Chapter 5
Sustainable Urbanization in India: Experiences and Challenges

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Abstract Urbanization brings about a variety of spatial, economic, social, demographic, and environmental changes. Some of these are positive whereas others are negative. Despite the tremendous potential of cities to provide quality of living conditions, urban problems limit their sustainable growth. Sustainable urbanization requires a balance between the development of the urban areas and protection of the environment with an eye to equity in employment, shelter, basic services, social infrastructure, and transportation in urban areas. The present urban chaos in India is mainly the result of ineffective and inefficient urban management, multiplicity of authorities, inadequate revenue base, lack of coordination between various municipal agencies, and the nonparticipatory attitude of stakeholders. Therefore, the objectives of the present chapter are (i) to analyze trends of urbanization in India, (ii) to highlight the problems and limitations of the urbanization process in India, and (iii) to suggest measures to make urbanization sustainable.

Keywords Crime • Sanitation • Slums • Sustainable urbanization • Transportation

5.1 Introduction

Sustainable urbanization refers to attaining social equity and ecological balance along with economic growth. It specifically means achieving a balance between the development of the urban areas and protection of the environment, with an eye to equity in employment, shelter, basic services, social infrastructure, and transportation in urban areas. By and large, the nature and extent of growth of Indian cities is unplanned and unanticipated; the provision of services is not proactive but reactive (Jain 2008). The demand for services, such as transport, water, and sewerage, continually outstrips supply, resulting in a situation of perpetual scarcity and shortages.

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Therefore, the objectives of the present chapter are (i) to analyze the trends of urbanization in India, (ii) to highlight the problems and limitations of the urbanization process in India, and (iii) to suggest the measures to make urbanization sustainable.

Urbanization often brings about a variety of spatial, economic, social, demographic, and environmental changes. Some of these are positive and others are negative. Cities offer job opportunities, provide better infrastructure, and promote social and economic mobility; their impact is revealed in improved indicators of quality of life. Urbanization is an indicator of economic development. Urban agglomerations afford economies of scale in both manufacturing and services activities and also in provision of infrastructure services. Urbanization should be seen as a positive factor for overall development, as is manifested in the increasing contributions of the urban sector to the national economy. For instance, in 1950–1951 the contribution of the urban sector to India's GDP was only 29 %, which increased to 47 % in 1980–1981; presently, it is contributing 62–63 %, and is likely to be 75 % by 2021 (Ministry of Urban Development 2006a).

In contrast, Indian cities suffer from acute housing shortages, environmental pollution, water and power shortages, and a crowded and inefficient transport network. The big cities are leaving ecological footprints on their hinterlands by vast consumption of both nonrenewable and renewable resources such as water, forests, and land. The present urban chaos is also caused by ineffective and inefficient urban management, multiplicity of authorities, inadequate revenue base, lack of coordination between various municipal agencies, and the nonparticipatory attitude of the stakeholders. Despite the tremendous potential of cities to provide quality of living conditions, the foregoing constraints limit their sustainable growth. Unless some serious legal, institutional, governance, and economic planning interventions are initiated, the future of Indian cities will remain unproductive, unhealthy, and unsustainable (Nath 2007).

5.2 Trends of Urbanization

In the twentieth century (1901–2001), the population of India increased about 4 fold whereas the urban population increased 11 fold. The urban population constituted 27.75 % of the total population of India in 2001. As compared to the world level of urbanization (50 %), the level of urbanization in India is low and the process is slow (Bhagat 2007). In absolute terms, however, the size is large, that is, 285 million (Table 5.1). Average annual rate of change (AARC) of the total population in India during 2000–2005 is estimated at 1.41 %, with 2.81 % for urban and 0.82 % for the rural sector [Report of 11th Five-Year Plan (2007–2012) Working Group on Urban Housing with Focus on Slums, Ministry of Urban Development 2006b]. AARC for urban areas during 2005–2030 will increase to 2.25 % whereas the rural population will decline to −0.40 %, showing a clear shift of population from rural to urban in the twenty-first century.

Table 5.1 Trends of urbanization in India (1901–2001)

Year	Urban population (in millions)	Urban population as % of total population	Decennial growth rate (%)	Annual exponential growth rate (%)
1901	25.85	10.84	–	–
1911	25.94	10.29	0.36	0.03
1921	28.08	11.18	8.27	0.79
1931	33.45	11.99	19.12	1.75
1941	41.15	13.86	31.97	2.77
1951	62.44	17.29	41.42	3.47
1961	78.93	17.97	26.41	2.34
1971	109.11	19.91	38.23	3.21
1981	159.46	23.34	46.14	3.83
1991	217.55	25.72	36.19	3.09
2001	285.36	27.75	31.20	2.71
2011	377.10	31.16	31.80	2.81

Source: Census of India, 2001, Provisional Population Totals, Census of India, 2011

Table 5.2 Urban population (%) by size class in India (1901–2001)

Year	Class I (100,000 or more)	Class II (50,000–99,999)	Class III (20,000–50,000)	Class IV (10,000–20,000)	Class V (5,000–10,000)	Class VI (<5,000)
1901	26.00	11.29	15.64	20.83	20.14	6.10
1951	44.83	9.96	15.72	13.83	12.97	3.09
2001	62.29	12.04	14.72	7.90	2.76	0.29

Source: Census of India, 2001

The Census of India, on a population size basis, divides the urban population into six classes. Class I, with a population of 100,000 and more, dominates the urban scenario. It constitutes around 62 % of the total urban population of India. The relative share of different class towns shows different trends (Table 5.2). The relative share of class I has increased exponentially, the share of class II and III has remained almost stationary, and the share of class IV, class V, and class VI has declined from around 47 % to just 11 %. As per the Provisional Population Totals of Census of India 2011, class I has 265 million persons, constituting 70 % of the total urban population. Urban growth and pattern are characterized by uneven distribution with few larger (metropolitan and mega) cities growing at a faster rate and containing a disproportionally large share of urban population whereas the numerous small- and medium-sized towns exhibit slow and sluggish growth with a low share of the total urban population.

Of 468 urban agglomerations (UAs)/towns belonging to class I category, 53 have a population of one million or more each and they constitute 42.6 % of the urban population in 2001; their number was 35 (Census of India 2011). There are three

very large UAs with more than ten million persons in the country, known as mega-cities: Greater Mumbai UA (18.4 million), Delhi UA (16.3), and Kolkata UA (14.1 million). The trend of urbanization in India is toward centralized urbanization although the decision makers wanted it to be decentralized. The trends of urbanization in India in recent decades indicate the following key features: (i) continued concentration of urban population in larger cities and existing urban agglomerations; (ii) slowing of urbanization during 1981–1991 (36.2 %), 1991–2001 (31.2 %), and 2001–2011 (31.8 %), as compared to 1961–1971 (38.2 %) and 1971–1981 (46.1 %); and (iii) large variations in the spatial patterns of urbanization across the States and cities.

The pattern of population concentration in large cities reflects the spatial polarization of employment opportunities. This phenomenon has led to a tremendous pressure on civic infrastructure systems: water supply, sewerage and drainage, solid waste management, parks and open spaces, transportation, etc. It has also led to deterioration in the quality of the city environment. In several cities the problems of traffic congestion, pollution, poverty, slums, crime, and social unrest are assuming alarming proportions. However, there is also another side of population concentration in cities. The large cities are engines of growth and generators of resources for rational economic development.

The role of cities in economic development is divided into two broad categories, the parasitic and the generative cities. Parasitic cities are those that drain the resources from their surrounding regions without giving much in return. The generative cities permeate their influence into the surrounding regions stimulating change and development with socioeconomic growth in the region and the city itself (Hoselitz 1960). In India, the centralized urbanization trend is an indicator of growing regional imbalances. The polarization effects are indicator of a parasitic role. Even in the National Capital Region the planned efforts have failed to decongest the main city, Delhi. Metropolitan region planning has failed, and metropolitan centers have emerged as primate cities.

What, therefore, we need in the country is a balanced urban system with a large metropolis at the apex supported by and, in turn, supporting a large number of micropolises and intermediate towns and cities. Such a system must be organically and generatively linked to the hundreds of thousands of rural settlements both vertically and horizontally. Thus, the question that needs to be posed is how to make the urban system of a country balanced so that the large cities play a generative role. It is unfair to brand large cities as parasitic without giving due consideration to the fact that the constraints within which they operate play an important role in social and economic transformation (Misra and Dung 1998).

The half-hearted attempts to slow down growth of the large cities, based on strategies such as industrial dispersal to underdeveloped regions, have proved to be ineffective. The results have been threefold: (i) increasing unemployment and underemployment in the cities and very low productivity in their informal sectors, which have had to absorb most of the in-migrants; (ii) acute housing shortages and increasing pressures on urban services, which have led, in turn, to increasing congestion and the proliferation of slums; and (iii) progressive deterioration of the

physical environment. The strategies for management of rapid urban growth must satisfy two essential conditions. First, they must meet the needs for gainful employment, housing, and essential services of the rapidly increasing urban population at acceptable economic and social costs. Second, they must ensure that urban growth contributes to national and regional economic growth, particularly through growth-inducing urban–rural interactions (Nath 2007).

The studies of Hoselitz (1960), Sovani (1964), and Bose (1978) have suggested that urbanization has gone ahead of economic development, leaving a wide 'development gap' that appears in two different forms: (i) in the form of over-urbanization, that is, urbanization exceeding the range of economic development, and (ii) in the form of a marked deficiency of urban facilities and services.

5.3 Problems of Urban Development

Urban problems and urban development are admittedly important national issues in India, but ultimately much of the burden of solving these problems lies on local administration—municipalities and corporations—and most of the money has to come from local or municipal finance. At the local level, political pressurization, municipal corruption, and administrative inefficiency perhaps play a much more important role than at the state level or the central level. At the heart of India's urban problems are grossly inadequate inputs of finance and management needed for efficient functioning of urban government and for expansion of housing and services to keep pace with the rapidly growing urban population. Provision of adequate finance will not be easy because of the great demand. But steady progress toward reducing the present inadequacy can be made, if there is greater perception of the interdependence between urban and rural development. The present shortages of urban housing and the inefficiency of urban services not only cause great hardship to the urban population but also result in enormous losses of output. They act as a major disincentive on productive investment. The latter effect is most apparent in the case of services, such as electric power, because prolonged cuts and erratic supplies have become a daily occurrence in most cities. India's cities and urban regions face a difficult future. Urban infrastructure and housing are inadequate and cannot absorb the massive numbers of newcomers. Urban economic and social conditions are deteriorating, which results in higher levels of unemployment and social unrest. Migration from the countryside continues unabated and in some cases is accelerating. In these adverse circumstances, India's urban areas must become the focus for new policy initiatives emphasizing population control, rural development, and urban growth containment (Nath 2007).

According to the Report of the Technical Group on Estimation of Housing Shortage, constituted in the context of preparing the 11th Five-Year Plan document, housing shortage as of 2007 is estimated to be around 24.71 million and housing shortage during the plan period (2007–2012), including the backlog, was estimated as 26.53 million, of which 21.78 million are related to the economically weaker

Table 5.3 Slum population in selective municipal corporations of Million Plus, 2001

Million+ municipal corporation	Total population	Total slum population	Slum population (%)
Greater Mumbai	11,978,450	6,475,440	54.1
Delhi	9,879,172	1,851,231	18.7
Kolkata	4,572,876	1,485,309	32.5
Chennai	4,343,645	819,873	18.9
Surat	2,433,835	508,485	20.9
Pune	2,538,473	492,179	19.4
Nagpur	2,052,066	737,219	35.9
Ludhiana	1,398,467	314,904	22.5
Meerut	1,068,772	471,581	44.1
Faridabad	1,055,938	490,981	46.5

Source*:* Census of India, 2001

sections (EWS) and 2.89 million to the low-income group (LIG). In addition, there are substandard housing units that need improvements, both structural and sanitary. Most of the housing shortage is for EWS and LIG sections, which does not seem to becoming translated into economic demand because of lower affordability by the poor. A sizable number of this requirement leads to squatters and slums. Mumbai, which is known as the commercial capital of India, is basically a *slumpolis* as 54 % of the population resides in substandard housing units. In the case of Kolkata, this proportion is around one third. In the satellite metropolis, Faridabad, around 47 % of thr population is concentrated in slums (Table 5.3).

In 2001, 33.4 % of urban households lived in one-room accommodations. It is extremely hard for the lower middle income group to afford to own a home or flat. Rental units are also in severely short supply. The poor section of the society mostly lives in slums and some are homeless, sleeping on the pavement. It is a gigantic challenge for the nation to provide adequate housing (Das 2007). In spite of ever-increasing investments in housing programs, the problem remains stupendous. It is a paradox that the number of homeless, squatters, and slum dwellers in the Indian cities is increasing in proportion to public housing programs.

Starting with the Slum Area Improvement and Clearance Act of 1956, the objective of the public agencies had been to make the city slum free and provide housing to the slum dwellers. In general, a three-pronged strategy had been adopted for improvement of shelter for those residing in the slums or *Jhuggi-Jhopri* (JJ) clusters: (i) relocation/resettlement, (ii) on-site upgradation, and (iii) environmental improvement in JJ clusters/slum areas. The greatest advantage of the relocation strategy is that it usually comes with housing security, through land use rights, and outright ownership of some kind of long-term land lease. However, these relocation sites are often far away from existing communities, job opportunities, support structures, and schools. Community members who want to keep their old jobs or attend the same schools must bear the burden of additional traveling time and expense and must adapt themselves to a new environment. In cases of relocation, communities

face the cost of reconstructing their houses at the new site and in some cases the additional burden of land purchase payments. But tenure security tends to be a big incentive to invest in housing and environmental development at the new site. To further improve the efficiency of relocation measures, proximity to workplace, low-cost transport, and control of land mafia are required. In reconstruction strategy, existing slum communities are totally rebuilt on the same land, or on land that is nearby, within the same general area, either under long term lease or outright purchase. The security of land tenure at the new site provides the community with a strong incentive to invest in their housing, through rebuilding or new construction. Although the reconstruction option involves making considerable physical changes within the community and requires some adaptations to a new environment, the strategy allows people to continue living in the same area and to remain close to their places of work, and this is a crucial compensation for the expense and difficulty that reconstruction involves. Slum upgrading is a way of improving the physical environment and basic services in existing communities, while preserving their location, character, and social structures.

Shelter for the slum and hutment dwellers is a continuous and a participatory process. It needs the support of the government agencies in terms of land, services, tenure, finance, public transport. etc., whereby they can organize their own structures and shelter. It is also necessary to adopt transparency and a noninterventionist approach in dealing with the squatters. The planning and housing should focus upon the deprived 'other half.' The provision of a component of shelter for EWS/LIG should be compulsory for all government/private/cooperative housing in a citywide strategy. The private sector should participate in this social responsibility. Mixed-use zoning should replace single-use zoning. Mandatory provision for informal sector/ street vendors should be an integral part of planned development.

The housing strategy should incorporate the development of new housing areas, upgradation, re-densification and redevelopment of existing housing areas, including unauthorized colonies, villages, and the inner city. The future requirement of shelter provision will be dominated by small dwelling units. In view of the limited availability of land and increased requirement of housing, plotted residential development should be discouraged. There is a need to reexamine the myth of low-rise housing for the poor and to encourage multi-storied housing options, as is being done in Mumbai, Pune, and other cities.

It is necessary to adopt a multi-prolonged strategy for provision of housing and for delivery of serviced land by involving the private sector to a significant extent, as well as public agencies and cooperative societies, etc. The overall responsibility for provision of land and facilitation of adequate housing to meet the projected demand lies with the government, which should devise ways of collaboration with the private agencies. Planning norms, land use zoning, density, floor area ratio (FAR), and building controls are to be reviewed so that new areas can be opened up for low-income housing as well as the redevelopment of existing areas can be triggered. It is essential to optimize utilization of land with a view to increase net residential density. A fixed density could lead to underutilization of FAR or imposition of artificial limits to optimal use of land, which is a scarce commodity.

Table 5.4 Water crisis in major metropolitan centers

Metropolis	Demand (million liters per day)	Supply (million liters per day)	Gap (million liters per day)
Mumbai	3,400	2,900	500
Delhi	830	520	310
Chennai	971	675	296
Bengaluru	840	705	135

While developing the city-level shelter, land, and infrastructure plans, there is a need to relate those with the urban poor and to redirect the resources for the economic emancipation and self-reliance of the poor. These concerns must involve transformation and innovation in the relationship among people, governments, financing institutions, etc. The success of this collective enterprise depends upon the involvement of people at the grassroots level for which civic engagement, sustainability, and equity are the guiding principles. The empirical evidence suggests that provision of housing to the urban poor really helps them to climb up the poverty line and accelerate up the social and economic ladder.

The population growth in urban areas increases the density of population in relation to the available facilities. The uncontrolled growth makes it impossible for the cities to expand and update urban amenities. Most of them are unable to provide water, sewerage, and drainage to a large portion of the urban population. It is clear that urban areas have more people than they can support given the present urban infrastructure. The imbalance between power demand and supply has increased. In 1951, the population of Delhi was 1.4 million, and in 2006 it became 12.79 million. The peak power demand in 1951 was 27 MW; it is now 4,100 MW. The city's five power plants generate only one fourth of its power needs. There is a shortage of 900–1,000 MW, which is reflected in 3- to 12-h power cuts. For the worsening urban crisis, there is an urgent need to focus upon the improvement in energy services. There is urgent need to develop decentralized renewable energy resources, such as solar and wind energy. Similarly, the water crisis is present in all the metropolitan centers and over time its intensity and magnitude have increased (Table 5.4). According to the 54th round of NSS (National Sample Survey), 70 % of urban households were reported being served by tap water, 21 % by tube well or hand pump, 41 % had sole access to their principal source of drinking water, and 59 % were sharing a public source.

In Indian cities water is emerging as the most critical sustainability constraint. A range of technical and institutional options ranging from centralized surface storage to decentralized rainwater harvesting and recycling, together with design and water management options, is to be explored. The following steps should be taken to ensure water security. (i) Metering of water supplies should be made mandatory in a gradual manner so as to conserve precious water and to generate revenue. (ii) Leakage and unaccounted-for water (UFW) is another constraint in cities and towns, up to 50 % in some cases. Such losses should be minimized through intensive

leak detection and rectification programs. Severe penalties should be levied on those found responsible for leakage and wastage of water. (iii) To reduce wastage of water, adopt low-volume flushing cisterns. (iv) Rooftop rainwater-harvesting systems in both public and private buildings including industrial and commercial establishments should be made mandatory so as to conserve water. ULBs should make it a point not to approve building plans without such systems. (v) Water quality surveillance and monitoring to ensure prevention and control water-borne diseases are required.

The 54th round of NSS reported 26 % of households having no latrines, 35 % using septic tanks, and 22 % using a sewerage system. Around 43 % of households in urban areas either had no latrines or no connection to a septic tank or sewerage system. According to the Central Pollution Control Board, the wastewater generated in 385 class I cities is about 15,800 MLD, whereas treatment facilities exist for barely 3,750 MLD.

About 71 % of urban households reported removal of household waste by household members themselves, 14 % by local authorities, and 12 % by private agreement among residents. The solid waste generated by the million-plus cities ranges from 1,200 metric tons per day in cities such as Ahmedabad and Pune to a maximum of 5,000–5,500 metric tons per day in cities such as Delhi and Mumbai. Of the total waste generated in the million-plus cities, barely 30 % is treated before disposal. The disposal efficiency ranges between 22 % and 66 %, with Kochi the best and Nagpur the worst, and 40 % of the municipal waste is not picked up at all (*The Hindustan Times*, 19 March 2010). It has been estimated that ULBs spend about Rs. 500 to Rs. 1,500 per tons on solid waste collection (60–70 %), transportation (20–30 %), and treatment and disposal (<5 %), which shows that hardly any attention is given to scientific and safe disposal of waste. Landfill sites have not yet been identified by many municipalities, and in several municipalities the landfill sites have been exhausted and the respective local bodies do not have resources to acquire new land. Because of the lack of disposal sites, even collection efficiency is decreasing. Increase in quantity of municipal solid waste generation with increase in the urban population is quite obvious. Efforts toward waste recycle, reuse, and resource recovery for reduction in waste and adoption of more advanced technology measures for effective and economical dispersal of municipal solid waste is the need of the hour.

Some urban households do not have access to latrines and defecate in the open. About 5.48 million (8.13 %) urban households use community latrines and 13.4 million households (19.49 %) use shared latrines; 12.47 million (18.5 %) households do not have access to a drainage network; about 26.83 million (39.8 %) households are connected to open drains. The status in respect of the urban poor is even worse. The percentage of notified and nonnotified slums without latrines is 17 % and 51 %, respectively. In respect of septic latrines, the availability is 66 % and 35 %. In respect to underground sewerage, the availability is 30 % and 15 %, respectively. More than 37 % of the total human excreta generated in urban India is unsafely disposed, imposing significant public health and environmental costs to urban areas. Impacts of poor sanitation are especially significant for the urban poor (22 % of the total urban population), women, children, and the elderly. The loss from

diseases caused by poor sanitation for children under 14 years alone in urban areas amounts to Rs. 5 billion at 2001 prices. Inadequate discharge of untreated domestic/municipal wastewater has resulted in contamination of 75 % of all surface water across India (Ministry of Urban Development 2007).

Because of the lack of efficient, comfortable, and reliable public transportation coupled with buoyant economic growth, most of the cities in the country are already witnessing a rapid growth of personal vehicles. This trend coupled with the declining share of public transport has led to severe problems of congestion and its consequent costs in the form of travel delays, loss of productivity, air quality deterioration, noise pollution, and increasing road fatalities. It is not only posing a serious threat to sustainability of urban areas but also impacting India's energy security with increasing demands. The road transport is breaking down, with poorly maintained roads, traffic jams, long delays at intersections, and frequent accidents. Traffic congestion is a serious problem that is choking many cities to a standstill in terms of the movement of people and goods within the metropolis. Today India's largest cities are among the world's worst hit by traffic problems (Gupta 2006). The greater size necessitates traveling by two-wheelers, three-wheelers, and cars, and the shortage of mass modes of transport (buses and trains) results in their explosion. Horizontal expansion of the metropolitan centers necessitates traveling by private vehicles and vertical expansion increases the density and parking problems. Delhi now has about as many cars as it had people in 1981. From 2001 to 2008 alone, the increase was around 2 million vehicles.

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people. Unfortunately, however, such flow of goods and people has been facing several problems. Billions of man-hours are lost with people "stuck in traffic." The population of India's six major metropolises increased about 1.9 fold during 1981–2001, and the number of motor vehicles increased by more than 7.75 fold during the same period. The cost of travel, especially for the poor, has increased considerably, largely because the use of cheaper non-motorized modes such as cycling and walking has become extremely risky as these modes have to share the same right-of-way with motorized modes. Further, with population growth, cities have tended to sprawl, and increased travel distances have made non-motorized modes impossible to use. In turn, this has made access to livelihoods, particularly for the poor, far more difficult. Travel in the city has become more risky with accident rates having gone up from 106,000 in 1981 to more than 390,000 in 2001. The number of persons killed in road accidents has also increased, from 28,400 to more than 80,000 during the same period. This risk again has tended to impact the poor more severely as many of those killed or injured tend to be cyclists, pedestrians, or pavement dwellers. Increased use of personal vehicles also has led to increased air pollution. Unless these problems are remedied, poor mobility can become a major dampener to economic growth and cause the quality of life to deteriorate.

'Urban fatigue' from urban frictions is common. Urban fatigue sets in on journey to and from work and after work, and a person is left with no energy to do any constructive or recreational work at the end of the day. Everywhere you go, there is congestion, competition for space, and physical bodily friction while walking,

riding a bus or train, shopping, or going to cinemas, etc. The parking problem is emerging as a first-rank problem of the majority of metropolitan centers. Traditional solutions to cope with the demand of increasing traffic have resulted in widening of roads to the maximum, thus eating away the area meant for pedestrians and cyclists. The building of new roads and widening of existing roads are, however, reaching the stage of saturation. It is becoming well nigh impossible to obtain land and remove encroachments for widening of the road network. Solutions such as an underground metro network that are often projected as the panacea for traffic and environmental problems are often long range and too expensive. Surface railways for intracity transport could be less costly and of shorter range. By and large, in the past few years, the investments made to improve transport are in the form of (i) construction of overpasses and (ii) widening of roads. These policy measures have not produced the desired results. The plan needs to take into account integration of land use and the transportation system and environmental sustainability.

The basic purpose of transportation should be efficiency, equity, ecological awareness, and land economy. The following areas need priority attention for sustainable transport. (i) Integration of buses and tram routes with MRTS, metro rail, circular rail corridor, and waterways. (ii) It is globally accepted that mixed land use (MLU) helps in revitalizing community life and attracts pedestrians back on the street. The mixed land use also provides a more diverse and sizeable population and wider commercial base to support public transit. (iii) It has also been established that higher density does not create congestion and is environmentally sustainable. Public transportation is to be linked with mixed land use and high-density lifestyle. (iv) Transportation policy should be linked with telecommunications, E-mail, video-conferencing, and mobile phones, etc., as alternatives to physical movement. (v) It is necessary to encourage pedestrian and cycle movement; for example, in China, the Netherlands, and Sweden it has a very significant role. The main problem arises from the low priority in planning and mixing of bicycle traffic with fast vehicular modes; 30 % of fatal accidents involve cyclists. These routes should be adequate, direct, shortest, safe, and attractive. The cycle rickshaw, a popular mode of passenger transportation in Indian cities, should be redesigned for efficiency, safety, and speed. (vi) It is well known that two thirds of the suspended particulate matter (SPM) is contributed by vehicular traffic. Pollution continues to impair human health; therefore, it is necessary to develop alternative fuels, which include electricity/battery, compressed natural gas (CNG), and solar energy. (vii) Parking is one of the critical problems faced by the city, which is becoming serious because of distortions in land use, unauthorized encroachments, and longer trip lengths accompanied by higher private vehicle ownership because of poor public transport and the easy financing of private vehicles. (viii) It must however, be recognized that the high costs, low profits, and long gestation periods of urban transportation projects do not always make them financially viable. To attract the private sector to participate in mass transportation projects, the government will have to participate in the equity of such projects and provide certain benefits and concessions.

An efficient transportation system is the lifeline of cities. Immediate proactive measures are needed to deal with the emerging situation. The only emerging solution

Table 5.5 Incidence and rate of Indian Penal Code (IPC) crimes in metropolitan centers

Year	Incidence	Rate (crimes/ 100,000)
2003	291,246	270.0
2004	309,929	287.3
2005	314,708	291.7
2006	326,363	302.5
2007	336,889	312.3
2008	347,153	321.8
2009	343,749	318.6

Source*:* National Crime Record Bureau Report (2009)

is to invest sincerely in public transport, pedestrianization, and non-motorized vehicles now or pay very heavily later. The National Urban Transport Policy (2006) recommends short-term and long-term planning for transportation of all cities, technology upgradation, private sector partnership, energy efficiency, regulating the car industry, and dovetailing the intercity movement system with intracity transport. The policy focuses on the need to 'move people, not vehicles.' It seeks to do this by encouraging improvements in public transport and facilities for the use of non-motorized modes. It suggests greater involvement of the private sector and innovative financing mechanisms to enhance efficiency and reduce the impact on the public budget. It seeks to encourage cleaner technologies and create better awareness among the people so that there is support for the initiatives that need to be undertaken and also for some of the compromises that people may need to make. It emphasizes the need to build capacity to undertake good urban transportation planning, both at the institutional and individual levels. The emphasis has to be on public-private partnership.

Urban India, especially metropolitan centers, has seen a tremendous increase in crime and of incidents of communal violence. The increase in crime is attributed largely to two factors: losing social control in the context of overall changing composition of the city's population and the widening gap between the rich and the poor. Both these factors are closely interrelated, and it is often not really possible to separate greater anonymity in social life or greed as the root causes (Dutt and Venugopal 1983). Inequalities, unemployment, and underemployment are creating insecurities. The incidence and rate of IPC (Indian Penal Code) crimes is increasing every year (Table 5.5). In this way, the symbols of civilized society have emerged as crime centers.

One of the most deleterious effects of overcrowding of cities is the reduced sense of social responsibility among the people. Competition for space and services has bred an everyman-for-himself attitude. People resist queuing for services, disregard rules and regulations, spoil public and private property, and show an utter disregard for the rights and feelings of fellow citizens. These attitudes mean urbanization is going on without urbanism.

Municipal by-laws need to be suitably amended with necessary penal clauses and enforced effectively to stop open defecation and the indiscriminate throwing of garbage/litter in public places, which is the main source of contamination of water bodies and spread of diseases. Adequate sanitation facilities need to be provided to the areas prone to open defecation. It is necessary that the problems of water supply and sanitation (including sewerage, low-cost sanitation, wastewater treatment, and solid waste management) are addressed simultaneously to improve overall environment.

The other major symptom of deterioration of the urban environment is rapid increase in the levels of water and air pollution. The increase is caused by a complex of reasons, of which the most important are related to the failure of the municipal bodies or other concerned authorities to (i) expand systems of disposal of solid and liquid waste, and put in place adequate systems of sewage treatment; (ii) enforce pollution control regulations to reduce or eliminate discharges of polluting affluent into the rivers and other water bodies by industrial units and power stations, and of particulate matter in the atmosphere; and (iii) take measures, such as requiring proper maintenance of motor vehicles to reduce pollution from their exhausts. The rapid increase in the number of motor vehicles is a particular cause of increasing air pollution over or near the large cities. The two- or three-wheeler vehicles, powered by two-stroke engines, are the principal source of noise pollution in the cities.

5.4 Sustainable Measures

Despite the Report of National Commission on Urbanization (1988) and the two successive National Housing Policies within a span of a decade, the country is yet to evolve a National Urban Policy. The Seventh Plan stated that apart from the fact that many of the municipal bodies are moribund or have been superseded, they are being administered badly, have undeveloped and/or eroded tax systems, and suffer from lack of capital funds for development. The services they provide have deteriorated over the years and there seems no sign of reversal (Planning Commission). Most of the municipal bodies in the country do not have the required professional competence to handle future challenges. The processes and technologies are very old and outdated. Despite the ongoing invasion of IT-enabled services in the country, many urban bodies are still in the process of planning to take e-governance initiatives. Accounting systems of most of the urban local bodies (ULBs) are primitive in nature. Delivery systems of water supply, urban transport systems, garbage collection and disposal, as well as other urban services, are inefficient and are not financially self-sustaining.

The urban governance in the country, today, has been characterized by fragmentation of responsibility, incomplete devolution of functions to the elected bodies, lack of adequate financial resources, unwillingness to progress toward municipal autonomy, adherence to outdated methods in property taxation, and hesitation in the matter of levy of user charges, property tax recovery, and levy or withdrawal of

octroi. Experience shows that functional autonomy can become a reality only when financial strength supports it. Therefore, states need to play a catalytic role; in particular, the governmental agencies and developmental authorities need to adopt a supportive role toward the elected bodies rather than take over functions that statutorily belong to urban local bodies (ULBs).

In recognition of the critical importance of rapid urban development, a new project aimed at encouraging reforms, and fast-track planned development of a few identified cities, the Government of India launched an ambitious program called Jawaharlal Nehru National Urban Renewable Mission (JNNURM) in December 2005. The program is not only concerned to provide central assistance for urban renewal and strengthening of urban infrastructure, but the strength of this Mission lies in the fact that this is directly linked with certain urban reforms at the ULB level as well as the State government level. The concerned ULBs are supposed to prepare a City Development Plan (CDP) after due consultation with various stakeholders. Under the CDP, various projects are to be listed in order of priority, along with the investment plan. After the CDP is prepared and accepted by the Government of India, the State government is then required to enter into a Memorandum of Agreement (MoA) with the Union government, on the timeframe of implementation of the required reforms during the Mission period, that is, up to the year 2013. The majority of the ULBs in the country are faced with financial crunch and badly need to reform themselves and their procedures. JNNURM would adequately meet both these requirements of the ULBs. There may, however, be some ULBs that fail to fulfill their reform commitments and deadlines as per the MoA.

The major problems in urban planning are (i) unwillingness by the administration to include citizens in the decision-making process; (ii) the problems of burgeoning slums, increasing slums, increasing crime, overburdened infrastructure, and lack of adequate public transport are increasing along with the growth in urban population; (iii) public space is inadequate, weakly linked, and difficult to access; (iv) the Town and Country Planning Department has done a weak and arbitrary job of land use mapping and zoning laws, and our administration has done a poorer job of enforcing these laws; and (v) citizens lack respect for public space. A myopic view focused on their private properties is widespread.

Sanitation has been accorded low priority, and there is poor awareness about its inherent linkages with public health. Despite the appropriate legal framework, progress toward the elimination of manual scavenging has shown limited success. Little or no attention has been paid toward the occupational hazard faced by sanitation workers. There are considerable gaps and overlaps in institutional roles and responsibilities at the national, state, and city levels, Sanitation investments are currently planned in a piecemeal manner and do not take into account the full cycle of safe confinement, treatment, and safe disposal, Technologies have been focused on limited options that have not been cost-effective, and sustainability of investments has been in question. Urban poor communities as well as other residents of informal settlements have been constrained by lack of tenure, space, or economic constraints in obtaining affordable access to safe sanitation. In this context, the issues of whether services to the poor should be individualized and whether community

services should be provided in nonnotified slums should be addressed. However, provision of individual toilets should be prioritized. In relationship to "Pay and Use" toilets, the issue of subsidies inadvertently reaching the non-poor should be addressed by identifying different categories of urban poor. Sanitation has been provided by public agencies in a supply-driven manner, with little regard for demands and preferences of households as customers of sanitation services (Ministry of Urban Development 2007).

An important element in the maintenance of a healthy and self-renewing mature city is the quality of community that is bounded by geography. Urban residents need to look beyond their personal properties and start investing in their neighborhoods. Zoning violations or encroachment on public pavement or even the street outside their front door is common. Retail store owners commonly take over public pavement space uncaring of the resultant pedestrian inconvenience and traffic chaos. Parks are taken over for religious activities. Stormwater drains are covered over and built upon. Unless local residents show some ownership, such examples will deteriorate quality of life. Most citizens have themselves not respected building regulations. Multiple administrative bodies with overlapping jurisdictional authority make the matters further complex. Reliable data are lacking; no comprehension and cohesive surveys are conducted. Public policies are made in an empirical vacuum. Policies and monitoring mechanisms are lacking.

It is high time that the city planners and managers should gear up to meet the challenges of urban planning, especially in the era of globalization wherein market forces will be, by and large, shaping the future of the cities. In view of the changing scenario and to make urban planning and development process sustainable, it would be appropriate to interlink the planning framework comprising national-level spatial strategies, regional-level strategy plans, the metropolitan region spatial plan, and city and ward level land use and development plans. Further, the process of a developmental plan should be facilitated by developing urban and regional information systems and providing access to remotely sensed data, aerial photographs and satellite imageries, and the Geographical Information System (GIS). The advent of digital technology with the availability of various modes of fast communication such as internet, intranet, cellular phones, and menu-based software has revolutionized the concept of governance. In a broader sense, e-governance represents the strategic and systematic use of modern information and communication technology by the government to improve the efficiency, transparency, and accountability in its functioning and interface with the citizens.

Planning and management of urban centers needs quicker reaction to the ground truth. The traditional information backup has a wide gap between paper and ground. GIS is a vehicle through which planners can be backed with geographic and attribute data for analysis and the decision-making process with fast update and analysis, especially in the field of property tax, fire, health, and other emergency services. The benefits of modern technology are that it makes infrastructure available in open domain, provides easy access to municipal services, hassle-free payment of taxes and user charges, quick redressal of grievances, development of regulatory mechanisms in the provision of services, access to information for investment decision and

project development, and improved information for urban sector research and policymaking and improved efficiency.

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people, an achievement sought by (i) incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement; (ii) encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population, is improved; (iii) improving access of business to markets and the various factors of production; (iv) bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus; (v) encourage greater use of public transport and non-motorized modes by offering central financial assistance for this purpose; (vi) enabling the establishment of quality-focused multi-modal public transport systems that are well integrated, providing seamless travel across modes; (vii) establishing effective regulatory and enforcement mechanisms that allow a level playing field for all operators of transport services and enhanced safety for the transport system users; (viii) establishing institutional mechanisms for enhanced coordination in the planning and management of transport systems; (ix) introducing Intelligent Transport Systems for traffic management; (x) addressing concerns of road safety and trauma response, (xi) reducing pollution levels through changes in traveling practices, better enforcement, stricter norms, technological improvements, etc.; (xii) building capacity (institutional and manpower) to plan for sustainable urban transport and establishing knowledge management system that would service the needs of all urban transport professionals, such as planners, researchers, teachers, and students; (xiii) promoting the use of cleaner technologies; (xiv) raising finances, through innovative mechanisms that tap land as a resource, for investments in urban transport infrastructure; (xv) associating the private sector in activities where their strengths can be beneficially tapped; and (xvi) taking up pilot projects that demonstrate the potential of possible best practices in sustainable urban transport (Ministry of Urban Development 2006c).

5.5 Conclusion

India is urbanizing. This transition, which will see India's urban population reach a figure close to 600 million by 2031, is not simply a shift of demographics. It places cities and towns at the center of India's development trajectory. In the coming decades, the urban sector will have a critical role in the structural transformation of the Indian economy and in sustaining the high rates of economic growth. Ensuring high-quality public services for all in the cities and towns of India is an end in itself, but it will also facilitate the full realization of India's economic potential. India's economic growth momentum cannot be sustained if urbanization is not actively facilitated. Nor can poverty be addressed if the needs of the urban poor are isolated

from the broader challenges of managing urbanization. Cities will have to become the engines of national development. India cannot afford to get its urban strategy wrong. The challenge of managing urbanization will have to be addressed through a combination of increased investment, strengthening the framework for governance and financing, and a comprehensive capacity building program at all levels of government.

According to the High Powered Expert Committee Report on Indian Urban Infrastructure and Services (2011) the key elements of a comprehensive framework of urban policy and planning are (i) increasing investment in urban infrastructure from 0.7 % of GDP in 2011–2012 to 1.1 % by 2031–2032 (ii) increasing spending on maintaining assets, both old and new; (iii) engaging in renewal and redevelopment of urban areas, including slums; (iv) improving regional and metropolitan planning with integration of land use and transportation; (v) ensuring access to services for all including the poor to meet the recommended norms; (vi) reforming systems of service delivery; (vii) improving governance of cities and towns by a unified command under a mayor; (viii) strengthening and securing the financial base of ULBs; (ix) State governments providing an enabling environment for ULBs to discharge their enhanced responsibilities; and (x) the government of India should launch a New Improved JNNURM (NIJNNURM) with focus on capacity building.

India's future is urban. It is in developing sustainable cities. Urbanization is both driven by and supports economic growth. Given this, the challenge for India is to avoid unplanned and haphazard urbanization and ensure orderly and citizen-friendly urban growth. The three pillars of sustainable urbanization are (i) improving enabling environments, the framework of institutions, policies, incentive structures, and reporting requirements for urban governance; (ii) ensuring that decentralization and devolution are made to work; and (iii) continuing programs of technical assistance and training for improving urban governance and management.

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