	185.5
13	Hyderabad	260.4	186.7
14	Indore	712.9	309.0
15	Jabbalpur	603.0	309.0
16	Jaipur	505.9	260.2
17	Jamshedpur	218.2	114.1
18	Kanpur	219.6	75.7
19	Kochi	481.5	322.9
20	Kolkata	80.7	72.2
21	Lucknow	306.7	85.5
22	Ludhiana	376.0	116.2
23	Madurai	308.7	265.2
24	Meerut	200.0	85.5
25	Mumbai	160.5	167.4
26	Nagpur	410.8	167.4
27	Nasik	218.8	167.4
28	Patna	357.4	110.4
29	Pune	226.4	167.4
30	Rajkot	463.5	206.0
31	Surat	148.4	206.0
32	Vadodara	476.9	206.0
33	Varanasi	188.2	85.5
34	Vijaywada	898.4	186.7
35	Visakhapatnam	213.5	186.7
TOTAL		**275.9**	**169.5**

Source: Crime In India, 2002, national Crime records Bureau, Ministry of Home Affairs, GOI.

It has been observed that the IPC crime rate in cities was generally higher than the corresponding crime rate of the domain state. Only in case of Asansol, Amritsar, Chennai, Coimbatore, Mumbai and Surat, the crime rate was lower than the parent state.

Crimes under Special and Local Laws (SLL)

The 35 metropolitan cities reported 1625689 cases of SLL crimes in 2002 compared to 1763759 cases in the previous year. Contrary to the National level increase of 4.9 percent, cities reported a decrease of reported cases of 7.8 percent over 2001.

Despite this, the 35 million plus cities contributed significantly towards the nation's share for cases under **Copyright Act** (36.9 percent), **Indecent Representation of Women Prohibition Act** (22.4 percent), **Immoral Traffic** (P) Act (17.9 percent) and **Arms Act** (19.9 percent). **Ludhiana** reported the highest percentage of 78.2 percent, followed by Varanasi 72.3 percent. In addition, **Kolkata and Vijaywada** also reported much higher incidences of cases under SLL.

Cyber Crimes

In recent years Cyber Crimes have also increased in the Indian Cities. **The Information technology (IT) Act of 2000**, specifies, the criminal acts under the broad head of Cyber Crimes. Of the total 70 cases registered under IT Act 2000, around 47 percent cases pertain to obscene publication and transmission in electronic form. 38 persons were taken in custody for such offences during 2002. Other such cases include hacking, signature fraud, breach of confidentiality etc. The urban centers of Andhra Pradesh, Maharashtra, Karnataka, and Delhi reported the maximum number of these cases.

2. Environmental Infrastructure

The **escalating demand** for urban basic services and infrastructure in urban centers is resulting in a serious deterioration of service quality across housing, transport, healthcare, power and water, sanitation and education. Benign neglect of urban sprawls by civic authorities has led cities to be vulnerable to natural disasters and disease. The recent Mumbai floods of July 2005, has pointed out unmistakably that infrastructure of cities in India is crying for help.

In recent years the infrastructure required to meet the requirements of the urban dwellers call for huge investments.

2.1 Housing and Housing Amenities and Infrastructure

The urban housing characteristics for entire India and the four leading Metros of Mumbai, Kolkata Delhi and Chennai reveal the following facts. In Mumbai, 34 percent of the households lived in semi-pucca and 3 percent in Kutcha houses followed by 33 percent and 9 percent respectively in Chennai. However, in Delhi, 11 percent households resided in semi-pucca

and less than 1 percent in kutcha houses. It is a good sign for Kolkata that there were only 5 percent semi-pucca houses and almost negligible kutcha houses. This shows that in Mumbai and Chennai housing situation is poorer than Kolkata and Delhi.

On the other hand, the houses in these metros are very much **over crowded.** More than 3 persons residing in a single room, is the condition of 56 percent of the population of Mumbai followed by 43 percent population of Kolkata, 30 percent population of Chennai and I/4th of the population of Delhi. Further, 5 and more persons residing in a room, such miserable conditions was faced by 28 percent population of Mumbai, followed by 17 percent of the population of Kolkata and about 10 percent population of Delhi and Chennai both.

Looking at the sanitation condition of the metro-cities, it is apparent that almost universal flush toilet facility is available in Mumbai, followed by 90 percent in Kolkata and 89 percent in Delhi. However, the matter of fact is that more than half of this facility in Mumbai is available in public place and not within housing premises. Kolkata and Delhi might have the similar situation. Again, it is unfortunate to note that about 9 percent population of Kolkata Delhi uses pit toilet. Further, what is worse is that 9 percent of Chennai's population does not have toilet facility at all, followed by 6 percent in Delhi. This shows the inadequate planning of Municipal Corporations because of unprecedented population pressure.

As regard to the sources of safe drinking water, the situation is the best in Mumbai, where almost the entire population has access to piped drinking water. However, a substantial population is dependent on hand pump in Kolkata (35 percent), followed by Chennai (31 percent) and Delhi (13 percent). On the other hand, in Chennai 6 percent of the population is dependent on the sources other than hand pump and tapped/piped water.

Considering the methods of purification of drinking water, it is very strange that half of the urban population in India does not purify drinking water at all. In Kolkata 3/4th population do not purify drinking water followed by 62 percent of the population of Delhi. However, the situation is slightly better in Mumbai and Chennai, where 27 percent and 43 percent population respectively do not purify drinking water. But at the same time, majority of Mumbai's population purify drinking water by straining only. The situation reveals the danger of water-borne diseases. This may cause **serious health problems** especially to the slum dwellers and low-income groups, and that too mostly among the children and infants.

Table 16: Housing Characteristics of Four Leading Metropolitan Cities and Urban India: 1988-99 *(in percentage)*

Household Characteristics	Mumbai	Kolkata	Delhi	Chennai	All India Urban
Type of House					
Pucca	62.8	94.1	88.2	57.5	66.0
Semi-Pucca	34.1	5.2	10.7	32.8	24.4
Kutcha	2.8	0.2	0.9	9.2	9.4
Sanitation Facilities					
Flush Toilet	97.4	89.5	85.5	89.1	63.9
Owned Flush Toilet	29.4	--	--	--	--
Shared Flush Toilet	15.2	--	--	--	--
Public Flush Toilet	52.8	--	--	--	--
Pit Toilet	0.1	8.9	8.9	1.6	16.8
No Facility	2.5	1.6	5.6	9.3	19.3
Sources of Drinking Water					
Piped	99.6	64.0	86.7	63.3	74.5
Hand Pump	0.2	34.5	12.0	30.6	18.1
Others	0.2	1.5	1.3	6.1	7.4
Methods of Purifying Drinking Water					
Straining	54.1	1.0	3.9	14.7	25.1
Water Filter	10.2	17.0	18.8	15.1	14.8
Boiling	18.2	5.7	14.4	38.2	13.6
Electronic Purification	2.5	2.7	3.8	3.0	1.2
Other Methods	0.7	1.5	1.0	0.7	2.0
No Purification	27.1	74.2	62.4	42.8	50.4
Electricity					
Yes	99.5	93.8	97.7	89.6	91.3
No	0.5	6.2	2.3	10.4	8.7
Main Type of Fuel used for Cooking					
Kerosene	39.5	50.3	16.3	54.0	21.5
LPG	58.9	39.9	17.0	37.3	46.9
Bio-Mass and Others	1.4	14.6	3.7	8.7	31.65
Persons Per Room					
Less than 3	43.9	57.4	75.2	69.9	68.6
3-4	27.6	25.3	15.1	19.8	19.5
5-6	20.1	11.9	6.7	8.8	8.3
7 and Above	8.3	5.5	3.0	1.1	3.5

Electricity facility is almost universal to Mumbai's population whereas 10 percent population of Chennai and 6 percent population of Kolkata do not have electricity facility. Main type of fuel used for cooking in urban India is LPG followed by bio-mass fuel and kerosene. However, in Kolkata and Chennai more than 50 percent population uses kerosene. There is very less percentage (less than 9 percent) of user of Bio-mass fuel and others in all the four metro-cities, except Kolkata, where 15 percent population uses it. This enhances the problem of **indoor air pollution** in the metro-cities.

2.2 Energy

The study of energy use in the urban areas is of particular importance in view of the impact of urbanisation on the utilisation of commercial energy resources like coal and oil products. The process of urbanisation leads to the substitution of commercial energy for non-commercial energy in industry, commercial and domestic sectors (the share of consumption of commercial energy carriers by urban areas is about 80 percent whereas that of urban population is only 32 percent). Thus one can relate urban development with increased commercial energy use. Urbanites travel via **energy-intensive transportation modes**. Building infrastructure in urban areas to support the high population density requires significant quantity of energy. Also in an urban environment, land use pattern, spatial structures, industrial location etc. affect the levels of energy consumption.

The changes in life style of urban people in recent years have contributed significantly to differences in energy-utilisation levels. In the residential sector fuel wood and charcoal stoves have been replaced with kerosene stoves for the urban poor. The propensity to consume more and more electricity is marked by an increase in the usage of air conditioners, desert coolers, refrigerators micro waves, washing machines, electric geysers, electric kettles and a host of domestic electrical gadgets, including, television, music systems, home theaters etc. Scooters and cars are being frequently used even by the middle-income groups.

Due to the increased availability and affordability, the shares of modern carriers like Liquefied Petroleum Gas (LPG) and electricity and significantly high in the urban areas. Also urban houses utilise larger quantities of superior energy than rural households. Hence, it is important to assess this problem of relative deprivation, both quantitative and qualitative going beyond final to useful energy. Also, since urban areas consume significant quantities of petroleum products, 2/3rds of which are imported, the issue of energy security should be taken into account, while considering urban energy policies.

The increase in urbanisation levels will have a significant impact on energy markets as well as on the global environment. Since energy production and use is the single most important source of green house gas (GHG) emissions, the pattern of energy utilisation and its environmental impact will strongly influence the look towards the environment in the future. The environmental implications are significantly dependent on the type of energy carrier chosen and hence it is important to restrict the use of commercial sources through efficient utilisation.

Table 17: Percentage of Urban Households using Particular Energy Carrier, 2000-1

Energy Carrier	Low Income	Middle Income	High Income	Total
Fuel wood	41.64	12.69	2.52	22.21
LPG	12.58	42.35	64.67	35.53
Dung	3.63	1.52	0.56	2.16
Kerosene	26.38	32.63	20.61	27.02
Others	15.76	10.82	11.65	13.09
Total	**100.00**	**100.00**	**100.00**	**100.00**

Source CMIE

2.3 Transport

Urban transport problems in India are becoming acute mainly because of rapid motorisation. The increasing use of motor vehicles in cities has been rapidly changing the mode-split structure. It has also helped to alter landuse patterns from compact to more dispersed which in turn reinforces the use of personalised motor vehicles. At present motor vehicle ownership in India, including two-wheelers and three-wheelers, is just a little over 40 vehicles per one thousand population. This is low compared to high income countries. During the last decade, motor vehicle ownership in India has expanded at roughly 10 percent a year. But the growth in the metropolitan cities registered over 5 percent a year during the same period; significantly higher than the National Average. This growth pattern is expected to continue with the growth of per capita incomes, especially in urban areas. The growth will also be further reinforced by the Central Government policy of relying on a strong domestic auto market for the development of a viable auto industry.

Motorisation has brought a higher level of mobility to the urban economy, and to high income of the urban population. But its adverse impacts are also substantial-- the most significant of these impacts being **road congestion, air pollution and traffic accidents**. The urban transport scene in India, is typically a high mix of noisy traffic comprising of two-wheelers, three-wheelers, cars, buses and trucks, all fighting for road space. The streets in most Indian cities are old and narrow, occupying only 6 to 10 percent of land area. Growing traffic and limited road space have reduced peak hour speeds to 5 to 10 km and are in the central areas of many major cities.

Indian cities face growing risk of traffic accidents, and are considered to be more accident prone inspite of a relatively lower level of vehicular population. In 1997, the number of accidents in the top 15 metropolitan cities were 75,605 with 6242 fatalities. In the same year, the

Delhi Metropolitan Region where motor vehicle ownership reached 2.8 million recorded over 11000 traffic accidents, 24 percent of which were fatal.

Table 18: Share of Two-Wheelers and Three-Wheelers - 1997

Cities	Motor Vehicle Population	Share (in percentage)	
		2- Wheelers	3- Wheelers
Ahmedabad	631,019	77	7
Bangalore	972,375	73	6
Kolkata	587,576	44	2
Delhi	2,847,695	66	3
Cochin	226,185	60	13
Mumbai	796,913	41	12
Hyderabad	769,401	87	7
Jaipur	448,625	74	2
Kanpur	246,801	79	2
Lucknow	330753	80	3
Chennai	889,819	73	4
Nagpur	238,576	78	6
Patna	219,513	69	5
Pune	476,372	74	8
Surat	361,838	85	5

Source CMIE, Infrastructure,2001

SECTION III

1. Policy Perspectives on Urban Environment Management

The following discussion shows that creating **Sustainable Urban Systems** have become a necessity under present day urban problems, related to urban environment and infrastructure. In other words we should not only think about solving the present day urban problems but should make the **cities livable** for the future generations to come. Let us consider certain critical policy links for **Urban Environment Management**.

Box 1. Critical Policy Links for Urban Environment Management

Urban Environment Management Issues	Underlying Causes	Relevant Policy Reforms
Access to Environmental Infrastructure and Services		
Serviced Land Shelter	Poor functioning of urban land and housing markets: Highly regulated prices, lack of affordable housing for the poor.	Reform property rights; develop mortgage financing; introduce affordable standards and target subsidies to the poor; Reduce unneeded regulations, Governmental regulations and subsidies.
Water supply, sanitation, drainage, solid waste collection and transport	Supply side dominated by government monopoly: prices heavily regulated, heavy subsidies	Introduce pricing and demand management: reconsider subsidies: move towards decentralisation, privatisation and participation.
Pollution from Urban Wastes and Emissions		
Water Pollution	Uncontrolled municipal and industrial discharges'; excessive water use and waste generation: failure to link water quantity and quality issues	Introduce water pricing and effluent charges: subsidise sewage treatment: strengthen regulations and capacity for monitoring and enforcement: prepare comprehensive basin plans.
Energy Use and Air Pollution - Ambient air pollution - indoor air pollution	Increased motorisation and transportation congestion: energy supply side dominated by Government monopoly: heavy energy subsidies, household cottage industry use of low quality fuels	Introduce energy and fuel pricing, road charges, emission charges: reduce automobiles subsidies fuel subsidies: integrate transport and landuse planning: promote clean technologies, fuel substitution, and vehicle maintenance.
Solid and hazardous waste management	Poor municipal management: Lack of disposal facilities: inadequate regulation and enforcement	Introduce regulation, licensing and charges: stimulate waste minimisation: strengthen operations: privatise disposal operations
Resource Losses		
Ground water depletion	Unsustainable extraction link to unclear property rights and treatment as free resource	Clarify property rights: introduce extraction charges: rain water harvesting and artificial recharge of ground water in water deficit regions
Land and Ecosystem degradation	Low-income settlements "pushed" onto fragile lands by lack of access to affordable serviced lands; Lack of controls over damaging economic activities	Coordinate land development; remove artificial shortages of land; develop sustainable uses of sensitive areas: monitor enforce landuse controls
Loss of agricultural and historic property	Lack of property rights, regulations enforcement, maintenance; failure to reflect social values in land prices	Introduce tax incentives for preservation; use redevelopment planning, zoning and building codes; develop property rights
Environmental Hazards		
Natural Hazards	Poorly functioning landmarks. Ineffective land policies; poor construction practices,	Enable land markets; provide disincentives to construction practices or occupation of high risk areas, incentives for using disaster-resistant construction techniques;

		disaster preparation plans.
Man-made Hazards	Inadequate regulation and enforcement: low income settlements alongside hazardous activities	Introduce and enforce environmental zoning: formulate urban disaster preparedness plans and strengthen response capacity. Disaster mitigation plans.

Source: Economic Survey of Delhi - 2001-2002

2. Urban Governance and Urban Environment: Infrastructure and Services Management

In addition to the ULBs, at the Central level, the **Ministry of Urban Development** and **The Ministry of Urban Employment and Poverty Alleviation** form the apex authority of the GOI at the National level to formulate policies, sponsor and support programmes, coordinate the activities of various central ministries, state governments and of the nodal authorities and monitor the programmes concerning all issues of urban development and housing.

The key interventions of the GOI are:

- National Urban Transport Policy;
- Guidelines for sector reform and public-private partnership in the urban water and sanitation sector;
- Centrally Sponsored Schemes (CSS), such as integrated development of small and medium towns;
- Mega city schemes;
- Special development plan for National Capital Region;
- Accelerated urban water supply programme;
- Low cost sanitation etc.
- Administering fiscal concessions such as tax holidays for integrated urban infrastructure development projects;
- Urban environmental infrastructure schemes such as for solid waste management and urban water supply, tax free status for municipal bonds, etc
- Training and information: by funding a variety of training programmes,
- Creating and disseminating manuals such as the Municipal Solid Waste Planning Manuel.

The present form of urban local government owes its genesis to the British rule. The first such body called Municipal Corporation was set up in Madras in 1688, and was followed by the establishment of similar corporations in Bombay and Calcutta in 1762.

Since then, the structure of municipal bodies has remained by and large the same even though the number of urban areas had increased and their problems had become more and more complex. Recent years have witness an increasing interest in and growing consciousness of the need and importance of local self-government as a provider of services to the community as well as an instrument of democratic self –government. The **74th CAA, 1992**, proposed to form a uniform structure of Municipal Corporations, Municipal Councils and Nagar Panchayats in transitional areas.

Urban local bodies are democratic institutions based on the principle of **self-government** and should represent peoples desires and strengths. ULBs offer

- Enhanced opportunities for **people's participation**; local government is closest to the citizens and in the best position both to involve them in the decision making process of improving their living conditions and to make use of their knowledge and capabilities in the promotion of all round development;
- **Bottom-up planning**; and
- **Effective implementation** by enhancing coordination and responsiveness to users

The **74th CAA** seeks to introduce fundamental changes in urban local bodies. Its salient features are:

- Introduction of **12th Schedule**, which lists the functions of ULBs, covering planning, regulation and development aspects;
- Establishment of **district and metropolitan planning** responsible for election of representatives for the preparation of development plans at district and metropolitan levels;
- Proposed establishment of **ward committees** in areas having a population over 300000;
- Specification by law of the powers and responsibilities;
- Entrusted to municipalities and ward committees;
- Holding of periodic and timely elections;
- Specifying by law the sources of **municipal finance** and their periodic review;
- Restrictions on the power of the state governments to do away with the democratically elected state governments;
- Reservation of 1/3rd of seats for women and weaker sections for municipal bodies.

In the face of service challenges, there have arisen **certain roadblocks undermining the reform initiatives**. The ULBs have been confronting **several problems** and there also seems to be a discontinuity between their revenue collection and service delivery outcomes.

The GOI has also begun to respond to the magnitude of challenges facing urban service provision in India. For the cities of India to realize their full potential and become **true engines of growth**, it is necessary that focused attention be given to the improvement of **infrastructure** therein. For achieving this objective **a mission mode approach** is essential. Accordingly, the Prime Minister of India has launched a mission **Jawaharlal Nehru National Urban Renewal Mission (NNURM) on 3rd December 2005.**The mission comprises two submissions – 1) For **Basic Services to the Urban Poor (BSUP)** and the other for 2)**Infrastructure and Governance**.

The **JNNURM** will be implemented in select **63 cities** the duration of the mission is for seven years beginning with the year 2005-06.

For other cities/towns two schemes, viz, **Integrated Housing and Slum Development** (IHSDP) and **Urban Infrastructure Development for Small and Medium Towns** have also been launched along with JNNURM on 3.12.2005. The existing Valmiki Ambedkar Awas Yojana (VAMBAY) and the discontinued National Slum Development Programme (NSDP) are subsumed in the IHSDP. The IHSDP implemented by the Ministry of UEPA has been launched with the objective to strive for holistic slum development with the healthily and enabling urban environment by providing adequate shelter and basic infrastructure facilities to the slum dwellers of identified urban areas.

Section IV
Conclusion

On India's onward path to economic development,it is quite inevitable that urbanisation in India would continue for years to come. The unintended cost of increasing urbanization is deterioration in the environmental quality and a pressure on the existing infrastructure, reinforcing a further degradation of the environment. However, environmental degradation is a manifestation of not only urban population pressure but also the changing life styles, which often accompany a rise in income levels of a segment of the population. On the other hand increasing disparities result in impoverishment of the urban poor that also results in deterioration of the urban environment. Today, various interlinked issues are to be addressed on both the environmental and infrastructural front. Features such as neglect of proper disposal of refuse by

households, industry and service providers such as hospitals, and water services have resulted in environmental deterioration. Intermittent piped water supply and ineffective treatment of waste water and industrial waste are resulting in a host of problems including contamination of water bodies and land. Increased motorised transport, unavailability of more road space in not only creating air pollution but increasing the number of accidents and other human miseries. Widening disparities among urban social groups have resulted in deterioration of the urban social environment and increase in crime rates particularly in the big cities.

Urban local bodies, which are entrusted with environmental protection and provision of urban basic services, are often strapped for adequate financial resources as well as knowledge of environmental management. In recent years, however the situation is not as grim as perceived. Supreme Court intervention in limiting air pollution generated by public transport and government initiatives in using green fuels have improved air quality perceptible in some cities. Today thoughts are being made to meet the energy requirements in a sustainable fashion, through the Energy Master Plan (EMP) and this should be integrated with the civil master plan so that the problems arising out of the urban sprawl and multiplication of urban activities are minimized. Awareness about **sustainable development** which includes environmental concerns is gaining grounds and various tools such as **ecological foot printing** and **green accounting** are being developed to ensure the quality of environment that we leave for our next generation is better than that we inherited from the past.

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