

5

Shelter and
Basic Services

@ Institute for Human Development

5.1 Background

Health, education and living standards, the three main components of the Human Development Index (HDI), are usually captured by life expectancy at birth, the mean years of schooling/expected years of schooling and the gross national income per capita.¹ Progress in these three dimensions has various underlying implications. For instance, improvements in health indicators could reflect progress on a host of inter-related fronts such as access to food, shelter, drinking water and sanitation facilities. Similarly, improvements in living standards reflect better access to the aforesaid services as well as to some other basic services such as electricity and transport, especially in the urban context. The Twelfth Five Year Plan in India, with its focus on inclusive growth, recognises the importance of improving access to basic amenities for all people.² Inclusive growth must not only translate into lower poverty levels, improved health outcomes, improved access to education, and better opportunities for wage employment and livelihoods, but “it should also be reflected in improvement in provision of basic amenities like water, electricity, roads, sanitation and housing” (p. 2, Approach Paper to the Twelfth Five Year Plan). The Delhi Human Development Report (2006) highlighted the deprivation faced by many of Delhi’s citizens in these very basic areas and discussed the related inequities that exist. Some of the pressing issues that were highlighted and discussed in the 2006 report included the deficient quantity and poor quality of water, and housing shortages.

Given the important role that basic services play in facilitating and enhancing various human development outcomes, it is imperative to focus on the access to and quality of basic amenities which impact the average citizen’s daily life in Delhi. In this chapter, an attempt has been made to explore the state of government provisioning in the crucial areas of housing and basic facilities such as water, sanitation, electricity, and transport, among other things, and analyse the successes and challenges in these areas. The scenario in the slums of Delhi and a few other types of settlements in the context of specific deprivations has also been examined. The underlying motive of this exercise is to understand the extent of inclusion in the access to various basic

facilities for slum-dwellers, which has important implications for policy interventions aimed at achieving inclusive growth and human development.

5.2 Shelter

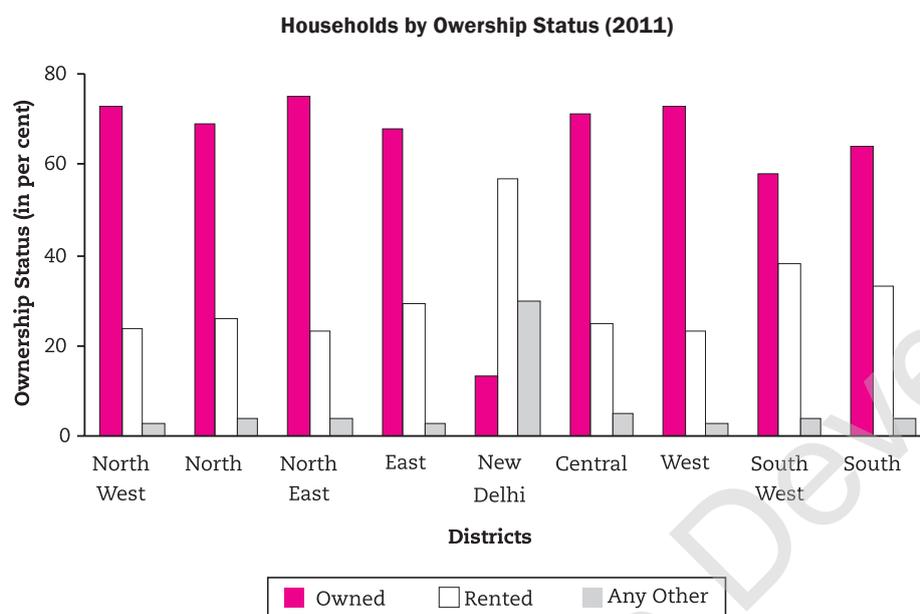
‘Shelter is important because it protects us from the elements, provides us with a basic sense of security, and a place for our families to interact. But it is also linked to other aspects of what we consider “normal life”: privacy, independence, dignity, safety. Shelter is fundamental to the enjoyment of many human rights’ (Quick Facts, Shelter and Human Rights: UNHCR, Canada, 2010).³ Housing does not simply signify a roof above one’s head, or a space enclosed within four walls. It is the place that people head towards at the end of a hard day’s work, or where families, including small children as well as the elderly, spend a large number of hours in a day, and where the family members have access to decent accommodation with enough space for all of them. However, the world over, the pressures of increased population, urbanisation, land scarcity and migration to urban centres have either pushed a large number of people into living in sub-standard housing or rendered them homeless. The latter group comprises persons who use any temporary shelter they can find or often sleep in the open, braving the weather and lacking any security. In the context of a metropolis like Delhi too, the living conditions and basic facilities in slums and some other types of settlements do not come anywhere close to the concept of ‘decent’ housing. A sizeable proportion of the homeless population living here does not have access to even basic shelter, leave alone any other support service. The congestion in the Delhi (NCT) region has led to the pressures on residential spaces and basic services, coupled with an escalation in land prices. The price index for housing for industrial workers (base year 2004-05) showed an increase of 11.3 per cent over 2010-11, which was slightly lower than the all-India figure of 11.8 per cent, but much higher compared to the figures prevalent in the other metros such as Chennai (6.6 per cent) and Kolkata (4 per cent) (Economic Survey of Delhi, 2012-13).

Among all the states and Union Territories (UTs), Delhi had the highest population density in 2011, at 11,297 people per sq. km. The population in Delhi has touched 16.75 million, as per the Census, 2011 estimates (Economic Survey of Delhi, 2012-13), despite a decline in the decadal population growth rate from 47 per cent during the period 1991-

1. <http://hdr.undp.org/en/statistics/hdi/>, Accessed on 3 April 2013.
2. Approach Paper to the Twelfth Five Year Plan, Available at: http://planningcommission.nic.in/plans/planrel/12appdrft/approach_12plan.pdf, Accessed on 3 April 2013.

3. http://www.humanitarianforum.org/data/files/resources/802/en/shelter_human_rights.pdf, Accessed on 4 April 2013.

Figure 5.1



Source: Census, 2011.

2001 to 21 per cent during 2001-2011. The city is overwhelmingly urban, with 75 per cent of its total area (1483 sq. km.) falling in an urban jurisdiction. In the urban areas, the population density is as high as 17,664 persons per sq. km (Economic Survey of Delhi, 2012-13). In contrast, the rural population now stands at only 4.19 lakhs.⁴ The Delhi Government's approach towards housing keeps the common citizen central to its ideology and aims at providing affordable housing for all, especially the economically weaker sections of society, in accordance with the National Urban Housing and Habitat Policy, 2007.⁵

The demand for shelter in Delhi is relentless, as more and more people continue to throng the metropolis, due to population growth as well as migration. In-migration during the decade 1991-2001 was 2.22 million, as compared to 1.64 million during the preceding decade of 1981-91 (Census figures cited in the Delhi Human Development Report, 2006, p. 41). Although, the annual population growth rate

has declined during 2001 to 2012 and the migration rates also seems to have stabilised, as mentioned in Chapter 2, an estimated 78,000 migrants come to Delhi annually.

5.2.1 Availability and Ownership of Housing

Despite the challenges of population growth, migration and land availability, housing stock in Delhi has increased over the years, while the gap in housing shortage remains. According to the Census 2011 estimates, there were 3.341 million households, residing in 3.176 million houses, which clearly indicate a shortage in housing. Houses in Delhi are not only used for residential purposes, but also have commercial use. Out of 4.61 million houses in 2011, only 4.09 million were occupied, and of the occupied houses, 77.6 per cent were being used for residential purposes. As regards the other uses, 9.2 per cent of these housing units were being used for shops/offices, 3.4 per cent for residential- cum- other purposes, and 5.8 per cent for entirely non-residential purposes. The quality of housing in Delhi has improved over the last decade, with the share of 'good' houses having increased from 58 per cent in 2001 to 66 per cent in 2011.⁶ Nearly one-third of the

4. Statement 2.15 in the Economic Survey of Delhi, 2012-13, Available at: http://delhi.gov.in/DoIT/DoIT_Planning/ES2012-13/EN/ES_Chapter_percent202.pdf), Accessed on 14 April 2013.

5. The National Urban Housing and Habitat Policy, 2007, focuses on providing "Affordable Housing to All", with special emphasis on the Economically Weaker Sections (EWS) and the Lower Income Groups (LIG). Available at: <http://mhupa.gov.in/policies/duempa/HousingPolicy2007.pdf>, Accessed on 14 April 2013.

6. The Census classifies houses as 'good', 'liveable' and 'dilapidated', in accordance with whether these are in good condition and need no repair, need minor repairs, or need major repairs, respectively.

houses need minor repairs and only 3 per cent are in a dilapidated condition and require major repairs (Census, 2011).

The ownership of houses in Delhi is also high, with 68 per cent of the households owning houses and 28 per cent living in rented premises (Census, 2011). The district-wise data reveals housing ownership to be higher in the northern than in the southern districts (Figure 5.1), with New Delhi being the only district having a higher share of rented than owner-occupied housing (many residents also avail of government accommodation in New Delhi).

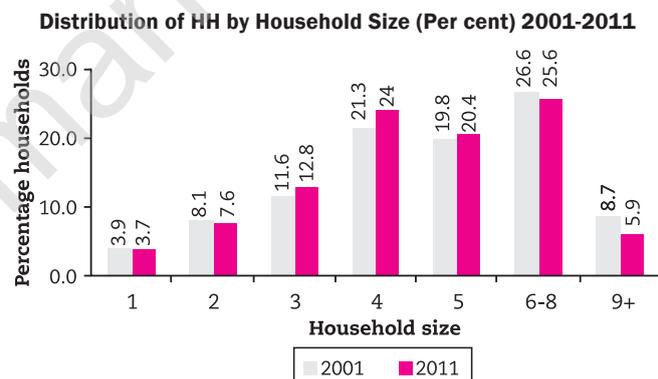
The high share of housing ownership in Delhi is a positive reflection of the housing situation and the official estimates too show that housing shortage has declined over time, from 2,53,679 in 1991 to 1,53,597 in 2011. This shortage also includes the homeless population and those living in *kuchcha* houses. The decline in housing shortage in the state has, however, primarily taken place between 1991 and 2001, with little improvement being seen in the situation during the last decade, and is reflected in the reduction of housing shortage by just 1.7 per cent. Other sources indicate that housing shortage may not be as low (Annexure 5.1). For instance, as per the estimates for the housing shortage provided in a Report released by the Ministry of Housing and Urban Poverty Alleviation (MHUPA) in 2012, estimates for housing shortage in Delhi are much higher at 0.49 million,⁷ showing a decline from approximately 1.1 million in 2007 (MHUPA).⁸

Even if the housing stock and the number of households grow at matching rates, shortages may persist because the houses that are being built may not be affordable by the homeless and other poorer sections of the population. In fact, the Delhi city index (RESIDEX) for tracking prices of residential properties used by the National Housing Bank (NHB) shows a steep upward rise from 100 in 2007 to 202 during the first quarter (January-March) of 2013.⁹

5.2.2 Crowding and Housing Density

Housing ownership encompasses a wide range of housing types. Unbundling housing ownership based on the Slum Census, 2011, reveals that in the Delhi slums, 0.27 million households (out of a total of 0.384 million households) had their own houses, that is, the ownership was as high as 70 per cent.¹⁰ However, 0.146 million households (accounting for 54 per cent of the households that owned houses) lived in single-room accommodations. The phenomenon of one-room cramped accommodation/shanties in slums in the name of a 'house' is well-known, with many house-owners also lacking tenure security. This is true even for new resettlement colonies wherein the beneficiaries are entitled to short period leases. Clubbing such dwellings with houses wherein the middle classes and rich people reside could be misleading.¹¹

Figure 5.2



Source: Census of India, 2001 and 2011.

The relatively higher ownership among poorer households is reflected in large families staying in one/two room accommodations. The distribution of households by size (Figure 5.2) shows that in Delhi, in 2011, around a quarter of the households had 6-8 family members while 44 per cent of the households had family size of 4-5. Also, 32 per cent of Delhi's households lived in one-room accommodations. Despite their large household sizes, families are clustered in one and two room accommodations (Figure 5.3), reflecting housing congestion. The Perceptions Survey data, 2013 reveals that on an average, about 2.5 persons live in one-roomed accommodations, and this figure is the highest

7. http://mhupa.gov.in/W_new/urban-housing-shortage.pdf, Accessed on 10 April 2013. Estimates provided by the Technical Group on Urban Housing Shortage (TG-12) (2012-17) constituted by the NBO, Ministry of Housing and Urban Poverty Alleviation. The estimate is based on Census and NSS 65th Round results on 'Housing Conditions and Urban Slums', July 2008-June 2009.

8. <http://mhupa.gov.in/ministry/housing/HOUSINGSHORTAGE-REPT.pdf>, Accessed on 11 July 2013.

9. <http://www.nhb.org.in/Residex/delhires.php>, Accessed on 10 July 2013.

10. http://www.censusindia.gov.in/2011census/hlo/Slum_table/hl-slum/SHH1604-crc.pdf, Accessed on 11 July 2013.

11. A detailed discussion on housing and basic services in slums/JJ clusters follows later on in this chapter.

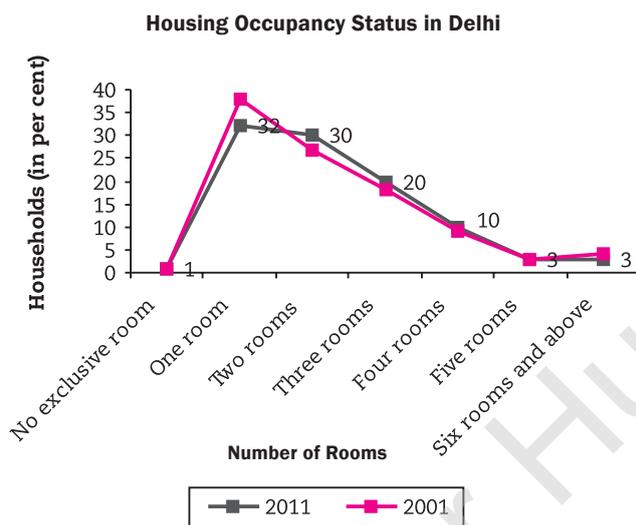
for *Jhuggi Jhopdi* (JJ) clusters at 3.5. Paradoxically, a number of vacant houses (11 per cent) in Delhi have been found to be coexisting with the crowding and congestion. Considerable variation is seen in the district-wise share of vacant houses with the North-west and South-west districts reporting 14 per cent vacant houses and the Central district having the lowest corresponding share of 6.74 per cent. It is interesting to note that despite the housing congestion, Delhi is better placed in terms of housing as compared to the other metropolises. The percentage of households living in a single room is 63 per cent in Mumbai, 42 per cent in Kolkata, and 39 per cent in Chennai (as per Census, 2011, estimates).

5.2.3 Rented Households, Rent Paid and Their Satisfaction Levels

The Census, 2011, shows that in Delhi, approximately 28 per cent of the households live in rented accommodation. As pointed out in chapter 2 on employment and livelihoods, lower income groups in Delhi spend very large proportions of their income on rent. In the lowest income category, around 45 per cent of the households were spending 20-40 per cent of their incomes on rent.

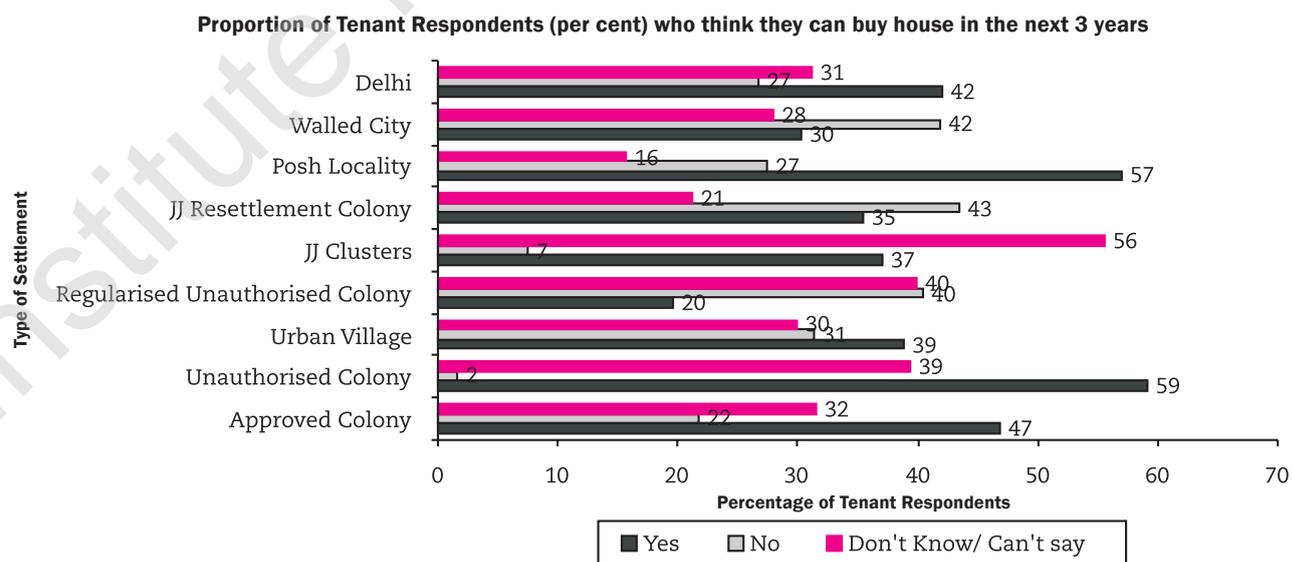
In order to ascertain the satisfaction levels in terms of housing quality and the amount of rent paid, the Perceptions Survey, 2013, divided people's satisfaction levels into three categories, viz. fully satisfied, somewhat satisfied, and not satisfied. The Survey found: *First*, on an average, 59 per cent of the tenants were somewhat satisfied, while 22 per cent were fully satisfied with their housing quality and the amount of rent they were paying. This pattern was similar across social and religious groups. Almost 54 per cent of the households belonging to higher income categories responded as being fully satisfied, and considering that there were more tenants in the higher income groups, it may be surmised that those who were paying high rent were also availing of good quality housing. *Second*, people residing in rented houses largely showed a positive outlook with approximately one-fifths of them reporting that they intended to buy a house within the next three years. Of these households, 42 per cent reported that they actually expected to be able to buy a house within

Figure 5.3



Source: Census of India, 2001 and 2011.

Figure 5.4



Source: Perceptions Survey, 2013.

the next three years (Figure 5.4). *Third*, almost 60 per cent of the respondents living in unauthorised colonies and 57 per cent residing in posh localities expected to be able to buy a house within the next three years. Except for the regularised unauthorised colonies, other settlements revealed 30-47 per cent of the respondents as being confident about being home owners. However, those who felt that they would not be able to buy a house within the next three years accounted for a high share (40 per cent or above) in the JJ resettlement colonies, the Walled City and regularised unauthorised colonies. A large share of the respondents in the JJ clusters did not reply in either 'yes' or 'no'.

5.2.4 The Homeless

Homelessness is a global phenomenon and millions of people all over the world are found to be spending their lives on pavements, on roadsides, railway platforms, in subways, under bridges, at their workplaces, in temple premises and so on—these are the people who lack a permanent place to call 'home'. Many factors contribute to this disturbing phenomenon, including rapid urbanisation, population pressures, and rural-urban migration, among others. In the Indian context, it has been found that extreme poverty in rural India causes many people to leave their homes and migrate to big cities. Unable to cope with the migratory shift, they end up becoming homeless. Natural disasters also act as a trigger for migration to urban centres as a survival strategy (Government of NCT of Delhi, Homeless Survey, 2010).

With an estimated 13 million homeless across the country, homelessness is not a phenomenon peculiar to Delhi, though the latter had an estimated homeless population of 56,000 in 2010 (*ibid.*).¹² The plight of the homeless in Delhi was recognised by the Supreme Court, which in January 2010 directed the Government of Delhi, the MCD, the NDMC and the Delhi Cantonment Board to set up a minimum given number of temporary and permanent shelters and community kitchens for

them and to issue AAY ration cards to them.¹³ It also directed the State Governments and Union Territories (UTs) to undertake a detailed survey on the homeless at the earliest and submit the detailed reports through their affidavits. Following this, in June-December 2010, a survey of the homeless population in Delhi was conducted at the behest of the Delhi Government, as an instrument for ensuring the rights of homeless citizens.¹⁴ The homeless in Delhi also stand to benefit from another important order in February 2010, whereby the Supreme Court mandated the following for all state governments and ULBs for cities covered under the JNNURM and having a population of more than 5 lakhs.¹⁵

- One 24-hour, 365-days-a-year, homeless shelter with a capacity of 100 persons for every population size of one lakh.
- Basic amenities including mattresses, bed rolls, blankets, portable drinking water, functional latrines, first aid and primary health facilities, and de-addiction and recreation facilities, among others.
- Thirty per cent of the shelters to be special shelters for women, the old and infirm, and to function as recovery shelters).

5.2.5 Government Initiatives

With the aim of making Delhi a slum-free city, the Delhi Government has, in its approach to the Twelfth Five Year Plan, outlined mission objectives that embrace human development goals, irrespective of class and status, including: environmentally

12. A study undertaken by the Institute for Human Development in 2007 pegged the number of shelter-less persons in Delhi at 46,788 in 2007 (IHD, 2007).

13. The details of the directive are: to set up at least 100 temporary shelters for people living in the streets within one week, to build at least 140 permanent shelters for people living in the streets by December 2010, to set up at least 500 community kitchens across the city and provide nutritious and cheap cooked food, to issue AAY ration cards to all homeless people in Delhi with a validity of at least two years, which could be renewed, should they remain homeless in the city by 31 March 2010, and to file an affidavit to the Supreme Court on the steps undertaken to protect the food and shelter rights of homeless people in the city by 15 February 2010, Available at: http://www.righttofoodindia.org/data/homelessness_data/July_2011_report_urban_homeless_national_advisor_on_homeless_to_the_commissioners_of_supreme_court.pdf, Accessed on 12 July 2013.

14. The survey was supported by GNCTD and UNDP. Mission Convergence, the flagship programme of the Delhi Government, selected St. Stephen's Hospital as the Mother NGO for the survey.

15. <http://www.righttofoodindia.org/orders/interimorders.html>, Accessed on 10 February 2013.

Box 5.1

Homeless in Delhi: A Snapshot

There are very few studies on headcount of the homeless population Delhi. A survey conducted by the IHD-GNCTD (2007) revealed a shelter-less population of 46,788 in Delhi. According to another study by the GNCTD-UNDP (2010), the shelter-less population in the city numbers 56,000. The main observations from the GNCTD-UNDP Survey (2010) for the homeless in Delhi were as follows:

- A majority of the homeless were men (85 per cent) and young adults.
- A majority of the homeless people were working and were productive citizens of the city.
- The motivation to migrate was a result of the poor state of the rural economy.
- Most of the homeless slept on the pavements and at workplaces, cooked their own food and consumed water from unsafe sources.
- A large number of the homeless were children, and more than 20 per cent of them were less than 18 years old.
- The ratio of homeless girls falls sharply as they enter puberty and adulthood.
- Harassment from the police is a major problem faced by the homeless besides other difficulties.

The homeless in Delhi were concentrated in three districts, accounting for 61 per cent of the total: 25 per cent in the Central district, 19.3 per cent in the North-west district, and 16.8 per cent in the South district. They were usually rag-pickers, rickshaw-pullers, construction workers, and porters, among others. Their contribution was invaluable in running the city's business and easing the daily life of its people.

The Survey Report outlined the need for the following in its recommendations:

- More appropriate and affordable shelters;
- Special shelters for women, children, families, the disabled and the destitute;
- Access to subsidised food rations for the homeless;
- Locations with a high density of homeless to be provided with additional public taps, drinking water facilities and public toilets;
- Sensitisation of the police about the needs of the homeless; and
- Issuance of Identity cards for the homeless.

Sources: IHD-GNCTD, 'Shelter-less Persons in Delhi', 2007; and GNCTD-UNDP Study on Homeless in Delhi, 2010.

sustainable urbanisation; provisioning of basic amenities in all habitats irrespective of their status; urbanisation for more inclusive growth with provisioning for social services; skill development and policy initiatives for productive employment for EWS workers; and convergence of all programmes to make Delhi a slum-free city, urbanisation with preservation and conservation of its built heritage to make Delhi a Heritage City of global standards.¹⁶

The Delhi Government is only one of the many players in the housing sector because land, land

development and public housing are under the jurisdiction of the Delhi Development Authority (DDA). However, with the introduction of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM)¹⁷ scheme, the Delhi Government is now

16. An Approach to the Twelfth Five Year Plan (2012-17), Available at: www.delhi.gov.in, Accessed on 12 May 2013.

17. The Mission Statement of the JNNURM includes attention to reforms and fast-track planned development of the identified cities. The focus is on ensuring efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of ULBs/Para-statal agencies towards citizens. There are two submissions under the JNNURM: (i) for urban infrastructure and governance, and (ii) for basic services to the urban poor. Source: <http://jnnurm.nic.in/wp-content/uploads/2011/01/PMSpeechOverviewE.pdf>, Accessed on 12 May 2013.

Box 5.2

Some Policy Landmarks of the Delhi Government in the Area of Shelter and Housing

Night Shelters including Mobile Shelters by DUSIB (Delhi Urban Shelter Improvement Board)

The scheme aims to provide night shelters and mobile shelters to the shelter-less population. The DUSIB has setup 150 night shelters in all parts of the city. Of these, 66 night shelters are functioning in permanent structures and 84 in temporary structures. These night shelters have also been provided with the basic facility of Sulabh Shauchalayas. The upgradation of 52 community halls into night shelters is in progress.

The Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

Under this Central Government scheme, infrastructure building, improving quality of services and spatial development of the city have been brought into focus to facilitate qualitative improvements in urban areas. It also includes the provisioning of low-cost houses and upgradation of slums by providing basic services to the urban poor.

Under the Basic Services for the Urban Poor (BSUP) scheme under the JNNURM, the Government of India has approved 17 EWS housing projects for construction. These projects together would provide 67,784 dwelling units for the poor in Delhi. Of these 14,844 units have already been constructed, while issues in beneficiary selection etc remain, and about 1,505 households have been allotted flats or have been issued letters of allotment.

In another initiative, the Government of the National Capital Territory of Delhi (GoNCTD) has conferred ownership/freehold rights to about 45 JJ resettlement colonies, which were held on lease/license basis till June 2006. This conferment promises tenure security to almost 1.25 million persons (2,50,000 plot-holders/ households) on payment of a conversion charge. This conferment is also being considered for other such settlements.

Rajiv Awas Yojana (RAY)

RAY is a significant policy guideline under the JNNURM for enabling slum redevelopment, rehabilitation and promotion of affordable mass housing. It envisages a 'slum-free city' in which every citizen has access to basic civic and social services and decent shelter. It aims to achieve this vision by encouraging states/UTs to tackle the problem of slums in a definitive manner, by using a multi-pronged approach. It focuses on bringing all the existing slums, notified or non-notified, within the formal system and enabling them to avail of the same level of basic amenities as the rest of the town. It aims to provide support to states for redeveloping all the existing slums in a holistic and integrated way, and to create new affordable housing stock. About 250 cities are expected to be covered under this scheme by the end of the Twelfth Five Year Plan.

Sources: Economic Survey of Delhi, 2012-13, and Department of Urban Development, GoNCTD.

engaged in the construction of houses for the EWS (Economically Weaker Sections). However, here again, given the huge size of the target populace, the Government's initiative would be limited by the fact that the availability and allotment of land is under the jurisdiction of the DDA. In order to cater to a projected population of 23 million by 2021, the Delhi Master Plan Document (MPD-2021) is planning to add 20 lakh new dwelling units over the period 2001-2021, out of which 54 per cent of the units would be for the EWS and LIG (Low Income Group) categories.¹⁸

However, implementation issues in schemes aimed at supplementing housing facilities for the poor remain. The night shelters are often situated in 'difficult to reach' locations, and lack basic services.

The regular functioning of these shelters also needs improvement.¹⁹ The Government of the NCT of Delhi has submitted a detailed proposal to the Government of India under the Rajiv Awas Yojana, for undertaking slum surveys, mapping slums, and developing a slum information system. Some policy landmarks of the Delhi Government in the area of shelters and housing are listed in Box 5.2.

5.2.6 Providing Legitimacy and Housing to the Rural Populace²⁰

Tenure security, legitimacy and identity are important for ensuring dignified living, apart from basic

18. An Approach to the Twelfth Five Year Plan (2012-17), Available at: www.delhi.gov.in accessed on 12th May 2013.

19. Ashray Adhikar Abhiyan representative's statement at the consultation organised by IHD.

20. Information source: Department of Urban Development, GoNCT.

services and housing. It is known that in Delhi, large areas of land meant for agricultural purposes get converted into unauthorised settlements, either just outside the *laldora* areas,²¹ or even away from these areas. Provisions under the Delhi Land Reforms Act (1954) mandate authorities to serve notices to such settlements, which use these areas for non-agricultural purposes. While they are meant to counter unplanned development, these laws are often used to exploit the poor and other residents through rent-seeking and, in general, need to be revised by keeping in mind urbanisation and the growing demand for residential land within the city. To this end, the Government of the National Capital Territory of Delhi (GoNCTD) has taken some meaningful measures that have helped 'unauthorised settlements' to lose their tag of illegitimacy, allowed owners to sell and register the sale of property and also legitimise access to basic services for residents in this area. While this measure is directed mainly towards those living in unauthorised settlements, given the numbers of such settlements, both the regularisation and extension of *laldora* areas is estimated to benefit about 4 million persons.

The drive to legitimise a large section of Delhi's population was initiated in 2007, when all such settlements were invited to apply for regularisation. In 2007, 1639 residential welfare associations (RWAs) applied, and by 2012, 895 such settlements (of which 42 were *laldora* extensions) were regularised after the fixing of boundaries. Many settlements were unable to apply in 2007 and some could not be regularised due to land-related issues. In order to legitimise more such settlements, the GNCTD again invited such colonies to apply in July 2013. Apart from providing legitimacy, this move is likely to significantly bridge disparities by providing access to basic services and facilitate much-needed inclusion.

In summary, the highly urbanised city of Delhi is likely to face challenges in the housing sector due to the extremely high population density and lack

of sufficient affordable housing facilities. Although the decline in housing shortage and improvement in housing conditions is a promising development, the number of people living in slums and slum-like conditions and the homeless is still large. While the ownership of houses is high in Delhi at 68 per cent, and even higher for the slums at 70 per cent, it is evident that houses in slums and those in affluent localities are not comparable. The one room/two room cramped living quarters usually found in the slums cannot be termed as decent housing. Many slum-owners also lack tenure security. Despite the congestion in housing, citizens living in rented houses in Delhi were found to be largely upbeat as regards the future outlook based on the findings from the Perceptions Survey, as 21 per cent were planning to buy a house within the next three years and 42 per cent of them were expected to be able to buy it. This share is higher for the affluent localities.

The various Government initiatives in housing are likely to have contributed to this positive outlook of the people. Central plans such as the JNNURM and the RAY (Rajiv Awas Yojana) have been launched with the aim of making Delhi a slum-free city, and the Delhi Government has been working in close coordination with the Centre for implementing these schemes, along with making houses for the EWS and building night-shelters.

5.3 Basic Services

One of the duties of the State is to provide all its citizens with adequate access to basic services such as water, sanitation, electricity and transport. Water, for instance, is an extremely precious natural resource, which must be used judiciously for there to be enough to go around, not just for the present generation, but also for those to come. However, as the 2006 Global HDR points out, access to this resource is also controlled by other factors such as poverty, inequality and government failures, due to which the poor and vulnerable segments of society can be 'locked out'.²² Delhi too has a multi-tiered society with a huge gulf between the living standards of those at the bottom and those at the top. The aggregate level statistics need to be probed further to bring out the multiple situations faced by people from widely differing backgrounds and here an attempt has been made to analyse the basic services scenario

21. *Laldora* literally means 'red thread', which was in use in the past for demarcating the jurisdiction of a village. Presently, it denotes the boundary of the territory of a village within which the norms and controls of the municipality or urban development authority are not applicable. However, since these areas did not come under the purview of the Municipal Corporation of Delhi (MCD), haphazard development has taken place here. The land in these areas was supposed to be sold to a villager only so that outsiders would not increase the population density. Source: http://articles.economicstimes.indiatimes.com/2006-11-12/personal-finance/27467106_1_lal-dora-urban-villages-mcd-area, Accessed on 14 May 2013.

22. Delhi Human Development Report, 2006, "Beyond Scarcity, Power, Poverty and the Global Water Crisis", Available at: <http://hdr.undp.org/en/reports/global/hdr2006/>, Accessed on 16 May 2013.

Table 5.1
Basic Facilities Available to Households in Delhi (Census, 2001 and 2011)

Sl. No.	Items	2001 (in '000)	Percentage of Total Households	2011 (in '000)	Percentage of Total Households
1.	Electricity	2372	92.86	3311	99.1
2.	Toilet facility	1991	77.96	2991	89.5
3.	Electricity and toilet facility	1874	73.77	2980	89.1
4.	Electricity available but no toilet facility	498	19.49	331	9.9
5.	Toilet available but no electricity	117	4.59	11	0.3
6.	No electricity and toilet facility	65	2.55	19	0.6
7.	Water supply				
	(i) Piped water supply	1924	75.33	2717	81.3
	(ii) Handpumps/tubewells	560	21.91	458	13.7
	(iii) Wells	1	0.04	3	0.1
	(iv) Other sources (river/canal/tanks)	69	2.72	163	4.8

Source: Socio-economic Profile of Delhi, 2011-12, Available at: www.delhiplanning.nic.in, Accessed on 14 May 2013.

with the help of disaggregated data in terms of the types of settlements, socio-religious groups, income groups and districts. Findings from the Perceptions Survey and Focus Group Discussions, 2013, constitute a useful source of information, helping one to gauge the pulse of the people in terms of how they view their access to various basic services as well as the quality of the latter.

An analysis of the provisioning of basic services over the last decade (Table 5.1) indicates that the Delhi Government has taken remarkable strides in this sphere. There is near-universal electrification, and 90 per cent of the households have access to sanitation facilities. The supply of drinking water by the Delhi Jal Board (DJB) now reaches 81 per cent of the households as opposed to 75 per cent ten years ago. Less than 1 per cent of the households are without both toilet facilities and electricity.

Drawing from the Perceptions Survey, data presented in Table 5.2 reveals people's perceptions about the improvements and/or deterioration in the provisioning of public services in Delhi over the last three years. Overall, electricity, bus services and street-lights are clear winners with a high proportion of the respondents claiming that these services had shown an improvement. A moderate share of the respondents reported an improvement in road conditions, water supply and garbage collection services. Sanitation, specifically the condition of

public toilets, was rated the worst amongst all the public services. In the subsequent sections, the provisioning of basic services is discussed individually, and assessed not only at the aggregate level, but also from the point of view of the vulnerable segments which may still be underserved.

Table 5.2
Proportion of Respondents Reporting Perception of Change in Basic Services during the Last Three Years in Delhi

Public Services	Improved	Deteriorated
Power supply	56.6	3.0
Bus services	53.9	4.1
Street lights	42.0	6.0
Road conditions	29.3	15.3
Water supply	26.3	9.8
Garbage Collection	23.7	9.8
Public toilets	20.2	26.3

Source: Perceptions Survey, 2013.

5.3.1 Access to Water Supply

Urban development must give top priority to planning for water, toilets and sewerage as an integrated whole taking into account the likely expansion of the urban population (Draft Twelfth Five Year Plan)

As the global Human Development Report, 2006, puts it, “access to water for life is a basic human need and fundamental human right”. Lack of safe drinking water can cause death, especially among children. Also, women and children invest considerable effort and time to collect and carry water.²³ Overall, it would not be an under-statement to say that poor access to water, drinking or otherwise, is not only life-threatening, but also increases the vulnerability of people by restricting the options available to them towards fully utilising their potential for human development.

Among all the basic services, water and sanitation are areas wherein, as per the Perceptions Survey, 2013, the citizens of Delhi are facing considerable problems. While less than half (48 per cent) of the respondents reported water availability to be above average (that is, ‘very good’ or ‘good’), a quarter (26 per cent) rated it as either ‘very poor’ or ‘poor’. Around 10 per cent of the households did not have their own toilet facilities, and a recent Government Survey²⁴ has found that 56 per cent of the children living in slums and unauthorised colonies in Delhi defecated in the open, which compromised not only their health but also their security.

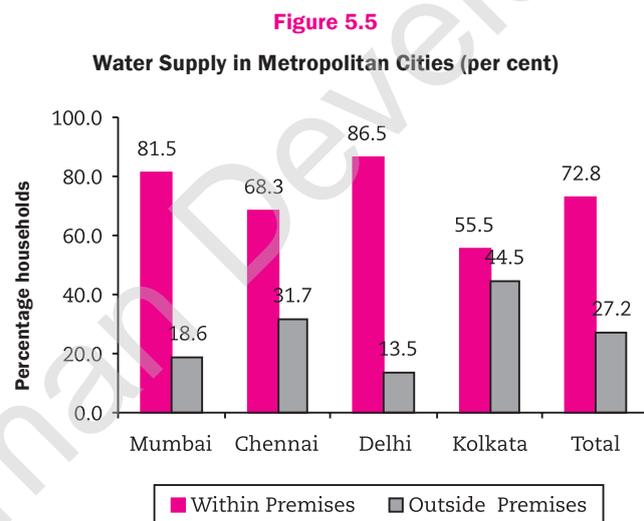
Water Availability

Water availability in Delhi improved considerably between 2001 and 2011. In 2011, approximately 81.3 per cent of Delhi’s population received piped drinking water supplied by the DJB (Table 5.1), while the residual population accessed water from hand-pumps, tube-wells, wells, rivers, canals, etc. The situation reflects an improvement since 2001, when 75.3 per cent of Delhi’s residents received DJB supply. The expansion in the coverage of drinking water supply took place despite a sharp increase in the number of households in Delhi over the period 2001-11 (from 2.55 million in 2001 to 3.34 million in 2011).²⁵ Disparity in access measured in terms of the distance to the source of drinking water shows a marginal improvement over the same period (Census, 2011). Thus, there is still considerable scope for correcting

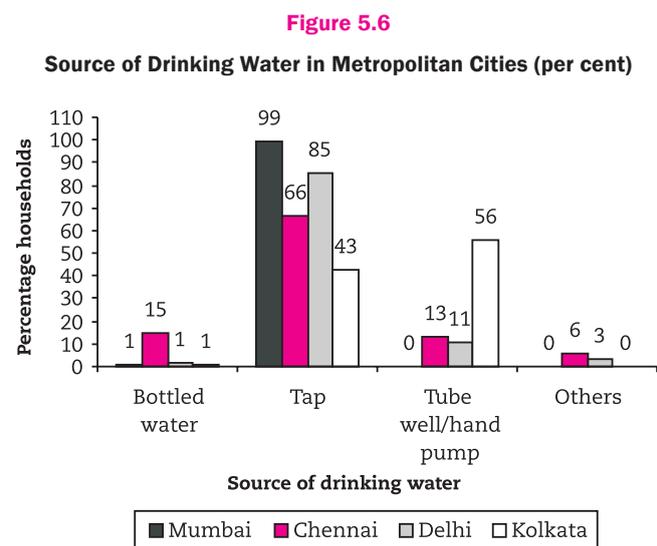
23. Human Development Report, 2006, “Beyond Scarcity, Power, Poverty and the Global Water Crisis”, Available at: <http://hdr.undp.org/en/reports/global/hdr2006/>, Accessed on 16 May 2013.
24. Report on ‘Water, Sanitation and Hygiene—Report of the Baseline Survey 2012’, from Mission Convergence, Available at: India Sanitation Portal, Accessed on 16 May 2013.
25. Census estimates, Available at: http://delhi.gov.in/DoIT/DoIT_Planning/ES2012-13/EN/ES_Chapter_percent202.pdf, Accessed on 17 May 2013.

the disparity in access to drinking water within the household premises.

Delhi fares well as compared to other metros in supplying water to households within their premises (Figure 5.5), accounting for the highest share (86.5 per cent), higher than the metros of Mumbai, Kolkata, and Chennai. In terms of providing piped drinking water to households, Delhi is second only to Mumbai, among the four metros considered (Figure 5.6).



Source: NSS 65th Round (2008-09).



Source: NSS 65th Round (2008-09).

While the aggregate water situation has improved over the past decade, the distribution of water is not equitable across districts, with the peripheral areas receiving lower volumes per resident (Figure

5.7) especially in the North, North-west, North-east and southern districts. The Perceptions Survey, 2013 also reveals a disparity among districts in terms of satisfaction with water availability (Figure 5.8). In the North-west and South-west districts, residents were found to be most dissatisfied with the availability of water, while in the east and New Delhi districts, residents rated water availability as high.

The poor and under-privileged in Delhi receive subsidised water, but it comes at a price, in terms of time and cost. Hours of waiting in queues at water points and fights around water tankers are a common sight in the slums of Delhi. This is reflected in the high proportion of residents in unauthorised colonies and JJ clusters rating water availability as 'very poor/poor', while respondents from the settlements such as posh localities and approved colonies seemed more satisfied (Figure 5.9). Among the Delhi slums, which are solely dependent on government provisioning for water, just half the households have drinking water available within their premises and nearly 10 per cent have to go far away to fetch water.²⁶ The disparate access to drinking water is also brought out by the Perceptions Survey, which shows an increase in access to DJB piped water with increases in income.

Figure 5.7

District-wise Availability of Drinking Water (percent) in Delhi



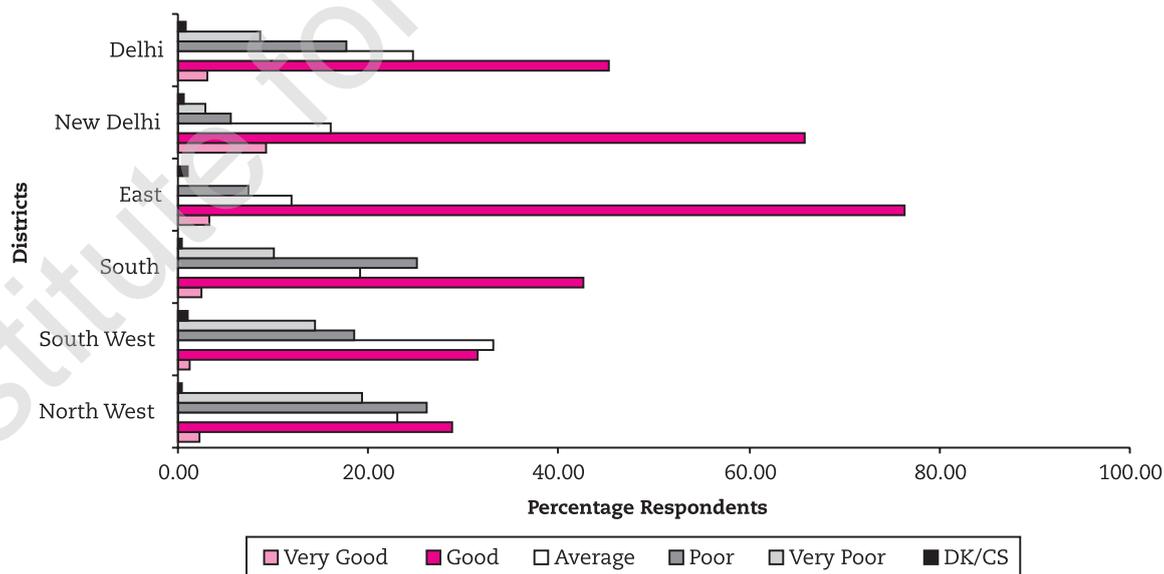
Source: Census, 2011.

Demand-Supply Scenario

The continued influx of people into Delhi creates an ever-rising demand for drinking water, which cannot be met by the existing production facilities (Figure 5.10). The total water supply from all sources in 2010 was around 845 MGD (million gallons water per day), including 745 MGD of surface water and 100 MGD of ground water. The total requirement in 2010 was 1080

Figure 5.8

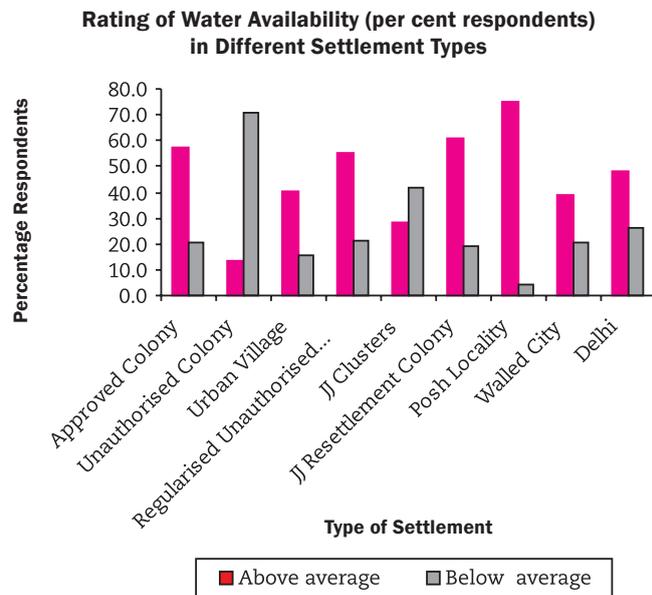
Rating of Availability of Water Supply in Selected Districts (per cent respondents)



Source: Perceptions Survey, 2013.

26. For a detailed discussion on slums, see Section 5.4.

Figure 5.9



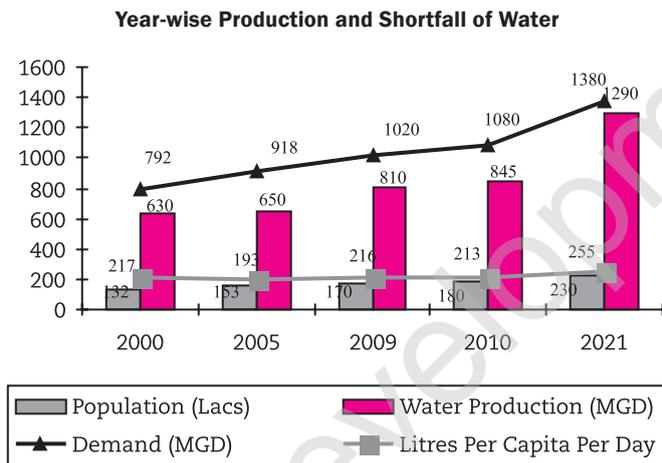
Source: Perceptions Survey, 2013.

MGD, implying a shortfall of 235 million gallons per day. In 2011, the shortfall was less at around 165 MGD. On the basis of a projected population of 19 million and the DJB consumption norms of 60 GPCD, the water supply requirement is projected to be around 1140 MGD by the end of the Twelfth Five Year Plan.²⁷

Deficits in the availability of raw water, the fast depleting groundwater and leakages from supply pipes are some of the main challenges faced by the DJB when tackling the increasing demand for water. The districts in South and South-west Delhi are worst affected by lowering ground water levels (below 20-30 meters from the ground level). DJB estimates a distribution loss of around 40 per cent of the total water supplied resulting from leakages alone.²⁸ Seven out of the nine revenue districts are reported to be precariously placed in terms of the availability of groundwater. The South and South-west districts have been declared as Notified Areas wherein there is to be no more extraction of groundwater. East, New Delhi, North-east, North-west and West Delhi districts have also been declared as 'over-exploited areas' by the Government.

27. Approach to the Twelfth Five Year Plan, Available at: <http://delhi.gov.in>, Accessed on 17 May 2013.
28. http://delhi.gov.in/DoIT/DoIT_Planning/ES2012-13/EN/ES_Chapter13.pdf, Accessed on 17 May 2013.

Figure 5.10



Source: Delhi Jal Board.

Water Quality

Poor quality of drinking water emerges as a major issue for Delhi-ites, as reflected in the Perceptions Survey, which reports that nearly half (47 per cent) of the respondents faced problems related to water quality in their daily lives. In terms of localities, a higher proportion of respondents from the Walled city (76 per cent), JJ clusters (59 per cent) and urban villages (56 per cent) reported issues with water quality. The FGDs corroborate these findings (Box 5.3).

The deteriorating quality of surface water and groundwater in Delhi has for long been an alarming development environmentally. The salinity of groundwater is increasing in South-west and North-west Delhi. In some areas of Shahdara and Kanjhawala, nitrate content has been found to be more than 1000 mg/litre, whereas the desirable limit of nitrate levels, according to Indian health standards, is a meagre 45 mg/litre.²⁹ The citizens of Delhi also incur high costs to procure water that is fit to drink by using systems like RO and Aquaguard, which the poorer segments of population cannot afford. The poor quality of surface water of the Yamuna, a river traversing a total distance of 48 km in Delhi, has for long troubled the city planners. The Yamuna accounts for 70 per cent of Delhi's water supply. However, the stretch of the river running through Delhi is extremely polluted as a result of the uncontrolled flow of untreated sewage and the discharge of industrial effluents. An additional reason is that no fresh water is available for dilution in Yamuna, as the entire fresh water from Wazirabad is used to meet

29. Indian benchmark data obtained from UNICEF, 2013.

Box 5.3

Water Availability and Quality: Findings from FGDs

In low-income localities such as the JJ clusters, JJ resettlement colonies and unauthorised colonies, there exist water supply as well as water quality issues.

- The Delhi Jal Board's piped water has not reached some JJ clusters covered in the FGD sample as well as many households in one regularised unauthorised colony. Some households depend on community standposts and some need to travel far to fetch water.
- Even in the areas where DJB water is available, there were issues cited regarding poor quality and severe shortages during the summer months. The seasonal water scarcity often led to fights colonies and sometimes people had to resort to buying water. Some of the better-off families augmented water supply from bore-wells where the cost had to be shared by the beneficiaries.
- Even many authorised colony residents cited issues about the quality of water including dirty water and foul-smelling water.
- Shortage during summer was a common complaint and some respondents reported that water bills were irregular and inflated.

Source: Focus Group Discussions conducted by IHD, 2013.

drinking water needs of the citizens of Delhi. It is alarming that the Yamuna has the lowest Dissolved Oxygen (DO) and highest count of total Coliform and faecal Coliform numbers among all rivers in the country. It also has one of the highest Biochemical Oxygen Demand (BOD).³⁰

Water Tariff and Revenue

The issue of garnering resources to carry out the necessary investments in the water sector to deal with both the water deficit as well as its quality is problematic. Huge revenue losses have been incurred by the DJB due to unmetered connections, which constituted about 20 per cent of the total connections in 2011-12 (Economic Survey of Delhi, 2012-13). The tariff, while having a volumetric structure, that is, 'pay more as you use more', also provides a high subsidy for poor consumers consuming up to 20 kl per month, and free water for connections with monthly usage up to 6kl consumption. Till recently, the DJB did not have accurate estimates of the volume of raw water going for treatment and treated

water available for distribution, and consequently could not estimate losses. Bulk meters have now been installed at water treatment plants to arrive at accurate estimates of the water supplied to consumers with consumption norms being applied for those without functional meters. Consumers are now also allowed to buy meters from the open market.

While the Perceptions Survey, 2013 showed that on an average, 80 per cent of the respondents across all the districts pay water bills, the incidence of non-payment was higher in the North-west (33 per cent) and South (26 per cent). Settlement-wise, the incidence of non-payment of bills was very high in the JJ clusters, wherein 69 per cent of the respondents reported not making any bill payments (Annexure 5.2). The non-payment would be partly due to the fact that two-fifths of the residents in these JJ clusters lack piped water supply.

Government Initiatives

Recognising the need for urgent reforms and capacity addition in the water sector, the Delhi Government has undertaken a number of initiatives during the Eleventh Five Year Plan period,³¹ and these include:

30. Coliform is a form of bacteria. BOD is the amount of dissolved oxygen needed by aerobic biological organisms present in a body of water to break down organic material present in that water. The annual average of DO has ranged from 0.7mg/litre at Shahdara (downstream) to 7.6 mg/litre at Palla. The annual average of BOD has ranged from 2.07mg/litre at Palla to a high 54.5mg/litre at Khajuri Pantoonpul. These do not conform to the CPCB water quality standards for DO and BOD, which are 4mg/litre and 3mg/litre, respectively for class 'C' of river water.

31. http://delhi.gov.in/wps/wcm/connect/DoIT_Planning/planning/important+links/an+approach+to+12th+five+year+plan+percent282012-17+percent29, Accessed on 18 May 2013.

- One water treatment plant has been constructed and two more are being built.
- Three waste water recycling plants have been made operational and one is being built.
- The Sonia Vihar Water Treatment Plant with a capacity of 140 MGD has been made functional, resulting in improved supply in East and South Delhi.
- DJB has attended to the replacement of corroded and outlived pipes, reducing water supply leakage. Trunk mains near water treatment plants have been replaced by superior quality pipes and new meters have been installed.
- Rainwater harvesting is being promoted and subsidy is being provided by the Government for the installation of such systems. Since June 2001, the Ministry of Urban affairs and Poverty Alleviation has made rainwater harvesting mandatory in all new buildings with a roof area of more than 100 sq. m. and in all plots with an area of more than 1000 sq. m. that are being developed.³²

In order to address water quality issues, Yamuna Action Plan-I (YAP-I), one of the largest river restoration projects, covering Delhi and some parts of Uttar Pradesh and Haryana, was initiated in 1993 as part of a joint effort by the Governments of India and Japan. However, cleaning the Yamuna remained an unfinished agenda under YAP-I and threw up the need for active people's participation. YAP-II focused on building new sewage treatment plants and expanding the capacity of old plants in order to address the most polluted stretch in Delhi. It also brought in NGOs to work at the community level on themes such as the socio-economic upgradation of the Community Toilet Complexes (CTCs) and the adjacent neighbourhoods, along with school health and hygiene programmes, etc. Now YAP-III has been approved for implementation of the selected projects by DJB, involving a total cost of about Rs.1657 crores.³³

The Government's adoption of the *Bhagidari* or citizens' partnership approach for the provisioning of

32. <http://www.rainwaterharvesting.org/policy/legislation.htm>, Accessed on 18 May 2013.

33. http://delhi.gov.in/DoIT/DoIT_Planning/ES2012-13/EN/ES_chapter8.pdf, Accessed on 20 May 2013.

basic services has seen the involvement of Resident Welfare Associations (RWAs) in raising awareness about water conservation, water harvesting, and distribution of water through water tankers. Delhi's citizens have been enabled to pay water bills through the 'Jeevan' centres opened by the Government since 2009. These centres, which number more than 520, are open all day and are closed only during three national holidays.³⁴ The Delhi Government's efforts to improve the availability of water appears to have paid some dividends. Findings from the Perceptions Survey, 2013, reveal that on an average, 26 per cent of the respondents felt that the water availability situation had improved over the last three years. The share of respondents who felt that it had actually deteriorated was very low (10 per cent), and a majority (63 per cent) of the respondents felt that there had been no change in the water supply. The settlement-wise information, on the other hand, shows that a comparatively higher share of respondents from the unauthorised colonies (20 per cent) and JJ clusters (16 per cent) reported that the situation had worsened.

5.3.2 Sanitation

Water and sanitation facilities are complementary in nature and together are essential for a healthy population. The benefits of sanitation facilities go far beyond the obvious and are closely linked to human development. The benefits emanating from better access to sanitation facilities include better public health, improved work opportunities and enhanced dignity of the people.³⁵ In the context of an urban agglomerate like Delhi with a large number of slums, unauthorised colonies and homeless, the provisioning of reliable sanitation facilities is also closely entwined with improving the security of women and children who are ever so often forced to defecate in the open.³⁶

Access to Latrine Facilities

At present nearly 90 per cent of the households in Delhi have access to latrines within their living premises (Census, 2011). However, 0.24 million

34. Source: <http://www.governancenow.com/gov-next/egov/it-brings-delhi-govt-services-citizen-s-doorsteps>, Accessed on 20 May 2013.

35. <http://www.un.org/waterforlifedecade/sanitation.shtml> Accessed on 20 May 2013.

36. Even community toilets may be unsafe, as is discussed later in this section.

Box 5.4

More than half of the slum children in Delhi defecate in the open

This is the finding from a 2012 Baseline Survey on Water, Sanitation and Hygiene conducted by Mission Convergence across 19,683 households in Delhi. Mission Convergence or Samajik Suvidha Sangam (SSS) is a flagship project set up by the Delhi Government to converge various welfare entitlement schemes and services so that entitlements reach the poor and the vulnerable.

The Baseline Survey finds that 52 per cent of the children living in slums and unauthorised colonies defecate in the open. This share is as high as 79 per cent for children aged less than 3 years old. Amongst children above 3 years of age, 56 per cent of the girls and 48 per cent of the boys go outdoors for latrine purposes. The adverse impact on infants' health from such practices would be enormous and there are externalities in terms of impact on environment, especially on the immediate neighbourhood. The report finds the intensity of faecal deposition alarming with faeces flowing into storm drains, which, in turn, flows into the Yamuna untreated. Apart from issues of hygiene, the security risks that such practices pose for young children and women are not hard to imagine.

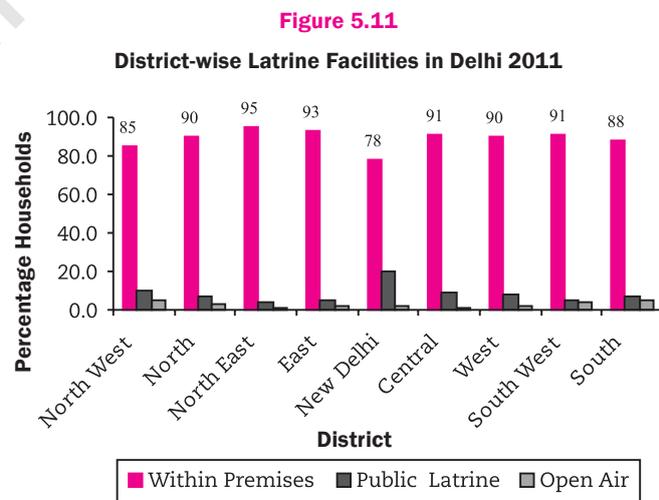
The Mission Convergence Report finds the highest shares of the practice of open defecation from the districts in the North-west, South and South-west. The main reason appears to be lack of community toilets and mobile toilets. The Survey Report highlights the need to build community awareness against such practices, alongside building more community toilets, increasing the number of seats in order to reduce waiting time, etc. The cleanliness and maintenance of public toilets is an issue that also needs urgent attention.

Source: <http://indiasanitationportal.org/category/content-type/media/statecity-news/delhi> and www.hindustantimes.com, Accessed on 5 June 2013.

households, comprising 7.2 per cent of the total, use public facilities and 0.11 million households (3.3 per cent) still use open spaces for defecation (see Box 5.4). This practice has serious implications not only for health and the environment, but also for the security of women and children, making them more vulnerable to exploitation.

The district-wise data for availability of latrine facilities shows that around 20 per cent of the households in New Delhi district used public facilities (Figure 5.11). The North-west district also shows the need for a lot of improvements in this regard.

Close to half the slum households did not have latrine facilities within their premises, according to Census data, which has important implications for the hygiene situation in and around slums, according to Census 2011 data. In quantitative terms, out of a total of 0.384 million households residing in the slums in Delhi, which comprise a little more than 10 per cent of Delhi's total population, nearly 0.192 million households did not have toilets within their premises. Among these, around 48,000 households



Source: Census, 2011.

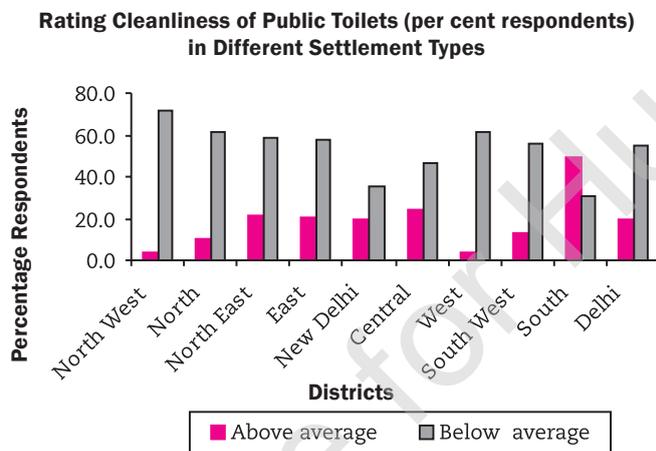
were forced to defecate in the open, and the rest used community toilets.³⁷

People's perceptions regarding public toilet facilities were found to be quite poor, according to the

37. A detailed discussion on sanitation facilities and other basic services in the slums follows in Section 5.4.

Perceptions Survey, 2013, with only 20 per cent of the respondents finding the facilities above average (i.e. very good/good) and more than half (54.5 percent) rating them as below average or very poor/poor (Figure 5.12). Only respondents from the South district were found to be relatively satisfied with the state of public toilets and a fewer proportion of respondents in New Delhi gave it a bad rating. This perception indicates that while some public provisioning has been made, the maintenance of such facilities in a regular and hygienic manner is lacking. These, in turn, impact the poorer segments of the population the most, since it is these very people who are the most dependent on public facilities. These findings are supported by the observations made during the FGDs, which reveal that a large proportion of respondents residing in the JJ clusters used the outdoors for defecation, having implications for hygiene and safety (Box 5.5). In one of the areas covered in the FGDs, women expressed fear in going alone to defecate near the railway lines.

Figure 5.12



Source: Perceptions Survey, 2013.

Provision of Sanitation and Sewerage Facilities by the Government

The NDMC and the Delhi Cantonment Board are the two local bodies in charge of providing sewerage facilities in their respective areas. For the area under the jurisdiction of the MCD, the DJB is responsible for the same. Since the DJB is responsible for more than 95 per cent of the total area, the total sewage treatment is being taken care of by the DJB. At present, there are 19 treatment plants with a capacity of 514.75 MGD for sewage treatment. However, the capacity utilization is low at 62.5 per cent with around 321 MGD of sewage being treated (Economic Survey of Delhi, 2012-13). Around 1400 industrial units have installed Effluent Treatment Plants (ETPs) following Government directives and others are expected to be linked to common ETPs. The Government is also installing an Interceptor Sewerage System along the Najafgarh drain, the Shahdara drain and Supplementary Drain (ibid.).

Basic sanitation services to the low-income slum settlements are provided by the MCD. The current provisioning of sanitation services to slums follows standards set in the 1970s under the Environmental Improvement of Urban Slums scheme. The norms include provision of community toilets (1 seat for 50 users), and open and shallow street-side drains for household wastewater disposal that are linked to community standposts. Community toilets are usually linked to septic tanks and sometimes to underground sewerage wherever networks are available. The maintenance of community toilets is rendered more difficult due to vandalism. Underground sewerage networks for household toilets are available in some of the slum settlements. Sewers are also not provided to unauthorised colonies and rural villages. In most urban villages, the underground sewerage and drainage systems

Box 5.5

Open Defecations: Findings from the FGDs

Although households in many FGD localities reported having private toilets within their premises, some JJ clusters did not have such facilities. Some JJC residents go outdoors for defecation. Apart from hygiene-related issues of open defecation, there are safety issues in one particular area as women are scared to go alone near the railway lines. The absence of sewerage and garbage disposal services and uncovered drains are common problems in most areas, especially in some urban villages. Open garbage dumps constitute an environmental menace and the rainy season sees choked drains overflow, causing serious hygienic concerns and daily inconvenience.

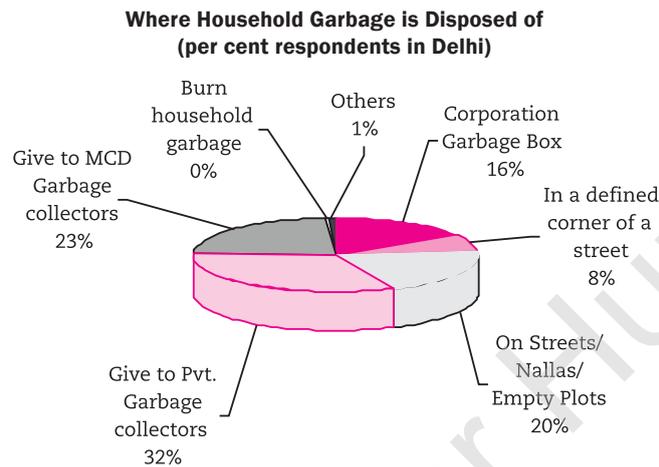
Source: FGDs conducted by IHD in 2013.

are combined into a single network because of the existence of very narrow lanes. The outcome has been poor coverage of sanitation services, as a whole, and of underground sewerage, in particular.

Garbage Disposal and Drainage

Garbage collection and disposal, two other areas of State provisioning, are facilities which need improvement, and which, in many cases, have been privatized, accounting for the highest share, according to respondents of the Perceptions Survey (2013) (Figure 5.13). Around 20 per cent of the households reported dumping their garbage randomly in the open, or in the drains, in the absence of any systematic garbage collection service.

Figure 5.13



Source: Perceptions Survey, 2013.

Open dumping of garbage is the most prevalent in the South-west district (31 per cent), followed by the North-west district (27 per cent), as shown by the Perceptions Survey, 2013. The highest incidence of private collection of garbage occurs in the Central districts (72 per cent), followed by that in the East and North-east (43 per cent) districts. The system of garbage collection by the Government bodies varies in different districts. Corporation garbage boxes are used more in New Delhi and South Delhi while the incidence of garbage collection by MCD garbage collectors is higher in the North and North-west districts. A majority (65.5 per cent) of Delhi's residents feel that garbage collection and disposal facilities have remained the same over the last three years, but nearly 24 per cent also feel that they have improved (Annexure 5.3). The level of satisfaction with garbage

collection services is higher in the Walled City, JJ resettlement colonies and approved colonies as compared to the JJ clusters and unauthorised colonies.

As discussed above, garbage dumped into open drains or overflowing into drain water during the monsoons poses a major health hazard for the residents. The drainage system in Delhi comprises internal drains that collect storm and wastewater from residential areas, and these flow into peripheral drains. The latter, in turn, join the main trunk drains and eventually this whole mass of water gets discharged into the Yamuna river. The length of the natural drain network in the city is 350 km, and this carries a discharge of 1,000 cubic meters, while the total length of man-made drains is 1,700 km over 12 municipal zones.³⁸ The industrial waste water generated in Delhi is about 40 MGD.

Area-wise, the drainage system in Delhi comprises the Najafgarh drain, the wildlife sanctuary area in Haryana territory, Shahdara area, the Bawana drainage basin, and Barapullah *nallah*, while the rest leads directly into the Yamuna River. A total of 22 drains fall into the Yamuna, out of which the Najafgarh drain alone contributes about 40.3 per cent of the total pollution to the Yamuna in Delhi followed by the Shahdara drain. The water quality monitoring results of the drains for the period April 2011 to March 2012 indicate that most drains are not meeting the standards with respect to Bio-chemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS) (Government of NCT of Delhi, Department of Environment, 2012).

While Delhi, as a whole, has around 59 per cent closed drainage, there is significant inter-district variation, with the New Delhi and Central districts faring far better than the other districts (Annexure 5.4). North-east Delhi stands out as the area with the poorest drainage with only 26 per cent coverage of the closed drainage. The poor state of drainage in some districts may be due to an outdated Master Plan for storm water drainage the period 1972-1976, which has not been revised till date. In order to rid the city of the perennial problem of waterlogging, the Delhi Government has decided to come out with a new Drainage Master Plan to streamline the entire sewerage network.

38. http://jnnum.nic.in/wp-content/uploads/2010/12/CDP_Delhi.pdf, Accessed on 20 May 2013.

Solid Waste Management

The total solid waste generation in Delhi is around 8500 TPD (see also Annexure 5.5) (Government of NCT of Delhi, Department of Environment, 2012). The collection and disposal of municipal solid waste is carried out by the MCD, with the total number of *dhalaos* (landfills), metallic bins and open sites estimated at around 2500. The total sweeping staff available with the MCD and NDMC is in ratio of 1:216 persons and 1:326 persons, respectively, which is well above the prescribed norms of 1:500 (CPHEEO). The MCD incurs considerable expenditure in transporting the waste through long distances to the landfill sites.³⁹ Tackling the problem of availability of sufficient land for garbage disposal by augmenting the capacity of landfill sites also poses challenges.⁴⁰

Government Strategies for Water and Sanitation

The DJB has been meeting its operating expenses since 2010-11 and has financially been in a position to invest in the water sector, as required.⁴¹ Yet, equity in the distribution and access to water remains a challenge, with the peripheral areas of Delhi facing a disadvantage, and the persistence of quality-related problems, especially in the distribution network. Various interventions have been undertaken and many more are on the anvil to tackle these issues in the water sector, including demand management through tariff structures, and metering, reductions in leakages and containing of the demand for water by raising awareness about water conservation. There has been an increase in metering in the city and the Government expects 100 per cent metering of water connections during the next two years. Around 2-3 per cent of the pipes are replaced annually and flow meters are used to detect leakages. Pilot projects for using such meters in the distribution networks are on the anvil. Water conservation ratings can also help in assessing the efficiency of water use. A move from intermittent to continuous water supply is expected to improve ratings in Delhi. In this context, there is need for year-on-year performance measurements at the disaggregated levels such as the division/sub-division level.

39. Landfill sites are located on the Bhalswa GT Road, Gazipur and in Okhla. Two more landfill sites have been proposed.

40. According to a presentation made by Mr. M. Gupta, MCD, at the Stakeholders' Consultation organised by IHD on 8 July 2013 at New Delhi.

41. The discussion here draws from the presentation made by Ms. D. Mukherjee, CEO, Delhi Jal Board at the Stakeholders' Consultation organised by IHD on 8 July 2013 at New Delhi.

A very important initiative in the sanitation sector has been that of the laying of an Interceptor Sewerage System along the Najafgarh drain, and Shahdara drain, and Supplementary drain across a 59 km stretch. The project is slated to ensure the protection of rivers and the major drains from any untreated effluents. It is expected that the sewage from over 1500 unauthorised colonies and other unsewered areas, including rural villages and JJ clusters would be trapped before it is permitted to reach the major drains. The project would ensure an improvement in the quality of water entering the river through three major drains that account for about three-fourths of the pollution.

A decentralised system of wastewater treatment might prove to be the right solution for unplanned settlements.⁴² The DJB has also prepared a plan to provide sewerage facilities in the unauthorised colonies which have been regularized in 2012. In the unauthorised colonies, many public toilets have been constructed with JBIC (Japan Bank for International Cooperation) funds, in addition to public toilets constructed by the DUSIB. Decentralisation may also provide the solution for the garbage management system, if the capacity for management facility could be created at the ward level, since transport costs would then be reduced considerably. An increase in the capacity of waste processing, waste to energy conversion and waste recovery is also needed.

The Government has used the Bhagidari initiative, since 2002, to involve citizens in the campaign for a cleaner and healthier Delhi through the RWAs. The latter have been instrumental in improving the internal colony sewage systems, desilting sewers, overseeing work by the sanitary staff, and raising general public awareness regarding sanitation issues, among other things. The Delhi Government has adopted a ten-point strategy for comprehensive reforms in the water and sanitation sector in its approach to the Twelfth 12th Five Year Plan, (Box 5.6). With their emphasis on ensuring the universal supply of safe drinking water and more equitable water distribution, the proposed reforms would enhance the quality of life not only for the average citizen of Delhi, but also for the most disadvantaged and vulnerable strata of society.

42. According to a presentation made by Mr. M. Gupta, MCD, at the Stakeholders' Consultation organised by IHD on 8 July 2013, at New Delhi.

Box 5.6

Mission Statement of the Delhi Government for the Twelfth Plan

- Potable & Safe drinking water to all residents of Delhi.
- 24x7 uninterrupted water supply in some pilot areas and more equitable distribution in the entire NCT.
- 100 per cent BIS Standard water quality to be made available to all consumers.
- Promotion of rainwater harvesting, groundwater recharge, regulated and controlled groundwater exploration.
- Complete measurement of water supply and distribution network at all levels with a 100 per cent metering system.
- Higher standards of treatment for wastewater.
- Use of treated waste water for all non-potable purposes.
- 95 per cent of total sewage generated to be collected, treated and disposed through interceptor sewers and normal sewage treatment network.
- Organisational restructuring of the DJB and promotion of a public-private partnership (PPP) approach to improve the management of the water and sewerage sector in Delhi.
- Non-revenue water level to be reduced to 30 per cent.

Source: An Approach to the Twelfth Five Year Plan (2012-2017), Available at: www.delhi.gov.in, Accessed on 21 May 2013.

In summary, it can be seen that despite improvement in access during 2001-11 access to water in Delhi is not equitable, with the unauthorised colonies and JJ clusters having much poorer access to water supply as compared to the other types of settlements. The residents in these and some other settlements also suffer due to the poor quality of water, which is sometimes muddy and foul-smelling. The Perceptions Survey, 2013, also found the residents of North-west and South-west districts most dissatisfied with the water supply.

The other main challenges that need to be addressed in the water sector include the deficit in raw water availability and the fast depletion of ground water. In particular, the lowering of the groundwater level has been adversely affecting districts in South and South-west Delhi. Leakage from the supply pipes also leads to considerable loss. Not just the deficient quantity, but the deteriorating quality of the surface water of the Yamuna also constitutes a major challenge for planners and policy-makers. The findings of the Perceptions Survey and FGDs also corroborate the issues pertaining to the water supply and quality, particularly in the low-income settlements. Supply problems are severe in summer and many residents complain of receiving foul-smelling water which is not fit for drinking. The better-off households resort to the use of bore wells, but these are costly and deplete groundwater.

There are some problems in raising revenue in the water sector including the prevalence of unmetered connections (20 per cent in 2011-12) leading to revenue loss. Till recently, the DJB was unable to estimate the volume of raw water going for treatment and the treated water available for distribution, and could not therefore estimate the losses accurately. Recently, the government has got bulk meters installed at various water treatment plants to be able to obtain accurate estimates of the water supplied to consumers and consumers are now also allowed to buy meters from the open market.

The sanitation sector is plagued by the fact that only 50 per cent of the slum-dwellers have access to private toilet facilities. Public toilets are also very poorly maintained, as perceived by the Delhi-ites. Many people, including small children, defecate in the open, leading to grave hygiene-related problems as well as security and environmental concerns. Open drains, lack of sewerage facilities in many settlements and inadequate garbage disposal facilities are among the other problems in this sector. In fact, the provision of sanitation facilities has been perceived by people to be one of the worst-performing areas of the government and immediate attention needs to be focused on this sector, especially in the slum areas.

5.3.3 Electricity

Electricity is a basic indispensable input in any modern day economy and is a key driver for development. It has become an essential service for providing decent living conditions in today's world and as such, provides a crucial underpinning for attaining human development goals. Electricity is an area wherein a majority of the Delhi-ites are satisfied with the efforts of the Government. According to the Perceptions Survey, almost 80 per cent of the households rated the availability of electricity as 'very good' or 'good', that is, above average. Only a very small proportion (6 per cent) rated it as below average.

Demand-Supply Situation

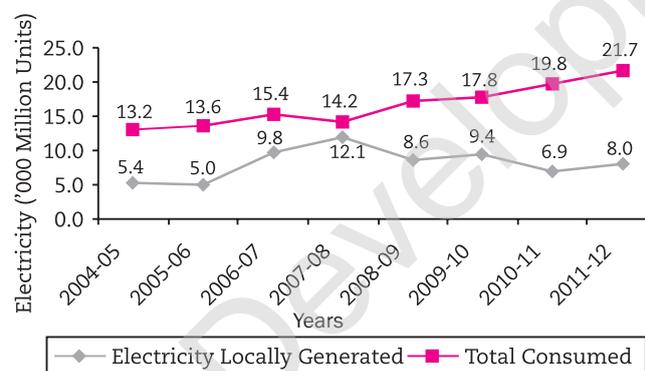
Delhi has been electrified to a great extent and at present, electricity is the main source of lighting for more than 99 per cent of all the households in the NCT.⁴³ This is a significant improvement over 2001 when about 7 per cent of the households in the NCT did not have access to electricity. In per capita terms, the consumption of electricity stands at 1651.26 kwh, which is more than double the all-India average (778.71 kwh).⁴⁴ Electricity consumption has been growing steadily, increasing from about 13,000 million units in 2004-05 to 21,700 million units in 2011-12, signifying an increment of 64 per cent. Domestic users comprise a majority of the electricity consumers (81 per cent) in Delhi, followed by commercial (18 per cent) and industrial (1 per cent) users.

The average annual growth rate in power consumption during the Eleventh Plan period (2007-08 to 2011-12) was around 8.5 per cent (Economic Survey of Delhi, 2012-13). Power generation in the state, however, has been unable to keep pace with the enormous increases in demand and has shown considerable fluctuations during the last seven years. The gap between local generation and consumption of electricity has not been bridged for several years. In 2007-08, the gap was reduced to about 2,000 million units, but it has been widening since then to reach 13,700 million units in 2011-12 (Figure 5.14). The huge excess demand for power in the capital is met

by the purchase of power from other states. Since 2004-05, more than half of the electricity available to the NCT is being purchased.

Figure 5.14

Electricity Generation, Consumption and Shortfall in Delhi



Source: Delhi Statistical Hand Book, 2012.

Power Sector Reforms

Up to 2002, when the Delhi Vidyut Board (DVB) was unbundled into six successor companies, the DVB was responsible for the generation and distribution of power to most parts of the Delhi NCT region. Around the beginning of the Tenth Plan, the DVB was restructured and unbundled as a part of the power sector reforms. Since then, with unbundling of the DVB, transmission and distribution (T&D) losses, which were largely responsible for negative returns in this sector, were reduced. Following privatisation, the Aggregate Technical and Commercial (AT&C) losses⁴⁵ also fell dramatically, from 52 per cent during the pre-reform era to 18.5 per cent in 2009-10 Economic Survey of Delhi, 2012-13). Some of the recent developments in the power scenario are delineated in Box 5.7.

Power Tariff and Power Cuts

Since the privatisation of the DVB, the spread of electricity has increased in the NCT and there have been significant reductions in transmission losses. However, the burden on the poor has intensified due to the frequent upward revision of power tariffs,

43. Census, 2011. The rate is marginally lower for the Scheduled Caste (SC) households.

44. The figures are for 2009-10, according to a reply to the Parliament question (PIB, Government of India, 14 March 2013).

45. AT&C is a better measure of efficiency as compared to transmission and distribution (T&D) losses since it also captures non-realisation of payments.

Box 5.7

Some Recent Developments in the Delhi Power Scenario

Generation: During 2011-12, installed capacity increased from 765 MW to 951 MW with the addition of GT-I of Pragati III Power Project, Bawana. In order to meet the steadily rising demand, two gas-based power projects, of 1500 MW and 750 MW, respectively, are being set up. A 1500 MW coal-based power project being set up in Haryana is expected to provide power to Delhi on an equal sharing basis.

Transmission: Delhi Transco, which is responsible for the planning, designing, construction and maintenance of 400 KV and 220 KV systems, has successfully met the challenges in this area. There is now a network of three 400 KV and twenty-nine 220 KV sub-stations associated with transmission lines. There has been considerable improvement in system availability, and reduction in transmission loss and in load-shedding.

Distribution: The distribution infrastructure is undergoing rapid improvement via the addition of power transformers, EHV cables, feeders and shunt capacitors.

Source: Economic Survey of Delhi, 2012-13.

especially during 2011-12.⁴⁶ In several instances, especially in the case of rented accommodation, electricity charges are fixed at a flat rate, which is much higher than the stipulated charge leading to financial pressure for these households. The rise in power tariff has not always been accompanied by assured power supply. The poor functioning of power plants is a widely cited reason for the shortage of power supply in the city. Illegal consumption of power is prevalent in slum settlements and illegal colonies, some of which have access to electronic appliances such as fans and televisions. There is thus a need for regularisation of the illegal residential colonies and slums, installation of meters and facilitation of payment for used electricity.⁴⁷

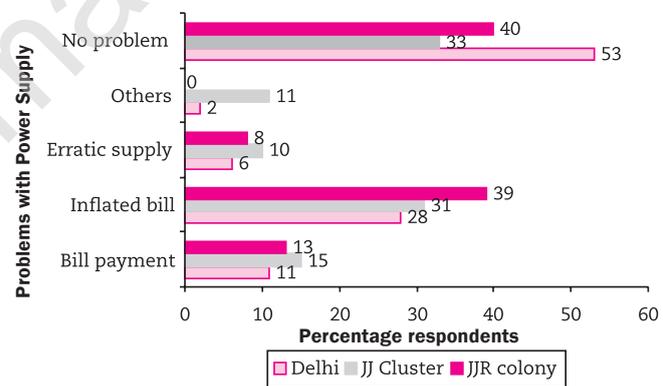
While the Perceptions Survey, 2013, has shown a majority of Delhi's residents rating the availability of electricity as above average, disaggregated data reveal differing satisfaction levels across settlements. Specifically, as compared to the average figure of 80 per cent, only 57 per cent of the residents in JJ clusters and 67 per cent of the residents in the Walled city rated power availability as above average. The district-wise rating reports South-west Delhi with the highest proportion (13 per cent) of residents who rated electricity supply to be 'very poor'.

46. <http://indiatoday.intoday.in/story/electricity-prices-hiked-in-delhi/1/202516.html> and <http://www.ndtv.com/article/cities/delhiites-to-pay-more-for-power-from-friday-324953>, Accessed on 21 May 2013.

47. <http://news.nationalgeographic.co.in/news/energy/2011/09/110913-smart-meters-for-electricity-theft/>, Accessed on 21 May 2013.

Figure 5.15

Problems with Power Supply in Selected Settlements (per cent respondents)

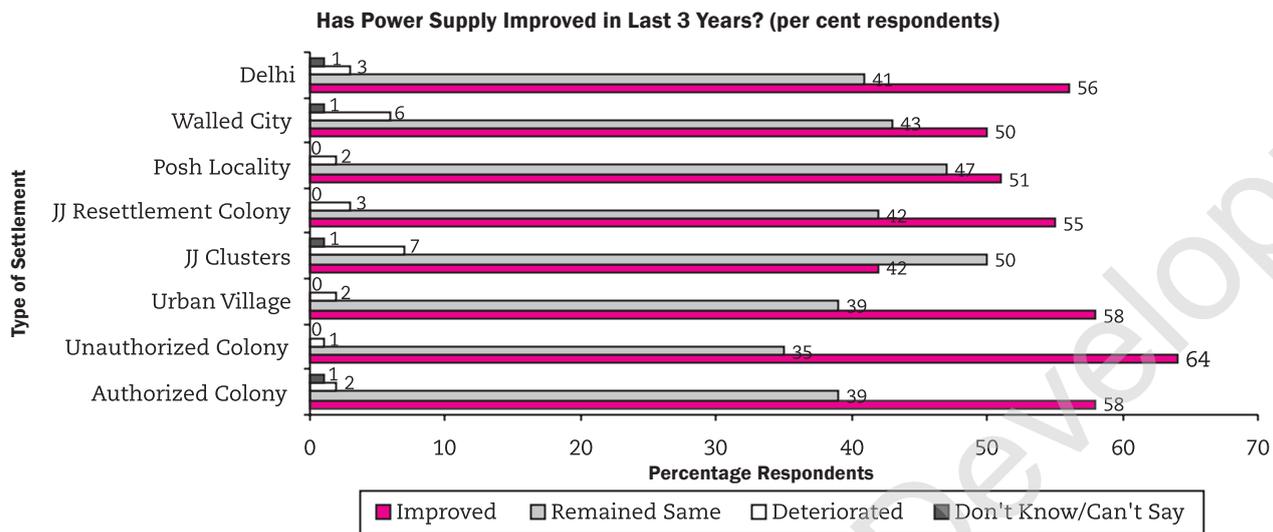


Source: Perceptions Survey, 2013.

The response of the people to the query as to whether they face any problem with power supply yielded an interesting response. As compared to 80 per cent of the respondents rating power availability as 'above average', the percentage share of respondents who said they had 'no problem' with power supply drops to 53 per cent (Figure 5.15).

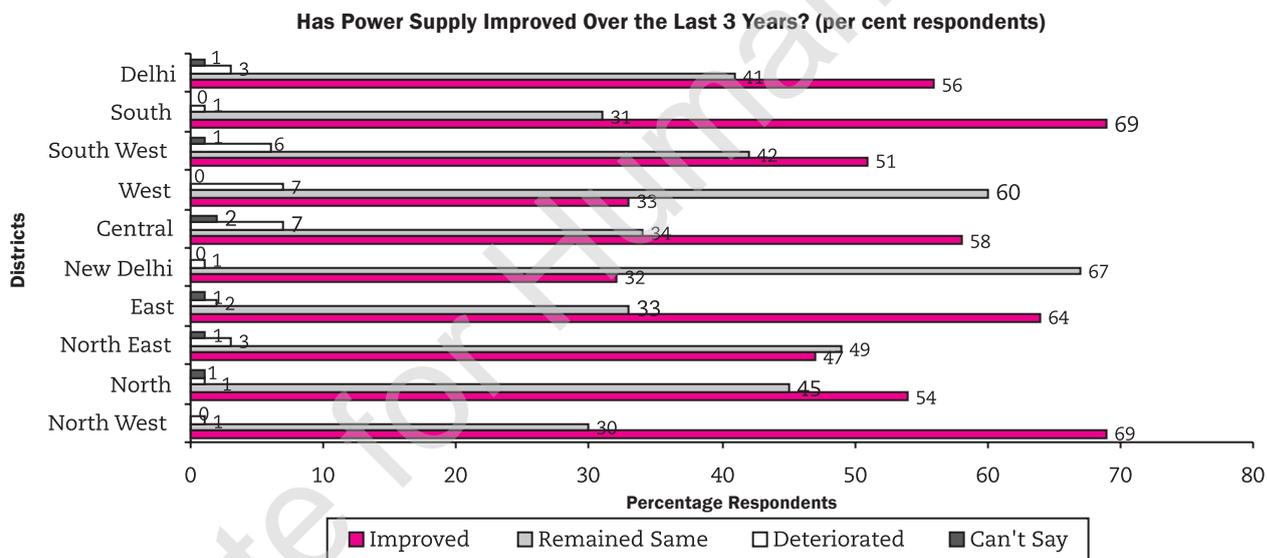
Some of the main findings related to the power sector are as follows. First, a large proportion (28 per cent) of the respondents complained of inflated bills while others cited problems related to bill payment and erratic power supply as common issues. In terms of settlement types, respondents from the JJ resettlement colonies, JJ clusters, urban villages and

Figure 5.16



Source: Perceptions Survey, 2013.

Figure 5.17



Source: Perceptions Survey, 2013.

the Walled City were among those citing inflated bills as a reason for dissatisfaction. These could also be attributable to either to the non-availability of electrical meters or forceful levying of fixed charges by landlords. About 17 per cent of the households in JJ clusters and urban villages reported that they did not pay for their electricity use according to meter readings but paid a fixed charge levied on them (a larger proportion of these respondents were residents of the South and South-west districts). Even in the posh localities and approved colonies, close to a quarter of the households reported this as a problem.

The district-wise data for those citing high electricity bills reveal a preponderance of such respondents in the South-west (46 per cent), Western (37 per cent) and Northern (29 per cent) districts. It is evident that there is a general feeling among the public that the cost of electricity has increased exorbitantly.

Second, as regards improvements in the electricity scenario over the last three years, more than half the respondents (56 per cent) felt that there had been an improvement in power supply in the city, while 41 per cent reported the feeling of a status

Box 5.8

Electricity Coverage in Poor Localities: Findings from the FGDs

The FGDs in 23 localities across Delhi found that mostly there is 100 per cent electrification with meters and payment through bills, except for one JJC in the South-west district, which gets power for four hours daily by using generators. Urban villages faced more problems with the supply of electricity especially in summer when there are a lot of power cuts. There was clear perception across the board that power has become very costly. There were reports of theft of electricity; people in authorised colonies and a regularised UC in the North-east complained of inflated bills. Residents of affluent areas, authorised colonies and even urban villages were satisfied with the functioning of street lights. In stark contrast, street lights were hardly functional in low-income settlements, including JJ clusters, JJ resettlement colonies, UACs and URCs, with obvious implications for safety of the residents.

Source: FGDs conducted by IHD.

quo, (Figure 5.16) and a small proportion (3 per cent) complained of it having deteriorated. The settlement type data finds the highest reporting of improvements by unauthorised colonies (64 per cent of the respondents), followed by the urban villages and authorised colonies at 58 per cent each. However, only 42 per cent of JJ cluster residents reported an improvement in power supply indicating an area for policy interventions in the power sector. The district-wise data show widely varying perceptions about a change in the power supply situation in the last three years (Figure 5.17).

Third, one of the benefits of the privatisation of electricity supply is improved efficiency in service delivery. A little over two-thirds of the respondent households (65 per cent) rated the power supply personnel as 'very good'/'good' and another 15 per cent rated them as average (Annexure 5.6). Respondents from unauthorised colonies gave the power personnel the best rating while the highest levels of dissatisfaction were expressed by the residents of JJ clusters, urban villages and the Walled City. Amongst the various districts, about 18 per cent of the households of the New Delhi, South-west and West districts gave a rating of 'poor' or 'worse'.⁴⁸ Such findings are also corroborated by a consumer survey conducted by DERC (2009),⁴⁹ which showed that consumers in Delhi were satisfied with stable voltage, regular visits by meter readers, regular receipt of bills and significant reductions in grievance redressal time.

Cooking Fuel

Liquid Petroleum Gas (LPG) or Piped Natural Gas (PNG) is used by 90 per cent of the urban and 75 per

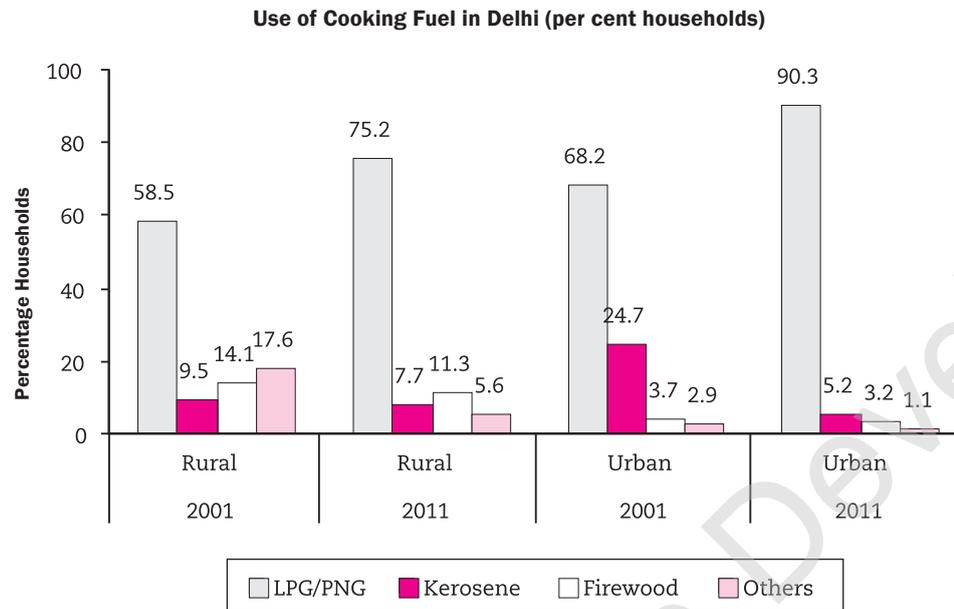
cent of the rural households in the NCT, (Census, 2011, Figure 5.18). Over the last decade, the more expensive and polluting fuels such as kerosene, wood and cowdung cakes have been increasingly replaced by LPG and PNG, more so in the urban areas. Yet, in the rural pockets, about 11 per cent of the population still depends on firewood. The use of LPG or PNG as cooking fuel is found to be relatively less in the SC households (80 per cent) (as per Census, 2011, estimates), compared to 91 per cent for Delhi as a whole. Almost 17 per cent of the SC households in the rural areas use firewood and 11 per cent use kerosene. Around one-fifth of the population still does not have a kitchen and 43 per cent of the households that cook in makeshift spaces outside the house still use firewood while 15 per cent use kerosene. Across the various districts of Delhi, the use of LPG and PNG is the lowest in North-west Delhi.

The Perceptions Survey reports variations across districts and settlements in the use of cooking gas stove. The districts of South-west Delhi (15 per cent) and West Delhi (16 per cent) were conspicuous in this regard, showing lower proportions of households using cooking gas stoves. The JJ clusters and JJ resettlement colonies also showed significantly lower levels of gas stove ownership. More than 90 per cent of the households in posh colonies, authorised colonies and urban villages owned gas stoves. One of the reasons for the low usage of cooking stoves in JJ colonies could be that LPG and PNG are only available against a proof of address, which many residents in JJ colonies do not possess and in the absence of which they are forced to buy cylinders from the open market on a premium. Another problem with LPG cylinders is the problem of pilferage. On several occasions, the weight of the cylinder delivered by authorised companies falls short of the stipulated weight. The grievance redressal mechanism is lengthy and ineffective. Access to PNG, which is the cleanest and safest cooking fuel, is more restricted than to LPG.

48. Data not presented here.

49. Available at: <http://www.derc.gov.in/consumer/Press percent20 Note/PressNote.htm>, Accessed on 21 May 2013.

Figure 5.18



Sources: Census, 2001 and 2011 estimates.

The pipelines for this facility have not been laid out in several pockets of the city. It necessarily requires concrete walls to install the required equipment and leave out slum-dwellers and illegal constructions by design. The shift from LPG to PNG is highly desirable. It ensures uninterrupted supply to every household and has fewer chances of leakage and pilferage. It is also the cheapest option for domestic use.

The GNCTD has launched a new Plan scheme to provide free LPG connection with gas stove to all BPL households using kerosene. Under this scheme, more than 0.17 million households have already been covered and it is planned to make Delhi a kerosene free city by September 2013.

In summary, Delhi, with its high density of population, is likely to continue to be a power-deficit state. The supply in this city-state is augmented by the purchase of power from other states. The result has been nearly universal electrification. Findings from the Perceptions Survey, 2013, provide useful insights into the power situation in the state. The slum localities, particularly in the western side of the state, are reported as the most power-deficient. The residents of the poorer areas and slum settlements cite shortages in supply, and the high cost of electricity as problem areas. Issues of theft and unpaid usage of electricity, especially in slum settlements, persist. This situation partly converts to losses for the producers and is partially reflected in

the frequent hikes in power tariffs and the absence of power.

It is, therefore, important to encourage the legitimate usage of power, accompanied with appropriate payments. The regularisation of illegal settlements and upgradation of slums is an important step in this direction. Privatisation has brought about positive changes in the grievance redressal mechanism and reduced transmission losses significantly. The Perceptions Survey, 2013, indicates that the districts of West and South-west Delhi require immediate attention in terms of power supply and efficiency of service providers. Installation of meters in the JJ clusters can be facilitated in order to generate accurate electricity bills.

5.3.4 Transport and Roads in Delhi

An efficient and people-friendly transportation system, along with roads that are in good condition, and adequate street-lighting constitute acceptable standards of living in a modern urban setting. In Delhi, rapid urbanisation, coupled with a rise in economic activities and personal income, have set in motion a massive upsurge in the demand for transport and an increase in the number of vehicles. Vehicular population in Delhi grew at the rate of 7 per cent over the periods 1999-2000 and 2011-12 (Economic Survey of Delhi, 2012-13). The number of

registered vehicles is more than 7 million,⁵⁰ which is higher than the combined vehicular population of Chennai, Kolkata and Mumbai (Twelfth Five Year Plan, 2012-17, and Annual Plan, 2012-13, Delhi). A bulk of the demand for transport in Delhi has translated into the rising use of personalised vehicles, comprising more than 90 per cent of the total vehicular fleet. More vehicles on the streets are leading to congestion as well as to other health and environment-related problems. The Government of NCT has been actively promoting the use of public transport with the help of a number of measures to revamp the public transport system in view of the fact that a majority of the populace in the city uses public transport. The Bus Rapid Transport (BRT) system and the Delhi Metro are worth noting in this regard. A host of reform measures related to alternative modes of transport and improved road networks are also on the anvil. The Perceptions Survey, 2013, reports that buses and the metro are the most commonly used modes of transport in Delhi for commuting to work and educational purposes. According to the Perceptions Survey, 2013, one-tenth of the respondents belonged to the 'on foot' category, indicating that people also resort to walking to work or to educational institutions.

A study on transport demand forecasts⁵¹ for Delhi predicts that the share of modal split for personalised vehicles like cars is expected to increase from 15.5 per cent in 2007 to 17.1 per cent in 2021 while the corresponding share for two-wheelers is expected to decrease from 25.5 per cent in 2007 to 20 per cent in 2021. The modal split in favour of public transport is expected to increase marginally for intra-city trips from 54.6 per cent to 59.7 per cent, and to decrease from 45 per cent to 40 per cent in the case of inter-city trips during the same time points.

The findings of this study as well as of the Perceptions Survey clearly indicate the predominance of the use of private transport. Thus, from both equity as well as efficiency perspectives, there is need for

bringing about a fundamental change, which would contribute towards strengthening public transport. Walking and cycling to work and education centres could also be encouraged, as these promote a healthier lifestyle and do not cause pollution.

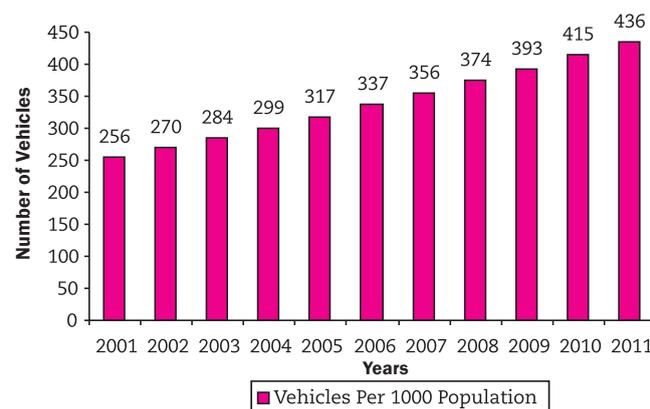
Transport Composition

The transport network in Delhi is still predominantly road-based though the Delhi Metro has definitely made its presence felt in recent years as a highly popular form of mass rapid transport. There has been an addition of 1.4 million vehicles over the three-year period of 2008-09 to 2012, reflecting a rapid expansion in Delhi's vehicular fleet.

Table 5.3 shows that together the share of two-wheelers (62 per cent) and cars (31.5 per cent) currently stands at more than 93 per cent of the vehicular population in Delhi, almost all of which are personalised vehicles. During the period 2008-09 to 2011-12, the overall compound annual growth rate (CAGR) for vehicles was 7.4 per cent, with taxis recording the highest growth rate (20 per cent), followed by goods vehicles (9 per cent), cars and jeeps (6 per cent) and two-wheelers (5.2 per cent). The per thousand population of vehicles has shown a phenomenal increase (70 per cent) over the period 2001 to 2011 (Figure 5.19 and Perceptions Survey, 2013), with personalised vehicles significantly contributing to this growth. However, the issues of vehicular congestion and the consequent pollution need policy attention.

Figure 5.19

Vehicles Per Thousand Population



Source: Economic Survey of Delhi, 2012-13.

50. Delhi Statistical Hand Book, 2012. Some experts feel that this number is on the higher side since it may include vehicles that were registered some time ago but are no longer being used on the roads, according to Mr. D. Mohan, speaker at the Stakeholders' Consultation organised by IHD on 8 July 2013, at New Delhi.

51. Based on the study, 'Transport Demand Forecast Study and Development of an Integrated Road Cum Multi-Modal Public Transport Network', 2010, for the NCT of Delhi, commissioned by the Transport Department, GNCTD, carried out by RITES Ltd. in association with MVA Asia Ltd. and TERI.

Table 5.3

Registered Motor Vehicles in Delhi

Mode of Transport	2008-09	2009-10	2010-11	2011-12	CAGR (%)
Cars and Jeeps (Total)	18,59,370	20,13,680	21,73,323	23,43,113	8.0
Proportion of total share (%)	30.93	30.46	31.35	31.50	
2 W (Motorcycles and Scooters) Total	37,97,943	40,55,229	43,42,403	46,44,146	6.9
Proportion of total share (%)	63.18	61.34	62.64	62.44	
Auto Rickshaws Total	83,948	86,482	88,181	88,197	1.7
Proportion of total share (%)	1.40	1.31	1.27	1.19	
Taxis (Total)	40072	45240	57958	69780	20.3
Proportion of total share (%)	0.67	0.68	0.84	0.94	
Buses (Total)	55148	58047	61471	64033	5.1
Proportion of total share (%)	0.92	0.88	0.89	0.86	
Goods Vehicles etc (Total)	175250	193205	209370	228886	9.3
Proportion of total share (%)	2.92	2.92	3.02	3.08	
Total number of vehicles	6011731	6451883	6932706	7438155	7.4

Source: Delhi Statistical Hand Book, 2012.

Box 5.9

Curbing Vehicular Pollution in Delhi

The increase in the number of vehicles in the city has a strong adverse environmental impact. Also, studies have shown that vehicular pollution is a major contributor to respiratory and pulmonary diseases in cities like Delhi and elsewhere (Ingle, *et al.*, 2005; Rizwan, *et al.*, 2013; Central Pollution Control Board and Ministry of Environment and Forests, 2008).

Although much still remains to be done vis-à-vis emission from vehicles that use diesel as a fuel, it must be mentioned that significant improvements have been made to control vehicular emissions in Delhi, following which vehicular pollution has been curbed to a great extent. These include:

- Introduction of clean fuels like CNG for public transport and autos. Delhi has the largest fleet of CNG buses in the world.
- Introduction of Euro IV/Bharat Stage IV norms for tailpipe emissions of automobiles.
- Availability of diesel with 50 ppm sulphur content from April 2010.
- Phasing out of commercial vehicles that are over 15 years old.
- Introduction of battery-operated rickshaws for travelling short distances operating from nearby metro stations.
- Concessions of up to 30 per cent are being given on the price of the vehicles on the use of battery-operated vehicles having zero tailpipe emissions.
- VAT refund of 12.5 per cent is allowed for conversion of vehicles to clean fuels like CNG. (Economic Survey of Delhi, 2012-13.)

Pedestrian and Non-motorised Transport

“The pedestrians, bicyclists and non-motorised rickshaws are the most critical elements in mixed traffic” (Twelfth Five Year Plan, 2012-17 and Annual Plan, 2012-13, Delhi). Low-income groups are often the major users of non-motorised traffic and the growth of non-motorised vehicles has been more or less stagnant in recent years, with their CAGR being just around 1 per cent during the period 2008-09 to 2010-11 (Delhi Statistical Hand Book, 2012). The declining use of non-motorised transport reflects the conflicting nature of the transport-related demand from low-income groups vis-à-vis high-income groups and the former’s relegation from road spaces.

Non-motorised forms of traffic are environment-friendly, but can only be used for short distance travel. Also in the existing conditions, an unplanned mix of fast- and slow-moving transport usually leads to more congestion, accidents and confusion. If people are at the heart of the road and transport infrastructure development policy, the current scenario in Delhi falls far short of the ideal, as it precludes the equitable distribution of road space and transport usage. There is an urgent need to modify infrastructure design to allow for mixed traffic. The construction of wide enough pavements for people to walk along and dedicated roads for cyclists would encourage people-friendly, non-polluting modes of transport. While the recent construction of the BRT corridor has dedicated lanes for non-motorised traffic and is a step forward in the right direction, a huge gap still needs to be bridged between conception and implementation to make a visible difference in the city.

Vehicle Ownership Patterns

The figures arrived at in the Perceptions Survey, 2013, indicate that 405 out of 1000 households own two-wheelers while the corresponding figure for cars is 159. Approximately 216 households own non-motorised vehicles including bicycles, rickshaws and *thelas*. When analysed by income and educational differences, the survey results reveal clear divergences in vehicle ownership patterns. The incidence of households owning two-wheelers and cars rises steadily as income increases. In the case of the lower middle or middle income brackets, the share of households owning two-wheelers is higher than those owning cars. In the case of higher income levels, two-wheeler ownership dips from 62.3 per cent (for the middle income category) to 55 per cent (for

the highest income category) while car ownership spurts from 35.7 per cent to 59.2 per cent from the former to the latter. A similar pattern holds true for the educational categories. The Perceptions Survey, 2013, also reveals a positive outlook of the citizens of Delhi, as among the people who do not own two-wheelers or cars, 18.6 per cent plan to purchase two-wheelers while 8.6 per cent plan to purchase cars within the next two years.

The Public Transport System and People’s Perceptions

Bus services in Delhi are currently provided by Private Stage Carriage operators (PSCs), the Delhi Transport Corporation (DTC), and the Delhi Metro Rail Corporation (DMRC), which provides connecting services to the metro rail system. These services are discussed in detail below.

- PSCs in Delhi comprised of cluster bus services, chartered buses and the Grameen Sewa vehicles for rural areas which constitute the measures that have been taken by the Government to meet the rising demand for bus services. On 15 March 2013, the Government also made the installation of GPS mandatory for chartered buses and Grameen Sewa buses to ensure the safety and security of passengers, which was to be effective from 30 April 2013.⁵² In view of several allegations including many registered bus routes not being operational, lack of direct supervision, overcrowding, and buses being driven rashly leading to accidents, the Government issued a directive for taking all blue line buses off the roads in Delhi, which was implemented by June 2012. Of late, private chartered buses have also earned public ire following occurrences of various untoward incidents, which have fuelled safety and security concerns. The final blow was the recent infamous incident of gangrape in Delhi in December 2012, and in the wake of a public outcry and strict vigilant measures by the police, a large number of private chartered buses too went off the roads. The DTC plays a pivotal role in the multi-modal transit system of public transport in the NCR

52. Based on the article, “Now, GPS Mandatory for Chartered Buses”, published in *The Times of India* on 19 March 2013, Available at: http://articles.timesofindia.indiatimes.com/2013-03-19/delhi/37843233_1_gps-device-school-buses-gramin-sewa. Accessed on 25 May 2013.

(Twelfth Five Year Plan, 2012-17, and Annual Plan, 2012-13, Delhi.), transporting about 45 lakh passengers and covering a distance of 10 lakh kms. per day. Operating a fleet of 6029 buses, including 3775 low-floor and 1275 low-floor AC buses, the DTC is reported to have the world's largest eco-friendly CNG-based bus fleet (Twelfth Five Year Plan, 2012-17 and Annual Plan, 2012-13, Delhi). In order to make the DTC services more efficient, the issues that need to be addressed include the presently inadequate number of DTC buses and prolonged waiting time for commuters at many less frequent routes. Since buses are the most frequently used modes of public transport and perceived to be the most affordable, especially for low-income groups, it is recommended that the service and number of buses be fairly improved.

- An integral part of the Integrated Multi Modal Transport System, the Bus Rapid Transport System (BRT) will entail the construction of a total of seven BRT corridors built during the first phase in South Delhi (covering a distance of 14.5 kms, of which around 5.8 kms is already operational). With dedicated lines for motorised and non-motorised traffic, the BRT safeguards cyclists and pedestrians. People's feedback on the difficulties faced in reaching bus platforms situated in the middle of the road needs to be taken cognizance of and addressed. Motorised vehicles consisting of cars, two-wheelers and auto rickshaws, constitute more than 90 per cent of the vehicular traffic in the BRT corridor, and transport around 15-20 per cent of the commuters. On the other hand, while buses account only for 2.0-2.5 per cent of the total vehicles, they transport around 55-60 per cent of the total commuters.⁵³ The 'buses only' lane in the BRT leads to huge traffic jams and the loss of fuel due to prolonged queues at the traffic signals. A recent High Court order also favours the continuation of BRT and the Delhi Government has decided to extend the

plan to other areas.⁵⁴ In a survey conducted by the Centre for Science and Environment (CSE) in 2008 amongst users of the BRT, 83 per cent of the commuters were reportedly happy with dedicated BRT lanes and wanted the BRT system to continue. A majority of the respondents felt that the BRT system should be expanded to other areas of Delhi and must be connected to the Delhi metro.⁵⁵

- Metro Feeder Buses were introduced by the DMRC at selected metro stations for enabling commuters to interchange modes and connect to nearby places. However, metro feeder services have come in for repeated criticism due to the poor quality of buses and services, low frequency and overcrowding. Although there are 145 stations in the Delhi Metro network, covering nearly 190 kms, feeder buses cover a distance of 119 kms only. Recently, the DMRC has announced the introduction of 300 new feeder buses, within the year 2013.⁵⁶

The findings from the Perceptions Survey, 2013, throw useful light on what the residents of Delhi have to say about the accessibility and quality of public transport in the capital city. The conclusions derived from their suggestions and comments are as follows:

- DTC buses (39.6 per cent), the metro (33.6 per cent) and chartered buses (12.2 per cent) were reported to be the three most frequently used modes of travel, based on a recollection of 30 days (excluding personalised modes of transport) (Perceptions Survey, 2013).

53. Available at: http://www.dimts.in/pdf/Delhi_BRT_System_Lessons_Learnt.pdf. Accessed on 21 May 2013.

54. Based on a report, "Government to Move SC if BRT Scrapped", published in *The Times of India* on 18 July 2012, Available at: <http://indiatoday.intoday.in/story/bus-rapid-transit-corridor-on-its-way-to-decongest-east-delhi/1/221933.html>, <http://indiatoday.intoday.in/story/sheila-dikshit-bus-rapid-transit-corridor-central-road-research-institute/1/208871.html> Accessed on 21 May 2013 "Delhi High Court Dismisses BRT Corridor Review Plea", posted in *ndtv.com* on 23 November 2012, Available at: <http://www.ndtv.com/article/cities/delhi-high-court-dismisses-brt-corridor-review-plea-296273>. Accessed on 21 May 2013.

55. Based on a survey "Delhi BRT System—Survey Report", conducted by CSE for DIMTS, Available at: <http://www.dimts.in/pdf/CSE-TrafficSurveyReport.pdf>. Accessed on 21 May 2013

56. Based on articles in *The Hindu*, "Metro Feeder Service: A Major Let-down", published on 23 December 2012, and TNN, "Metro Crowded, Few Feeder Buses", published on 13 February 2013. Available at: <http://www.thehindu.com/news/cities/Delhi/metro-feeder-service-a-major-let-down/article4231500.ece> and http://articles.timesofindia.indiatimes.com/2013-02-13/delhi/37078811_1_feeder-buses-vaishali-corridor-lakh-commuters. Accessed on 21 May 2013.

Table 5.4
Perceptions about the Bus Service in Delhi

Respondents	Topmost 'Likes'	Second-most 'Likes'	Third-most 'Likes'
Males	Affordability (31.7%)	Coverage (24.3%)	Safety (13.7%)
Females	Affordability (31.3%)	Coverage (23.8%)	Safety (13.9%)
	Topmost dislikes	Second-most dislikes	Third-most dislikes
Males	Overcrowding (31.3%)	No direct bus (18.01%)	Time consuming (11.4%)
Females	Overcrowding (31.8%)	No direct bus (17.04%)	Indecent behavior by bus conductors/ drivers/ co-passengers (10.4%)

Source: Perceptions Survey, 2013.

- A majority of the respondents felt that the services of DTC buses (54.2 per cent) and the metro (70.7 per cent) had improved over the last three years while close to half felt that the services provided by chartered buses had actually deteriorated (Perceptions Survey, 2013).
- Buses were still considered as the most accessible and usable mode of transport. Affordability, coverage and safety emerge as the three most important attributes that the people (of both sexes) like about the bus service in Delhi (Table 5.4) On the other hand, overcrowding and the absence of buses across all routes were cited as the downsides of the bus service in Delhi by both males and females.
- The male respondents disliked the relatively long time taken by buses to travel from one destination to another, while the female respondents cited the indecent behaviour of bus drivers, conductors and co-passengers as their reasons for disliking the same. Paradoxically, women found buses safe to travel in and did not see any link between the indecent behaviour of drivers/conductors and their safety considerations.

The Delhi Metro, an integral part of the Mass Rapid Transport System (MRTS), was introduced in Delhi in 2002 as an alternative means of providing safe, non-polluting and expeditious travel within the city. Presently spanning a length of 190 kms,⁵⁷ the Delhi

Metro first started running between Shahdara and Tees Hazari stations on the Red line. Since then, it has expanded to other dedicated routes, viz., the Yellow, Blue, Green, Violet and Airport lines, which aim to cater to the travel needs of the entire NCR region. The phase-wise expansion of the Metro has ensured that the city does not come to a halt and consequently, inconvenience to commuters has been significantly mitigated. The work along Phases I and II of the Metro has been completed, and work on Phase III is currently underway. .

The Delhi Metro has made travel relatively much faster, easier and more comfortable for citizens, as they can avoid traffic snarls on the road and travel in air-conditioned comfort. The average number of daily passengers in the Metro has reportedly increased from 45,000 in 2003 to 2 million in 2013 (*Economic Times*, 17 March 2013), and on festive occasions and special days, the Metro ridership shoots up even more. An added advantage is that the Metro has not only made travel easier within Delhi but has also connected other adjoining areas in the NCR as well.

The satisfaction of commuters with this mode of travel is evident from the findings of the Perceptions Survey, 2013 (Table 5.5). The key factors favouring the Metro services were cleanliness and comfort. The male respondents also identified safety as a reason for preferring the Metro while the female respondents showed a preference for the presence of separate women's compartments, which could also be associated with safety. On the flip side, overcrowding, the non-availability of direct Metro facilities to various locations, the lack of toilets at all the metro stations and expensive fares were reasons whereby the Metro seemed to fall short of people's expectations.

57. delhimetrorail.com/project-updates, Accessed on 21 May 2013.

Table 5.5
Perceptions about the Metro Service in Delhi

Respondents	Topmost 'Likes'	Second-most 'Likes'	Third-most 'Likes'
Males	Clean (19.8%)	Comfortable (16.5%)	Safe (11.9%)
Females	Clean (18.8%)	Comfortable (16.6%)	Women's Compartment (16.2%)
	Topmost 'Dislikes'	Second-most 'Dislikes'	Third-most 'Dislikes'
Males	Overcrowded (32.4%)	No direct Metro (26.0%)	Toilets not available on all stations (16.0%)
Females	Overcrowded (31.7%)	No direct Metro (25.4%)	Toilets not available on all stations (15.5%)

Source: Perceptions Survey, 2013.

Responses from the Perceptions Survey about daily travel indicate that the percentage of people using the Metro is still the least among the lowest income groups and increases as one ascends the economic ladder, which is in contrast to DTC buses, for which the usage is seen to fall as one climbs up the economic ladder (Perceptions Survey, 2013). Such a finding rekindles the debate about whether the Metro, in its essence, is actually serving the masses, or is rather emerging as a premium transport mode. Similar concerns were expressed in a 2011 study on the work and livelihoods of the poor in the NCR region,⁵⁸ wherein the Metro was seldom found to be a mode of conveyance for poor workers. More thought and insight thus is required in this direction. However, in view of the fact that a major achievement of the Metro has been in terms of connecting satellite towns like Gurgaon in Haryana and Noida and Ghaziabad in Uttar Pradesh to Delhi, thereby benefiting commuters of these far-flung areas, it is expected that the proposed expansion of Metro services would soon touch the lives of the poorer strata. The Metro under Phases III and IV is envisaged to connect the satellite town of Faridabad in the extreme south of Delhi and the far-flung areas of Bawana in the extreme west, and would thus go a long way towards serving the working classes and poorer sections of the population.⁵⁹

58. The study 'Livelihoods of the Poor and Vulnerable in NCR' was conducted by IHD in 2011 at the behest of Sir Dorabji Tata Trust (SDTT), Mumbai. Please refer to "Livelihoods of the Poor and Vulnerable in NCR—Final Synthesis Report 2012", p. 200, for details.

59. Sources: www.delhimetrorail.com and <http://www.dailypioneer.com/city/delhi-metro-phase-iii-a-landmark-for-city.html>. Accessed on 23 April 2013

Box 5.10

Recent initiatives by the Government in the Transport Sector

The Delhi government has been turning towards technology in a big way to solve the nitty-gritties of the problems plaguing the transport sector. The Global Positioning System (GPS) has been a useful tool in this respect. Some details of the recent efforts of the Delhi government in using GPS in the transport sector are presented below:

The Automatic Vehicle location system (AVL) through GPS was launched in 2010 to monitor crew behaviour, idling of buses etc. and help improve operational efficiencies and services to commuters.

Installation of GPS technology in buses would help the corporation keep a tab on the operation of buses from the time they leave the depot to the end of their journey. Reportedly in Dec 2012, 3,900 DTC low-floor buses and 379 cluster buses had GPS installed in them. The government has also installed GPS in 10,000 new autos. Installation of GPS would help keep a record of the route taken by drivers as well as address the safety aspect of commuters, especially female commuters.

The Delhi Govt. has issued a notice for making GPS compulsory in chartered buses and Grameen Sewa vehicles from April 30, 2013.

Source: Twelfth Five Year Plan, 2012-17, and Annual Plan, 2012-13, Available at: <http://www.delhi.gov.in/wps/wcm/connect/795c72804b89d45f9eaebf27c1af8e74/12TH-5YEAR-PLAN-2012-17-and-ANNUAL-PLAN-2012-13-one.pdf?MOD=AJPERES&lmod=-891377213&CA CHEID=795c72804b89d45f9eaebf27c1af8e74>, Accessed on 21 April 2013.

Road Network and Street Lighting

From the Perceptions Survey we find that two fifths of respondents felt road conditions were below average in the city while a little over a third felt the same to be above average. District wise data show residents from New Delhi rating road conditions highly, while in the North East and North West districts road conditions were rated as poor. Above average ratings were given for roads in posh colonies and JJ resettlement colonies but respondents in JJ clusters and unauthorised colonies rated roads as poor. A large proportion of respondents (54.8 percent) felt that road conditions had remained the same in the last three years (Perceptions Survey, 2013).

The city road network in Delhi, reported to be about 33,198 lane kms long in 2012, has increased by 535 km since then. Multiple agencies are responsible for constructing roads in the city, such as the MCD, NDMC and the Public Works Department (PWD). Five national highways also run through Delhi as it is a wholesale trade centre for the whole of North India, leading to a lot of congestion on Delhi's roads. As a solution to the congestion problem, the Eastern Peripheral and Western Peripheral expressways are being constructed. (Twelfth Five Year Plan, 2012-17 and Annual Plan, 2012-13, Delhi.). The construction of flyovers, primarily over the busy traffic intersection points, has aimed at ensuring the smooth flow of traffic, and reducing fuel inefficiencies and time consumption.

Street lighting in Delhi was accorded a lot of attention prior to the Commonwealth Games in 2010 and superior quality lights were installed throughout the city, especially on the main roads. However, the arterial roads did not receive as much attention, and reports of poor illumination have surfaced in various parts of the city⁶⁰ in response to which policy interventions were put into place. The Perceptions Survey, 2013, reports that more than half the respondents rated the condition of street lighting as good, with the New Delhi district reporting the best street lighting and the Central and North-east districts reporting the poorest lighting. While 42 per cent of the respondents thought that street lighting

60. Based on the article, "How Inadequate Police Patrols and Street Lighting Make Parts of the Capital a Hotbed of Crime", Published in December 2012, Available at: <http://www.dailymail.co.uk/indiahome/indianews/article-2251297/How-inadequate-police-patrols-street-lighting-make-parts-Capital-hotbed-crime.html> and "Street Lighting in Delhi Should Match That of Developed Cities", Available at: http://zeenews.india.com/news/delhi/street-lighting-in-delhi-should-match-that-of-developed-cities_789491.html. Accessed on 15 June 2013

had improved during the last three years, 49 per cent reported that it had remained the same. However, disparity in lighting across settlement types was highlighted in the FGDs wherein most of the poorer settlements such as the slums and unauthorised colonies reported inconvenience due to dysfunctional street lights, which was also reported as a great cause of concern for the safety of women and children.

To sum up, the Delhi Master Plan, 2021, aims at increasing the share of trips by public transport from the current 40 per cent to 80 per cent by 2020, which can only be achieved if the public transport system improves phenomenally along with other improvements in road space and infrastructure design, which would also accommodate non-motorised vehicles.⁶¹ As mentioned at the inception of this chapter, one of the key policy objectives of the Government in recent years has been the strengthening of the public transport system and curtailing the usage of personalised vehicles. The Metro has been able to lure away people from using their private means of transport to a great extent. The Perceptions Survey, 2013, is also indicative of these behavioural changes, which indicate that a large proportion of the people from the reasonably well-off socio-economic categories have started taking to travelling by the Metro for both work and educational purposes, thus avoiding the use of personalised vehicles and reducing traffic congestion in the city. The Delhi Metro thus symbolises a major achievement for the Government in terms of providing a safe, convenient, expeditious and eco-friendly mode of travel, which has benefited the people of not only Delhi but of the entire NCR region as well. As part of the holistic urban planning system, the Government has also been promoting other alternative environment-friendly modes of travel, which can supplement the Delhi Metro and public buses. In fact, Delhi has the highest number of CNG buses in the world. Alternative modes of public transport like the Elevated Monorail, Light Railway Transit (LRT), and High Capacity Bus System (HCBS) are also on the anvil.

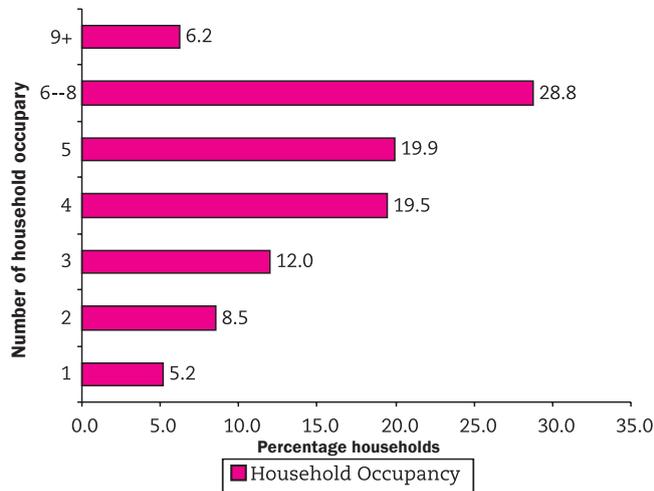
5.4 Slums and Some Other Deprived Settlements

Rapid increases in the slum population area signify a global phenomenon and are not confined to India

61. Sources: <http://www.cseindia.org/content/one-third-delhi-walks-work-are-our-roads-designed-safe-walking-and-cycling-latest-cse-survey> and http://ncrpb.nic.in/latest_news/26Transport%20Department,%20Government%20of%20NCT%20Delhi.pdf. Accessed on 1 June 2013.

Figure 5.20

Slum Households by Average Occupancy



Source: Census, 2011.

alone. Recognising the substantial size of the slum population, their poor living conditions, as well as the challenges for including them in the mainstream population, the United Nations has set the target of achieving significant improvements in the lives of at least 100 million slum-dwellers by the year 2020, as part of the Millennium Development Goals (MDGs—target 11).

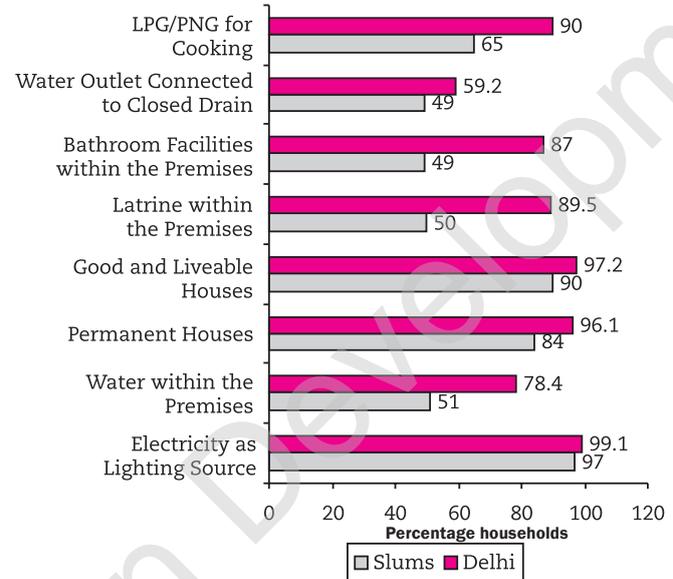
The number of slum households and slum population has increased substantially in Delhi over the decades, with the exception of the last decade. While in 2001, there were 0.42 million slum households (comprising a population of 2.15 million), in 2011, the numbers dropped to 0.384 million households (comprising a population of just over 1.9 million), thereby registering a decline. The Delhi Urban Shelter Improvement Board estimates for 2010 peg the number of JJ clusters as 643, with 0.4 million households and an estimated population of 2 million.

5.4.1 Housing

For Delhi, the Census 2011 data reveals that 84 per cent of the slum households stay in permanent houses and 9 per cent reside in semi-permanent houses. The average size of rooms in the slums is extremely small and the room density, that is, the number of people living per room is found to be very high. In 2011, 59 per cent of the slum households resided in single-room homes, 25 per cent shared two rooms, with household sizes of either 5 (20 per

Figure 5.21

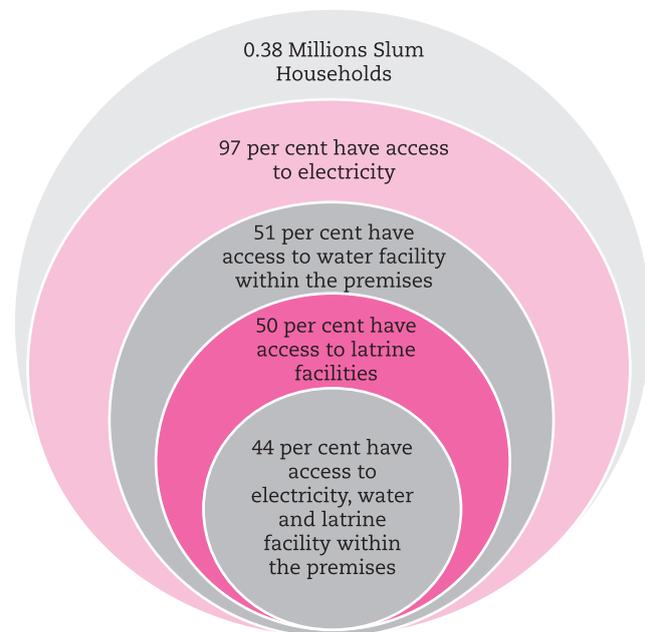
Status of Basic Services



Source: Census, 2011.

Figure 5.22

Access to Three Basic Services (Water, Electricity and Sanitation) among Slum Households



Source: Census, 2011.

cent households) or 6 people (nearly 35 per cent), thus clearly reflecting congestion and overcrowding (Figure 5.20).

Figure 5.23

Perceptions Regarding Performance of Basic Services for Selected Settlements



Source: Perceptions Survey, 2013.

5.4.2 Provisioning of Basic Services

When the Census, 2011, data on the provisioning of basic services to the slum and non-slum households is compared (Figure 5.21), it reveals that with the exception of electricity, slums lag behind the average level in terms of access to all the basic facilities, especially sanitation.

The gap between the figures for slums and the average figures for Delhi is the highest with regard to sanitation facilities. Combining the three important basic services of availability of water within the premises, electricity and latrine facilities, it is found that out of over 0.38 million slum households, only 44 per cent had access to all the three services (Figure 5.22), whereas, on an average for Delhi, approximately 76.5 per cent of the households had access to all these three basic services.

5.4.3 People's Perceptions about the Provisioning of Basic Services

Here we take a look at the findings from the Perceptions Survey by the type of settlements. The earlier discussion in this chapter indicated that JJ clusters⁶² and unauthorised colonies were especially

deprived in terms of access to basic services, and here we focus our attention on these very types of settlements.⁶³ The JJ resettlement colonies, urban villages and the Walled City are also discussed here since the residents of these areas also have issues in the area of provision of basic services, though not to the extent of the JJ clusters and unauthorised colonies (Figure 5.23). The vulnerability is the least in this sense in the approved colonies and posh localities, and these have therefore been kept out of the ambit of analysis in this section.

There is almost a unanimously positive perception about power supply in all the settlement types, except for the JJ clusters wherein more than 20 per cent of the respondents rated power supply as below average. The respondents from the JJ clusters,⁶⁴ urban areas and urban villages, regularised unauthorised colonies and the Walled City expressed garbage disposal and roads to be the problem areas as

63. The category of 'unauthorised colonies' includes both colonies that remain unauthorised and those that have been regularised. In this section, these are examined separately.

64. There is a possibility that the respondents' perceptions regarding roads and sanitation could be intermingled since in the FGDs, many respondents complained about flooded roads during rains, when open drains get clogged with garbage.

62. Here the term *Jhuggi Jhopdi* clusters (JJs) is used synonymously with slums.

perceived by them. Water supply was a particular problem area for the residents of unauthorised colonies. On the other hand, respondents from the JJ resettlement colonies rated all these basic services quite highly.

5.4.4 Key Problems of Settlements

As part of the Perceptions Survey, respondents from the different types of settlements were also asked about the key problems faced by them in their respective localities. In keeping with the data depicted in Figure 5.23, sanitation figured as the most problematic area in four out of the six settlements considered (Table 5.6). In the unauthorised colonies, regularised and otherwise, water was reported to be the biggest issue for residents. The JJ clusters also clubbed power with sanitation as the key problem areas.

Table 5.6
Key Problems for the Settlements

Localities	Most Problematic	Second Most Problematic
Unauthorised Colony	Water	Roads
Urban Village	Sanitation	Roads
Regularised Unauthorised Colony	Water	Sanitation
JJ Clusters	Power and sanitation	Roads
JJ Resettlement Colonies	Sanitation	Roads
Walled City	Sanitation	Water

Source: Perceptions Survey, 2013.

5.4.5 Government Policy for Slums

The broad policy framework adopted in Delhi for slums is that no fresh encroachments shall be permitted on public land and that past encroachments, which have been in existence prior to 31 January 1990, will not be removed without providing alternatives. A three-pronged strategy has been adopted for dealing with the problems of JJs, as delineated below.

i) Relocation of the *jhuggi* households where the land-owning agencies are in a position to implement projects on the encroached land pockets as per requirements in the larger public interest. Submission

of requests to the Slum and JJ Department for clearance of the *jhuggi* cluster for project implementation and with contributions of due share towards the resettlement cost.

ii) Institutionalisation of upgradation of JJ clusters and informal shelters in case of those encroached land pockets wherein the land-owning agencies issue No Objection Certificates (NOCs) to the Slum and JJ Department for the utilisation of land. However, the utilisation of land under this strategy is linked with the clearance of the project by the Technical Committee of the DDA.

iii) Extension of minimum basic civic amenities for community use under the scheme of Environmental Improvement in the JJ clusters and its component scheme of construction of 'Pay and Use Jansuvidha Complexes', containing toilets and baths, and also the introduction of mobile toilet vans in the clusters, irrespective of the status of the encroached land until their coverage is assured under one of the aforesaid two strategies.

5.5 Conclusions

Access to shelter for the citizens in Delhi is severely impacted by population pressures, accompanied by migration, and it has been compromised by the stark disparity in access to this basic facility. At the bottom of the pyramid, there are around 56,000 homeless people. Slum-dwellers constitute another vulnerable group living in congested housing, often without basic minimum services and lacking tenure security. The housing facility varies considerably depending on the type of settlement considered, from slums and unauthorised colonies at one end of the spectrum, to affluent colonies, at the other. The official figures of housing shortage show a declining trend and the present shortage is estimated at slightly over 1,50,000. This shortage paradoxically co-exists with a large number of vacant houses, indicating issues of affordability. In addition, given the large variation in housing facilities, as well as crowding due to the high incidence of large families living in one- or two-room premises, it appears that Delhi still has a long way to go before all its citizens are provided with decent housing. It is however, remarkable, that, according to the Perceptions Survey, 2013, around one-fifth of the people living in rented houses were largely positive about the future, with many of them reiterating the belief that they would be able to buy a house in the coming three years.

The provisioning of basic services has improved between 2001 and 2011 in all the four areas considered: water, sanitation, electricity and transport. The Delhi Government has succeeded in increasing the coverage of the services, particularly electricity connections, which are now nearly universal. The Government has spruced up the transport landscape of the city to a great extent, especially in the run-up to the Commonwealth Games held in 2010. Piped water connections are now available to 81 per cent of the households and sanitation facilities are available to nearly 90 per cent of the households.

In the Perceptions Survey, 2013, people perceived electricity, bus services and street lights to be the main services that had improved considerably over the last three years. The percentage share of people perceiving that that these services had deteriorated was very small. People, by and large, hailed the new additions to transport facilities such as the Metro and low-floor buses. A more moderate share of the respondents reported an improvement in road conditions (30 per cent), water supply (26 per cent), and garbage collection services (24 per cent). More than half the respondents felt that road conditions have maintained their status quo during the preceding three years, while 15 per cent felt that they had worsened. A large proportion (63 per cent) felt that water supply has remained the same while 10 per cent felt that it had deteriorated. Around two-thirds of the respondents felt that there was no change in garbage collection services during the last three years. Sanitation, specifically the condition of public toilets, was rated as the worst amongst all the public services.

5.5.1 Settlements

Moving from the aggregate frame, the settlement-wise analysis reveals a more nuanced picture. Although Delhi's natural population growth rate has been slowing down, every year nearly 2,50,000 people are added to the population of the city. Added to this is the pressure from the inflow of migrants into the city. While the new-comers provide invaluable services to Delhi's economy, the influx creates pressure on land, and also strains the available civic services and infrastructure. The various tiers of the Delhi society, with varying degrees of advantage and foothold, get reflected in the considerable differences in terms of the quality of services that they have access to. The disadvantaged masses are also handicapped by the fact that they can hardly afford

private provisions and are the most dependent on government facilities.

The Perceptions Survey, 2013, indicates relatively poorer availability and functioning of all the basic services for the JJ clusters and unauthorised colonies. The poor quality of drinking water and water shortage in summers are particularly problematic issues for these people. Only half the slum-dwellers have access to private toilet facilities and the practice of open defecation poses great risks in terms of hygiene, security and environment. Open drains constitute an added woe for the residents of these settlements (and the residents of urban villages), as they turn the slums into stinking swamps during the monsoons when the drains are clogged with garbage dumped in the open. These poor and vulnerable segments of the population cannot afford access to private garbage collection systems like their counterparts who reside in the affluent settlements.

While slum-dwellers largely have access to electricity, they suffer from erratic supply and inflated bills. The residents of JJ resettlement colonies, urban villages and the Walled City, too, had issues with inflated bills. It is an interesting fact that unauthorised colonies reported the maximum improvement in power supply during the last three years. Dysfunctional street lights constituted an extremely important deficit area in the JJ clusters and unauthorised colonies, given the often precarious safety situation for the children and women residents there. Transport and roads were the other areas which need to be flagged for improvement. While the disadvantaged groups of people reap some external benefits from recent milestones such as the Metro and the introduction of low-floor buses, they face increasing costs and diminishing frequency of public bus services. Further, the inner roads in their own settlements are ill-lit and often not paved properly.

Social group-wise, the differences in perceptions were not very stark between the various groups, though the SCs were found to be marginally worse off than the other groups in terms of some of the basic services. The SC and Muslim households were found to face relatively more problems with regard to water availability while the Sikhs expressed most satisfaction regarding the same.

5.5.2 Variations across Districts

The North-west and South-west districts were found to be lagging behind the other districts in accessing

many of the basic services. According to the Census information, water availability is poor in the North, North-west, North-east and South districts. The Perceptions Survey findings show residents citing poor availability of water in the North-west and South-west districts, as also salinity problems. The Samajik Suvidha Sangam (SSS) or Mission Convergence Report (2012) indicates that sanitation facilities are very poor in the North-west and South-west districts as well as in the South, since a higher percentage of the slum-dwellers in these districts are reported to defecate in the open. Yet cleanliness in the public toilets is given a thumbs-up by the respondents from the South district, which is an exception since all other districts have given poor rating to the same. In terms of drainage, the North-east district is the worst off as it has only 26 per cent closed drainage as opposed to an average of 59.2 per cent for Delhi.

Complaints about erratic power supply came mostly from the West and South-west districts, while a high share of inflated bill problems was reported by residents of the South-west, West and North districts. The New Delhi and West districts reported low proportions of respondents who felt that there had been improvements in the power supply over the last three years. Road conditions have largely remained the same during the last three years, according to more than half the respondents (55 per cent). The South district residents reported the maximum improvement (47 per cent), while 32 per cent of the residents of the Central district felt that road conditions had deteriorated. Overall, the South-west and North-west districts were found to be lagging behind in terms of the provisioning of basic services.

The discussion in this chapter points towards the need for a regular policy review for all the basic services in view of the fast-paced growth and changing conditions in Delhi. Simultaneously, the Government needs to play closer attention to the planning and implementation aspects of the same. In order to attain the eventual goals of a high level of human development for the citizens of Delhi, the Government initiatives also need to be focused further on the un-served and under-served groups/pockets of people. The JJ clusters and unauthorised colonies have already been revealed as the most deprived in terms of shelter and basic services, and among the districts, the South-west and North-west districts also need a closer look.

5.6 The Way Forward: Some Policy Pointers

5.6.1 Housing

- The homeless need to be provided with adequate shelter, cheap food, and access to safe water and sanitation facilities, till such time that they can gain access to affordable housing.
- More focus and attention is needed for making the existing night shelters easily accessible and fully functional in terms of basic services. There is also need for separate shelters for women.
- There is a need to address the issue of crowding, especially in slums, where large families are forced to live in one or two rooms.
- A holistic approach to slum improvement and upgradation is already envisioned by the Government and needs to be carried forward by taking into account livelihood issues in the case of relocation.
- The availability of comprehensive data on slums and the homeless in Delhi would aid planning.
- More affordable houses are needed, as is evident from the fact that despite the housing shortage in the city, there are 11 per cent vacant houses in Delhi.
- Access to credit facilities at low rates of interest can be increased to bring houses within the financial reach of the people.

5.6.2 Water

- There is need for demand management by changing social attitudes towards the use and conservation of water.
- The Government's ongoing initiatives for rainwater harvesting should be continued and, in fact, accelerated, leakages from pipes reduced, regulation of groundwater use by deepening lakes, dams, reducing the number of tubewells undertaken, and more water treatment plants built. In this regard groundwater drawl charges and metering can be an option.

- Adoption of decentralized wastewater treatment may be made mandatory with reuse and recycle of treated wastewater in horticulture, cooling, flushing, etc. by individual units such as hotels, hospitals and shopping malls.
- In order to improve the quality of water, the target of the Twelfth Five Year Plan to supply 100 per cent BIS standard water quality to all, needs to be adhered to.
- For achieving equitable distribution of water, the DJB coverage must be fully extended to slums within their household premises.
- In order to raise revenue for resource generation, the Twelfth Five Year Plan proposes 100 per cent metering and reduction of non-revenue water level to 30 per cent.

5.6.3 Sanitation

- Public toilet facilities must be maintained in a clean and hygienic manner, and safety must be ensured.
- Public toilets for exclusive use of women are required.
- The eventual aim should be that all the vulnerable sections of the population have private toilets with water and sewerage connections, so that no one need suffer the indignity of open defecation.
- Settlements lacking sewerage networks must be provided with the requisite facilities and the drainage system needs replacement. Expansion of closed drainage is needed, especially in the North-east district.
- Decentralized waste management must be promoted at the local level, for which there is already an existing subsidy. In addition specific zonal level sites need to be allocated to set up environmental services for managing municipal solid wastes, biomedical waste and other types of waste.
- Garbage disposal systems must be improved with checks on the open dumping of garbage. People should be made aware about the problems resulting from the disposal of construction debris in the drains.

- Higher standards need to be adopted for the treatment for waste water, as recommended by the Twelfth Five Year Plan and the use of treated waste water for all non-potable purposes is recommended.

5.6.4 Electricity

- Tariffs must be rationalised to the extent possible in order to prevent their adverse impacts on the poor and the illegal use of power should be curbed to arrest revenue loss.
- Metering should be extended to all areas and complaints of inflated bills should be addressed regularly.
- Incentives should be used to promote renewable sources of energy and energy efficient measures, energy audits, etc. adopted.

5.6.5 Transport, Roads and Street Lights

- The bus network coverage and the number of buses need to be increased.
- Inter-state bus travel must be smooth and trouble-free within the NCR region to reduce pressures on Delhi.
- Services of public transport must be improved and surveillance measures like GPS immediately implemented to address the issue of safety and security.
- The multi-modal transport system network needs to be strengthened with the intermediate shifts of travel modes made smoother.
- Gender sensitizing of commuters and bus staff is needed and the helpline numbers should be widely circulated for ensuring safety.
- Functioning street lights are needed in all types of settlements, especially for the safety of women and children.
- Interior roads in the JJ clusters and unauthorised colonies need to be improved and maintained.

Annexure

Annex 5.1

Housing Shortage as per Census 1991-2011

Sl. No.	Items	1991	2001	2011
1.	No. of Households	1861576	2554149	3340538
2.	No. of Residential Houses	1802338	2452402	3313904
3.	No. of Shelter-less Households*	12200	24966	33506
4.	No. of Kutchra Houses (Non serviceable Temporary House for 2001)	182241	32976	93457
5.	Housing Shortage (c 1-2)+3+4)	253679	159689	153597
6.	Percent Housing Shortage (%)	13.62	6.25	4.59

Annex 5.2

Settlement-wise Residents Paying Water Bill (per cent)

Type of Locality	you pay a DJB water bill	
	Yes	No
Approved Colony	85.5	14.5
Unauthorised Colony	75.9	24.1
Urban Village	71.8	28.2
Regularised Unauthorised Colony	74.4	25.6
JJ Clusters	30.7	69.3
JJ Resettlement Colony	92.9	7.1
Posh Locality	96.7	3.3
Walled City	89.9	10.1
Delhi	79.7	20.3

Source: Perceptions Survey, 2013.

Annex 5.3

Perception in Change in Garbage Collection and Disposal Facilities over Last 3 Years (per cent respondents)

Type of locality	Improved	Remained Same	Deteriorated	Don't Know/ Can't Say	Total
Approved Colony	27.07	64.77	6.93	1.23	100.00
Unauthorised Colony	7.84	81.60	10.14	0.42	100.00
Urban Village	24.08	63.60	11.56	0.76	100.00
Regularised Unauthorised Colony	15.63	67.83	15.16	1.38	100.00
JJ Clusters	13.64	66.00	18.64	1.71	100.00
JJ Resettlement Colony	33.88	56.34	9.17	0.61	100.00
Posh Locality	21.88	73.38	4.74	0.00	100.00
Walled City	39.16	50.23	9.78	0.83	100.00
Delhi	23.70	65.51	9.77	1.02	100.00

Source: Perceptions Survey, 2013.

Annex 5.4

Drainage Facility for Waste Water Disposal

Area Name	Total Number of Households	Waste water outlet connected to		
		Closed Drainage	Open Drainage	No Drainage
NCT OF DELHI	3,340,538	59.2	36.6	4.2
North West	730,034	54.8	38.9	6.3
North	175,890	67.1	28.4	4.5
North East	395,060	25.9	72.5	1.5
East	354,385	60.8	37.9	1.3
New Delhi	30,385	84.5	11.8	3.7
Central	114,587	93.0	5.9	1.1
West	523,703	71.7	24.2	4.0
South West	462,772	65.2	29.5	5.3
South	553,722	60.0	35.2	4.8

Source: Census, 2011.

Annex 5.5

Solid Waste Management in Delhi, 2012

Sl. No.	Particulars	Capacity/Quantity
1.	Generation of Municipal Solid Waste (MSW)	8500 TPD
2.	MCDs Collection Dhalaos	168 Nos.
3.	Total Quantity of MSW through Sanitary Landfill Sites	5700 TPD
4.	Total Quantity of MSW treated	1000 TPD
5.	Proposed Quantity for treatment of MSW	8800 TPD

Source: DOE, Govt. of NCT Delhi, 2012.

Annex 5.6

Rating of Power Supply Personnel Across Settlements (per cent respondents)

	Authorized Colony	Unauthorized Colony	Urban Village	JJ Clusters	JJ Resettlement Colony	Posh Locality	Walled City	Delhi Total
Very Good/Good	68	80	65	50	55	68	46	65
Average	16	12	15	12	16	14	29	15
Poor/Very poor	5	4	11	15	7	6	10	7
DK/GS	2	0	5	4	5	6	7	3
Not Experienced	9	4	4	19	17	6	8	10
Total	100	100	100	100	100	100	100	100

Source: Perceptions Survey, 2013.