

Vision Delhi 2030

Draft Report



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VISION DOCUMENT FOR DELHI –2030

INTRODUCTION

Delhi shines as the brightest star in the Indian economy. It has been a migrant's dream for many years and they add roughly 2.5 lakh to its population every year. It is the preferred destination of the MNCs that entered India since the 90s. It is India's second most affluent state with a per-capita income of Rs. 2.5 lakh approximately, that is more than three times the national average. The state has more private vehicles than the other three metros combined, enjoys the highest per-capita ownership of consumer goods as well as the highest per-capita consumption of electricity. The city's infrastructure is a big draw for both industry and people. Delhi's wide roads, green landscape and access to good schools and hospitals add to its charms.

Decadal population growth has declined to 21.2 per cent in 2011 as compared to 47.02 in 2001. Such a significant decline has been evident for the first time since 1951. High population growth rate in previous decades has resulted in very high population density (persons per sq. km) from 6352 in 1991 to 11320 in 2011. Another positive development during the last decade is the increase in sex ratio from 821 in 2001 to 868 in 2011. Growth rate of population during the last decade has come down to 2.12 per cent while the growth rate of per-capita income in constant prices(real term) has been 6.06 per cent, thereby indicating stronger economic base and growing prosperity.

However, the national capital cannot escape from the contradiction observed in highly urbanised metros, i.e. the co-existence of poverty and prosperity. Around 10 per cent of the state population lives below poverty line as against 22 per cent of national average. One-third of Delhi's population still lives in slums, mostly on public land (90 per cent). The percentage of slum population was higher than the national average in 2001. It has also declined from 16.3% of urban households in the state in 2001 to 11.3 in 2011 while national average has increased from 14.8 to 17.7 during the same period. More than 60 per cent of the effluents

channelled into the Yamuna is untreated and the water level in some of its most posh areas has gone down to 30 m below the surface. All these lead to the unavoidable question: is Delhi's development sustainable?

The government wants to turn Delhi into a city of international standard. A world class network of roads with a modern public transport system supported by a series of flyovers and grade separators along with introduction of a high capacity Urban Bus System and Electronic Trolley Buses are part of this dream to make Delhi a proud city. Eco-friendly and cost-effective modern modes of public transport, well integrate through a multi-modal transport system, will provide the desired connectivity for expanding economic horizon. A modern global city is the immediate agenda, for which, upgrading infrastructure is the top-most priority. Power, water and transport, the crucial determinants of quality of life, would remain the most important challenge. In the power sector, the government will try to consolidate the gains so far and focus on alternate energy based projects to reduce the dependence of Delhi on the Northern Grid and other sources. Delhi Electricity Regulatory Commission would be strengthened to ensure a level playing field between different stakeholders especially after privatisation.

In order to ensure development with a human face, the government wants to increase citizens' participation, specially, involvement of women in governance. In order to make the elected civic body more accessible and accountable to the people, the Municipal Corporation of Delhi has been divided into three MCDs, North, South and East.

The major challenges are centred round the following sectors: Economy and Employment, Transport, Water Supply and Sanitation, Housing and Urban Development, Medical and Public Health, Education, Social Security, Environment.

Economy and Employment: Delhi has experienced a functional shift in its producing sections so far as contribution in Net State Domestic Product is concerned. Primary sector's contribution has gone down from 4.48 to 1.58 in NSDP, similarly for the secondary sector, (from 27.39 to 18.87) though share of construction sector has increased. Electricity contributes less than 1 per cent to NSDP, though Delhi has the highest per-capita consumption of

electricity. Tertiary sector's contribution has risen from 68.12 per cent to nearly 80 per cent. Financing and real estate sectors have become very prominent in the tertiary sector, followed by trade and hospitality sector. Community, social and personal services have maintained uniform share in the NSDP. The trend suggests that future employment prospects will emerge in financial and hospitality services along with transport and communications. Delhi is heading for pollution free white collar employment opportunities suitable for a globalised city.

The New Industrial Policy of Delhi focuses on promotion of knowledge based industries with priority on skill development and its vision to make Delhi a hub of clean, high-tech economic activities. The industrial skyline is dotted with small and medium industries as large scale industries are banned in the capital since 1960. A number of measures have been taken to shift the industries from non-conforming areas in order to reduce industrial pollution.

Apart from industrial activities, distributive trade is another major contributor to growing economic strength of the national capital. Delhi enjoys this prominence owing to three major factors; (I) its spatial location in relation to transport and communication network within the northern region, (ii) the available resources and environment and (iii) functional specialisation of Delhi. Delhi being the centre of political and administrative power, the concentration of banking activities, godowns, transport and communication facilities including marshalling yards have all combined to help the growth of wholesale trade in Delhi which ranks as the third biggest distributive centre in the country, next only to Mumbai and Kolkata.

During 2001-11, population of Delhi increased at 2.12 per cent per annum, but the proportion of working population to total population increased at 0.46 per cent. The Workforce Participation Ratio (WPR), as per Economic Survey, 2016-17 is 408/1000. Growth of workers during 2001—11 was 18.65 while that of non-workers was 16.92 during the same period. One-third of total population of Delhi is taking care of remaining two-thirds, revealing high dependency ratio. Female workers constitute around 14 per cent of total workers. Predictably, industry and tertiary sectors provide major share of employment, while share of primary sector is around 1 per cent.

Rate of unemployment is around 4.46 per 1000 of labour force. Educated unemployment (graduates and above) constitutes 26 per cent of total unemployed persons.

Transport: Delhi's development has largely been based on road transport nodes. A major fall out of this has been distortion between infrastructure, transport and land use. To achieve spatial balance, development should take place as per new corridors of mass movement like the metro rail. The metro corridors up to a certain depth, would require selective redevelopment and re densification of the existing land use based on site conditions. The total road length in the state has increased considerably, but the number of vehicles has more than doubled thereby creating a condition of perpetual problem of congestion on Delhi roads, with consequent increase in congestion costs in terms of fuel, pollution and man hour loss. Integration of all public transport modes is essential to provide convenient public transport system. Park and ride facilities need to be developed at all important junctions. Increasing traffic demand between Delhi and other NCR towns also increases traffic loads within the city.

Water Supply and Sanitation: Delhi depends on neighbouring states to meet around 50 per cent of drinking water demand of its residents. Political considerations remain very serious challenge. The city state is 98 per cent urban in terms of population. The growing need for water is very fast, including the demand of construction industries. The distance between source of water and destination increases the possibility of leakage and pilferage. Loss of treated water is around 30 per cent. It increases the cost of water supply. Excessive drawing of water from bore wells has resulted in depletion of ground water which is aggravated with inadequate monsoon. The status of non-revenue water is around 50 per cent. DJB does not have enough resources to meet the cost of water supply and sewerage infrastructure required for growing population.

Housing and Urban Development: It is one of the priority sectors in the development planning process of Delhi. The state government has no role in it. DDA is the sole agency responsible for land, land development and public housing in Delhi. Growth of slums, unauthorised colonies and encroachments remain permanent challenges as rate of

construction is inadequate compared to growing demand for housing. Continuous flow of migrants tends to aggravate the problem. The economically weak is in need of the night shelters but occupancy rate is very low excepting in winter. Civic supplies are increasing over time but property tax rates have not been increased since 2004. Municipal Corporations in Delhi are examples of rich city and poor municipality. Whatever meagre rent is due from slum katas, collection is very poor. Regular municipal services are nor carried out because of mismanagement. The corporations have no records of properties, manpower and other inventories. Land fill sites have reached the saturation points and are prone to accidents. MPD—2021 has suggested redevelopment and densification of the existing urban areas and city improvement through mixed land use, enhancement of ground coverage, increased FAR and height for all categories of residential plots, development of district and community centres as some major requirements of urban management. The challenge is sources of finance and implementation procedure.

Medical and Public Health: In spite of massive increase in expenditure on health services, Delhi has some poor health indicators like bed-population ratio, sex ratio and the like. The private sector accounts for almost half of total hospitals and nursing homes in the state. This raises the question of affordability specially the people below poverty line which are around 10 per cent of state population. Out-of-pocket expenditure for health services is quite high in Delhi. Availability of land is a major issue that is under jurisdiction of DDA. Institutional delivery is more than 85 per cent but not yet 100 per cent. Vector born diseases, per-natal and post-natal maternal health and mental health are major challenges. These are low in proportion, but very high in absolute number. The government provides lots of incentives to the private sector, but their contribution in delivering low-cost medical services are not satisfactory. There are several free health insurance schemes provided by the government for the poor, but low number of recipients show that there is not enough awareness or there are procedural difficulties. Hygienic living conditions and food safety are serious issues.

Education: The government aspires to make the state an educational hub. However, very high cut-off marks make it very difficult for average students to pursue the desired courses within state. The number of available seats is not adequate compared to increasing number of

students. Higher education is not meant for everybody. But there should be enough number of vocational and skill development training centres so that the students are not forced to go for higher education. Massive investment is required both in terms of school infrastructure as well as recruitment of teachers and supporting staff. DDA allots land at concessional rates for both medical and educational infrastructure but the private sector tries to avoid the 25% free admission to EWS students on various pretexts. Drop-out rates are low and declining owing to various incentives offered by the state but it is not zero as yet. The employability of educated students is a major issue. The industry and service sector face shortage of skilled manpower. ICT coverage is not adequate though many improvements are underway. Measurement of performance of teachers, especially in public schools should be done on continuous basis. At the same time, large number of vacancies in public schools cause serious problem.

Social Security and Welfare: Delhi aspires to be an inclusive global city. It has to attack directly on inequality issues with all possible aspects. There are various programmes offering direct benefits to the target groups in social welfare related schemes. Yet the gap in male and female literacy, especially among the SC, ST and other vulnerable class is significant. Social audit should be taken to ensure that only the eligible persons get the benefits of the respective schemes. Schemes like conditional cash transfer should be scrutinised thoroughly before implementation so that the expenditure is not wasted. The inmates in juvenile homes, old age homes, mental asylum, orphanage and the like often go through inhuman conditions and suffer trauma. These areas should be given priority consideration under continuous monitoring. Often, these organisations become centres of several crimes. There are several SHGs that are not getting necessary loans from the formal sector and are subject to oppressions from informal moneylenders in order to meet their compulsory financial needs. They are not aware of the government financial assistance and insurance schemes and are deprived of various benefits. This should be considered on a priority basis. ICT should be used extensively to map the targeted beneficiaries and monitor the impact in order to avoid duplicity. Increasing number of beggars is a serious problem. Provision of hostels to migrant women workers, medical and other security arrangements for aged persons whose number is growing fast, child right protection, the safety of rag pickers are some very vulnerable social

issues prevalent in the national capital. These are the major bottlenecks that need urgent attention to reduce social inequality and achieve the goal of inclusive city.

Environment: Unprecedented scale and speed of urbanisation in Delhi and consequent pressure on physical and social infrastructure has created damaging stress on living environment and affected the level of pollution adversely. Increase in number of vehicles in Delhi is far faster than construction of roads. Even with availability of CNG, there are large number of diesel operated vehicles. There are various grades of good quality fuels, but vehicular pollution is increasing. Delhi metro has diverted around 18 lakh commuters daily, but inter-connectivity is not adequate. Consequently, public transport like buses has reduced operations in some areas owing to metro, but private cars have not gone down in number. Besides, there is air pollution due to heavy construction activities, water pollution owing to dumping of untreated industrial and municipal wastes in the river and excessive ground water exploration. Fresh water should be flown to Yamuna for its rejuvenation. Recharging of ground water is the need of the hour. The government is emphasising on rain water harvesting and solar energy in order to reduce pollution from thermal power. The excess water available in monsoon should be impounded in the river bed for charging the river bed area. Concretisation of footpath and open spaces has affected ground water recharging. Sewage water gets discharged in storm water drain causing serious contamination. Hazardous waste, bio-medical waste and electronic waste are serious threat to environment. These are increasing with urbanisation and economic development in the city. Green cover of the state should be increased to 30 per cent. Green buildings should be promoted for conservation of water, reduction in generation of solid and liquid waste and reduction of consumption of electricity. Waste treatment plants should be rigorously promoted.

Sustainable Development Goals, Targets and Indicators

“The 2030 Agenda for Sustainable Development Goal”, the new universal Agenda as approved by United Nations is a “Plan of Action for People, Planet and Prosperity” adopted by many member countries for implementation. India as a member country of the United Nations and signatory to UN Sustainable Development Summit in September 2015 has

adopted the SDG 2030 as the guiding framework for its National Development Agenda till 2030. The prime objective of this universal agenda is to eradicate poverty in all its forms and dimensions including extreme poverty that is the greatest global challenge and an indispensable requirement for sustainable development. The SDG 2030 includes 17 Goals with 169 targets. The SDG framework is built on the millennium development goals and aims to realise the human rights of all and to achieve gender equality and empowerment of women by stimulating action in the areas of critical importance of humanity: “economic, social and environmental”.

Sustainable Development Goals focus on areas like end of poverty, sustainable production and consumption, health and well being, gender equality, clean water and sanitation, affordable clean energy, reduced inequalities, social peace and justice, development of partnerships, climate change action, life below water, life on land, decent work and economic growth, industry, innovation, infrastructure, sustainable cities and communities etc.

Sustainable Development Goals

- Goal 1 End poverty in all its forms everywhere
- Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3 Ensure healthy lives and promote well-being for all at all ages
- Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5 Achieve gender equality and empower all women and girls
- Goal 6 Ensure availability and sustainable management of water and sanitation for all
- Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
- Goal 10 Reduce inequality within and among countries

Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Under SDG indicators framework, it is essential to strengthen data from administrative and household sources to develop indicators that are relevant to achieve the goals and for focused measurement of both the dimensions of quality & equity. Indicators for tracking the progress in the State need to be carefully designed to capture the vision behind the SDG targets.

Around three interconnected documents are to be formulated as advised by Niti Aayog. These are:

- Vision Document 2030 which would be co-terminus for achievement of SDGs.
- Seven-year Strategy for the period from 2017-18 to 2023-24 would be formulated to convert the longer visions in to implementable policies.
- The third document would be a three-year Action Plan for the period from 2017-18 to 2019-20 aligning it to the financial resources.

Vision for Delhi

Delhi aspires to be an inclusive, equitable, livable global city, providing equal economic, social and legal opportunity to all its residents. It aspires to provide access to healthy livelihood, safe, just and pollution-free environment, barrier-free mobility and empowerment for all the residents in a time-bound manner with use of digital technology and good governance.

In order to realise its vision and achieve SDGs in a time-bound manner, the state should identify the growth drivers, analyse the challenges, allocate department wise responsibilities for different SDGs, and formulate strategies and action plans accordingly. Broadly, the strategic interventions should cover the following:

- To bring all families above the poverty line
- To generate adequate new employment opportunities per annum, especially for the lower income groups
- To eradicate illiteracy
- To raise primary and secondary enrolment rates and minimise dropouts
- To improve public health and reduce infant mortality and child malnutrition
- To increase investment massively in pollution-free power generation, telecommunications and other physical and social infrastructure
- To accelerate acquisition of technology capabilities to raise productivity in agriculture, industry and services with pollution-free means of production
- To use ICT for transparent and accountable governance
- To establish proper documentation for targeted milestones and measuring gaps in targets and achievements

Administrative Responsibilities

The state government has allocated the responsibilities of achieving SDGs in the following ways:

Goal 1	End poverty in all its forms everywhere Responsible Departments: Social Welfare, WCD, Technical Education, Minority Department, Revenue Department, Urban Development, Rural
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Development, DUSIB, DJB, DSCFDC, DKVIB, Local Bodies, Environment Department

Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Responsible Departments: Food and Civil Supply, ICDS, Agriculture Department, Delhi Agriculture Marketing Board, Animal Husbandry

Goal 3 Ensure healthy lives and promote well-being for all at all ages

Responsible Departments: Health and Family Welfare, WCD, Minority Development, DJB, Transport, PWD, Department of Prohibition, Environment Department

Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Responsible Departments: Education Department, Local Bodies, Directorate of Technical Education, Higher Education

Goal 5 Achieve gender equality and empower all women and girls

Responsible Departments: WCD, Education Department, Labour Department, Urban Development, Social Welfare

Goal 6 Ensure availability and sustainable management of water and sanitation for all

Responsible Departments: DJB, DUSIB, Local Bodies DSIDC, Environment

Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all

Responsible Departments: Power Department

Goal 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Responsible Departments: Industries, Technical Education, Environment, Urban Development, Labour and Employment Department, WCD, DTTDC, Tourism, Art and Culture Department, Finance Department

Goal 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Responsible Departments: PWD, Transport, Industries, DSIIDC, DPCC, DITE, NSIT, DTU, IIT, Technical Education, Environment

- Goal 10 Reduce inequality within and among countries
 Responsible Departments: Urban Development, Technical Education, Social Welfare, WCD, Minority Development, Law Department, Finance Department
- Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable
 Responsible Departments: Urban Development, DDA, DSIIIDC, DUSIB, DTC, DMRC, PWD, Local Bodies, Art and Culture, Environment, Delhi Park and Garden Society
- Goal 12 Ensure sustainable consumption and production patterns
 Responsible Departments: Food and Civil Supply, Urban Development, Local Bodies, PWD, Finance, Environment, DTTDC, Tourism
- Goal 13 Take urgent action to combat climate change and its impacts
 Responsible Departments: Environment, DPCC
- Goal 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development
 Responsible Departments: Does not relate to NCT of Delhi
- Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
 Responsible Departments: Forest Department
- Goal 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
 Responsible Departments: Home, Law and Judiciary, WCD, IT
- Goal 17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
 Responsible Departments: 17.1 relates to Finance Department. Others do not directly relate to NCT of Delhi.

The Vision Document is structured to elaborate the challenges and prepare Action Agenda for identified growth drivers in a time bound manner to achieve the SDGs. We should identify the budgetary provisions for different sectors and financial requirements in order to estimate the financial gaps in realizing the goals and ways of resource mobilisation.

This report deals with SDGs 1 to 16, excluding 14 as it is not applicable in Delhi. A separate report will deal with SDG 17.

The structure plan for the report is as follows:

EQUITY FOCUSED DEVELOPMENT

Chap I:Demography, Migration, State Income (SDG 8, 10)

Chap II:Livelihoods and Income Opportunities (SDG 8, 10)

Chap III: Eliminating Economic Deprivation (SDG 1, 2)

Chap IV:Inclusive City (SDG 11)

CITIZEN CENTRIC SERVICES

Chap V: Water Supply and Sanitation (SDG 6)

Chap VI: Transport (SDG 11)

Chap VII: Energy (SDG 7)

Chap VIII: Education (SDG4)

Chap IX: Health (SDG 3)

Chap X: Women and Child Development, Vulnerable Section (SDG 5, 10)

Chap XI: Law and Justice (SDG 16)

GREEN GROWTH (SDG 13, 15)

Chap XII: Environment (13, 15)

EQUITY FOCUSED DEVELOPMENT

CHAPTER I: DEMOGRAPHY, MIGRATION, STATE INCOME (SDG 8, 10)

Vision

The city aspires to use its potential productivity to its full in order to generate enough income to ensure comfortable life to all residents and to reduce inequality in opportunities and income.

Goal 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 10 Reduce inequality within the state

Delhi became the National Capital Territory (NCT) through 69th Constitutional Amendment in 1991 with enactment of National Capital Territory of Delhi Act, 1991. The central government controls part of the territory with its hold over land and internal security i.e., police force. This dual Jurisdiction distributed between central government and state government sometimes leads to conflict in implementing development policies. The state is spread over 11 Revenue Districts, 110 census towns, and 112 villages. These places are often very attractive to the migrants to settle down as land is cheaper in these towns and villages compared to the inner circle of the capital.

General administration of the state is divided between the central government, state government and the local bodies. There are five local bodies in the capital. The Municipal Corporation of Delhi (MCD) has been trifurcated in 2012 into three corporations for better delivery of services. These are South Delhi Municipal Corporation (SDMC), North Delhi Municipal Corporation (NDMC) and East Delhi Municipal Corporation (EDMC), together serving 95 per cent of the areas with 98 per cent of population. This includes rural population as well. The other two local bodies are New Delhi Municipal Council and Delhi Cantonment Board. The first three MCDs have all elected representatives. New Delhi Municipal Council

is wholly nominated body while members of the Delhi Cantonment Board are partly elected, and partly nominated by Defence Ministry.

The central government, state government and the local bodies, all 3 tiers of administration, manage the affairs of Delhi.

UN Specified Targets related to enhancing economic growth

- Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries
- Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value- added and labour-intensive sectors
- Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services
- By 2030, achieve full and productive employment and decent work for all women and men, including young people and persons with disabilities, and equal pay for work of equal value
- Take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour, eradicate forced labour and, by 2025, end child labour in all its forms, including the recruitment and use of child soldiers
- Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
- By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
- Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services

UN Specified Targets related to Reduction of Inequality

- By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average
- Facilitate orderly, safe, regular and responsible migration and mobility of people through the implementation of planned and well-managed migration policies
- By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 percent
- Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality

Demographic Expansion

When Delhi became the national capital in 1912, it had a total population of a little over 4 lakh of which approximately 2 lakh were urban. Increase in government sector activities coupled with various economic incentives for industries transformed the city into a vibrant centre of economic and administrative power. The city growth primarily was the result of administrative expansion, followed by industrial expansion. The functional classification of Delhi changed from mono-functional ‘service’ city in 1961 to bi-functional ‘industry-cum-service’ city in 1971 to signify its growing economic strength. From approximately 10 lakh population (7 lakh of them being urban) at the dawn of Independence, Delhi now boasts of 167.88 lakh residents, of which 163.69 lakh i.e., 97.50 per cent are urban (Census 2011). Growth rate of population in the national capital has remained more than double the all-India growth rate during last fifty years. Urban Delhi grew even faster. Decadal population growth rate of Delhi has been 21.20 per cent against 17.70 for India. Share of Delhi in India’s total population is only 1.39 per cent.

Table 1.1: District wise Urban and Rural Population of Delhi - 2011

S. No.	District/State	Population (Number)			% of Urban Population
		Urban	Rural	Total	
1	North West	3442589 (21.23)	213950 (51.05)	3656539 (21.78)	94.15
2	North	870232 (05.31)	17746 (4.23)	887978 (05.28)	98.00
3	North East	2220097 (13.56)	21527 (5.13)	2241624 (13.35)	99.04
4	East	1705816 (10.42)	3530 (00.84)	1709346 (10.18)	99.79
5	New Delhi	142004 (00.86)	--	142004 (00.84)	100.00
6	Central	582320 (03.55)	--	582320 (03.46)	100.00
7	West	2536823 (15.49)	6420 (01.53)	2543243 (15.14)	99.75
8	South West	2149282(13.13)	143676(34.28)	2292958 (13.65)	93.73
9	South	2719736 (16.61)	12193 (02.90)	2731929 (16.27)	99.55
10	Delhi	16368899 (100.00)	419042 (100.00)	16787941 (100.00)	97.50

Note: As per the notification of Government of Delhi dated 11.09.2012, two more districts, i.e., South East district and Shahdara district have been created by altering the boundaries of other districts.

Spread of urbanisation has been generally uniform in Delhi, indicating more or less similar kind of employment opportunities available in the districts. Movement of population is the first reflection of ongoing economic activities. New Delhi and Central Delhi do not have any rural population at all. North West district accommodates more than half of rural population, followed by South West district, accommodating around one third of rural population. Urban infrastructure need to be spread in these two districts in order to improve quality of life as well as creating more employment opportunities.

Several factors account for concentration of population in the districts. New Delhi is highly restricted area in terms of accommodation and other activities. It has the minimum share of state population (00.84%) and highest per capita infrastructure because of its unique position within the state. The conversion of residential areas into commercial areas coupled with

clearance of encroachments accounts for low share of population in Central district. In the South West district, several new settlements have come up. North West district is home to several rehabilitation colonies, occupied by people displaced from industrial estates and elsewhere. The growth of numerous unauthorised colonies in West and South districts has led to increase in population concentration in these districts. The advent of Delhi metro and many flyovers have contributed to redistribution of population in a significant way.

Age Distribution

Table 1.2: Age Distribution of Population in Three Censuses (Percentage)

S. No	Age Group (Years)	1991	2001	2011
1	0 -- 14	34.75	32.44	27.19
2	15 – 29	30.90	30.42	30.38
3	30 -- 59	29.82	31.78	35.49
4	60+	4.67	5.20	6.83
5	Age not stated	0.46	0.15	0.1
6	Total (No.) (%)	9420644 (100)	13850507 (100)	16787941 (100)

Source: Primary Census Abstract 2011

There has been a consistent decline in the percentage of children indicating the positive impact of population policy and reduction of family migration. This also indicates falling rate of growth of population. The proportion of population in the next age group has remained almost the same. This group includes significant student population; many of them may have come from outside the state. It is safe to conclude that proportion of students coming to Delhi has not declined. Increasing literacy ratio indicates that student population is increasing in the capital along with growth of population though the share remains the same.

The share of age group between 30 and 59 is increasing continuously in the capital. They constitute mainly the workers and job seekers. They are the basis of demographic dividend that may be utilised in the national capital with creation of opportunities to realise their full productive potential.

The share of older people is also increasing in the capital. It signifies increasing dependency ratio in the economy. Population policy should be framed adequately with special focus on the senior citizens catering to their various needs.

Another area of concern is the status of disabled people. Disabled persons (2.34 lakh) constituted 1.4 per cent of the total population in Delhi in 2011. They suffer from visual, speech, hearing, walking disabilities. More than 26 thousand persons suffer from mental disabilities while another 24 thousand suffer from multiple disabilities. An inclusive city cannot be visualised without proper strategy and target specific programmes for them.

An encouraging demographic feature is the increasing sex ratio from 821 to 866 during last decade. The literacy rate has also shown an upward trend with 86.34 per cent in 2011 from 81.67 in 2001. Male literacy (91.03%) remains higher than female literacy (80.93%), though the gap is declining significantly. It is also safe to conclude that quality of population is improving.

Delhi has been ranked 2nd in 2011 from 3rd in 2001 in terms of total population, Mumbai occupying the first place. The difference between population of Mumbai and Delhi has reduced from 3.55 million in 2001 to 2.1 million in 2011, indicating the fast development of the national capital. It is also projected among the top ten urban agglomerations of the world in 2025. In spite of reduction in population growth rate, the national capital will have to provide improved living conditions and adequate income to continuously increasing number of residents. The population projection for Delhi is as follows:

Table 1.3: Projected Population of Delhi (Lakh)

Total Population	2011	2021	2031
	167.87	205.22	243.32

Source: CSO, based on growth rate of 1.9% per annum

Urbanisation is continuously reducing rural areas. Total rural area has declined from 797.66 sq. km (53.79%) in 1991 to 369.35 sq. km (24.91%) in 2001. The number of villages has declined from 300 in 1961 to 112 in 2011. These villages and 110 census towns are not part of notified urban areas. Hence, urban services cannot be provided in these areas. These are the preferred locational choice of the migrant population with comparatively cheaper land price and less restrictions. As a result, the gap between supply and demand for infrastructure

is felt from the very beginning in these peri urban areas thereby having negative impact on quality of life.

Migration

Migration plays an important role in the growth of population of NCT Delhi. During 1971-81, there was a net addition of 21.54 lakh persons to the population of Delhi, of which, 12.30 lakh were migrants. During 1981-91, of the total 32 lakh addition in population, net migrant population accounted for 13.05 lakh. A significant proportion of these migrants come from the neighbouring states of the NCR, i.e. Uttar Pradesh, Haryana and Rajasthan. Uttar Pradesh still accounts for nearly 50 per cent of the migrants, followed by Haryana (nearly 12 percent) and Rajasthan (nearly 10 per cent). Far-off backward states like Bihar also accounts for nearly 10 per cent of the migrants, while rest of India accounts for the remaining 8 per cent. It is only likely that industrialised rich states like Tamil Nadu and Maharashtra will send few migrants (less than 2 per cent each) to Delhi, but significant number of migrants from prosperous states like Haryana is indicative of the fact that increase in quality of life in the national capital has a strong pull factor which becomes a little depressant with distance. Bihar contributes a lot of this increasing flow of migration but almost equally poor people from Orissa adds very negligible number of migrants leading to the prominence of several non-economic forces like sense of social security and risk averting attitude of people that restrict outmigration from the state. On the other hand, relatively richer state of Haryana contributes significantly to the flow of migration to Delhi despite increasing economic activities in this state as per NCR plan. Uttar Pradesh also has seen increasing investment opportunities in the state but its law and order situation is still inadequate to instil feel-good factor among the main economic actors, i.e. the industrialists and businessmen both large scale and small scale. The poor states as well as the neighbouring rich ones contribute significantly to the flow of migration to the national capital, though the magic spell of Delhi decreases gradually as distance increases. The wealthy gets accommodation in the posh areas and continue to demand better quality public services, whereas the poor continue to increase the density in the slum areas and in the city periphery, vying with each other for meager civic facilities, thus leading to increasing intra-city disparity and towards more and more unsustainable development.

It is the strong pull of migration that has made the population calculations for Delhi grossly under estimated.

Table 1.4: Population: Estimated and Actual (Lakh)

Plans	Projected Population	Actual/Estimated	Excess/Reduced
1st Master Plan (1961 – 81)	46.00	62.20 (Census 1981)	16.20
2nd Master Plan (1981 – 2001)	128.00	138.51 (Census 2001)	10.51
3rd Master Plan (2001 – 2021)	2011: 182.00 2021: 230.00	Census 2011: 168.00 205.22 (Census Estimate: 2021)	14.22 -24.78

Source: Delhi Master Plans and CSO

For the first time, Master Plan 2021 projection is estimated to be much more than Census estimates for 2021. It seems both pull factors from the NCR in terms of industrial incentives and affordable land price coupled with push factors from Delhi in terms of very high land price and shortage of infrastructure have contributed to lowering of population estimates by CSO. Direct subsidies in the poverty alleviation programmes pursued in the states also have contributed to reduction in population estimates. There has been a substantial reduction in migration in the state, but in terms of actual numbers, it is still significant.

The Master Plan for Delhi-1981 pointed out that Delhi's proper development shall be planned in the regional context rather than for Delhi Territory only. Accordingly, M P D - 1981 recommended simultaneous development of National Capital Region (NCR). Govt. Of India enacted "National Capital Region Planning Board Act-1985" to establish the NCR Planning Board with the responsibility of coordinating all these efforts of the adjoining States through the instrumentality of Regional and Sub-Regional Plans. The Regional Plan-2021 prepared by the NCR Planning Board for the Region suggested four Policy zones for development of the National Capital Region.

Table 1.5: Trend of Migration in Delhi 2001 -- 2011 (lakh)

Year	Estimated Mid Year Population	Natural Increase	Migration
2002	142.10	2.15	0.55
2011	168.96	2.41	0.81
2012	172.24	2.55	0.73
2013	175.59	2.73	0.62
2014	179.00	2.53	0.88
2015	182.47	2.49	0.98

Source: Office of the Chief Registrar, Births and Deaths, Government of NCT Delhi

Note: Natural increase of population = Difference between total births and total deaths

Estimates of migration in Delhi are based on birth and death rates and total increase in population. Migrated population is the different between increased population and natural increase in population. Natural increase accounts for roughly 2.5 lakh population and 50 to 60 thousand persons migrate to the city annually. The number of migrants has been less than one lakh since 2002 but it is increasing steadily since 2013. It is estimated that close to 1 lakh persons are likely to migrate annually in the capital. Therefore, it is a huge challenge to provide housing and other amenities to this additional population along with creating job opportunities and other facilities for the 2.5 lakh persons (making 3.5 lakh in total), and clearing existing backlogs.

As for reasons of migration, it has been observed that percentage of people coming to the city in search of jobs or better jobs has declined while that of persons coming for education and training shows increasing trend. The high cost of living in Delhi and deteriorating environment may be major deterrent. It is also observed that the proportion of high skilled migrants is increasing in recent years (Delhi Human Development Report 2013). Delhi aspires to be a Knowledge Hub in coming future and is investing more on higher and Technical Education. People's perception also matches with the aspiration, creating huge possibilities for investing in high skill development. At the same time, lower level skill development need to be given priority for enhancing lower level income for inclusiveness.

State Income

One of the SDG targets specifies that state/national income should grow by 7 per cent on average so that adequate income can be distributed for inclusiveness. Delhi's average real GSDP is growing by 7 – 8 per cent annually since last decade. It is the hub of trade, commerce and industrial activities in the Northern India and is among the three most prosperous states of India with very high per capita income.

Table 1.6: Per Capita Income in Delhi and All India 2011-12 – 2016-17
(Base Year 2011 – 12)

Year	Current Prices (Rs.)				Constant Prices (Rs.)			
	Delhi	ACGR (%)	India	ACGR (%)	Delhi	ACGR (%)	India	ACGR (%)
2011 –12	185343		63460		185343		63460	
2012 - 13	206503	11.42	71011	11.9	193123	4.20	65568	3.3
2013 – 14	229518	11.15	79146	11.5	201541	4.36	68717	4.8
2014 – 15	249004	8.49	86513	9.3	212646	5.51	72712	5.8
2015 – 16	273618	9.89	94178	8.9	226583	6.55	77524	6.6
2016 - 17	303073	10.76	103818	10.2	240318	6.06	82112	5.9

Source: Directorate of Economics and Statistics, Government of NCT of Delhi

Income per capita of Delhi is about three times that of the rest of India, both in current and constant prices. There is not much difference in growth rate of income. But as India's base is low, the gap does not reduce. Delhi is showing a per capita income growth rate which is much higher than the target of 7 per cent at nominal prices. But, the rate in constant prices is still lower, indicating the need for control of inflation rate.

Delhi's income growth rate is emphasized by international studies also. Bloomberg data shows that Delhi will have the fastest growth in Asia, with economy to be almost 50% larger in 2021 than what it is today. Financial and business services are projected to be the fastest growing sector in India. Delhi's dominance in this sector will lead to higher growth of income at more than 8% per annum (Mint 10.08.2017).

Trade and commerce have been major drivers of Delhi's growth with significant contribution of tax revenue and providing gainful employment. Delhi is the biggest trade and consumption centre in North India. It serves as entry port of trade. A significant part of its economic activities consists of redistribution of goods produced elsewhere and imported for local sale

as well as exporting to other states. It is a major distribution centre as 49% of fuel, 47% of food grain, 44% of iron & steel, 78% of fruits and vegetables are imported to Delhi and exported to other parts of India and outside India also. The MPD 2012 states that the wholesale markets of Delhi deal with about 27 major commodities including textiles, auto parts and machineries, stationary and others.

High growth rate of income shows the general prosperity level of the state, but does not reflect the high income inequality in the distribution of income. High income inequality is a reflection of unequal distribution of opportunity with resultant possibility of stunted economic growth. The state government has implemented several direct and indirect poverty alleviation programmes to reduce poverty gap. However, as the table below reflects, there is lot more to be done in order to reduce income inequality.

Table 1.7: Distribution of Persons below Poverty Line in Delhi- Urban and Rural

S. No.	Years	Urban		Rural		Total	
		Population (Lakh)	Percent	Population (Lakh)	Percent	Population (Lakh)	Percent
1.	1973-74	21.78	95.36	1.06	4.64	22.84	100.0
2.	1977-78	16.81	92.57	1.35	7.43	18.16	100.0
3.	1983	17.95	97.61	0.44	2.39	18.39	100.0
4.	1987-88	10.15	99.02	0.10	0.98	10.25	100.0
5.	1993-94	15.32	98.78	0.19	1.22	15.51	100.0
6.	1999-00	11.42	99.39	0.07	0.61	11.49	100.0
7.	2004-05	18.3	94.33	1.1	5.67	19.4	100.0
8.	2009-10	22.9	98.28	0.30	1.29	23.3	100.0
9.	2011-12	16.5	97.06	0.50	2.94	17	100.0

Source: Delhi Statistical Handbook, 2016

There are around 6 lakh persons raised above poverty line in four decades. As Delhi is almost urban, percentage of rural population is shrinking and naturally the poor are concentrated in urban areas. Given the track record in poverty alleviation, it is highly unlikely that 17 lakh persons will be above the poverty line by 2030. In order to achieve even half of the target, poverty alleviation programmes need to be given utmost priority.

There are not any comparable income figures to study the spread of inequality over time. Hence we should look into savings and consumption data to understand the nature of economic inequality.

According to the Delhi Study Report (2014)¹, 54 per cent of the total urban poor are capable of saving small amounts per month. Rest of the households either do not save or have to borrow to meet their expenditure. 24% of the households earn a monthly income below Rs 5000 per month and they spend more than their income through various forms of loans. 66% of households earn an average income Rs 5000 to Rs 10,000 and spend 89% of their income. 10% of the households earn between Rs 10,000 to Rs 20,000 and spend 80% of their income. It shows the lower income groups are likely to fall into perpetual debt trap that will prevent them to spend on any resource generating capital assets in future. They cannot get any direct subsidy from the government as they are above the poverty line.

Perception Survey 2013 reveals that the ownership and access of consumer assets is an important indicator of well being and the proportion of households owning various consumer assets goes up monotonically in the higher income groups. Further, the size of dwellings reveals extreme inequality in Delhi as per Delhi Human Development Report 2013. More than half of the lowest income households live in one-room dwellings. On the contrary, 40 percent of the households in the top income groups live in houses with three or more rooms.

The National Sample Survey is the only source of accessing data on consumption expenditure.

Table 1.8: Monthly Per capita Consumption Expenditure in Delhi for Different Years (% Household)

Consumption (Rs.)	2006-07	2007-08	2011-12
up to 500	0.21	0.54	2.17
501-1000	27.42	17.41	1.13
1001-1500	24.03	30.54	15.78
1501-2000	18.4	17.44	17.71
2001-2500	7.55	11.19	19.51
2501-3000	6.31	6.05	9.2
above 3000	16.08	16.83	34.5
Total	100.00	100.00	100.00

Source: NSS Round 2011--12

¹ This is a city level report, which talks about the present condition and status of urban poor living in respective cities.

NSS data shows that less than 4 per cent of households were spending less than Rs. 1000 in 2012. The percentage of poorest has increased a little, while the percentage of households in the next three expenditure brackets has declined considerably. It is safe to assume that households in the middle expenditure (a proxy for income) range have become better off over time. The percentage of people in the highest expenditure range has increased considerably, indicating increasing economic gap between the lowest and highest expenditure class. As Delhi's annual per capita income is close to Rs. 3 lakh, average annual expenditure will be around Rs. 2,40,000 (assuming 80% of income is spent on average), i.e., Rs. 20,000 per month. In the present context, monthly expenditure of Rs. 3000 is not even middle income level. Hence, more declassified information is required to estimate the actual income gap. However, on the basis of available data, increase in income gap between the lowest and highest level is visible, though there has been improvement in the level of economic wellbeing in many middle income level.

The above table shows that the gap between the expenditure of bottom 40 per cent and average spending has increased during 2005 -09 while it declined in one year. It indicates the penetration of poverty alleviation programmes has not been adequate. There has been a decline in persons below poverty line, but inequality in spending power has not been addressed. This needs strategic intervention in creating opportunities for an inclusive city.

Table 1.9: Increasing Inequality

Year	Spending by bottom 40% (Rs)	Average Spending (Rs)	% spending of average spending	Gap (Rs)
2005-06	1100	1557.91	70.61	457.91
2006-07	1380	1803.86	76.5	423.86
2009-10	1842	2654	69.4	812
ACGR	10.86	11.24	-	-

Source: NSS Consumption Expenditure Survey.

Distribution of Plan Outlay

Sector wise distribution of plan outlay indicates priority of the state in directing the course of development. It is worrisome that share of energy in total plan outlay has declined continuously with considerable drop during 12th Plan. Electricity distribution has been privatized since 2003. This may explain partly the decline of expenditure. But development of alternate energy is a priority as it is both environment-friendly and available given the limited stock of petroleum in near future. Use of renewable energy is not yet adequately popular in Delhi as it is not yet affordable. The government should increase the subsidy and spend more on R & D in order to realise the goal of sustainable energy consumption. The share of expenditure on energy is not very encouraging.

Similarly, the proportion of expenditure on industry is also not very encouraging. Manufacturing activities in Delhi is quite substantial and provides significant employment. But industrial infrastructure is not very encouraging, especially for the informal sector.

Table 1.9: Major Sector wise Plan Outlay (%)

S. No	Sectors	9 th Plan (1997 – 2002)	10 th Plan (2002-07)	11 th Plan (2007-12)	12 th Plan 2012-17)
1.	Energy	19.28	15.03	10.00	5.36
2.	industry	0.71	0.43	1.00	0.22
3.	Transport	20.18	23.68	33.89	24.39
4.	Science, Technology and Environment	0.72	0.24	0.10	0.61
5.	Tourism, Art & Culture	0.49	0.56	0.34	0.53
6.	Education, Sports & Youth Services	7.45	9.35	7.98	13.27
7.	Medical, Public Health & Nutrition	8.06	11.24	10.29	16.89
8.	Water Supply & Sanitation	15.38	16.37	16.65	12.22
9.	Housing & Urban Development	15.84	13.65	12.06	12.67
10.	SC,ST etc., Social, Women and Labour Welfare	1.48	2.28	2.91	6.68
11.	Others	10.41	7.17	4.78	7.16
12	Total Outlay (Rs. Crore)	15541.28 (100)	23000.00 (100)	54799.15 (100)	90000.00 (100)

Source: Computed from Five Year Plan Documents

There are large industrial parks and estates for the organized sector but informal sector is deprived of many such opportunities. The state should restructure the budget allocations keeping the SDG goals in mind.

Similarly, shares of Science and Technology and Tourism are also very low, i.e., less than 1 percent. Delhi has a very rich heritage, boasting of some World Heritage sites. Tourism is an important growth driver. The budget allocation does not reflect this importance.

Education, medical sector and transport account for significant share of plan outlay. Their share has increased considerably during 12th plan, indicating renewed emphasis on their growth. But, budget allocation for housing, urban development, water supply and sanitation has declined. It is an area of concern as the state aspires to provide housing for all by 2024. Providing adequate physical infrastructure for improved productivity by 2030 is a specific SDG for which the state is committed.

SC, ST, OBC, women, children and other backward classes are part of the vulnerable sections whose welfare is the backbone of inclusive growth. But, they do not get the priority share in plan expenditure. The share has increased from a little over 1 percent in 9th Plan to over 6 percent in 12th Plan, a span of 20 years. It is fair to conclude that the vast improvement in wealth of the state has bypassed this section, thereby increasing significant inequality in income and opportunity.

Employment

Economic census, conducted from time to time, provides a detailed picture of nature of employment in Delhi. These censuses reveal that number of establishments in Delhi is increasing steadily but their growth rate is declining. Average employment size has also steadily declined from 5.10 per establishment in 1998 (4th Economic Census) to 3.45 in 2013 (6th Economic Census). The establishments are divided into two types: Own Account Establishments (OAE) and Establishments with at least one hired worker: Estt. (H). Number of OAEs increased from 3.29 lakh in 1998 to 4.77 lakh in 2013 while the number of Estt (H) increased from 3.56 lakh to 3.97 lakh during the same period. It indicates that self –

employment showed more prospects than opportunities of wage employment. The Economic Census has also distributed the establishments by major economic activities: Agricultural activities (Primary Sector), Non-agricultural Activities other than Services (Secondary Sector) and Non-agricultural Activities (Services) or Tertiary Sector. The percentage share of service sector establishments has been 78 to 83 per cent in all the three censuses. The secondary sector including manufacturing, water supply, electricity, construction has the percentage share of 20 to 21 during the same period. Expectedly, the share of primary sector is negligible.

However, secondary sector has significant contribution in employment generation as depicted in the following table. The percentage share of employment in service sector has increased from 54.29 in 1998 to 64.06 in 2013 while that of the secondary sector has declined from 45 to 35.39 during the same period. The secondary sector still supports one third of total employment. Total employment has actually declined from 35.00 lakh in 1998 to 30.19 lakh in 2013.

Table 1.10: Number and Percentage Distribution of Persons Employed by Major Economic Activities in Last Three Economic Censuses (4th, 5th & 6th)

S. No .	Major Economic Activity Group	4 th EC (1998)			5 th EC (2005)			6 th EC		
		OAE	Estt. (H)	Total	OAE	Estt. (H)	Total	OAE	Estt. (H)	Total
1.	Agricultural Activities (%)	6062 (1.27)	16272 (0.54)	22334 (0.64)	2551 (0.67)	9711 (0.31)	12262 (0.34)	7660 (1.29)	8864 (0.37)	16524 (0.55)
2.	Non-Agricultural Activities (Other than Services) (%)	79211 (16.57)	1498631 (49.58)	1577842 (45.01)	42605 (11.16)	1214956 (38.27)	1257561(3 5.36)	112781 (18.94)	955867 (39.43)	1068648 (35.39)
3.	Non-Agricultural Activities (Service Sector)(%)	39273 1 (82.16)	1507965 (49.89)	1900696 (54.29)	336654 (88.17)	1949910 (61.12)	2286564 (64.29)	474996 (32.54)	1459613 (60.21)	1934609 (64.06)
4.	Total (%)	47800 4 (100.0 0)	3022868 (100.00)	3500872 (100.00)	381810 (100.00)	3174577 (100.00)	3556387 (100.00)	595437 (100.00)	2424344 (100.00)	3019781 (100.00)

Source: Reports of Fourth, Fifth & Sixth Economic Census 1998, 2005 & 2013 Directorate of Economics & Statistics, Delhi

Note: OAE: Own-account Establishments operating without hired workers

Estt. (H): Establishments running with at least one hired worker

The following table shows the comparative situation in employment during a period of fifteen years, 1998 to 2013. In OAE, there has been considerable improvement in growth of employment, while the hiring has gone down in all kinds of activities. It is only likely that

agricultural activities will decline continuously in highly urbanized Delhi but establishments in the secondary sector also is experiencing very high (close to 3%) decline in the growth rate of employment generation. In the tertiary sector also, employment growth rate is declining though marginally. It has been observed that increase in number of establishments is not growing with increase in employment, indicating more capital intensive development. On the one hand, this is reducing migration, which is one of the objectives of economic policy of the state. On the other hand, it is indicating declining job opportunities for the poor, threatening their quality of life. The state should come out of the formidable dilemma in order to achieve the target of reducing economic inequality.

Table 1.11: Average Compound Growth Rate of Employment 1998 – 2013(%)

Components	OAE	Estt. (H)	Total
Agricultural Activities	1.57	-3.97	-1.99
Non-Agricultural Activities(Other than Services)	2.38	-2.95	-2.56
Non-Agricultural Activities(Services)	1.28	-0.22	-0.12
Total	1.48	-1.46	-0.98

Challenges

1. Distribution of Income

There is significant inequality in terms of income and opportunity within the unorganised sector as well as the vulnerable section of society. Poverty ratio has declined substantially but in absolute number, more than 17 lakh persons need to be provided income opportunities, housing, medical and other facilities for a decent quality of life. The vulnerable section need to be covered with income and social security. This is aggravated by continuous migration that adds close to 70,000 persons in the city every year including poor in search of jobs.

2. Level of Education

Differentiation in earnings is primarily caused by the level of education, which reflects in the economic opportunities. In the modern era, global economy is very much dependent on the advanced technology, where considerable emphasis is placed on the contribution made by human resources, or the human capital like education, knowledge, skills, competencies and other attributes that are relevant to economic activity.

The average socio-economic indicators, like per capita income, infant mortality rate, literacy level, enrolment of the school going children, are much better in urban Delhi as compared to the national average, but the same is not true of the slum areas. Poverty is not only a problem of low incomes; rather, it is multi-dimensional problem that includes low access to opportunities for developing human capital and to education.

The majority of parents on an average spend nearly Rs. 20 lakh to Rs. 25 lakh raising a child by the time their teen graduates from high school. Parents invest an average 60 per cent of their income in their children's education. The survey on "Steep Rise in Education Fees" highlighted that school expenses including tuition fees have gone up from Rs.60,000 in 2005 to Rs.1,20,000 per annum in 2011 on a single child. According to the survey, 85 per cent of parents spend over half of their take-home pay on their children's education, extra coaching and extra co-curricular activities, placing significant burden on their family budget. The challenging task is to enhance public sector expenditure on education in terms of more schools and associate infrastructure to make education affordable and create more opportunities to reduce inequality.

3. Unemployment

Unemployment rate is an important economic indicator for any country. High rate of unemployment indicates that an economy is not using its available resources in the best possible way. It has been revealed that unemployment has been the major reason of economic inequality in most of the developing and less developed economies of the world. The unskilled labours are the worst affected in all these cases.

As per Delhi Human Development Report 2013, a comparison of the unemployment rates of Delhi with those of urban India as a whole indicates that the overall unemployment rate is slightly higher in Delhi (4 percent) as compared to that of urban India (3.4 percent) over the period 2011-12. The rate of job creation is not satisfactory in Delhi. Most of the employment is being generated in the unorganised sector, wherein the quality of employment is low and offers no social security. Around four-fifths of the workers do not have any social protection

(with the insecurity affecting two-thirds of the workers in the formal sector and 93 percent in the informal sector).

The distribution of occupational status as per the Perceptions Survey, 2013, reveals that the main earners belonging to the lowest household income are largely engaged in unskilled, service work and low-wage skilled jobs. On the other hand, the main earners belonging to highest income category are mostly engaged in professional and semi-professional jobs. Further, the female work participation rate is double in case of the highest income group as compared to the lowest income group (13 percent as against 4.8 percent) according to Delhi Human Development report, 2013. Moreover, households belonging to the lowest income group are less confident and optimistic about employment opportunities and improvement in their incomes.

4. Inflation

Another cause of inequality is inflation. During inflation, few profit earners gain and most wage earners lose which is what has happened in India. Since wages have lagged behind prices, profits have increased for some and created more and more inequality. Moreover, during inflation, money income increases but real income falls leading to a fall in the standard of living of the poor people since their purchasing power falls.

During inflation, workers in the organised sector get higher wages but wages and salaries of workers in unorganised sectors (such as agriculture and small-scale and cottage industries) do not necessarily increase. Hence, their real income falls. This leads to inequality in the distribution of income, increasing the gap between the organised and unorganised sectors.

In 2016, Delhi's retail inflation, based on Consumer Price Index (CPI) was 5.77 per cent, compared to 3.69 per cent in 2015. Food inflation during 2016 rose to 8.35 per cent. Government had put inflation targeting at 4 per cent with a range of plus/minus 2 per cent for next five years under the new monetary policy framework agreement with the Reserve Bank.

CPI inflation for urban sector was 5.39 per cent in July, while that for rural segment it was 6.66 per cent contributing much to economic inequality.

Strategy

The state wants to achieve the twin targets of increasing income opportunities and reduce inequality. The most deprived sections need to be identified and direct income subsidy programme need to be focused to target groups in order to reduce wastage and overlapping of public benefits. Plan funds should be allocated on priority basis so that share of vulnerable section is enhanced in time bound manner. Delhi's high rate of capital expenditure has led to increase in state income. Hence, infrastructure should be prioritized with the help of ICT in order to maintain the growth rate. Growth drivers like micro, small and medium industries should be provided affordable credit facilities for their expansion. Labour-intensive productive techniques of production should be adopted for employment oriented economic growth. There is severe shortage of basic services as elaborated in the following sections. Public expenditure should be enhanced in these sectors to create more employment as well as increase the supply of services. All public expenditure should be result oriented. Proper institutional mechanism need to be in place for monitoring the relationship between outlay and outcome. E governance should be adopted extensively for delivery and monitoring of services.

The major growth drivers in Delhi are industry and trade. The micro, small and medium industries should be provided with finance in terms of cheap credits, adequate industrial infrastructure and transportation facilities in order to reduce logistics cost. This sector has few women headed enterprises. Proper incentives should be provided to female entrepreneurs so as to increase female workforce participation ratio. Large size of informal economy should be reduced smoothly without causing much disturbance in structure. Digitization should be promoted extensively with adequate investment in digital infrastructure. Delhi's high literacy ratio provides high opportunity to adopt digitization and enhance productivity.

The state should maintain 8 to 10 percent rate of income growth in order to reduce poverty and inequality by 2030. The manufacturing sector supports significant proportion of employment in Delhi. It is going to be led by the medium sector followed by the small and

micro sector. It supports more than 40 percent of labour force but contributes around 25 percent of GSDP. MSME sector should be provided incentives to reduce input cost, increase efficiency in terms of skill development and improved marketing.

The tertiary sector generates maximum share of GSDP. Trade, commerce and transport are the major contributors. Delhi is the most important trade centre of North India. Even if 98 per cent of Delhi is urban, it boasts of the Asia's biggest agricultural market. It should retain this advantage with proper infrastructure for smooth running of economic activities that generates jobs for the unskilled labour.

The capital boasts of some great heritage sites within and near the city. It should generate income from tourism sector. The tourists from all over the world come to Delhi not only to visit the capital but the areas surrounding it. The state should spend more in tourism related infrastructure in order to provide jobs for both skilled and unskilled labour. There is increasing number of medical tourists also to take advantage of its world class hospitals. Recently, track records of some hospitals have been very disappointing. The state should take note on urgent basis to remove the bottlenecks of health infrastructure. The healthcare sector is an important contributor of removing inequality and increasing income.

The state will have to work on the indicators provided by the UN in order to achieve the SDGs. At present, data for most of the indicators are not collected by the state government. Delhi is aspiring to increase penetration of e governance for better transparency and efficiency. It should increase investment in expanding and improving IT infrastructure to create a data bank for monitoring development indicators to reduce inequality and increasing income.

SDG Targets/Indicators

SDG 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all						
Target/Sub-Target and Indicators			Physical Targets	Remarks		
Target 8.1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 percent gross domestic product growth per annum in the least developed countries					
	Source	2016-17 Basel line	2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2030-31	
8.1a	Annual growth rate of real GDP (%)	Economic survey	8.26	8.95	9.25	9.85
Target 8.2	Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value- added and labour-intensive sectors					
8.2a	Annual growth rate of real GDP per capita (%)	Economic survey	6.06	6.74	7.45	7.95
8.2b	Share of Manufacturing Sector in GSDP at Constant Prices (%)	Economic survey	14.89	20.00	22.00	24.00
Target 8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises including through access to financial services					

	8.3a Proportion of MSME in access to formal credit	SIDBI	4.03	10.45	23.12	40.00	Pradhan Mantri Mudra Yojana is increasingly focusing on formalization of credit.
	8.3b Proportion of formal to informal employment						
	8.3c Unemployment Rate (%)						Discussed in Chapter 2
Target 8.4		Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead					
	8.4a Domestic material consumption, domestic material consumption per capita and domestic material consumption per GDP						Data need to be compiled and processed to monitor the change in indigenous growth.
Target 8.5		By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value					
	8.5a Unemployment rate.						
	8.5b Workforce participation ratio (WPR)						Discussed in Chapter 2
Target 8.6		By 2020, substantially reduce the proportion of youth not in employment, education or training					
							Discussed in Chapter 2

Target 8.7	Take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour, eradicate forced labour and, by 2025, end child labour in all its forms, including the recruitment and use of child soldiers	
	8.7a Proportion and number of children aged 5-17 years engaged in child labour, by sex and age	Discussed in Chapter 2
Target 8.8	Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	
	8.8a Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status	Need to develop database from concerned departments.
	8.8b Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status	Relates to National Policy.
Target 8.9	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products	
	8.9a Tourist arrivals (million)	Discussed in Chapter 2
	8.9b Tourism direct GDP as a proportion of total GDP and in growth rate	
	8.9c Number of jobs in tourism industries as a proportion of total jobs and growth rate of jobs, by sex	

Target 8.10	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all					
	8.10a Insurance penetration (%)	General Insurance Council	1.34 1.42	1.70 2.25	Delhi has the highest insurance penetration in India, but it is lower than the national average (3.35). With increase in schemes, the percentage is likely to increase.	
	8.10b Number of banking outlets per one lakh population	Statistical Abstract of Delhi 2016	16 22	26 32	Emphasis on formalisation of the economy is expected to increase.	
	8.10c Share of population having bank account (%)	PMJDY	86	90 100	100	

SDG 10 Reduce inequality within and among countries Target/Sub-Target and Indicators	Source	2016-17 Baseline	Physical Targets			Remarks
			2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2030-31	
Target 10.1 By 2030, progressively achieve and sustain income growth of the bottom 40% of the population at a rate higher than the national average						
10.1a	Growth rate of household expenditure among the bottom 40% of the population					
10.1b	Growth rate of household expenditure					
Target 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status						
10.2a	Proportion of people living below 50 percent of median income					
Target 10.3						
Ensure equal opportunities and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard						

10.3a	Poverty ratio	Economic ic Survey	9.91	7.26	5.68	4.79	Direct benefit transfers are increasing to reduce poverty ratio.
10.3b	Households having access to sanitation in premises (%)	Discussed in the Urbanisation Section					
10.3c	Households having access to water supply in premises (%)						
10.3d	Households having access to electricity in premises						
Target 10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality							
10.4a	Share of labour in GDP (%)						
10.4b	Percentage of labour covered by social security						
Target 10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations							
Target 10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions							

<p>Target 10.7</p> <p>Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies</p>	<p>Relates to National Policy</p>										
<p>Target 10a</p> <p>Implement the principles of special and differential treatment in accordance with world trade organization agreement.</p>	<p>Relates to National Policy</p>										
<p>Target 10b</p> <p>Encourage official development assistance and financial flows</p>	<p>Relates to National Policy</p>										
<p>Target 10c</p> <p>Reduce to less than 3% the transaction cost of migrant remittances</p>	<p>Relates to National Policy</p>										
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<p>Note:</p>											
<p>Manufacturing Sector</p>											
<p>Enterprises</p>											
<p>Micro Enterprises</p>	Investment in plant & machinery										
<p>Small Enterprises</p>	Does not exceed twenty five lakh rupees										
<p>Medium Enterprises</p>	More than twenty five lakh rupees but does not exceed five crore rupees										
<p>Service Sector</p>											
<p>Enterprises</p>											
<p>Micro Enterprises</p>	Investment in equipments										
<p>Small Enterprises</p>	Does not exceed ten lakh rupees										
<p>Medium Enterprises</p>	More than ten lakh rupees but does not exceed two crore rupees										
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CHAPTER II: EMPLOYMENT AND LIVELIHOOD (SDG 8, 9)

Sustainable Development Goals (SDGs) 8 and part of 9 covers employment and livelihood. Box 1 presents detailed targets of these goals. Delhi is an urbanized state with about 98% of the people living in urban area. The present chapter compares Delhi with urban India wherever possible. We rely largely on secondary data from government sources. The data sources are Labour Bureau (Employment and Unemployment Survey, 2015-16) and Economic Survey of Delhi, Economic Censuses, tourism survey and others.

This chapter is organized in four parts. We start with describing and analyzing the current status in Section 1, then move to challenges in Section 2. It is followed by efforts taken by state government to promote employment and livelihood generation in Section 3 and then we briefly present the strategies that need to be followed to achieve SDG goals.

Box No. 1

Target 8.1: Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 percent gross domestic product growth per annum in the least developed countries

Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labour-intensive sectors

Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Target 8.4: Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead

Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

Target 8.6: By 2020, substantially reduce the proportion of youth not in employment, education or training

Target 8.7: Take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour eradicate forced labour and by 2025, end child labour in all its forms, including the recruitment and use of child soldiers.

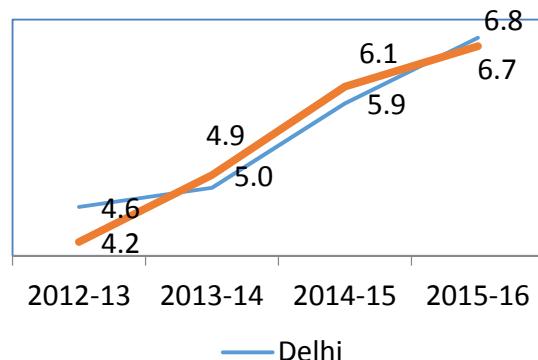
Target 8.8: Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.

Target 8.9: By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.

Target 8.10: Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all

Target 9.1: Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

Target 9.2: Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

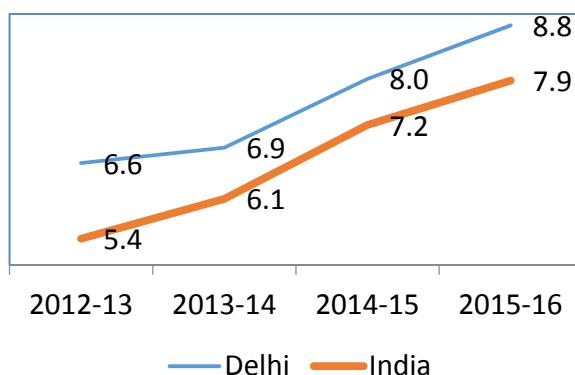


Current Status

Sustained Economic Growth

The sustained growth of per capita income with its more equitable distribution among the population is one of the requirements for a better living standard for the populace. In this context, Delhi is one of

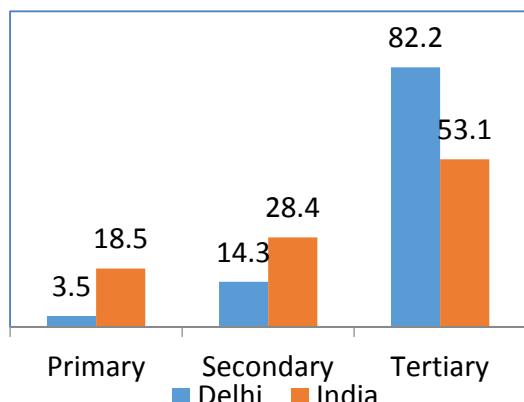
the fastest growing states of the country. It is growing at a uniform pace and achieved a growth rate of 8.8 per cent in the year 2015-16, which is comparatively higher than the national average of 7.9 per cent. The average growth of gross domestic product of during 2012-16 of Delhi of 7.6 per cent was also higher than all India average growth of 6.7 per cent (see *Figure 1: Annual Growth of GDP (At constant 2011-12 prices)*).



In terms of per capita gross domestic product (PCGSDP), Delhi's PCGSDP (Rs. 251,292) was three times of All India (Rs. 88,706) in 2015-16. It grew at a uniform pace and increased from Rs. 202,513 in 2011-12 to Rs. 251,292 in 2015-16. The average annual growth rate of PCGSDP of Delhi during 2012-16 period was almost similar to all India average. [*Figure 2: Annual Growth of GSDP per capita (At constant 2011-12)*]

Sectoral Growth

Service sector had been the driver of growth in Delhi and it completely dominates state's economy with 82.2 per cent share in state GDP. The contribution of services sector in Delhi was consistently



higher than all India. Secondary sector contributes 14.3 per cent to state GDP which is half of India's contribution (28.4 per cent). The contribution of service sector in state GDP is shared by all service segments sectors of trade, hotels, real estate, banking, insurance, transport, communications & other services.

The historically experience of developed countries and of some East Asian countries showed that service sector alone is not enough

for sustainable long term growth. The manufacturing is still vital for the long-term growth and in turn for creation of jobs. Its share in Delhi's economy is significantly less (7.9 per cent) compared to all India average of 17.8 per cent in 2015-16. The disappointing part is fluctuating growth and stable share of manufacturing sector, which has been hovering between 6 per cent and 7 per cent since, 2011-12.

Sectoral Labour Productivity

The labour productivity (GSDP per worker) is comparatively high in services sector segments such as finance, real estate & business (Rs. 3016) and transport, storage & communications (Rs. 794). Manufacturing sector considered to be a growth engine, is similar to trade, hotel & restaurant in terms of large employment generation and low level of labour productivity. Labour productivity of these two sectors is lower than even construction. This is due to substantial presence of informal trade & hotel & restaurant services and predominance of small or unorganised manufacturing units in Delhi [Table 1: Sector Wise Labour Productivity of Delhi].

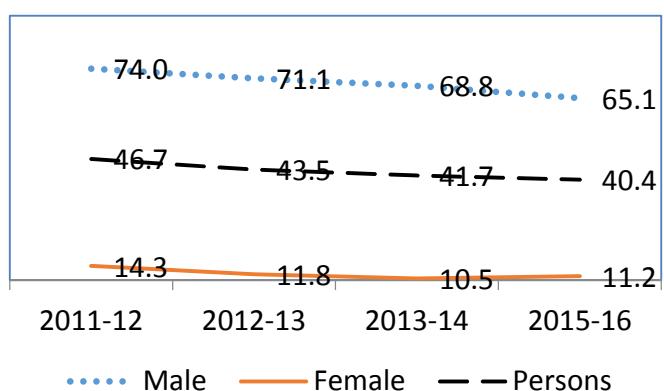
Table 2.1: Sector Wise Labour Productivity of Delhi, 2015-16

Sector	Employment(in Rs 000')	GSDP(Rs in Crore)	Productivity (in Rs 000')	Relative Labour Productivity
Agriculture, forestry and fishing	100	2,260	226	32
Mining and quarrying*	0.001	11,573	-	-
Manufacturing	970	31,511	325	45
Elect, gas, water etc*	72	9,492	1317	183
Construction	344	15,997	465	65
Trade, Hotels & Restaurants	1458	54,037	371	52
Transport, Storage & Communication	699	55,456	794	110
Finance, Real Est. & Business	560	168,927	3016	420
Pub Admin., Edu., Health & Others	1331	49,311	371	52
Total	5545	398,563	719	100

*Note: The share of mining and quarrying and Electricity, Gas and Water supply in employment is minuscule in Delhi.

Employment Generation

The sustainable growth leads to creation of more employment opportunities for both men and women including youth. But these new jobs should be productive and generate decent jobs. Overall work participation rate (WPR) of adult (15+ years) in Delhi (40.4 per cent) and is almost 10 percentage points less than all India (50.3 per cent) in 2015-16. However, it is quite similar to the urban India WPR (41.4 per cent). The WPR of the Delhi got reduced by 6.3 percentage points during 2011-12 to 2015-16 [Figure 4: Work Participation Rate by Sex (15+ years)].



Large gap exists between male and female WPR. Female WPR of the state (11.2 per cent) is less than half of all India average (23.7 per cent) and 3 percentage points less than urban India (14.3 per cent) in 2015-16. Little over one-tenth of adult female is involved economic activities during major part of the year. Several arguments are mentioned in literature for low female work participation. These are greater participation in higher education, social norms discouraging women to work outside, responsibility of household and care activities, high family income, lack of gender friendly jobs, safety and security issues in transportation and at work place and low availability of part time jobs and flexible working hours

etc. However, male WPR also declined by 9 percentage points in Delhi during the last five years. It reflects that high growth in recent years have not generated sufficient number of jobs in the state..

Sectoral Employment

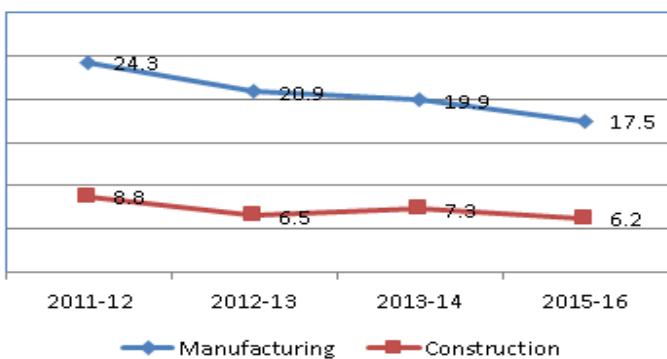
The sector employment distribution of workers shows that tertiary/services sector dominates the employment and it is distantly followed by secondary sector.

Table 2.2: Distribution of Workers by Sector in 2015-16

Sector	Person	Male	Female
Agriculture, forestry and fishing	1.8	1.6	3.1
Mining and quarrying	0	0	-
<i>Primary</i>	<i>1.8</i>	<i>1.6</i>	<i>3.1</i>
Manufacturing	17.5	18.0	14.0
Elect, gas, water etc	1.3	1.5	0.3
Construction	6.2	6.6	3.4
<i>Secondary</i>	<i>25</i>	<i>26.1</i>	<i>17.7</i>
Trade, Hotels & Restaurants	26.3	28.2	13.3
Transport, Storage & Communications	12.6	13.8	4.5
Finance, Real Est. & Business	10.1	10.4	8.2
Pub Administration, Education, Health & personnel services	24.0	19.8	53.2
<i>Tertiary</i>	<i>72.0</i>	<i>72.2</i>	<i>79.2</i>
Total	100	100	100

Source: Labour Bureau. Employment and Unemployment Survey 2015-16

Trade, Hotels & Restaurants and Public administration, education, health & personnel services are two major employment creating sectors in Delhi. More than half of female employment is in the public administration, education, health & personnel service segment whereas this sector provides one-fifth of male employment. More than one-fourth of female employment is in the social sector of education and health. Manufacturing has around 18 per cent share in total employment. The employment in construction sector is small in Delhi and it generate about one-sixteenth of all jobs. Over the years, the share of these sectors in total employment had been declining. Manufacturing sector's share in total employment got reduced from 24.3 per cent in 2011-12 to 17.5 per cent in 2015-

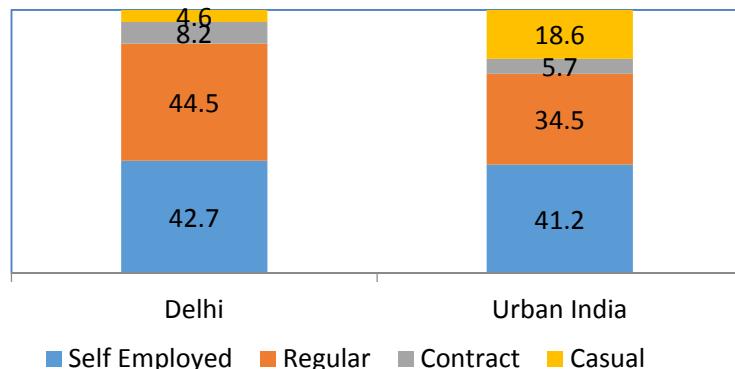


Year	Manufacturing (%)	Construction (%)
2011-12	24.3	8.8
2012-13	20.9	6.5
2013-14	19.9	7.3
2015-16	17.5	6.2

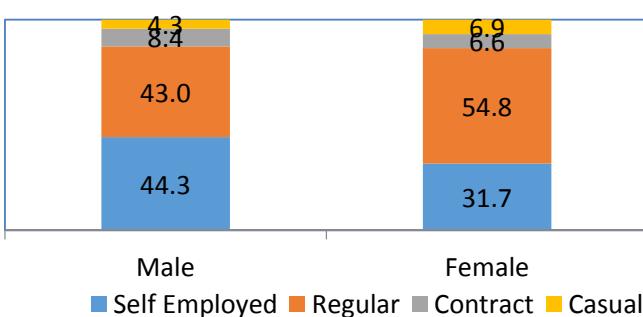
16, while the share of construction sector decreased from 8.8 per cent to 6.2 per cent during the same period [*Figure 5: Share of Manufacturing and Construction in Overall Employment, 2011-12 to 2015-16*].

Decent Jobs

The status of employment covers four categories of workers namely self employed, regular, contractual and casual workers. In these categories, regular jobs are considered better jobs due to regularity, better paid and other benefits, while casual jobs are worst type because of irregularity and low level of remuneration. Self employed still absorbs more than two-fifth of total employment both in Delhi (42.7 per cent) and urban India (41.2 per cent), while difference lies in regular employment, which is significantly high in Delhi (44.5 per cent) compared to urban India (34.5 per cent) in 2015-16 [*Figure 6: Employment status*]. The casual employment in Delhi (4.6 per cent) is relatively small compared to urban India (18.6 per cent). According to National sample survey (NSS) data, the regular employment share in the state was high but about three-fourth of them (73 per cent) were involved in informal type of jobs in 2011-12.

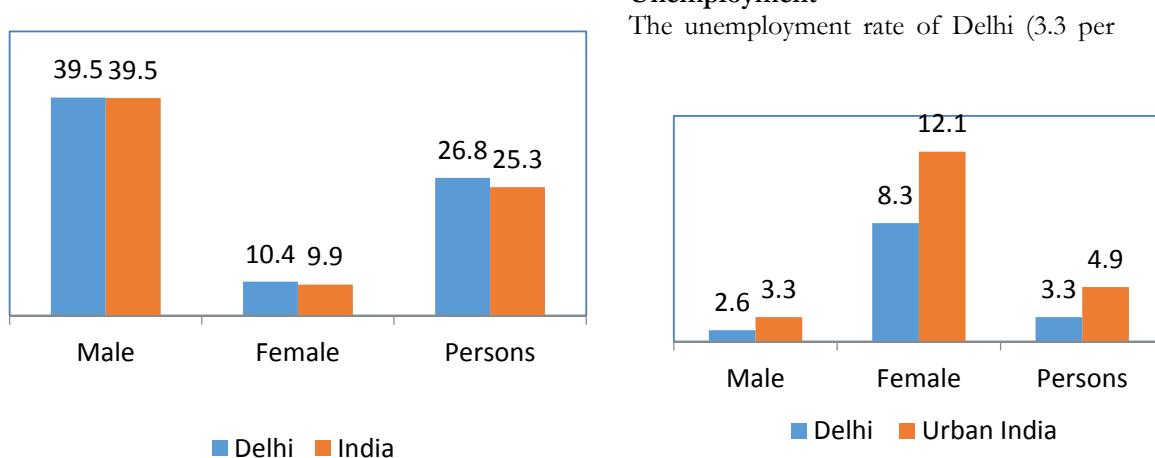


The gender-wise distribution reveals that more than half of the females (54.8 per cent) are involved in



regular work than their male (43 per cent) counterpart, while opposite is true in case of self employment in the state. Male employment in self- employment (44.3 per cent) is relatively more than female (31.7 per cent) [*Figure 7: Employment status by Gender*]. The reason lies in the gender differences in the

sectoral composition of employment. Largest employment generating sector for male is trade, hotel & restaurants that are predominantly self-employed type and the largest generating sector of female employment is education & health that is mostly consist of regular jobs.



The number of unemployed in Delhi grew at faster rate in recent years. The persons with higher level of skills can effectively adjust challenges and opportunities of work. The graduates and diploma holders constitutes only one-fourth of total unemployed. In Delhi bulk of unemployed have only completed school education. It is an additional challenge to create decent jobs.

Table 2.3: Educated Unemployment Rate, 2015-16

Year	Distribution of Unemployed					
	Below Secondary	Secondary to higher secondary	Graduates & Post Graduates	Other Diploma Holders	Total Unemployment	Growth over previous years
2013	15.0	57.9	21.9	5.3	855,292	10.42
2014	13.5	60.5	20.8	5.2	1,017,569	18.97
2015	13.1	60.4	21.1	5.4	1,085,896	6.51

Source: Economic Survey, Delhi, 2015-16

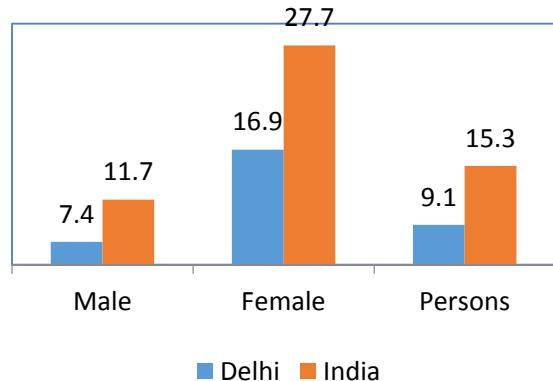
Youth Employment and Unemployment

According to the census of India, youth (15-29 years) constituted 30.4 per cent of the total population of Delhi in 2011. The work participation rate of youth in Delhi is 26.8 per cent compared to all India average of 32.6 per cent in 2015-16. However, the WPR is almost similar when compared with urban

India. Gender wise distribution also shows significant gap between male and female WPR. Female youth WPR is one-fourth of male youth WPR in Delhi [*Figure 9: Work Participation Rate of Youth in Delhi and Urban India*].

The youth unemployment rate in Delhi is almost in double digit at 9.1 per cent in 2015-16. The female youth unemployment rate is more than twice (16.9 per cent) male [*Figure 10: Unemployment rate among Youth in Delhi and Urban India*]. In particular, the unemployment rate is even higher among the educated female youth (26.4 per cent) in Delhi.

The category of youth 'Not in Employment, Education and Training' (NEET) are attracting attention in recent year. NEET youths are vulnerable and without proper attention some of them may participate in



distrustful activities. Around one-fourth (24.4 per cent) of the youth in Delhi are NEET which is relatively less compared to all India (37.6 per cent) and Urban India (32.2 per cent), 2015-16. The proportion of NEET female (47 per cent) is almost 10 times of males (7 per cent) in Delhi. It reflects poor participation of female youths in work, education or training. [*Figure 11: Youth not in employment, education, training, 2015-16, Delhi and Urban India*].

Role of SMEs (Small and Micro Enterprises)

The organised manufacturing enterprises contribute 4 per cent in total employment in Delhi. On the other hand, non-factory establishment completely dominates with 87 per cent of the total employment in the state. Hardly one-twelfth of employment was in factories mostly in unorganised MSME segment in 2013-14.

Table 2. 4: Number of Establishment and Employment in Delhi (2013-14)

Establishment	Number	Employment	% Share in Employment
<i>Factories</i>	8,821	403,270	13.4
Organised (ASI)	2,980	115,731	3.8
Unorganised	5,841	287,539	9.5
<i>Non-factory Establishment</i>	866,487	2,616,511	86.6
Total	875,308	3,019,781	100.0

Source: Economic Survey of Delhi, 2016-17 and Economic Census, 2013

Table 3 presents number of enterprises and estimated employment in them. Strict enforcement of various environmental norms by the Central Pollution Control Board and Delhi Pollution Control Committee led to virtual closure of large factories in Delhi and shifting of number of smaller industrial units in neighbouring states. The estimated number of workers employed in factories increased at a slow rate in Delhi in recent years.

The state government has taken several steps in the past and is planning to take a number of development initiatives for the development of industries in tune with the state Industrial Policy 2010-2021. The objective of the policy is to promote knowledge based industries and make Delhi a hub for clean, high- technology & skilled economic activities. The government initiated redevelopment of industrial clusters and maintenance of industrial areas under the public private partnership mode. The state government has approved special economic zones in Baprola village for the development of Information Technology and Gems & Jewellery and an Industrial complex on 612 acres of land in Narela. In addition, it has been proposed to develop 50 acre high tech estates for ITES in Kirtinagar, Mangolpuri, Naraina, Bawana and Okhla. These projects are expected to provide direct employment to 100 thousand people and create indirect employment for more than 170 thousand people.

Tourism

The capital of India is one of the key arrival destinations for both foreign and domestic tourists. According to the economic survey, 2016-17 (up to December 2016), the state registered foreign tourist arrivals (FTA) at 2.46 million (27.77 per cent of the total FTA in India) as against that of 2.38 million in 2015-16. The state is among the top tourist destinations in the country. The number of domestic tourists visiting the state had been rising continuously. It grew from 18.49 million in 2012-13 to 22.62 million in 2014-15. The latest survey conducted by NSSO (72nd round, 2014-15) on tourism illustrated that majority of tourists (95 per cent) visited to Delhi during the year for 'holidaying, leisure and recreation'. These tourists mostly stayed in hotel & guest houses (62 per cent) followed by friends & relative's home (24 per cent). The average number of night spent by domestic tourist in Delhi is about

6. This clearly reveals that tourism has huge potential for employment generation and becoming a growth driver of the state.

Challenges

Following challenges are emerging from the above analysis:

The service led growth process of the Delhi has failed to generate sufficient number of employment. The state is characterised by declining overall work participation rate (WPR) with low female WPR.

Employment share of manufacturing is low and it has been declining. Employment share of construction sector is negligible in the state.

Low level of labour productivity exists in large employment generating sectors of manufacturing and trade, hotel & restaurants.

The share of regular employment is high but mostly it is informal employment.

High youth unemployment rate exist particularly concentrated among female. The numbers of educated youth unemployed are also rising. A large proportion female youths is not in employment, education or training (NEET).

State Initiatives for Employment and Livelihood Promotions

The state government has been taking several initiatives to generate employment and promote livelihood option. Some of these are enumerated below.

Employment Exchanges

Employment services to the job-seekers, job-providers and all other related activities operate through 9 District Employment Exchanges (DEEs) / University Employment Information & Guidance Bureau (UEI&GB) located at University of Delhi, Jawaharlal Nehru University and Jamia Millia Islamia University. This service includes online registration of the job-seekers, modification of their registration, receiving of the requisition of vacancies from the job-providers and sponsoring the names of registrants as per the requirements of the job-providers for employment.

Delhi Job Fair

It is an initiative of Directorate of Employment Govt. of NCT of Delhi to provide Employment opportunities to Jobseekers in private sectors. It has organized several such job summits since December 2015 and provided a platform of interaction between job-seekers and employers in private sectors.

Empanelment of Hiring All Contractual Jobs in Government Sector

It has empanelled M/S Intelligent Communication System India Ltd (ICSIL) for hiring all kinds of contractual manpower for various departments under Government of Delhi NCR (including state public sector and state autonomous bodies) directly without any tender.

Self-Employment Schemes for Educated Unemployment Youths

The Scheme mainly targets school dropouts having passed 8th standard, 10th standard and college dropouts. Training modules of three months duration in various trades such as Fashion Designing, Air Conditioning & Refrigeration, Beauty Parlour & Hair Dressing, Radio & T.V. Repair, Mobile & Computer Repairing, Electric House-Wiring etc. have been designed. The focus is on skill formation and entrepreneur development. The expenditure incurred during training is born by state government. After completion of the training, the candidate can approach the financing institutions concerned to avail the financial assistance under the Plan Scheme.

Rajiv Gandhi Swavlamban Rozgar Yojna (RGSRY)

This scheme has been designed, developed and promoted to provide the employment opportunities to the unemployed youths, artisans, trained professionals, skilled technocrats and entrepreneurs by promotion/expansion of permissible industries, professions and other services. Under this scheme up to Rs 3 lakh is provided with 15% subsidy component of project cost subject to a ceiling of Rs 7500 per entrepreneur. In 2015-16, 24 people were provided such loans out of 30 targets.

Prime Minister Employment Generation Programme (PMEGP):

This scheme was introduced by the Ministry of Small and Medium Enterprises, Government of India with a view to generate employment opportunities in the country. The maximum cost of the project per unit admissible to each entrepreneur under the scheme is Rs 25 lakhs. In 2015-16, 221 were availed the benefits out of targeted 254.

4 Strategies

Basic employment and livelihood strategy in Delhi requires emphasis on service-led growth as tertiary sector employs nearly two-third of total employment along with some emphasis on specific manufacturing industry segments.

Manufacturing employment in Delhi is still quite large and it employs nearly one-fifth of Delhi's workforce. But sectoral productivity of manufacturing is low and manufacture of wearing apparel has the second highest employment in unorganised sector after retail trade in 2010-11. In the short run,

they may be provided some skill development training along with some credit facilities to improve their productivity. In the long run they need to be shifted in some other productive sectors.

The manufacturing industry that can be developed in Delhi is high value added electronic industry.

The retail trade is largest employment provider in Delhi. It provides employment to all sections of population including the poor. Planned development of flee market with proper regulations in designated places that allows relatively free access to poorer section of population on certain days of the week can enhance income generating process of vulnerable section of the population.

Delhi's population is one of highest educated in India with one-fifth of Delhi's adult population (25 year and above) have at least graduate degree. They played a big role in developing high skilled jobs in the NCR regions.

Create comparatively large infrastructure in designated areas (close to metros and well-connected roads) where high skilled workers can do innovative jobs in various segments of knowledge industries areas like medical & clinical research, R & D in communication & IT, R&D in manufacturing, internet based jobs etc.

Highly paid high skilled job creates numerous jobs in the low skilled (cleaner, real estate agents, carpenter, small-business owner) and in middle skilled jobs (teachers, nurses, doctors, architects) apart from large demand of domestic service workers and greater demand for hotels and restaurant services.

The hospitality industry, which has emerged as one of the main contributors to the state economy needs encouragement through proper regulations and building middle level hotel. This will promote tourism, generate quality employment and revenue for the state.

The low level of female participation in labour market in Delhi can be substantially augmented by creating job opportunities in sectors of electronics hardware, tourism & hospitality and social sectors like education and health. Safe and secure transportation and flexible working hours needs to be promoted.

The informal sector needs proper attention in terms of social security measures and other conditions of work. Even the informal employment in formal sector which are on the rise needs proper implementation of social security measures and employment conditions.

CHAPTER III: ELIMINATING ECONOMIC DEPRIVATION (SDG1, 2)

Poverty is a situation where the individual or communities lack the resources, ability and environment to meet the basic needs of life such as safe drinking water, sanitation, housing, health infrastructure. Poverty reduction has been an important goal of development policy. To achieve inclusive development, several poverty-alleviation and employment-generation programmes are being implemented by GoI . Poverty is one of the issues, attracting the attention of sociologists, economists, governments, civil society organizations and almost all other organizations related to human welfare and development. It indicates a status wherein a person fails to maintain a living standard adequate for a comfortable lifestyle.

Ending poverty in all its forms everywhere is one of the major objectives of the Sustainable Development Goal (SDG) agenda which impinges on several other SDGs as well. For fulfilling this objective we need to attend other key socio-economic, cultural, political and environmental dimensions of poverty, and monitoring progress in social protection and inequality. SDG 8 aims for inclusive economic growth which will increase the income opportunities of the people and finally contribute towards poverty reduction. Persistent poverty is often due to unequal treatment and disrespect to people's rights and human dignity. Enabling institutions to address such issues of poverty may require additional investments.

Delhi with the Gross State Domestic Product (GSDP) at current prices of Rs 451154 crore for 2014-15, recorded a growth of 15.35percent over previous year. The real growth in GSDP of Delhi i.e. at constant prices during 2014-15 is 8.2 percent as compared to 7.4 percent recorded at national level. Per Capita Income of Delhi during 2014-15 at current prices is Rs2.41 lakh as against Rs 2.12 lakh during 2013-14 showing an annual increase of 13.49 percent. The per capita income of Delhi is almost three times higher than the per capita income of Rs 87748 at national level. Although Delhi continues to have the highest per capita income in the country; about three times that of the rest of India but the latest estimates shows that in Delhi 17 lakh population still in the below poverty line.

The vision for 2030 for Goal No. 1 for the Delhi

By 2030, all deprived people will be out of poverty, all poor and vulnerable people will be covered with social protection schemes and will have access to formal financial institution.

The targets for Goal no. 1 as developed by UN are presented in the Box no. 1. The targets 1.1 to 1.4 all relate to a great extent to rural development and urban development. Out of these, Targets 1.1 and 1.2 directly relate to poverty, while the Targets 1.3 and 1.4, which relate to social protection and inclusion will be discussed together. Target 1.5, dealing with resilience of the vulnerable and poor to climate related extreme events will be discussed separately. However these target and the indicators are modified in the context of Delhi.

Box no. 1 Target for SDG 1

- 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day
- 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
- 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable
- 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
- 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day

In India for measuring poverty we generally use nationally defined poverty line based on which we can estimate percentage of the population below poverty line. To convert the national poverty line to PPP it is always a controversial issue because of floating exchange rate. Hence we are not much focused on Target 1.1 and more focused on Target 1.2.

Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

Baseline:

The indicators for this target show that the poverty rate with reference to the state poverty lines is low at 9.91 percent as of 2011-12, much below the all-India poverty of 21.92 percent for the same year based on the Tendulkar Methodology. Using the same Tendulkar methodology, the poverty estimates during 1993-94 was 15.7 per cent. The average annual decline in poverty between the 1993–94 and 2011–12 period was 5 per cent. The decline is, however, more substantial in urban Delhi in comparison to rural Delhi. In the urban area, the poverty declined from 15.7 per cent to 9.8 per cent in the 1993–94 to 2011–12 period whereas in the rural area, the decline was from 16.2 per cent to 12.9 per cent during the same period. However, it may be noted here that the share of rural areas in Delhi is only 2.5 per cent. The incidence of poverty is considerably lower in Delhi than India as a whole.

It may be seen that the decline in both urban and rural poverty in Delhi was lower (-3.28 and -5.86) than at All-India level (-24.4 and – 18.1 respectively) during 1993-94 and 2011-12. Obviously this is because of low levels of poverty in Delhi in 1993-94 compared to the national level. The main findings from our analysis is that the poverty ratio of Delhi was less than half compared to the ratio for all India in 2011- 12. The poverty ratio decreased in both Delhi as well as all India during 1993-94 to 2011-12. But the rate of fall in poverty was higher in all India compared to Delhi during the same period. Thus with respect to income poverty, the state is better placed vis-à-vis many other states in the country. However, it is widely accepted that poverty is multi-dimensional in nature, and it is worthwhile to explore these other aspects of poverty and deprivation in the state, such as access to basic services.

Table 3.1: Incidence of Poverty (in per cent)

	Year	Delhi	India
Rural Poverty	1993-94	16.2	50.1
Urban Poverty		15.7	31.8
Total		15.8	45.3
Rural Poverty	2004-05	15.6	41.8
Urban Poverty		12.9	25.5
Total		13.0	37.2
Rural Poverty	2011-12	12.92	25.7
Urban Poverty		9.84	13.70
Total		9.91	21.92
Rural poverty change	2011-12-1993-94	-3.28	-24.4
Urban poverty change	2011-12-1993-94	-5.86	-18.1

Poverty Gap Ratio (PGR)

Poverty Gap Ratio (PGR) is the mean shortfall of the total population from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. It reflects the degree to which mean consumption of the poor falls short of the established poverty line, indicating the depth of poverty. The PGR helps to provide an overall assessment of a region's progress in poverty alleviation and the evaluation of specific public policies or private initiatives (MOSPI, 2014). Between 2004-2005 and 2011-12, the PGR has also recorded a decline.

Table 3.2: Poverty Gap Ratio for 2004-05 and 2011-12

	Rural		Urban	
	2004-05	2011-12	2004-05	2011-12
Delhi	1.92	1.79	1.99	1.62
India	9.63	5.05	6.08	2.7

Source: Economic Survey of Delhi 2016-17

The poverty line for Delhi was Rs 315 for rural and 320 for urban. In 2004-05 it was increased to 541 in rural and 642 in urban Delhi as against the national level of Rs 447 for rural and 579 for urban. In 2011-12 the poverty line of rural Delhi was 1145 was lower than the urban Delhi of Rs 1134. Poverty line of Delhi in 2011 is also higher than the national level of Rs 816 of rural and Rs 1000 of urban.

Table 3.3: Poverty Line (Rs. Monthly per Capita Expenditure)

	Rural	Urban
1993-94	315.4	320.3
2004-05	541	642
2011-12	1145	1134

Visions and Interventions

The vision of Delhi government is that in order to empower the households identified as deprived and provide basic earnings which can support at least nationally defined monthly per capita consumption expenditure which is above the poverty line for each member of those deprived households. This is only possible through creating employment opportunities and skill training.

The first strand of the strategy aims to eliminate extreme poverty by reducing the number of deprived population to zero by 2030. To attain this from the baseline level of 9.91 percent of poor in 2011-12, the percentage should be reduced by 5 percent in 2019-20 and another 3 percent by 2023-24. The remaining 1 percent of the poor population will be out of poverty by

2030. The second strand of the strategy would involve providing schemes to ensure social protection of the poor and the vulnerable

With increasing pace of urbanization, the number of urban poor is likely to increase in the coming years. The dimensions of urban poverty can be broadly divided into three categories: (i) residential vulnerability (access to land, shelter, basic services, etc.); (ii) occupational vulnerability (precarious livelihoods, dependence on informal sector for employment and earnings, lack of job security, poor working conditions, etc.). These vulnerabilities are inter-related. iii) social vulnerability (deprivations related to factors like gender, age and social stratification, lack of social protection, inadequate voice and participation in governance structures, etc.) The social vulnerability is addressed by various departments/ministries, while central ministry of Housing and Urban Poverty Alleviation address the first two issues.

Government's Initiatives

The Deen Dayal Antyodaya Yojana-National Urban Livelihood Mission (DAY-NULM) has the vision to reduce poverty and vulnerability of the urban poor households by enabling them to access gainful self-employment and skilled wage employment opportunities, resulting in appreciable improvement in their livelihoods on a sustainable basis, through building strong grass-root level institutions of the poor. The urban street vendors will be helped by access to suitable space, institutional credit, social security and skills for accessing emerging market opportunities. Prime Minister's Awas Yojana (Housing for all), Shelter for Urban Homeless (SUH) and such schemes operate to address the problems of those without shelter and homes.

Challenges

Rate of reduction of poverty between 2004-05 and 2011-12 was 0.44 percent per year. If Delhi can maintain this pace of reduction in poverty, the poverty in 2029-30 will be only around 2 percent. However poverty is a multidimensional concept. Hence main challenge is to address some other dimensions of poverty such as

(i) Homelessness: According to the Census of 2011, India has more than 1.7 million homeless residents, of which 938,384 are located in urban areas. Out of these in Delhi 150000 to 200000 are homeless people².

(ii) Basic amenities for slum population

Slums in Delhi lack basic amenities. With increasing slum population, the major challenge for the government is to provide basic amenities to urban slum population.

(iii) High in-migration

Delhi is national capital and hub of many economic activities. It attracts many people in search of employment and better life. Therefore, there is high in-migration in Delhi which put challenge before government to provide basic amenities to all.

Strategy

Alleviating poverty in the urban sector: The DAY-NULM is the main scheme which is aimed at lifting the poor out of poverty in the urban areas. This has six main components³

- (i) Social mobilization and Institution Development (SMID) which envisages development of a three-tier structure for the socio-economic upliftment of the poor, comprising SHG (Self Help Group), ALF (Area Level Federation) and CLF (City level federation).
- (ii) Employment through skill training and placement (ESTP): The features of ESTP are that training to be provided as per market need and there will be empanelment of Skill Training Providers (STPs). There will also be empanelment of independent Certification Agencies (CAs) and a Placement (minimum 50% candidates) and/or linkages for self-employment ventures. Thus an asset will be provided to the urban poor in the form of skills for sustainable livelihood and alleviation of urban poverty.
- (iii) Self-employment Programme: Individual and Group Enterprises are to be promoted and linked with banks for financial support and there is provision of Interest subsidy on loans for individual enterprises (Rs 2 lakh max) and group enterprises (Rs10 lakh max). The

² <http://hln.org.in/homelessness>

³ <http://nulm.gov.in/>

individual and group enterprises will get subsidized loans and SHGs will be linked with banks for loans.

- (iv) Capacity building and training: Technical support will be provided at National, State and City levels.
- (v) Support to urban street vendors: A city wide street vendor survey will be carried out with a view to identify vendors, vendor zones and existing practices and ID cards will be issued to the vendors by the ULB. There are plans for Vendor Market Development, skill development and financial inclusion, as well as social security convergence.
- (vi) Scheme of shelters for urban homeless: For every 1 lakh urban population, there will be permanent – 24x7 - all weather community shelters, where each shelter will cater to 50 - 100 persons. A minimum space of 5 square meters or 50 sq. feet per person is to be provided Linkages with social security and other entitlements is to be ensure

Target 1.3: Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

Target 1.3 relates to extending social protection for vulnerable people. The vision is to extend social protection with the help of pension and other Schemes to all poor and vulnerable people by 2030.

Base line

The Govt. of NCT of Delhi is implementing, to attain the objectives laid down in Directive Principles of State Policy on Social Security, plans/programmes to ensure the welfare of weaker sections of the society, disadvantaged groups and physically challenged persons for better care and support. Government is implementing schemes and programmes for empowerment of women, security to aged people and vulnerable sections and creating an enabling environment for children. At present Government of Delhi is spending 11.9 percent of the total planned expenditure

Table 3.4: Plan Outlay and Expenditure under Social Security and Welfare Sectors (2011-12 to 2016-17)

	Exp. 2011-12	Exp. 2012-13	Exp. 2013-14	Exp. 2014-15	Exp. 2015-16	BE 2016-17
Total Expenditure ((Rs Crore)	1196.9	1584.6	1654.5	1799.2	1908.2	2449.2
Total Plan (Rs Crore)	13575.3	13237.5	13964.3	13979.7	14960.5	20600.0
%	8.8	12.0	11.8	12.9	12.8	11.9

Source:

There exist a number of pension schemes, many of these central schemes, in Delhi, such as Old Age pension, Widow pension, Disability pension, , etc. which provide a security net for the vulnerable segments of the society. In 2016-17, the baseline physical achievements and financial expenditure for these schemes were as follows

Table 2.5: Physical achievement (no.) and expenditure under major pension schemes in Delhi (2016-17)

	Total beneficiaries (No)	Total Expenditure (Rs in lakh)
IGNOAPS	384545	1923.94
IGNWPS	106775	765.68
IGNDPS	48382	132.74
NFBS	1642	43.5

Note: IGNOAPS - Indira Gandhi National Old Age Pension Scheme; IGNWPS - Indira Gandhi National Widow Pension Scheme; IGNDPS - Indira Gandhi National Disability Pension Scheme; NFBS - National Family Benefit Scheme

The largest outreach is for Old Age pension scheme with 5 lakh 41 thousand beneficiaries. Other schemes which provide some assistance to the vulnerable segments of the society are financial assistance to poor widows for performing marriage of their daughters and financial assistance to orphan girl for their marriage.

Challenges

Social protection floor is a nationally defined sets of basic social security guarantees on housing, health, education, working age population and old age population. However schemes for different sectors are managed by different depart of different government bodies. Some

schemes are managed by central government, State government and some are managed by MCD and DDA. There is lack of coordination between different department of the government needs to be addressed. There is an increasing trend of old age population in Delhi. In 2001 old age population was near 7 lakh which is now almost 11 lakh in 2011.

Strategy

Promoting of transparency, accountability and mitigating corruption hold the key to improve the effectiveness of the ongoing social protection schemes. Use of information and communication technology (ICT) in the implementation of social protection schemes and introduction of social audit for monitoring the implementation of these programmes will help in ensuring transparency, accountability and mitigating corruption. Computerization of records pertaining to beneficiaries and other details and making them public through internet sources will enable the service delivery mechanism to be transparent. Social audit acts as an effective mechanism to ensure the proper implementation of the programme and thus achieving desired outcomes in the form of benefits reaching the target population. Thus, both these mechanisms, i.e. use of ICT and social audit infuse accountability, transparency and mitigate corruption involved in the implementation of social protection schemes

Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, in heritance, natural resources, appropriate new technology and financial services, including microfinance

Baseline

Target 1.4 is assessed primarily by financial inclusion, in the form of number of Jan Dhan Yojana accounts opened till date. The baseline value is 3930073

Table 3.6: Account Opened under Jan Dhan Yojana Scheme in Delhi

Total No of Households	26,96,322
Total No. of Covered Households	26,96,322
Total No. of Beneficiaries	39,30,073
Balance in beneficiary accounts (in Rs. Crore)	1,469.12
No. of RuPay cards issued to beneficiaries	31,43,918

Regarding Target 1.4, the baseline financial inclusion as reflected in the number of Jan Dhan Accounts opened in the state. Delhi government has already archived vision for coverage for full financial inclusion for the household

Challenges

There is already 100 percent coverage of households under Jan Dhan Yojana but it's operationally is under question (per capita deposit is merely Rs. 3738). This reflect the low operational level of Jan Dhan Yojana Accounts

Strategy

1. Basic income should be increased

As mentioned in the challenges, the per capita deposit is merely Rs. 3738. It shows the prevalence of high non-functional Jan Dhan accounts which indicates low level of financial inclusion. To increase the level of financial inclusion, employment opportunities should be generated in such a way that it may increase basic income of the population.

2. Improving trust in using technology in financial transaction

In general, people are hesitant to use technology for financial transaction. Government should adopt appropriate measures to improve people's trust in using technology in financial transaction.

Table 3.7: Targets and Indicators for SDG 1 ‘End Poverty in all its forms everywhere’

Indicators	Baseline	Vision2030
Target 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions		
1. Population below state poverty line (%)	9.91	1
Target 1.3 Implement nationally appropriate social Protection systems and measures for all, including floors, and by2030 achieve substantial coverage of the poor and the vulnerable		
1. Social protection expenditure in total budget (%)	11.9	
Beneficiaries (no.) under Old Age pension scheme	384545	
Beneficiaries (no.) under Widow pension scheme	106775	

Beneficiaries (no.) under Disability pension scheme	48382	
National Family Benefit Scheme	1642	
Target 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property inheritance, natural resources, appropriate new technology and financial services, including microfinance		
	2696322	

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The aim of Sustainable Development Goal no. 2 is to end hunger and remove malnutrition by the year 2030. It additionally pledges to universalize access to safe, nutritious and sufficient food. The Vision for the state for Goal no. 2 is - there will be no hunger by 2030 and all poor and vulnerable people will have access to sufficient nutrition all over the year. The targets for Goal no. 2 as developed by UN are presented in the Box no. 2 below. There are five targets 2.1 to 2.5. Out of these 2.1 and 2.2 will be discussed in the context of Delhi.

Box no. 2 Targets for SDG 2

- 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.
- 2.2 By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.
- 2.3 By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers' lists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment
- 2.4 By 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality
- 2.5 By 2020 maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed

Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

Delhi has no problem of hunger although there is considerable malnutrition. There is an active Public Distribution System (PDS) comprising active Public Distribution System (PDS) around 2254 Fair Price Shops. Delhi Government has so far issued National Food Security Smart Cards of 19.50 lakh to eligible households covering total beneficiaries of 72.60 lakh for disbursement of food entitlement.

Target 2.2 : By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.

Malnutrition among children is widely prevalent in India and Delhi is no exception. Chronic malnutrition manifested in stunting and wasting, is considerable among children under 5 in Delhi at 32.3% and 5% on an average. 27 percent of the children under 5 are underweighted. The incidence of stunting, wasting and underweight children has declined since 2005-06.

Anemia is a manifestation of under-nutrition and poor dietary intake of iron. Nearly 63% children between 6-59 months in Delhi are anemic, and this high level of anemia has persisted since 2005-06

However, it may be noted that causes of nutritional anemia among children include iron loss due to parasite load (e.g. malaria, intestinal worms)) as well as poor environmental sanitation, unsafe drinking water and inadequate personal hygiene and not just dietary deficiency⁴. Thus the attainment of Target 2.2 is also dependent on attainment of SDG 6 and its targets. Anemia amongst women of reproductive age is also high at 45.1 percent, and it has increased from 2005-06.

⁴ http://www.pbnrhm.org/docs/iron_plus_guidelines.pdf on 27th April 2017

Table 3.8: Present Status of Malnutrition in Delhi (%)

	2005-06	2015-16
Prevalence of underweight children <5 years	26.1	27
Prevalence of stunted children <5 years	42.2	32.3
Prevalence of wasted children <5 years	7	5
Prevalence of anemia among women of reproductive age (15-49)	29.9	45.1
Prevalence of anemia among children 6-59 months	57	62.6

The objectives for reducing anemia are: reducing the baseline levels of anemia among women of reproductive age from the baseline levels of around 45% to successively 40% by 2019-20, to 30% by 2023-24 and to 10% by 2029-30. For children (6-59 months), the baseline levels are higher at around 63%, and these are sought to be reduced successively to 50% by 2019-20, to 40% by 2023-24 and to 20% by 2029-30.

Strategies

For reducing anemia among women of reproductive age, the government can adopt following strategies:

- Increase the awareness of importance of problem of anemia during pregnancy
- For reducing anemia among women of reproductive age:
- Strengthen the Anemia tracking
- Antenatal Screening of all pregnant women
- Counseling of anemic among women of reproductive age
- Distribution of Iron Folic Acid to pregnant women
- Increase in institutional delivery
- Financial aid provided to BPL pregnant women for nutrition

For reducing anemia among children 6-59 months, the government can adopt following strategies:

- Increase the institutional delivery and focus on start the breast feeding within 1hrs of birth and exclusive breastfeeding.

- Establish the KMC (Kangaroo Mother Care) units for LBW (Low Birth Weight) infants.
- Early detection and treatment of 30 identified disease under age group of 5 years under RBSK program.
- Distribution of IFA (Iron-folic acid) syrup to children of 6-59 months.

For Reducing underweight among children 6-59 months, the government can adopt following strategies:

- Adequate nutrition for adolescent girls
- Intermittent iron and folic acid supplements for women of reproductive age and adolescent girls
- Fetal growth monitoring and neonatal size evaluation at all levels of care, integrated into the WHO antenatal care mode
- Daily iron and folic acid supplements for women during pregnancy
- Daily calcium supplementation for women in settings with low calcium intake

Target and Indicators for SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

	Baseline (in per cent)	Vision2030 (in per cent)
Prevalence of underweight children <5 years	27	<5
Prevalence of stunted children <5 years	32.3	<5
Prevalence of wasted children <5 years	5	<5
Prevalence of anemia among women of reproductive age (15-49)	45.1	<10
Prevalence of anemia among children 6-59 months	62.6	<20

Target 2.3: By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers' lists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment

Agriculture is a state subject, as per our constitution. Therefore, it is the primary responsibility of the state government for increasing agricultural production and productivity, and enhancing income of the farming community rest with state government. However, the contribution of agriculture sector in the Gross State Domestic Product (GSDP) of Delhi has reduced due to high urbanization and growth of secondary and tertiary sector. The share of agriculture and allied activities in the GSDP at current prices in Delhi has declined from 1.09 % in 2004-05 to 0.83% in 2014-15. In terms of area, 25 percent of total area of Delhi belongs to rural area where around 4.19 lakhs (2.50% of the total population) people reside, as per census 2011.

Challenges

With the rapid urbanization and high growth of industries and services, rural area in Delhi is shrinking fast.

Strategies

Though agriculture and allied sectors is shrinking fast, the government should provide incentives to those who are involved in these sectors so that they can earn basic income to live a decent life.

Target 2.4: By 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.

Challenges and Strategies

In general, this target is not applicable to Delhi. With the rapid urbanization and reducing share of agriculture in GSDP, there is less scope for the government to ensure sustainable food production systems and implement resilient agricultural practices. However, government can ensure availability and affordability by developing markets and employment opportunities.

Target 2.5: By 2020 maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access

to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed

Challenges and Strategies

In general, this target is also not applicable to Delhi. With the rapid urbanization, the land available to Delhi for maintaining genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species is drastically decreasing. However, government can promote such activities in certain areas of Delhi. It may generate new employment opportunities and enhance environmental conditions of the city.

SDG 1 End poverty in all its form everywhere						
Targets/indicators	Source	2016-17 Baseline	Physical Targets			Remarks
			2017-20	2017-24	2017-30	
Target 1.1 Eradicate extreme poverty for all people everywhere, currently measured at people living on less than 1.25 dollar a day						
1.1a Proportion of population living below the state poverty line						Discussed in Chapter 1.
1.1b Poverty gap ratio						
Target 1.2 Reduce at least by half the proportion of people living in poverty						
1.2a Percentage reduction of people below poverty line	NSSO	8.08	7.21	6.20	4.99	If annual growth rate of population in Delhi is 1.9 percent and rate of reduction of poor people is 1.86 percent then in 2030 the poverty head count ratio will be reduced to half (4.99)
Target 1.3 Implement social protection systems and measures						
1.3a Employment to population ratio						Discussed in.
1.3b Proportion of the eligible population covered by the social protection schemes under MGNREGA						
Target 1.4 Ensure that population including the poor and the vulnerable have equal right to economic resources and access to basic services						
1.4a Proportion of households having access to portable drinking water within premises						
1.4b Proportion of households having access to sanitary services within premises						
1.4c Proportion of households covered by bank loans						
1.4d Proportion of households covered by insurance						

	Discussed in Chapter 1 and Chapter 4.
Target 1.5 Build the resilience of the poor and the vulnerable sections and resource their exposure to climate related and other environmental disasters	Discussed in the environment section
Target 1a. Ensure enhancement of resources from a variety of resources to end poverty in all its dimensions	Will be discussed in the finance section
Target 1b. Create sound policy frameworks based on pro poor and gender sensitive development strategies to support accelerated investments in poverty eradication	Will be discussed in the finance section

SDG 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture						
Targets/indicators	Source	2016-17 Baseline	Physical Targets			Remarks
			2017-20	2017-24	2017-30	
Target 2.1 End hunger and ensure access to safe nutritious and sufficient food						
2.1a Household with inadequate food production (%)						Data need to be released regularly.
2.1b Population spending more than 2/3 rd if total consumption on food (%)						
Target 2.2 End all forms of malnutrition						
2.2a Percentage of stunted children under age 5	NFHS	30.76	28.60	25.95	22.43	If this is reduced annually by 2.4 percent, it will reach 22.43 percent
2.2b Percentage of wasted children under age 5	NFHS	4.7	4.29	3.7	3.16	If this is reduced annually by 3.01 percent, it will reach 3.16 percent
2.2c Percentage of underweight children under age 5	NFHS	27	20	12	5	There is possible with increasing government support.
2.2d Prevalence of anemia among women of reproductive age (15-49)	NFHS	45.1	38	25	10	This is possible with increasing number of women-centric health programmes.
2.2e Percentage of children under 5 years suffering from Anemia	NFHS	62.6	50	35	20	Targeted nutrition programme is urgently required.
Target 2.3 Double the agriculture productivity and incomes of small scale food producers						
Not applicable to Delhi						
Target 2.4 Ensure sustainable food production systems and implement resilient agricultural practices						
Not applicable to Delhi						
Target 2.5 Maintain the genetic diversity of seeds, cultivated plants to ensure access to fair and equitable sharing of benefits						
Not applicable to Delhi						
Target 2a Increase investment in rural infrastructure						
Not applicable to Delhi						
Target 2b Correct and prevent trade restriction and distortions in world agricultural markets						
This relates to national policy						

CHAPTER IV: INCLUSIVE CITY (SDG 11)

Vision for SDG II

To make Delhi sustainable, inclusive and equal for all with a quality of life that is ecologically resident and culturally sustainable, where all communities, especially the poor and the marginalized groups have a voice in the process of development.

The city of Delhi is overwhelmingly urban with 75 per cent of its total areas (1483 sq. km) and 98 per cent of total population (16.79 million) falling in urban jurisdiction. It has the highest population density in India (11, 320 persons per sq km) and as per Census 2011. The decadal growth rate declined from 47.02 per cent during 1991-2001 to 21.20 per cent during 2001-11, but urban density did not. The urban spill over continues in surrounding states of UP and Haryana as well.

The rate of migration has been stabilized in Delhi, yet the national capital continues to be a favourite destination for a significant number of people seeking livelihood and better employment opportunities in the city. Delhi is experiencing robust growth in infrastructure and economic growth for the last several years. These have resulted in having continuous flow of migration to the city whose growth rate is as significant as natural growth rate of population.

A positive aspect of population growth rate in the city is the increase in sex ratio of the state from 821 to 866 during last decade; 2001-2011.

UN specified Targets for Inclusive Cities

- 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
- 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women and children, persons with disabilities and older persons

- 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
- 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and decrease by 100 percent the economic losses relative to gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
- 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

Table 4.1: Growth of Urban Population in Delhi

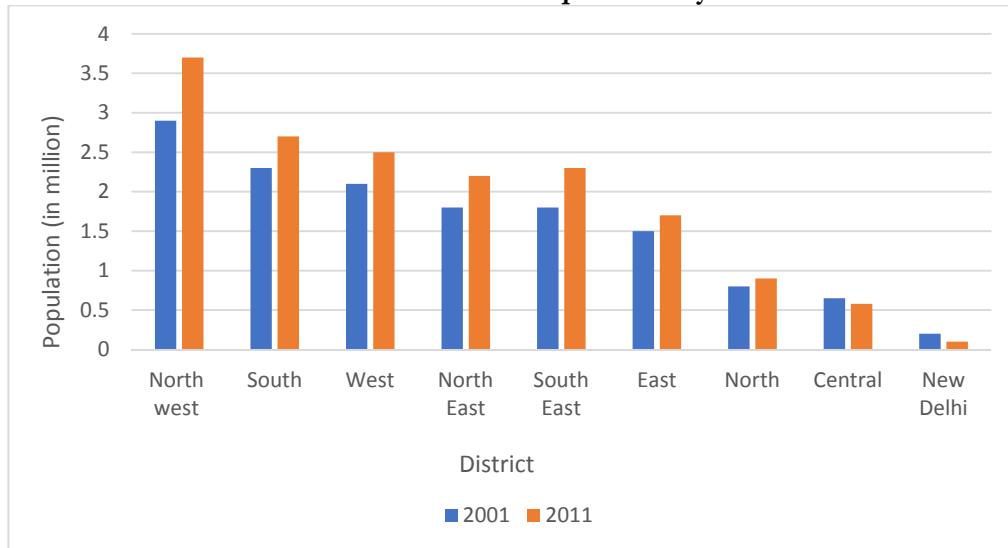
Components	Census 2001	Census 2011
Urban Population (lakh)	129.06	163.69
Growth Rate (%)	52.34	26.8
Percentage of population living in slums	16.3	11.3

Source: census 2001 and 2011

The reduction in growth rate is attributable to a drop in fertility rate, a substantial increase of population in other parts of NCR and slowing of migration in the capital. The district wise distribution of population reveals that New Delhi and Central districts show negative population growth during last decade as per Census 2011. New Delhi district has restrictions on shelter construction and central district is becoming largely commercial, thereby displacing the local residents. In contrast, population growth in South West district is attributable to people shifting to new relatively uncongested places like Dwarka sub-city. North West district shows maximum growth of population with several rehabilitation colonies accommodating displaced persons from industrial estates and other places. In South and West districts, there are several unauthorized colonies. North district shows least population growth. The

expansion of Delhi Metro and numerous flyovers led to large scale demolition of houses and consequent decline of population. The growing infrastructural activities in Delhi have made people shifting to peripheral regions.

Chart 4.1: Distribution of Population by Districts in Delhi



Delhi accounts for around 0.05 per cent of India's geographical area and 1.39 per cent of population. Highly urban character of Delhi exerts tremendous pressure on public delivery of services and infrastructure like water supply sewerage and drainage, solid waste management, affordable housing, health and educational facilities, signifying great challenge to urban governance.

Notwithstanding the challenges of population growth, migration and land availability, housing stock in Delhi has increased over the years but gap in housing supply is still quite significant. Gap in housing stock is measured by not only the number of houses but also housing congestion and housing conditions.

In very simple measurement, the gap in housing supply is measured by the difference between number of households and number of residential houses based on the assumption of one house per household. The following table shows the difference, in comparison to national situation.

Table 4.2: Shortage of Houses in Delhi and India during Census 2001 and 2011

Year and Place	Household(Lakh)	Residential Houses (Lakh)	Shortage(Lakh)
2001			
Delhi	25.54	23.17	2.37
India	1919.64	1792.76	126.88
2011			
Delhi	33.41	31.76	1.65
India	2466.93	2360.52	106.41

Source: Tables on Households and Amenities census of India, 2001, 2011

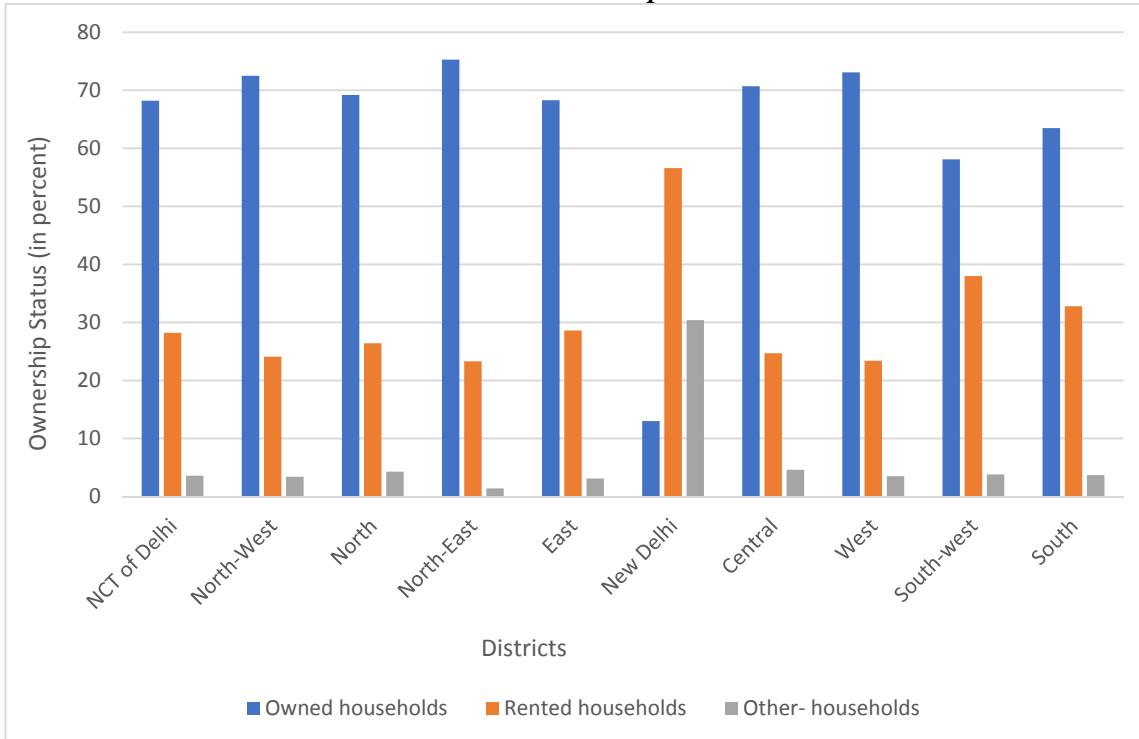
Basic housing shortage in Delhi has declined by 72,000 during last decade, very slow decline. If it is added that one household may and does have more than one house as is evident in Delhi, the gap will be much more. Housing conditions also add up to housing shortage. According to Census 2011, only 55.3 per cent of rural houses and 66.1 per cent of urban houses can be categorized as good, while 40.9 per cent of rural and 31.1 per cent of urban houses are categorized as livable. The rest are in dilapidated condition, adding to housing shortage.

Housing shortage is reflected by the nature of ownership and density of houses also.

Ownership Pattern

Ownership of houses is very high in Delhi with 68 per cent of the households having their own houses as per 2011 census. District wise distribution shows that proportion of owned houses is much higher in all districts excepting New Delhi, where majority of government quarters and diplomatic enclaves are located. Migrants generally live in rented accommodations initially before they stabilize in the city. The increase in ownership of houses refers to the growing stabilization process in the city; migrants in significant proportion are getting absorbed as permanent residents.

Chart 4.2: District wise Ownership of Houses in Delhi



Housing Congestion

Table 4.3: Distribution of Households by Number of Dwelling Units – India and Delhi, 2011

(Per cent)

No.	Number of Rooms	India	Delhi
1	No Exclusive Room	3.90	1.30
2	One room	37.10	32.20
3.	Two rooms	31.70	29.60
4.	Three rooms	14.50	20.00
5.	Four rooms	7.50	10.40
6.	Five rooms and above	5.30	6.50
Total		100.00	100.00

Source: Census of India, 2011, Delhi

A majority of households in India as well as in Delhi live in one and two room dwelling units, indicating very high housing congestion, keeping in mind that average household size in India as well as in Delhi is still 5. The UN describes average household size as 2.5 to be above the congestion level. It indicates housing supply needs to increase fast.

Slums and Unplanned Housing

Urban Delhi is growing rapidly both in size and population spread over an area of 1483 sq. km. Delhi receives the largest flow of migration in urban India. Its rural areas and small towns have absorbed substantial proportion of migrants, with spatial and service inequalities. At the same time, very high per –capita income of Delhi has resulted in decline of percentage of people below poverty line, from 27.89 per cent in 1983 to 9.9 per cent in 2011-12 (Economic Survey of Delhi 2016-17). On the other hand, around three quarter of Delhi's population lived in slums.

The increasing urban sprawl has resulted in various types of settlements as clarified below:

- a) Jhuggi Basti, Squatter or Slum Settlements
- b) Resettlement Colonies
- c) Notified Slums in old Delhi (Katrals)
- d) Urban Villages
- e) Homeless and Pavement Dwellers

Jhuggi Basti, Squatter or Slum Settlements

Slums or squatter settlements, known as Jhuggi Basties, are encroachments on public or private lands and home to large number of poor migrants who came to Delhi for livelihood. At present, Delhi has 755 JJ Basties of which 675 are listed and 80 are unlisted. They accommodate around 3.3 lakh households and a population of 17 lakh. These settlements occupy the area owned by 30 government agencies of which 30 per cent are state government offices and the rest 70 per cent, accounting for about 10 per cent of Delhi's population, have encroached upon lands owned by the central government.

Delhi Urban Shelter Improvement Board (DUSIB) is the nodal agency for the development of slums and low –income communities including the homeless in Delhi. It came into existence under the Delhi Urban Shelter Improvement Board Act, 2010. It has the following mandate:

- a) To use multi-pronged approach,

- b) To bring about a paradigm shift from resettlement to in-situ up grading and mainstreaming settlements within the city,
- c) To bring all existing slums, notified or non-notified, within the formal service system and enabling them to avail of the same level of basic amenities as the rest of the town.

DUSIB conducted a socio-economic survey of Jhuggi Basties in 2014 and developed a priority matrix using several vulnerability parameters like literacy level, below poverty line households, female-headed households, SC/ST population and the like. The following table shows the number of Basties by their level of vulnerability:

Table 4.4: Priority Matrix

Infrastructural Deficiency	Vulnerability			Total
	Low	Medium	High	
Low	34	54	47	135
Medium	46	122	81	249
High	46	74	55	175
Total	126	250	183	559

Resettlement colonies

The policy that led to development of these colonies was aimed to provide planned development and community level basic services to the unplanned settlements. However, dwellings in these colonies have been constructed without conforming to byelaws and have remained unplanned. But all properties in these colonies have been allotted on license fee basis.

These colonies do not have adequate infrastructure like water supply, sewerage, drainage, garbage, disposal, schools etc.

Unauthorised Colonies

These are residential colonies that have come up in Delhi over the past 50 years without authorization of the Delhi Development Authority (DDA). More than 30 per cent of Delhi's population, i.e., around 40 lakh persons live in these colonies, which are officially categorized as illegal. These colonies are built in contravention of zoning regulations, developed either in

violation of Delhi's Master Plans (1962, 2001, and 2021) or on illegally subdivided agricultural land. Hence the residents do not have clear title to their land. The most popular method used by residents to transfer properties in unauthorized colonies is a General Power of Attorney (GPA). GNCTD has estimated that 40 lakh people were living in such colonies in 2013. The GNCTD's Unauthorized Colonies Cell attributes the rise of unauthorized colonies to the DDA's failure to construct adequate low cost housing in face of large scale migration from neighbouring states since 1960s.

Legally Notified Slums (Kratas)

Slums are notified according to Slum Areas (Improvement and Clearance) Act, 1956. Majority of notified slums are in old Delhi Shahjahanabad and its extensions. These were originally meant to accommodate 60,000 persons, but an estimated number of 20 lakh persons are living there at present, leading to continuous deterioration of living conditions.

At present, there are 2423 Kratas under DUSIB. These are built up properties occupied by licensees who continued to reside on perpetual license basis.

Urban Village

There are 362 villages in Delhi, out of which 135 have been notified as urban villages as per Delhi Municipal Corporation Act, 1957 and the remaining 227 continue to be rural villages. The urban villages of Delhi carry 5 to 6 times more population density than the non-village areas and cater for mixed land use with residential, commercial, industrial (small or household industries) uses based on the demands of the surrounding localities. These are better places for migrants for cheaper rental availability compared to planned colonies. At the same time, they are more vulnerable to fire and earthquakes as it is not possible for fire engines to enter the narrow lanes of densely built up areas. The illegal building activities are creating unhealthy housing stock quite often without proper light and ventilation.

Homeless and Pavement Dwellers

The city has around 16,000 persons in this category, mostly concentrated in the Walled City Area, Central Delhi, railways station, bus stops and the like.

Table 4.5: Distribution of Unplanned Dwelling Units and Population

Jhuggi Basti	Dwelling units 155 Population 17 lakh	Encroached on public land. State government: 30 per cent Central Government 70 per cent.
Resettlement Colonies	Colonies 82 Plots 267859 Population not specified	Incorporated within the expanded city with good shelter consolidation without adequate services
Unauthorised Colonies	Colonies 1797 Population 40 lakh	Illegal colonies in violation of Master Plans, no clear land title
Notified Slum Areas (Katrals)	Katrals 2423 Population 20 lakh	Notified under Slum Areas (Improvement and Clearance) Act, 1956. The residents are staying on perpetual license basis.
Urban Village	Urban Village 135 (227 rural villages not yet notified as urban) Population not specified	Notified under Delhi Municipal Corporation Act, 1957
Homeless and Pavement Dwellers	16000 persons	

Source: Delhi Urban Shelter Improvement Board

Basic Amenities in Delhi

Prime consideration for inclusive city is to provide all its citizens with adequate access to basic services like water, sanitation, electricity and transport. Provision of basic services in Delhi improved significantly over the last decade. Electrification is near universal and sanitation accessibility is also quite significant. Delhi Jal Board supplies drinking water to about 81 per cent of the households against 75 per cent ten years back. Supply of basic services like electricity, water supply and sanitation improved remarkably during last decade.

Table 4.6: Availability of Electricity, Water Supply and Sanitation in Delhi 2001-2011

Components	Households(HH) Census 2001 (No)	Percentage to total HH	Households Census 2011	Percentag e to total HH
Electricity	23.72	92.86	33.11	99.1
Toilet Facility	19.91	77.96	29.91	89.5
Electricity and Toilet Facility	18.74	73.77	29.80	89.2
No Electricity and Toilet Facilities	0.65	2.55	0.19	0.6
Piped Water Supply	19.24	75.33	27.17	81.3
Hand Pumps /Tube Wells	5.60	21.91	4.58	13.7
Wells	0.001	0.004	0.003	0.1
Other Sources (River, Canal Tanks)	0.69	2.72	1.63	4.8

Source: Census 2011

The table shows that 65000 households did not leave electricity and toilet facilities in 2001. Their number is reduced to 19000 in 2011, i.e. less than 1 per cent of total households. Similarly, piped water supply has been extended to 27.17 lakh households in 2011, compared to 19.24 lakh households in 2001. This is evident that even slums and unauthorized colonies have been covered with basic housing services to a large extent.

The DUSIB survey shows that major source of drinking water is either tap or hand pump in 86.50 per cent of slums, while in around 30 per cent of the slums, residents are using septic tank/flush type of latrine facility. At the other extreme, there is no latrine facility at all in 22 per cent of slums. About 98.38 per cent of slums are having underground/covered pucca/open pucca /open Katcha drainage system. There is no drainage system in 1.62 per cent of the slums.

Local bodies are responsible for garbage collection in slums. However, the frequency of collection is not satisfactory at all. The frequency is shown in the following table.

Table 4.7: Frequency of Garbage Collection in Slums

Collection Frequency	Slums (%)
Daily	37.00
Once in 3 to 7 days	32.00
Once in 3 to 7 days	29.00
Once in 8 days to 15 days	0.68
No regular mechanism for garbage collection	1.32
Total	100.00

Source: Delhi Urban Shelter Improvement Board.

It is evident that garbage collection remains the most disappointing area of housing services. Garbage collection and disposal is vital to the concept of inclusive city as it threatens the living environment with acute health hazard possibilities. It goes without saying that the poor and other vulnerable sections bear the maximum brunt of unhealthy environment. Garbage collection and disposal is the basic step in solid waste management. Delhi's land fill sites are also saturated and collapsing but these problems are discussed elsewhere.

As for roads and transport, around 48 per cent of the slums have motorable approach road while 77 per cent of the slums have pucca road/lane/ path within the slum. Electricity is used for both street light and household use in only 16.76 per cent of slums. Street lights only are available in 58.96 per cent, while around 24 per cent of households get electricity for household uses only.

The growth rate of vehicles in Delhi during 2015-16 was recorded at 9.94 per cent, auto rickshaws registering the highest growth rate at 142.72 per cent.

Government *Interventions:* Policies

The urban development authorities have several policies related to shelter and basic services. It is imperative to coordinate and network among relevant agencies in order to establish a compact city form with inclusiveness.

(a) Jhuggi Basti Policy

The state government set up a special cell in 1962 under Slum Areas Improvement and Clearance) Act, 1956, to rehabilitate JJ Basties and provide infrastructure and utility services. It followed three pronged strategy:

- (i) Environmental Improvement of Urban Slums (EIUS) to provide basic services to all slums till they are relocated or in-situ rehabilitated.

‘

- (ii) In –situ up gradation of JJ Basties

The slum and JJ Department has provided in situ up gradation to 5711 families after receiving NOC from land owning agencies.

- (iii) Relocation of JJ Basti

The department has relocated around 2, 00,000 households and provided 70,000 plots of different sizes since 1976. 82 resettlement colonies were created.

In 2010, the department was renamed as Delhi Urban Shelter Improvement Board (DUSIB) through Gazette notification under the provisions of Delhi Urban Shelter Improvement Board Act, 2010. It is the nodal agency for resettlement /rehabilitation of slums in Delhi and managing its infrastructure. It has modified Slum Rehabilitation Policy with the guiding principles as:

- Master Plan for Delhi (MPD) -2021 proposals for improvement of JJ squatters
- Delhi Special Law Act
- Pradhan Mantri Awas Yojana – Housing for All (Urban)
- Court decisions and protocol for removal of Jhuggis in Delhi

MPD – 2021 proposes in-situ slum rehabilitation including use of land as a resource for community and private sector participation. It also directs mandatory provision of EWS housing/slum rehabilitation in all group housing with minimum 15 per cent of the proposed FAR on the plots or 35 per cent of the dwelling units, whichever is more, for the lower income groups and EWS. These sections must have a share of 50-55 per cent of total dwelling units

built. It advocates shift from plotted housing to group housing for optimum utilization of land and encourages private sector participation. At the same time, it advocates recategorisation of housing types, flexible development control norms and different densities to make EWS/LIG housing affordable and economical. In short, it encourages market sale of dwelling units subjects to restrictions in order to provide social housing at a subsidised rate.

The National Capital Territory of Delhi Laws (Special Provision) Second Act, 2011 has been extended to December, 2017. It stipulates for orderly arrangement for relocation and rehabilitation of slum dwellers in Delhi with proper coordination between DUSIB and MPD -2021.

Pradhan Mantri Awas Yojana

It envisions housing for all by 2022. This mission provides central assistance to implementing agencies through states and UTs for providing houses to all eligible families as centrally sponsored scheme. The component of credit linked subsidy is implemented as central sector scheme. It emphasizes on in situ slum rehabilitation using land as a resource with private participation to provide houses to eligible slum dwellers.

Supreme Court, from time to time, laid down judgments that consider right to shelter is a fundamental right. It has also passed a judgment that in situ rehabilitation is priority. It is only when this is not possible, relocation may be taken up.

The Slum Area (Improvements and Clearance) Act, 1956 provides the legal basis for defining or notifying any area as slum. The Act intended to protect the tenants in such areas from eviction. However, the definition of slum in the Act does not provide any measurable parameters for areas to notify as unfit for human habitation. Hence, the interpretation becomes very subjective.

MPD -2021 has made some provisions related to special areas that DUSIB need to consider while carrying out construction in the katras. Traditional areas in Walled City need special treatment to conserve its heritage value while retaining the residential character. Redevelopment need to be promoted in all katras, whether situated on government owned

lands or privately owned lands with improving architectural character of the area as well as revitalizing trade and commerce in the area.

(b) Delhi Slum and JJ Rehabilitation and Relocation Policy, 2015

DUSIB has adopted this policy to promote the development and rehabilitation of the city's slums. It emphasizes that JJ Bastis that came up till end of 2014 will not be removed without providing alternate housing. The bastis may be handed over to private developers under strict conditionality.

The rehabilitation work needs to be completed within five years in coordination with all land owning agencies. It does not allow dwelling units in Jhuggis to be used solely for commercial purpose. The scheme is based on 5 to 10 per cent contribution for the beneficiaries.

(c) Policy for Resettlement Colonies

It envisages granting free hold rights to occupants of 45 JJ resettlement colonies. Majority of properties have changed hands. The existing policy has been modified to provide free hold rights to the legal heirs and purchasers as well, on payment of conversion charges.

(d) Policy for Provision of Night Shelters

MPD 2021 explains provision of night shelters to the shelter less as per requirements. Night shelters need to be identified keeping in view major work centres.

It is necessary to create special provisions for women and children including differently able, orphans and the old. Existing buildings, new construction, within Railway terminals, bus terminals, markets, fight complexes, police stations spaces need to be used as night shelters with suitable modifications. Innovative ideas to multiple use of land with commercial complex on the grand floor and night shelters on the first floor should be encouraged.

(e) Policy for Regularisation of Unauthorised Colonies

Unauthorised colonies, which are to be regularized as per government policy, should be incorporated in the mainstream of urban development with provision of necessary services

and facilities. MPD 2021 has recommended a redevelopment strategy for unauthorized colonies to accommodate more population in planned manner.

This includes provision of physical and social infrastructure as well. DDA and GNCTD have issued notifications to all RWAs of 1639 unauthorised colonies that no new construction should take place and the size and boundary of existing colonies should not be altered. An unauthorized colony must establish and register a Residents Welfare Association (RWA) before qualifying to apply for regularization. There must be a complete layout plan including boundaries of the colony, names of streets and neighbouring areas. The residents must pay for the recovery of cost of land and development charges.

The State government has authorized Delhi State Industrial and Infrastructure Development Corporation (DSIIDC) to carry out the infrastructural activities in all of 1797 unauthorised colonies, of which work has been completed in 760 colonies.

(f) Policy for Improvements in Urban Villages

MPD 2021 recommends that comprehensive schemes for the development of such villages should be prepared by the concerned local bodies for provision of services and integration with the surrounding areas. Development along peripheries of the villages should be carefully planned for provision of services and maintenance of green areas and open spaces.

Major Responsible Agencies

Delhi Urban Shelter Improvement Board (DUSIB)

In 2010, the Delhi Urban Shelter Improvement Board (DUSIB) was set up under the DUSIB Act, 2010. It has been nominated as nodal agency for enactment of scheme of relocation of Jhuggi Jhompri (JJ) clusters in Delhi.

The main aim of DUSIB is providing qualitative improvement of slum settlements through various kinds of services. The broad activities include survey of slum areas, construction of low cost housing for Economically Weaker Sections (EWS) under Jawahar Lal Nehru National Urban Renewal Mission (JNNURM), removal and resettlement of squatters, plans for improvement and redevelopment of JJ bastis, housing schemes for the people who are resettled, and construction of Basti Vikas Katras/Community halls. Apart from this, DUSIB

also looks after the services of night shelters. It has ensured suitable number of clean toilets, blankets, electricity, water etc to assist people in the night shelters.

Delhi Development Authority

Delhi Development Authority (DDA) was established under the Delhi Development Act, 1957. DDA was formed with the following mandate “*To acquire and develop land on large scale basis; to formulate plans [Master Plan] and develop Delhi in a manner to provide shelter, amenities and facilities to the existing population and make provision for future growth; to carry out building, engineering or any other allied activities so as to provide services required for smooth and social living.*”

Over the years, DDA has provided housing facility to almost half of the population of Delhi. This has been achievable through construction and allocation of 3,11,879 houses, 43 facilitating land allotment to 878 Cooperative Societies, 126 House Building Societies, 55169 Residential Plots under Rohini Residential Scheme and 2.40 lakh DUs for rehabilitation of slum dwellers. It is the sole authority to implement the Master Plan in Delhi. It operates under the Ministry of Urban Development, as land is not a state subject in Delhi.

Local Bodies of Delhi

There are five local bodies in the state:

Three Municipal Corporations of Delhi (MCD): Till 2012, there was only one municipal body, but later it was trifurcated as the North Delhi Municipal Corporation, the South Delhi Municipal Corporation and the East Delhi Municipal Corporation. MCD covers about 96 percent of nearly 1485 sq. km geographical area of Delhi with 95 percent of Delhi's population residing in these areas. It has been accountable for providing civic services to rural and urban areas. It had assured a door-to-door collection of garbage and waste segregation across the city which is not happening except in few localities. Further, a lot of work is still required to improve city's sanitation and providing clean toilets at busy public places. The civic body has 272 wards which is divided among the three corporations as follows:

South Delhi Municipal Corporation (SDMC)	104 Wards
North Delhi Municipal Corporation (NDMC)	104 Wards
East Delhi Municipal Corporation (EDMC)	64 Wards

All these corporations have elected councillors.

New Delhi Municipal Council (NDMC): NDMC exists as an independent entity and comes directly under the Centre. It covers 42.74 sq. km i.e. 2.88 percent of total area and accommodates around 2.18 percent of the population. NDMC houses almost all major government offices, residential complexes and diplomatic missions. It also holds the responsibility of road maintenance, health services, water supply, education, social welfare with main emphasis on promotion of art and culture, environment improvement, sanitation and cleanliness and green campaigning. It has all nominated members.

Delhi Cantonment Board (DCB): The Delhi Cantonment Board functions directly under the control of the Ministry of Defense. It is headed by one Station Commander of the Indian Army, who is the ex-officio president of the Board. It occupies 42.97 sq. km i.e. 2.90 percent of area and accommodates 0.94 percent of population. The main function of DCB is to provide civic services to the public within its jurisdiction. This includes water supply, education, roads, birth and death registrations, public health, street lighting and firefighting. The members of DCB are partly elected and partly nominated.

Trans Yamuna Area Development Board(TYADB)

This was established as an advisory board in 1994 to develop the Trans Yamuna area in a proper, speedy and sustainable manner. It approves and recommends works for development of infrastructure in Trans Yamuna Area. It also coordinates the works done by several agencies like Public Works Department, local bodies, Delhi Jal Board, Flood Control and others engaged in development of infrastructure in this area.

Shahjanabad Redevelopment Corporation

It has been established to develop the Walled City of Delhi maintaining the original heritage character and improving the environment with active involvement of government sector,

private sector, NGOs and professionals. The major activity of the Corporation is to promote conservation of built and natural heritage in Delhi that needs to be protected, nourished and maintained by all citizens. The corporation is to conserve the civic and urban heritage that are architecturally significant and having socio-cultural values.

Delhi Jal Board

The Delhi Jal Board was established on 1998 under an act of the Delhi Legislative Assembly. It is accountable for the production and distribution of potable water after the treatment of raw water from Yamuna, Bhakra Storage, Upper Ganga Canal and Groundwater. It is also responsible for treatment and disposal of waste water.

In order to supply water in Delhi, numerous steps have been undertaken by the Delhi Jal Board. It has constructed several water treatment plants. Delhi depends on neighbouring states for supply of water to meet nearly half of its water demand. Hence, DJB has to coordinate with them frequently to improve the flow and quality of water supply. Till now, there is no 24/7 water supply in majority of the state.

Delhi Transport Corporation (DTC)

Delhi Transport Corporation was established under the Road Transport Corporation Act, 1950. DTC plays a significant role in road transport system of the state. It transports around 35.37 lakh passengers daily and covers a distance of 10 lakh kms. per day. Further, DTC is reported to have the world's largest eco-friendly CNG-based bus convoy functioning a fleet of 6029 buses including 3775 low-floor and 1275 low-floor AC buses. According to the Perceptions Survey, 2013, DTC buses are one of the most frequently used modes of transport and the usage of the mode is more among the lowest income groups.

In order to make the DTC facilities more effective, the concerns that need attention include the presently insufficient number of DTC buses, protracted waiting time for commuters at many routes, overcrowding and the absence of buses across all routes. Since buses are the most commonly used modes of public transport and alleged to be the most reasonable, especially for low-income groups, it is important for the services to improve.

In this respect, the state has taken several initiatives. In 2010, the Automatic Vehicle Location system (AVL) through GPS was launched to observe the crew behaviour, idling of buses etc. and help improve operational proficiencies and services to commuters. The government has installed GPS in 3900 DTC low-floor buses and 379 cluster buses to track the route taken by drivers and the safety aspect, especially of females. The Delhi Government also issued a notice for making GPS compulsory in chartered buses and Grameen Sewa vehicles from April 30, 2013.

Electricity

Power supply is the responsibility of both Union and State Government to develop the power sector to become effective, strong and financially viable. Distribution of power supply has been privatized in Delhi while both transmission and generation are with three Government owned companies, i.e. Delhi Transco Limited, Indraprastha Power Generation Company Limited (IPGCL) and Pragati Power Corporation Limited (PPCL). The state also depends on neighbouring states and the national grid for power supply as it generates less than half of total power demand.

There has been 59.26% growth in total power purchase in Delhi during the last ten years where 13.17% of total power purchase is sourced from Delhi Government Power Plants, whereas, 86.83% is purchased from Central Government and other sources.

The challenge faced by the Delhi Government in the energy sector is to meet the continuous demand of the power and to supply reliable and quality of power at a reasonable cost. Investment in energy sector by the Government of Delhi is only for expansion of transmission and transformation capacity and power generation, constituting 4 to 6% of the total budget expenditure.

Major Programme

There are several policy interventions from central and state governments to achieve basic urban services for economical weaker sections. The major schemes include:

Swatch Bharat Mission (SBM)

The programme was launched by the Government of India on 2 October 2014. It is a central scheme with the objective of freedom of India from open defecation and accomplishing 100% scientific management of municipal solid waste in 4,041 statutory towns in the country.

The SBM guidelines were revised in the year 2016 such that higher flexibility is provided to the states to finalize the targets of their own sanitation infrastructure including public toilets in the purview of central assistance for grants. The central government has increased base grant for community/public toilet seats from Rs 65,000 to Rs 98,000 per seat and increment of grant for Solid Waste Management Projects from 20% to 35%.

Under SBM-Urban, the focus has become more outcome oriented by counting and monitoring ODF wards and cities, instead of counting toilets alone.

Further, MOUD has partnered with Google to provide location of toilets in Google Maps, a national helpline number and ‘swatchhata’ app has been launched. More of such innovative technologies are being evaluated. The scheme has also encouraged public participation by introducing a variety of initiatives such as the Swatch Survekshan survey in 2016. Delhi, with very poor record of sanitation and waste management, need to take full advantage of this centrally sponsored scheme.

Smart City Mission (SCM)

Smart City Mission was launched in 2015. It came into action with an objective to promote cities that deliver core infrastructure and provide a decent quality of life along with a clean and sustainable environment and application of ‘Smart’ solutions to its residents. Major elements in this mission include adequate water supply, affordable housing, especially for the poor, strong IT connectivity and digitalization, security of citizens, particularly women, children, the elderly, health, education, etc. The strategies used by the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (Greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city including slum areas and transforming it into improved human settlements.

The Mission is a Centrally Sponsored Scheme (CSS) with a goal to cover 100 cities over five years i.e. from FY2015-16 to FY2019-20. These cities are selected in two stages. Till now, four lists have been announced which comprises a total of 90 cities with its first list announced in January 2016. The areas under NDMC have been selected as one of the smart cities. NDMC established a Special Purpose Vehicle (SPV), New Delhi Municipal Council Smart City Limited for its Smart City project. It has received a grant of Rs 194 crore from the Ministry of Urban Development, and Rs 56 crore from the NDMC. Apart from this, the civic body has set aside a fund of Rs 7.5 crore each for technology innovations and to run its sustainability scheme for promoting green initiatives. The Council has also proposed to establish a Technology Board, having mentors from academia, research institutes, and think tanks to drive technology innovations.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is also a Centrally Sponsored Scheme (CSS) launched during 2015-16 to 2019-20. The foundation of the Scheme is the development of basic urban infrastructure such as development of park, urban transport, water supply, sewerage, storm water drains, etc. The strategy of the mission is to make ULBs more accountable, increase available resources, improve service delivery and empower them and citizens through reforms.

AMRUT has selected 500 cities with an outlay of Rs 50,000 crore which was launched in 2015. In 2016-17, the funds were allocated for the mission period. By December 2016, State Annual Action Plans (SAAPs) of 36 states have been approved. It has included the programmes of erstwhile JNNURM. Delhi, the capital city, is also a part of the scheme. The State Annual Action Plan (SAAP) has been approved by the Ministry of Urban Development for two consecutive years, 2015-16 and 2016-17. Hence, a sum of Rs.489 crore is available for improving basic urban infrastructure in Delhi. Of this, Rs. 215 crore will be invested in improving water supply, Rs.254 crore on improving sewerage networks, Rs. 8 crore for drainage networks and Rs.12 crore for developing open and green spaces.

Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was the first flagship scheme of the Ministry of Housing and Urban Affairs launched in 2005. Initially, it was a seven-period mission lasting up to March 2012 but later it was extended up to March 2014. JNNURM comprised of two sub missions i.e. Urban Infrastructure and Governance (UIG) (Sub-mission I) and Basic Services to the Urban Poor Urban (BSUP) (Sub-mission II). 65 Mission Cities were identified based on urban population (Census 2001), cultural and tourist importance was covered under BSUP and the remaining cities were covered under IHSDP. Parts of Delhi have been selected under this programme. Now, JNNURM has been subsumed under AMRUT.

Green Space

Urban greenery development relies not only on investment and technology but largely on the attitude and involvement of urban residents. India's National Building Code lays down that there should be at least 4 acres of accessible open spaces per 1,000 persons. In Delhi, 20% of its geographical area under green cover. Agencies working for 'Green Capital' mission are DDA, the state government and the local bodies. Recently, Parks and Garden Society in Delhi constituted to coordinate greening activities.

Table 4.8: Urban Green Space in Some Indian Cities

City	Per-capita Green Space (Sq.m/person)
Delhi	21.52
Bangalore	17.32
Gandhinagar	162.80
Chandigarh	54.45
Jaipur	2.30

Source: Association of Metropolitan Development Authorities, 2016

It shows that excepting In Jaipur, the cities are maintaining green level well above the norm specified by the WHO (9.0 sqm/person). In percentage terms, Gandhinagar has 57.13% of total area under tree cover while in Chandigarh, Bangalore and Jaipur; the percentages are 35,

19 and 5 respectively. The government has tried to club archaeological conservation with creation of urban green spaces. About 100 monument sites have been resurrected with green spaces around them and 1200 are aimed for future. There are programmes of free distribution of saplings to schools, RWAs, NGOs and financial assistance to RWAs. There are about 3000 eco-clubs in Delhi to engage school students in plantation and maintenance of trees.

Challenges

The state has many policies and programmes aimed at improving the quality of lives of the poor and integrating them within the city towards achieving inclusiveness and equality in Delhi. But there are serious barriers to proper implementation.

The major challenges may be identified as follows:

(1) Multiplicity of Land Ownership

Multiplicity of authorities, lack of land ownership with concerned agencies, limited eminent domain powers with DUSIB to provide services and legal restraints are some major bottlenecks. In situ up gradation depends on proper security of tenure based on clear land title. In Delhi, 30 per cent of total slums are on state government land, while the rest are on central government land. Land is not a state subject in Delhi and DDA under central government is the sole implementing authority of Delhi Master Plan 2021. Railways, local bodies, Delhi Jal Board and the like are some major landowners. There is confusion regarding land ownership among the various public agencies also. This stands in the way of any in situ development activities. DUSIB cannot intervene in such land disputes.

(2) Exclusion

Poor migrants and other low income dwellers fail to avail various subsidies as they do not have proper documents like proof of residence, identity cards and other papers. They do not know where and how to approach. Lack of education also acts as huge barrier. This creates huge gap between service delivery and demand for services. They do not have access to various legal documents for entitlement and consequently are deprived of various facilities targeted for them.

(3) Development Control

Unauthorised colonies are regularized from time to time. Once regularized, uncontrolled construction activities continue within these colonies. Commercial activities continuously keep on increasing and overloading the structure to make it unsafe. Regularisation has not made the places to be developed as per zoning restrictions. As a result, quality of life has not improved. The plots have been sub-divided continuously in all informal settlements as well as notified slums, resulting in poorly ventilated houses with inadequate infrastructure and poor accessibility. Property prices are increasing continuously the trend of encashing on the increasing land and property values have made the areas more chaotic. Regularised colonies have shown negative environmental quality owing to lack of development control.

The Supreme Court appointed a Monitoring Committee in 2006 to identify and seal unauthorised premises/construction and to oversee the implementation of the law relating to sealing of offending premises. The committee was doing “exceptionally good work of identifying and preventing/sealing unauthorised premises in Delhi.” – The Court observed. In 2012, the Court asked the committee not to seal any more premises as it “expected, hoped and believed that the authorities in Delhi would carry out their statutory duties.” Recently, the Court lashed out at civic authorities for failing to curb rampant illegal constructions in the capital and has restored the committee again to act against such violations. It stated that “prima facie, it appears to us that the rule of law with regard to the sanction and construction of buildings in Delhi seems to have completely broken down.” (Indian Express, 7.12.17)

(4) Land Availability and Costs

Land costs are very high in Delhi, making affordable housing a challenge. Whatever land is available through DDA and small proportion of private holding, has reached near saturation point. The growth of satellite cities and NCR region has significantly diverted population flow outside Delhi but has not led to decline in land price. Delhi still accounts for nearly 1 lakh migrants annually. Poor, new migrants should get affordable low-income housing close to the area of work to reduce mobility needs and costs in an inclusive city. Very high land prices in the city stand in the way of achieving such objectives. Land prices are relatively cheaper in peri-urban areas, but settlements in such areas will increase community time and cost, thereby reducing productivity.

(5) Basic Services

To ensure equitable urban development, water taps, electricity and toilets need to be provided to every house. In absence of land ownership, services are provided at community level on shared basis, where maintenance and monitoring are of very low quality. For improving health and productivity of poor neighbourhoods, properly covered drains with outfalls, solid waste collection and disposal with networking to city trunk infrastructure is the need of the hour. These are constrained by availability of adequate resources and city capacity to provide households services as well as availability of land at proper time. Sometimes, legal hurdles related to land allotment also stand in the way of implementation of policies.

The city government is also not particular regarding timely implementation of central schemes and loses opportunity of getting more finance.

AMRUT aims at ensuring robust sewage networks, water supply and other infrastructure for improving the quality of life in urban areas. The projects approved under this programme need to be completed by 2020. The central government has approved all SAAP, totaling Rs. 802.31 crore, submitted by Delhi government. However, only projects worth Rs. 143 crore have been awarded so far by the state. It means that 82 per cent of the total SAAP size has not been addressed as yet. In SAAP – 1, approved in March, 2016 for water supply and sewerage sector for Rs 217 crore, only two projects, costing Rs 142.11 crore have been awarded so far. In SAAP – II, approved in December 2016 for Rs. 251 crore, no project has been awarded so far.

On the other hand, the Delhi High Court has recently pulled up the DDA and civic bodies over their failure to examine the feasibility of lands proposed for Mahalla Clinics in the city to provide adequate health facility to the people (*The Statesman 5.12.17*).

(6) Linkages with Livelihoods

Economically weaker sections and low income earners generally work in informal, unplanned sector as self employed, regular or casual workers. Many use homes as space for economic

activities. Housing provided at peripheries may disrupt their livelihoods. There are some zoning regulations that prohibit commercial activities operated from home. Provision of shared household services like water, sanitation and electricity also have an impact on productivity of poor for whom time is a major input. Availability of finance is often linked to legal land tenure, which is generally not available to these sections. The same thing is true for availing other social services as well.

(7) City wide Integration

Slum development is always taken as a standalone effort without integration with the city's overall development planning. Hence low income settlements are not connected to mainstream development. This results in lack of accountability and community involvement. Inclusiveness cannot be achieved without proper institutional framework.

(8) Legal Constraints

Several courts have passed judgments in favour of demolition in order to clear encroachment on public land. This has created hurdles for in situ developments also.

(9) Ecological Constraints and Natural Disasters

There have been several indiscriminate constructions and additions to building with very narrow access. Moreover, uncontrolled extraction of underground water, unplanned regularization exposes the city to adverse ecological impact and unprotected against natural disaster like flood and earthquake. It is imperative to make the city resilient by protecting and sustaining city's resources. Service delivery plans should be set within the particular ecological context of the city, keeping in mind the sensitive areas like water bodies, rivers, bio diversity areas and the like.

(10) Information and Capacity Building

The new migrants do not have a transit shelter and access to information related to livelihood, low cost housing, skill development opportunities and the like. They settle in the peri urban areas, thereby deepening their marginalization. The institutions responsible for planning and

implementation are generally short of adequate manpower and technical skill. ICT need to be used extensively to reduce these gaps.

Strategies for Inclusive Urban Development

The government envisaged slum-free Delhi in its Approach Paper of 12th Five Year Plan, with outline of human development goals including environmentally sustainable urbanization, provisioning of basic services, skill development and productive employment for the economically weak and convergence of all programmes. These are the objectives of SDG 11 as well. Four key strategies need to be adopted for this:

- (a) Provision of basic services to households irrespective of land tenure with a focus on retrofitting.
- (b) Address the difficulties of the formal housing system as a major reason for creation of slums so that no slum is created in future.
- (c) Address the problem of shortage of housing and allotment of land that raise price of land and make the houses unaffordable, both financially and legally.
- (d) Community involvement in the process of planning, implementation and modification of development projects.

Based on these major principles, the strategy for inclusive urban development should include the following:

1. Community Participation
2. In site up gradation of slums
3. Housing for All
4. Basic services in the slums networked to the city system
5. Ownership Rights
6. Creation of slum data base and Monitoring
7. Review of Urban Regulations

Community Participation

It should be at the core of any inclusive development. It will help DUSIB to identify their needs, be part of implementation process with accountability and monitoring and often innovative solutions.

In-situ up gradation

It should be the preferred option to ensure that there is no loss of linkage to livelihood. It should be done in a phased out manner.

Housing for All

In order to ensure Housing for All by 2022, the central government has launched the massive Pradhan Mantri Awas Yojana with focus on affordable housing in partnership with public and private sector.

MPD 2021 has given the projection for fulfilling the objective of Housing for All in details.

Table 4.8: Projection for Housing – 2022

Sl.	Housing Type	Agencies	No (lakh)	Percent age
1.	Slum and JJ In situ development/Reconstruction/Up gradation	Public agencies, Private agency, Co-operative Societies, Residents Associations	12	25
2	Houses on Independent Plots and Redevelopment		3.84	8
3.	Group Housing (Minimum 35 per cent mandatory for 2 rooms and less		20.16	42
4.	Employer Housing		1.96	4
5.	Unauthorised Regularised Colonies infill		7.2	15
6.	Others		2.88	6
Total			48	100

Source: MPD 2021

In order to achieve housing for all by 2022, a massive total of 48 lakh houses need to be built/upgraded. EWS component will be 54 per cent of the total.

Basic Services Networking

As slums are being upgraded or resettled, taps and toilets at home is the ultimate objective with a shift from community to individual services. These services should be networked to city trunk infrastructure to create equitable service solutions. Properly covered drainage with outfalls, garbage collection and disposal, waste management system will be key to clean environment with reduction of threat to health and productivity. The neighbourhoods will also have access to efficient, reliable and affordable public transport services.

Ownership Rights

DUSIB shall provide de-facts tenure for 10 years on lease basis to all those settlements that are unlikely to be relocated in future. The settlements on state lands may be regularized under free-hold plan on payment of charges.

Slum Data base and Monitoring

DUSIB should create slum database that will enable planning by categorization of slums and unplanned settlements, designing interventions, monitoring and measurement impact. This will be spatially integrated with the GIS software to build a GIS based MIS for spatially tracking, upgrading and development of all settlement. The MIS system shall also aim to prevent duplicate allotment of houses.

Review of Urban Regulations

All urban development agencies in Delhi shall come together to review and revise urban regulations and inclusionary zoning practices and land policy to facilitate slum improvement/redevelopment and provide for affordable housing options in city and achieve compact city form.

SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Targets/ Indicators	Source	2016-17	Physical Targets			Remarks
	Basel line	2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2030-31		
Target 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums						
11.1.a Proportion of urban population living in slums, informal settlements or inadequate housing (%)	Delhi Urban Shelter Improvement Board	11	5	0	0	MPD 2021 needs to be implemented so as to prevent growth of unauthorised colonies. Funds and land need to be properly allocated.
11.1.b. Regularisation of unauthorised colonies (%)	MCDs	15	25	2485	70	
11.1.c. Construction of night shelters (No.)	Delhi Urban Shelter Improvement Board	19619	50%	75%	100%	
11.1.d Construction of EWS houses (No)	Ministry of Urban Development	20000	50000	30000	20000	With declining number of EWS, less such houses will be needed.
11.1.e Households with access to electricity and toilet facility (%)	NSS	89.1	95.00	100.00	100.00	Increasing spending on infrastructure and Swach Bharat Mission.
11.1.f Households with access to piped water supply (%)	NSS	81.3	90.00	100.00	100.00	Successful negotiation with neighbouring states is needed.

Target 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

(Discussed in the 'Transport Section')

Target 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

11.3a. Number of building plans sanctioned and completion certificates issued	Data not released regularly.				MCDs need to be strictly vigilant in issuing completion certificate according to Master Plan guidelines.
11.3b. Number of active wards committees in local bodies	Data not released				This citizen-councillor link need to be maintained.
11.3c. Percentage of women councillors in ULBs	State Election Commission	50	50	50	This percentage need to be maintained in all elections.
11.3d. Percentage of SHGs linked with banks	Status of Microfinance in India: A NABARD Publication	0.04 (4480)	20	50	Banks are aggressively pursuing door-to-door extension of services.
11.3e. Number of meetings between stakeholders and ULs for local planning decisions	Data not released				Regular connectivity will help in solving local issues.
11.3f. Percentage use of earthquake-resistant technologies in buildings					
11.3g. Percentage use of fireproof technologies in buildings	Data not released				MCD need to check on this component.
Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage					

11.4a Percentage documentation of World Heritage Sites	Data not released				The department of Tourism need to collect regular date on this component.
11.4b Percentage of historical sites free of encroachment	Data not released				
11.4c Percentage of tourist sites with adequate basic services coverage	Data not released				
11.4d Percentage of tourist footfall	Data not released				
11.4e Nearness of tourist sites from police stations	Data not released				
11.4f Police per thousand of tourists	Data not released				
Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and decrease by 100 percent the economic losses relative to gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations					
11.5a Number of deaths, missing persons and persons affected by disaster per 100,000 people	Indian Disaster Report 2013	216			The concerned department need to generate regular data.
Target 11.6					
By 2030, reduce the adverse per capita environmental impact of cities, by paying special attention to air quality and municipal and other waste management					
11.6a. Concentration of total suspended particulates (TSP) (averaging period 24 hours)	Data not released				Action need to be taken on emergency basis to reduce air pollution. Sulphur level is very

11.6b. Concentration of particulate matter10 (PM10) ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])		597								low. This is the only grace. It must be maintained at current level, not allowed to rise.
Permissible		Final Report: Air Pollution Component	50							
Percent Higher(+)/Lower(-)			1094	100	60	5				
11.6c. Concentration of PM2.5 ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])		(Delhi.gov.in) and Arthapedia	377							
Permissible			30							
Percent Higher(+)/Lower(-)			1156	100	60	5				
11.6d. Concentration of sulphur dioxide ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])			14	14	14	14				
Permissible			40							
Percent Higher(+)/Lower(-)			-65							
11.6e. Concentration of nitrogen dioxide ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])			83							
Permissible			40							
Percent Higher(+)/Lower(-)			107.5	40	10	0				

11.6f. Concentration of carbon monoxide ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])		0.04				
Permissible		0.001				
Percent Higher(+)/Lower(-)		3900	1000	200	5	
11.6g. Concentration of lead ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])		1.35				
Permissible		0.5				
Percent Higher(+)/Lower(-)		170	20	5	0	
11.6h. Concentration of ozone ($\mu\text{g}/\text{m}^3$ [averaging period 24 hours])						
11.6i. Percentage of Garbage Collected and Transported to Garbage Generated	Data not released					Swatch Bharat Mission needs to focus on data monitoring.
11.6j. Percentage of Sewage Treated to Sewage Generated	Economic Survey of Delhi	66.72	83.05	100.00	100.00	Swatch Bharat Mission needs to focus on data monitoring. These actions must be part of the Mission.
11.6k. Percentage of Wastewater Treated to Generated	Delhi Jal Board	8.35	15.05	57.00	90.00	'This is must for saving water.'
11.6l. Percentage of Households Connected to Drainage System	Data not collected.					Should be done on priority basis.
11.6m. Number of Wards with 100% Garbage Collection and Transportation	Data not released					Should be done on priority basis.

Target 11.7

By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

11.7.a. Per capita availability of Green Space (sq.m)	Census 2001	21.52	30.00	35.00	40.00	Delhi is much better placed in this component but need to increase per capita space in order to curtail air pollution.
11.7.b. Average Distance of Accessing Public Space from residence/work place	Data not released					
11.7.c. Average Distance of Accessing Recreational Space from residence/work place	Data not released					

CITIZEN CENTRIC SERVICES

CHAPTER V: WATER SUPPLY AND SANITATION (SDG 6)

Vision

The city-state will provide safe, qualitatively better and affordable potable drinking water, provide accessible and hygienic sanitation to all with special focus on the needs of vulnerable sections ensuring individual water and sewerage connection to each house.

The NCT of Delhi is a territorially small and largely urbanized city state with a huge and growing concentration of population that requires to be served with water supply and sewerage treatment. The national capital is comparatively small territory but hugely significant as economic engine of whole of northern India. It also offers livelihood and economic opportunities as well as markets well beyond its borders. Yet, it has limited internal natural resources and is largely dependent on external resources over which it has no direct control. It gets raw water from Ganga, Yamuna and Bhakhra Beas Management Board besides extracting ground water through Rainy wells and Tube wells as internal water sources. Yamuna Water Sharing Agreement has been signed in 1994 among the Northern Region States of Himachal Pradesh, Haryana, Uttar Pradesh, Rajasthan and Delhi, allocating water among them. The share for Delhi is divided into three block period of the year, i.e. July to October, November to February and March to June. Delhi can get its full share only after construction of three new reservoirs in the upper Yamuna Basin Area. These proposed reservoirs are Renuka Dam in Himachal Pradesh, Kishu Dam and Lakhwar Vyasi Dam, both in Uttarakhand.

Major water resources

- Surface water (Yamuna sub-basin, Ganga and Indus basin)
- Potential surface water sources from proposed dams in the Himalayas
- Grand water aquifers
- Treatment wastewater
- Rainwater

Delhi is a riparian state of the river Yamuna which is the only river flowing through the NCT of Delhi. This river constitutes the primary source of water supply to NCT Delhi. It also accesses water from the Ganga and Indus basin. The water resources are over utilised and underutilized. Yamuna water is allocated to Delhi from neighboring state on the basis of mean year availability. However, during monsoon season, nearly half of allocation goes unutilized for lack of storage capacity in Delhi or absence of upstream reservoirs in the Himalayas.

It is estimated that projected supply of water will be more than the demand by 2030, if following assumptions are satisfied:

- All the type wells and rainy wells are redeveloped.
- All water bodies are rejuvenated and artificial water bodies are created.
- Raw water is allocated through Renuka, Kishau and Lakhwar Vyasi dams.

The state government was to finance the Renuka Reservoir. But the project has been declared as national project and to be financed solely by the central government. The state of Uttarakhand has also assigned the construction of other two reservoirs. Delhi's water supply will improve only after these three reservoirs become functional.

The city is presently serviced from the Ganga basin, Yamuna sub-basin, Indus basin and internal aquifers. These sources are continuously under pressure owing to political conflicts and increasing population. It is expected that population in Delhi will grow to 24.88 million in 2021 and 31.68 million in 2030 from current level of 19 million. These factors are causing the decline in per capita availability of water in the state.

Delhi Jal board (DJB) is responsible for production and distribution of potable water after treating raw water from various sources. It is also responsible for treatment and disposal of waste water. It has tried to increase capacity in order to match the ever growing demand for water with laying of water pipes, construction of underground reservoirs, water treatment plants, fixing of leakages and the like. Water supply distribution network has been developed to cover both planned and unplanned areas. It has supplied water to 1153 unauthorised colonies out of total 1639 (70.34%). Installed treatment capacity of DJB has increased from

650 MGD to 906 MGD (39%) during 2006-16. It receives a supply of 913 MGD from internal sources on average in 2016. It appears that it can treat more than 99 per cent of internal water. However, this supply is well below the demand generated. Another 782 MGD is expected from the dams to be constructed outside the state.

Table 5.1: Status of Water Supply in Delhi and Future Projections

Components	2016	2017	2021	2030
Projected Census Population (Total) (million)	18.75		24.88	31.68
Projected Demand for Water (mgd)	1040		1113	1123
Projected Supply of Water (mgd)	925		950	1500
Water Supply in Unserved Areas (Length of water line in km)	1127	1247	1634	100%
Households with Access to Tap Water (%)	83.42		77.82	100.00
Households with Access to Hand pump/tube wells (%)	12.30		11.22	
Households with Access to Water Tankers (%)	4.28		10.95	
Households with Access to Water within Premises (%)	83.42		77.82	100.00
Households with Access to Water near Premises (%)	12.30		11.22	
Households with Access to Water away from Premises (%)	4.28		10.95	
Households with Access to Tap Water from Treated Sources (%)	83.42		77.82	100.00

Mgd – million gallons daily

Based on per capita supply norm: Planned areas: 50 gpcd (228 lpcd), NDMC area: 75 gpcd (320 lpcd)

Outer Delhi: 35 gpcd (160lpcd)

Gpcd = gallon per capita daily, lpcd = liter per capita daily

This is based on the assumption of average household size of 5.09 (rural) and 4.59 (urban) persons. One water connection on an average serves 1.7 households in urban areas. DJB hopes to supply more than the demand for water, provided supply from external sources is uninterrupted.

Demand for water can be classified as domestic, industrial, commercial, community requirement, special uses like Embassies, floating population, airports and railway stations and fire protection. Based on population projections, growth in demand for water supply can be estimated as follows:

Table 5.2: Projected Demand for Water for Different Categories till 2030

Category	Demand for Water (mld)		ACGR (%)
	2021	2030	
Domestic (@172 lpcd)	4283 (62.77)	5452(62.77)	2.72
Industrial, Commercial and Community Requirement (@47 lpcd)	1170 (17.15)	1490 (17.16)	2.72
Special Uses, Embassies, Floating Population, Airports and Railway Stations (@52 lpcd)	1295 (18.98)	1648 (18.98)	2.71
Fire Protection (@3 lpcd)	75 (1.10)	95 (1.00)	2.66
Total	6823 (100)	8685 (100)	2.72

DJB has estimated demand for water based on requirement of 60 GPCD (274 lpcd) while Delhi Master Plan 2021 has estimated the demand for water to the tune of 1140 MGD, based on 80 GPCD norm. Hence, shortage of water is much higher according to MPD 2021.

It is evident that share of demand for water in different categories remains the same over time. It makes the projections easier if population projections are correctly done. Growth rate of demand in different categories also shows same trend of increasing by 2 per cent (round) every year. Residential demand for water constitutes the bulk of demand for water, whereas, industrial, commercial demands and the special needs account for one-third of total demand. It is clear that revenue generation can be expected largely from commercial and industrial demands only. The residential sector enjoys maximum benefits in terms of subsidy and other concessions as water is a major utility good.

UN specified Targets for Water Supply and Sanitation

- 6.1 *By 2030, achieve universal and equitable access to safe and affordable drinking water for all*
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse by [x] per cent globally
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6 By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- 6.7 Support and strengthen the participation of local communities in improving water and sanitation management

Challenges

1. Depletion of Ground Water

The declining level of ground water in Delhi has become a matter of critical concern. Numerous people depend on this for meeting their regular water requirements. While government extracts groundwater through tube wells for piped water supply in areas which are not adequately served by a WTP, households extract groundwater through personal bore wells.

In a few zones of Shahdara and Kanjhawala, nitrate content has been observed to be more than 1000 mg/liter. A high concentration of Fluoride and concoction fixations, more than the recommended limits, have likewise been found in ground water at different areas in Delhi. Not only is the exhaustion of groundwater raising questions about future accessibility of water in the capital city but also the quality of water. Chemical quality of groundwater in Delhi varies with depth and space. Saline groundwater mainly exists at shallow depths in North-West, West and South-West districts with minor patches in North and Central districts.

At a few places in South and South West Delhi, the water level has gone 20 to 30 meters underneath the ground level. The nature of underground water is deteriorating in a few spots and is observed to be unfit for human utilization. Further, in South-West and North-West Delhi, the salinity of ground water is rising. The salinity of water increases with depth. The surge in salinity with depth and occurrence of moderate to high saline groundwater advocates that the groundwater flushing is incomplete, and amount of contemporary recharge is very limited or even absent in many places. Thus, it is because of this salinity of groundwater that the citizens are even more dependent on private suppliers of water.

To handle these issues, the Central Ground Water Board (CGWB) has found a way to control the quantity of tube-wells being constructed in Delhi. As on March 2016, Delhi Jal Board has 3961 utilitarian Tube Wells and 14 Ranney Wells. The Flood fields downstream of Wazirabad and the zone neighbouring Najafgarh Lake are being investigated for extraction of water on maintainable premise. Pre-feasibility examines for ground water revive, through the surrendered Bhatti Mines and Canal framework in the North-Western region of Delhi, have additionally been undertaken. The extending of old lakes and other water bodies, safeguarding and building up the timberland zone in Delhi, development of check dams at Asola Wild Life Sanctuary and estate of trees, are some of the methods undertaken to enhance ground water resources by custodian department.

2. Dependence on Outside Sources

The primary source of water in Delhi is the river Yamuna, which travels through Haryana before reaching the city. Delhi Jal Board allocates 900 million gallons of water daily, out of which, 540 million gallons i.e. around 60 per cent come from Haryana. Therefore, if there will be any trouble in Haryana, it can cause distress in Delhi's water supply. The situation has been particularly stressed in the recent two years as Delhi has frequently ended up amidst the legal battle between Haryana and Punjab over the construction of the Satluj-Yamuna Link (SYL) canal which distributes shared river water between the two states along with Delhi. Unfortunately, politicians have used the situation to advance their agenda by making water, a political weapon to fight petty battles.

The former Chief Minister, Sheila Dixit, had accused the Haryana Government for the acute shortage of water in Delhi as Haryana had drastically reduced raw water supply. On December 1, 2014, the new Haryana Government agreed to find a positive solution to the drinking water problem in Delhi. Several issues were discussed at the meeting between the higher officials of both the States, such as proper allocation of water from the Yamuna and Ravi-Beas rivers, the proportion of water in different water treatment plants in Delhi and the construction of Munak canal for supplying Delhi's portion of water and so on.

The second major source of water supply is the Upper Ganga canal which provides 240 million gallons to East and South Delhi every day. The canal flows through western Uttar Pradesh and hence, an analogous situation can arise in the two areas if trouble occurs in western Uttar Pradesh. Therefore, the only independent sources of Delhi are the natural water bodies, underground water, Ranney wells and recycled water. These provide 120 million gallons of water every day, hardly enough to fulfill the demands of the 1.8 crore Delhi citizens.

3. Unsustainable Water Policies

The current ruling Aam Admi Party instituted a Water Policy in Delhi in 2015 which made a populist promise to provide 20,000 litres of free water per household per month. This implies that if a household has 5 members, there will be 130 litres of water per capita per day available every day. However, the plan did not work out due to several problems. Firstly, the city does not have adequate water resources of its own and depends almost entirely on neighbouring states for its raw water supply. Also, Delhi's groundwater tables are gradually declining, several households still lack functional water meters and there are pending bills that DJB has to clear off regularly. Hence, the capital city does not actually have sufficient water to make the plan successful, nor does it have enough funds to provide the promised amount of water for free. Presently, some localities have access to water for just one to two hours a day.

In 2016, official estimates from Delhi Jal Board showed that the total distribution losses in the water sector amount to around 40 per cent. Many cities in both the developed and developing world have losses in the 4% to 20% range. As a result, Delhi needs to actually produce 182 litres per person every day such that citizens receive their allotted 130 litres.

Therefore, the focus of the government must shift to address prevailing infrastructure and governance challenges, rather than resorting to radical unsustainable populist experiments. An awareness of water as a scarce resource and instill conservation practices are required urgently among the citizens.

4. Dependence on Plan Funds and Lack of Demand Management

State Government is very much dependent on plan funds for functioning and sustaining the water supply plans. An efficiency of services i.e., productivity in cost recovery and demand management through adaptive valuing with a specific end goal, in order to enhance the income age, are majorly required.

A consumption of 75 litres per day is enough for a person to live a perfectly healthy life. Yet, a citizen of Delhi consumes about 220 litres of water daily on average, which is almost double the amount consumed in other regions in the world according to data compiled by the Third World Centre for Water Management. People in high-income households in Delhi can use up to 600 litres. Even the 20,000 litres of free water provided by the AAP government is estimated on the assumption that each person should receive at least 130 litres per day.

Given the high fluctuations in water quality, a large number of middle class houses have recently adopted the Reverse Osmosis (RO) system of water filtration. RO system is known to cause energy and water wastage as high as 40 to 60 percent of water used. This can have a devastating impact on water-stressed cities like Delhi. The dependence on such technology is growing rapidly with no knowledge of how this is becoming an evolving threat to water supply.

5. Unaccounted for Water (UFW)

There are significantly high losses at different stages of water supply system ranging from 30% to 50% in conveyance and distribution system apart from treatment plants including pilferages. In an analytical study conducted by the Delhi Committee of the Associated Chambers of Commerce and Industry of India (ASSOCHAM), it has been revealed that distribution losses

are primarily due to leakages in a network of nearly 9,000 km-long water supply lines and because of theft committed in unauthorised connections.

At present as against a demand of the 4,300 million litres per day, Delhi supplies only about 3,000 million litres of water. It is noted with concern that Delhi only has an average of four hours of water supply a day. And while the Delhi Jal Board supplies about over 3,000 million litres per day, but out of it only about 1,700 million litres actually reach the consumers due to infrastructural constraints and problems.

With as much as 40 per cent of the water being lost due to leaking pipes, many households go without water and as per the study, 27 per cent of homes in Delhi receive tap water for less than three hours a day.

The study has estimated that per capita consumption of water in Delhi was about 296 litres, out of which about 190 litres per capita was supplied to the households, 50 litres per capita went to the commercial sector, 52 litres per capita to the hotels and migrated population, and four litres per capita to the fire protection services.

6. Neglecting natural resources

During the monsoon season, Delhi undergoes from water-clogged roads and overflowing sewers. Even though Delhi incurs a lot of rain, it still suffers from serious water scarcity.

Delhi's surface water sources are limited. But still, untreated wastewater is frequently being released into the water bodies making them futile for human utilization. Consider the instance of Yamuna, one of the biggest streams of India that goes through Delhi and is a critical wellspring of water for Delhi and different urban areas. Over many years of mistreatment and mismanagement, the waterway in and around Delhi has transformed into an open sewer. Ambitious designs of cleaning the river Yamuna have been major disappointments. Only 40 percent of the city's sewage has received any type of treatment before being released into the waterway. According to estimates of Central Pollution Control Board, every day, almost 40 percent of untreated sewage from Delhi either seeps into the ground or is discharged into the

Yamuna River. Therefore, the condition of wastewater treatment in Delhi isn't just insufficient but has also been a total failure.

Further, unsustainable abstraction of groundwater has brought about critical source contamination. Nitrate fixation in groundwater in some areas is as high as 1500 mg/l, about 30 times over the World Health Organization (WHO) standard of 50 mg/l. The vast majority of the nitrate contamination, which causes health hazards particularly in infants, is the result of anthropogenic elements including improper transfer of sewage. Also, health risks due to declining quality of groundwater are being borne mainly by the residents that are outside of DJB's channeled water supply, who rely upon private tankers or tube wells for customary water supply.

7. Areas Lacking Adequate Focus

Apart from this, there are certain areas which require focus in order to maintain the minimum standards of water supply and quality:

- Phased augmentation/replacement of distribution network in the congested areas.
- Public awareness and media coverage for minimizing wastage.
- Correct population forecasting for adequate planning for drinking water supply.
- Involvement of NGOs and private sector in operation and maintenance.
- Decline of ground water due to over utilisation and increase in the runoff due to urbanization.
- Contamination of ground water and surface water.

Government Interventions

1. Piped Water Supply

Aam Admi Party (AAP) had set a target in its budget (2017-18) of ensuring piped water supply to all in the national capital by the end of 2018. It is determined to deliver piped water supply in all the authorised and unauthorised colonies and JJ clusters.

According to Economic Survey of Delhi (2016-17), 81% of the households have access to piped water supply. According to the 2011 census, out of 33.41 lakh households in Delhi,

27.16 lakh households are getting supply of water through pipelines. Besides reaching the new localities through water pipelines, the budget also focuses on providing improved water supply and quality. In 2016, 309 unauthorised colonies were provided water pipelines and so far 1,200 unauthorised colonies have access to piped water supply.

The administration has additionally proposed to make a major stride towards enhancing water quality and will proceed with the modernisation of Delhi Jal Board (DJB). DJB is working for round the clock water supply, stressing on giving clean drinking water through taps. Further, the water supply network is being adjusted and the supply arrangement of the city is being assessed under walk the line program. Walk the line campaign was initiated with the aim to reduce wastage of water. Under the campaign, all staff of DJB from Junior Engineers to Members decided to walk the entire length of the pipeline network over 45 days to check for leakages and point of contamination. This campaign started in December 2017 and was completed by first week of March, 2017. The survey was first-of-its-kind covering a length of 13000 km. The survey identified 1.25 lakh connections where maximum leakage was taking place. The survey further found out that numerous external factors like traffic passing above or due to some excavation work, the pipes get damaged.

2. Free Water Scheme Delhi

After the AAP government completed 100 days, it made an important announcement in 2015 of providing regulated but free water supply to the citizens of Delhi. It decided to ensure free water supply of up to 20,000 liters to every household per month. The scheme was implemented from 1st March, 2015.

The scheme was particularly launched for domestic consumers to benefit, In order to take advantage of the scheme, the domestic consumers must have functional water meters installed in the house such that if consumption exceeds 20,000 liters per month, it would be charged.

Further, the government also decided to abolish all charges like water developments charge, sewage maintenance, meter rent, etc. So, DJB eliminated these charges from the water bill.

Around 7 lakh water consumers benefitted in the first three months and received zero bills for their water consumption. The number of beneficiaries further increased after the inclusion of areas of NDMC by AAP government in the scheme. DJB was receiving new applications every day including applications from the unorganised housing societies. 35 percent consumers of North West Delhi and 24.6 percent consumers of North East and East Delhi directly benefited from the scheme. However, in Central Delhi, only 4.88 percent population was aided as this area is dominated by business and industrial activities.

3. Interceptor Sewer Project

The Interceptor Sewer Project was a major initiative undertaken and proposed by Delhi Jal Board in 2006. It was in response to the disparagement over the failure of the efforts to clean the river Yamuna. The project includes four major components. The first and the utmost vital component being the laying of 150 km of interceptor sewers to tap the minor drains carrying sewage into three of the major drains—Najafgarh, Supplementary and Shahdara at the cost of Rs 2454 crore. This cost includes the expenditure to operate and maintain the interceptors for ten years. By 2009, Delhi government had spent over Rs 1,500 crore just to connect 50 per cent of Delhi's population to its sewerage network. The city has the largest sewerage infrastructure— 6,000 km sewers and 2330 MLD (million litres per day) sewage treatment capacity. The other three components include expansion of existing capacity of sewerage treatment plants at mouth of Delhi gate and Sen Nursing Home, intercepting 13 small drains into the Bela road and ring road trunk sewer after rehabilitation and the construction of sewerage treatment plants (STPs) after utilisation.

DJB started the work of the Interceptor Sewer Project on a priority basis to provide an incremental, immediate visible improvement in water quality of the main drains (Najafgarh, Supplementary and Shahdara), thereby, improving water quality in the river Yamuna. Initially, it was promised that the project would complete before the 2010 Commonwealth Games that would ensure a sparkling Yamuna for the hundreds of visitors expected during the event. However, work was commissioned only in 2011 with a deadline of three years and there is already a delay of four years.

About 85% of work had been completed, but the project had stalled about a year back due to a National Green Tribunal order which forbid any expenditure on drainage projects.

According to the Central Pollution Control Board, during 2007 the wastewater discharge from Delhi was to the tune of 4,300 MLD. In 2009, the gap between treatment capacity and waste generation was over 1900 MLD. If the underutilisation of installed capacity is accounted, the amount of untreated wastewater discharged into the Yamuna was to the tune of 2,800 MLD. However, the growth in sewage treatment capacity has not kept pace with the increase in population and waste. Despite the advanced state of the project, currently it is only trapping 90 MGD of sewage against the approximately 250 MGD it is supposed to trap. Even when the project is completed, it will treat only about 75% of the total sewage released into the river Yamuna. Hence, the project is criticised by environmental NGOs as a capital-intensive project that would not deliver on the basic direction issued by the Supreme Court that the water should be clean to 'bathing' quality level.

4. Rain Water Harvesting

The demand of water in Delhi is increasing day by day with the rapid urbanization and the availability of potable water is not adequate to meet the growing requirements of Delhi. Main water source in the city is the water share from neighbouring basin states like Haryana, Himachal Pradesh, Uttar Pradesh etc. Thus, there is a limitation to augment the water supply. Due to this, the burden on ground water extraction is, increasing and unexpected withdrawal of ground water has resulted in depletion in water level and deterioration in quality of ground water. Keeping in view the water scarcity in Delhi, the local bodies have been asked to adopt water harvesting through storage of rainwater runoff.

Rainwater harvesting is an ideal solution to areas where there is insufficient ground water or surface water resources are lacking. It helps in using the ground water and furthermore keeps the overflow from going into sewer or storm water drains. Rainwater is bacteriologically untainted, free from biological matter and delicate in nature. Its collecting enhances the nature of existing ground water through the procedure of filtration. Rainwater Harvesting likewise lessens urban flooding and reviving water into the aquifers.

Delhi Govt. started a financial assistance scheme in December 2002 for executing Rainwater Harvesting in South and South West Delhi. Under this scheme, grant in-aid was to be given by Delhi Jal Board to enrolled Resident Welfare Associations (RWAs)/Cooperative Group Housing Societies (CGHS) of South and South West District of Delhi only. Later in August, 2004, this plan was reached out to whole Delhi aside from few places in North West, West and North-East District. Additionally, this scheme of financial assistance was made valid to perceived private/government schools, hospitals, charitable institutions and NGO buildings and so forth to adopt Rainwater Harvesting (RWH). The financial assistance provided under the scheme to the RWAs/CGHS/Institutions and so on was 50 % of total cost of the rainwater harvesting structures or Rs 50, 000, whichever is less.

Out of 128 requests accepted for adopting Rainwater Harvesting, the subsidy was given to 90 RWAs/CGHS whose structures were completed as per approved design of Central Ground Water Board. The subsidy was not released to rest 38 cases due to incomplete construction of the rain water harvest (RWH) or construction of the structures were not as per the approved design of CGWB. For the 90 RWH structures completed during 2002-03 to 2005-06, Rs. 43.17 lakh had been released as subsidy to the concerned RWAs / CGHS / Institute etc. and Rs.9.30 lakh had been spent for promotional activities.

According to the survey of the 10 sampled RWH structures by the planning department, it was revealed that ground water level did not deplete further in their locality after adoption of RWH system. According to them, the public of the locality benefited due to recharging of the ground water which was being tapped by them for watering plants, cleaning purposes etc. Most of them also informed that RWH scheme created awareness among the public to avoid wastage of water and further promoted adoption of conservation of water.

5. Water Accounting and Auditing

DJB was using old system of measuring the quantity of raw water available at water treatment plants and the quantity of treated water supplied by treatment plants for distribution. It was not able to assess the quantity of water losses due to transport. Now, it has started installing bulk meters at all treatment plants, distribution mains, underground reservoirs and booster pumping stations in order to get correct quantity of water supply from these points up to

different localities. There were 2.65 lakh un-metered connections and 4.00 lakh non-functional meters. The scheme of free water up to 20 KL per month is not available to households with non-functional meters

Sewage Management

Delhi Jal Board is in charge of both water supply and sewage management. It is also responsible for collection, treatment and disposal of waste water/sewage. In sewage sector, the priority areas are optimum utilization of sewage treatment capacity, rehabilitation of sewage system, abatement of pollution of Yamuna River and extension of sewage facilities to uncovered areas.

It generates around 900 MGD of filtered water to its commuters. This does not include water extracted from ground through private tube wells. The leakage from water supply net work is assumed to be 30 per cent which nearly compensate water extracted from private tube wells, estimated to be 250 MGD. The quantity of sewage generated from individual households is worked out to be around 720 MGD as per the norms of CPHEEO (i.e. 80 per cent of water supply). DJB has 36 waste water treatment Plants at 21 locations with installed capacity of 604.72 MGD, 42 major SPS and 7500 km sewage net work across Delhi. There are proposals to construct other STPs in order to raise total treatment capacity to 790 MGD. It has an efficient network of about 7700 km of sewage lines and a network of 200 km of trunk sewers across Delhi. DJB has provided sewage facilities in all the approved colonies, all 44 re-settlement colonies and 126 urban villages, 541 unauthorized-regularized colonies and 100 unauthorized colonies in the year 2016. The work for providing sewage facility in remaining un-sewered area has already been initiated. In 2012, there were 30 sewage treatment plants located at 17 locations in Delhi, out of which only two were running within the capacity limit, 20 were running under capacity, five were running over capacity and three were non-functional.

Table5.3: Expansion in Sewage Treatment Activities

Components	2016	2017	2024	2030
Augmentation/ Setting up STP (MGD)	604	604	731	1000
Collection of sewage (MGD)	410	500	700	1000
Rehabilitation of sewer line (km) cumulative	90	133	273	273
Rehabilitation of STPs (No.)	5	-	219	145
Recycle/ Reverse of treated effluent (MGD)	90	100	150	253

Source: Delhi Jal Board

In 2016, there are 36 Sewage Treatment plants at 21 locations. The sewage generated was at 80% is as per CPHEEO norms and was estimated to be around 680 MGD. DJB was able to accumulate and treat 367 MGD of sewage and the remaining 313 MGD of sewage was discharged untreated into River Yamuna.

According to the Economic Survey of Delhi 2016-17, sewage treatment capacity of Delhi Jal Board has increased from 402.40 MGD in 2001 to 607.26 MGD in 2016. The percentage of utilization of sewage treatment plant in Delhi as on 31st March 2016 was 74 per cent. There are various reasons for performance below capacity, such as, low flow of sewage to STPs, no connection between trunk and peripheral sewer lines to STPs, incomplete rehabilitation of silted and settled sewer lines. The following table shows the estimated waste water generation and treatment between 2011 and 2021.

Table5.4: Waste Water Generation and Treatment during 2011—21 (MLD)

Components	2011	2021
1. Total Water Demand	5181	6272
2. Total Net Water Supply	3573(68.96%) (2 as % of 1)	5259 (82.84) (2 as % of 1)
3. Waste Water Generated	4144	5017
4. Treated at STPs	346(8.34%) (4 as % of 3)	755(15.4%) (4 as % of 3)

Source: Delhi Jal Board

It is estimated that there will be improvement in supply conditions so that around 83 per cent of demand for water will be met, but treatment and discharge of waste water will remain a grey area unless heavy investment is planned.

Coverage of sewer system is also unsatisfactory as reflected in the following table:

Table 5.5: Progress of Sewer System -- 2016

S. No	Category	Total Number	Colonies with Sewerage System
1.	Unauthorised Regularised Colony	567	541(95.41%)
2.	Urban Village	135	130(96.29%)
3.	Rural Village	219	34 (15.52%)
4.	Unauthorised Colony	1639	239 (14.58%)
5.	Resettlement Colony	44	44 (100%)

Source: Delhi Jal Board

Rural villages and unauthorised colonies suffer most from lack of sewer facilities. Rural villages will soon be converted to urban villages with concentration of migrants in peripheral areas as first choice of residence owing to cheap land and opportunity to encroach. It takes time to regularize the unauthorised areas. DJB cannot provide infrastructural facilities till then. Meanwhile, more migrants come here in search of employment and other opportunities and create pressure on infrastructure. In order to be sustainable, the state will continuously have to take care of its migrants.

Schemes

1. Interceptor Sewer Project

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infrastructure— 6,000 km sewers and 2330 million litres per day (MLD) sewage treatment capacity. The other three components include expansion of existing capacity of sewerage treatment plants at mouth of Delhi gate and Sen Nursing Home, intercepting 13 small drains into the Bela road and ring road trunk sewer after rehabilitation and the construction of sewerage treatment plants (STPs) after utilisation

DJB started the work of the Interceptor Sewer Project on a priority basis to provide an incremental, immediate visible improvement in water quality of the main drains (Najafgarh, Supplementary and Shahdara), thereby, improving water quality in the river Yamuna. Initially, it was promised that the project would complete before the 2010 Commonwealth Games that would ensure a sparkling Yamuna for the hundreds of visitors expected during the event. However, work was commissioned only in 2011 with a deadline of three years and there is already a delay of four years. About 85% of work had been completed, but the project had stalled about a year back due to a National Green Tribunal order which forbid any expenditure on drainage projects.

According to the Central Pollution Control Board, during 2007 the wastewater discharge from Delhi was to the tune of 4,300 MLD. In 2009, the gap between treatment capacity and waste generation was over 1900 MLD. If the underutilisation of installed capacity is accounted, the amount of untreated wastewater discharged into the Yamuna was to the tune of 2,800 MLD. However, the growth in sewage treatment capacity has not kept pace with the increase in population and waste. Despite the advanced state of the project, currently it is only trapping 90 million gallons per day of sewage against the approximately 250 MGD it is supposed to trap. Even when the project is completed, it will treat only about 75% of the total sewage released into the river Yamuna. Hence, the project is criticised by environmental NGOs as a capital-intensive project that would not deliver on the basic direction issued by the Supreme Court that the water should be clean to 'bathing' quality level.

2. 80% reduction scheme

In June, 2016 Delhi government provided relief to people living in unauthorised colonies. It notified its scheme of 80 percent reduction in one-time sewer and water development charges for new connections. 1700 unauthorised colonies were able to take advantage of this scheme

with urban development department. The water development charges were reduced from Rs 440 per sqm to Rs 100 per sqm whereas the sewer development charges were deduced from Rs 494 per sqm to Rs 100 sqm. These rates were valid until September 25, 2016, thereafter, original rates were applicable.

These rates were applicable in case of properties falling in D, E, F, G and H category of unauthorised colonies that were being used for residential purpose. DJB also reduced the regularisation charges for illegal connections in other residential areas from Rs. 18,000 to Rs. 3,300.

3. **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**, a centrally sponsored scheme launched during 2015-16 to 2019-20 includes sewage as one of the components in its strategy of development of basic infrastructure.

Future Plans

1. Sewage Master Plan 2031

The final report on Sewage Master Plan for Delhi 2031 was uploaded by Delhi Jal Board in 2014 on its portal.

According to the Delhi Master Plan 2021, the population in Delhi is anticipated to touch 23 million by 2021. Currently, half of the Capital isn't associated with a sewerage system. The report states that the wastewater services in the following 20 years are probably going to get worse.

The Master Plan conceives laying of sewer lines in a length of around 10,500 km. Since it is a long procedure, the work is to be completed in a staged way, prioritising territories where sewer lines can be made functional, instantly in the wake of being laid, due to accessibility of outfall sewers and waste water treatment plants.

With the implementation of SMP 2031, sewage facilities will be stretched out in the unplanned areas including the rural, the resettlement and the unauthorised colonies. As per reports, the

work of laying of sewer lines has been finished in 135 unauthorised colonies and is in progress in 208 unauthorised colonies.

2. AECOM

With growing population and the effort to bring clean water to the under-served communities by 2031, Delhi Jal Board has banded together with AECOM to build up an integrated and sustainable strategy to enhance sanitation conditions and improve the water quality in River Yamuna, the largest tributary stream of the Ganges in northern India.

This project covers the whole 1500-kilometer National Capital Territory of Delhi and is divided extensively into two stages, a sewered zone and an un-sewered zone. AECOM guarantees that extensive, technical and fiscally practical plans – capital expenditure (CAPEX) and working expenditure (OPEX) – are set up for the usage of the two stages.

For the sewered zone, AECOM is in charge of the following tasks:

- Inspecting 30 existing sewage treatment plants with an outline limit of 512.4 million gallons per day at 17 locations.
- Hydraulic modelling of the trunk sewer for integration with the unsewered zone.
- Stream checking and wastewater sampling at key areas.
- Contingent appraisal of 500 manholes for dovetail approach.

For the un-sewered zone, AECOM is in charge of the following tasks:

- A broad topo-survey and geotechnical investigation for 2,200 unsewered settlements
- Building up a wastewater Management Information System (MIS) including development of an enterprise Geographic Information System (GIS) framework, reconciliation and close coupling of sewage data in the GIS database to carry out hydraulic modelling.
- Assessment of the unsewered range for 1,600 remote settlement

3. Decentralised STPs

On September 5, 2017, a new scheme of setting up small Sewage Treatment Plants (STPs) across the city has been announced to treat sewage and recharge groundwater at minimal cost. Delhi Jal Board (DJB) is formulating guidelines for decentralized STPs all over Delhi.

Apart from solving the crisis faced due to sewage, the decentralised STPs would also produce huge amount of recycled water.

Challenges

Delhi's population and settlement profile create enormous challenge to construct adequate STPs and pipe lines for sewage treatment. In Delhi, only 24 per cent of total population is inhabitants in planned developed areas. In other areas, people settle down first, and then civic amenities are provided. It is very difficult to provide robust drainage system in these unplanned areas with unknown population pressure. Major challenges can be identified as follows:

1. Lack of Uniform Water Supply

Sewage pumping stations are designed at peak discharge, while the STPs are designed at moderate discharge. Maximum flow of sewage is generated during morning and evening overloading the STPs. During the remaining period, very low flow of sewage is generated, thereby disturbing the treatment process. Moreover, some of the STPs are constructed at places where water supply is not available with consequently under utilization of STPs.

2. House Sewer Connection

The residents in unauthorized colonies are not willing to take sewer connection due to high development charges and complicated procedure. Hence, sewage infrastructure remains unutilized. At the same time, it increases possibility of water bodies, chains and rivers getting polluted.

3. Shortage of Land

Non-availability of land for constructing new infrastructure often makes it compulsory to go for deep sewers which are not economical. It lays stress on funds.

4. Inter-mixing with storm water drains

Storm water drains should only carry storm water during rains and sewers will carry domestic soil waste collected from individual houses and other commercial buildings. But mal functioning of these separate systems happens when sewerage system is damaged by inter connecting storm water drainage. In many areas, two separate systems are not possible to construct owing to space congestions. In the entire walled city area, this combined system is working very well. This system is operational in many slum areas also. Sometimes, industrial waste is mixed with domestic sewage and reaches STPs. But there is no mechanism to treat chemicals. Hence, COD Increases at STPs that disturbs the effluent treatment.

5. Malfunctioning of conveyance

Many sewer lines have been laid in the forties and fifties and have outlived their normal designed life span. The trunk sewers are major links to carry the waste water generated in various parts of Delhi to the waste water treatment plants for treatment and disposal. Once a period of time, the old trunk sewers become dysfunctional due to several depositions, sewer gas induced corrosion in sewers, deteriorated and leaking joints, heavy siltation, blockages due to indiscriminate throwing of rubbish in manholes, illegal discharge of trade waste, unauthorized connection of storm water drains etc. Non-functioning trunk sewers become serious bottlenecks resulting in over flow of sludge in roads and residential areas. DJB installed trolley pumps in the peripheral sewers in the last two decades as a stop gap measure to pump the sewage into nearby drains. This eventually reaches river Yamuna and pollutes the river. Trolley pumps are temporary relief measures to deal with blockage and consequent overflowing of sewage.

6. Inadequate capacity

The total sewage treatment capacity of all the plants is 582.72 MGD against the total sewage generation of 680 MGD. The STPs are also not operating at their full capacity. They operate at not more than 60 per cent of their full capacity owing to several reasons cited earlier. The rest untreated sewage somehow flows ultimately into the river, thereby alarmingly increasing the level of water pollution.

7. Quality of treatment

Quality of treatment is a major challenge. The treatment standard is as follows:

BOD<20, SS<30 ppm

Many times, treated water does not follow this standard and the ground water is recharged with polluted water. If discharged into the river, it contributes to increasing level of water pollution.

8. Un served Areas

Till now, 45 percent of total population of Delhi is connected with sewerage network. There are more than 1600 unauthorized colonies in Delhi. Sewer system is laid when adequate water supply is available in the colony and technical feasibility survey is complete. In the unplanned areas, these two components are not available. The growth of population is also uncertain to estimate the quantity of sludge.

9. Underutilization of treatment plants and raw sewage flowing into River Yamuna

Yamuna is the primary source of the capital city's water supply and accounts for 70 percent of the water supply in Delhi, but, it is also the destination for a large amount of raw sewage. This is because treatment plants are being underutilized and so the remaining sewage flows into the river Yamuna.

According to the Delhi Jal Board, 680 million gallons per day of sewage is produced, however, the capacity of the treatment is only 594.72 MGD. Hence, one problem is that there is a shortfall of 86 MGD. There is an additional problem as well i.e. water utility is unable to fully use its existing capacity. On June 6, 2014, DJB was able to treat 343.28 MGD at its sewage treatment plants indicating 42.28 percent of the installed treatment capacity not being used.

According to a report in 2012, only about 30% of the sewage is treated. It has been estimated that Delhi contributes about 3,296 million litres per day of sewage water into river Yamuna. In May, 2012 DJB had reported that treatment capacity would increase to 614.4 MGD, but,

instead of reaching the target, the water utility's sewage treatment output had actually gone down.

In 2015, DJB had initiated a trial run of its constructed 15 MGD waste water treatment plant at Delhi Gate Nalla to keep the river Yamuna clean. This plant was constructed at a cost of Rs. 204 crore and is odourless and functions on clean fuel. However, there is still 25 to 30 percent of waste water flowing into River Yamuna.

Hence, the goal of clean Yamuna would not improve unless 100 percent of the sewage is treated.

10. Increasing Population

Delhi's population is a major concern and is responsible for the socio-ecological disbalance in the city. In 2014, Delhi was declared as the world's second most populous city. The population has already doubled since 1990 and is projected to have 36 million residents by the year 2030. The population of Delhi was 4 million in 1971 and has increased to around 18 million people today. Approximately 55 percent of the population (9.9 million people) in urban Delhi has access to a centralized sewerage system.

The uncontrolled growth of residents has further led to a growth in both domestic and industrial wastewater pollution. The city has registered a sharp increase in the volume of wastewater generated each day. This is creating stress as Delhi's sewage capacity is not enhanced to its full potential. Additionally, sewage infrastructure has not kept pace with the growth in population, resulting into major threats to the city's sanitation, river water quality, and overall health of inhabitants.

11. Mismanagement of Fecal Sludge

Only one-third of urban houses in India are connected to the sewer system. As per Census 2011, 38.2 percent of the houses use toilets connected to septic tanks. The problem is that the construction quality of the tanks, buried underground in populated areas, is often poor. As a result, the treatment of sewage is limited as it is not practical to connect every house to the sewer system.

Then there is no system for the disposal of the fecal sludge, which in most cases is emptied out secretly into water bodies and municipal sewers.

In India, over 1.2 billion people generate nearly 1.75 million ton of excreta regularly. So, the volume of sewage has expanded several times and the municipalities will have to separate the excreta from water at a huge cost. If the house is connected to sewage, this sewage will travel from the building's internal wastewater collection system to the municipal sewer system. Forced by pumping stations, the wastewater will finally reach an STP, if there is one. Creating this infrastructure for all will not only be prohibitively costly nor will it be suitable to all terrains. Management of excreta on the site by using septic tanks and pit latrines is, therefore, a necessity.

Census figures show that nearly 45.3 percent of urban houses depend on on-site systems. A large part of the wastewater from these systems seeps into the soil. This may breach deep enough to pollute groundwater.

Emptied fecal sludge should ideally be sent to a treatment facility, where it should be treated to meet the standards set by the Central Pollution Control Board (CPCB). This, however, does not happen in most cases. Census data shows that 65 percent of the cities in the country do not have a proper arrangement for safe collection of human excreta.

12. Problems associated with setting up Sewage Treatment Plants

- **Initially failing to treat sewage:** An STP is ordinarily intended for the total sewage that is likely when a building or premises is completely occupied. Initially, inhabitancy can be as low as 30% or somewhere in the vicinity and gradually increase over the span of one year or more. Therefore, the sewage that comes in at first does not give the base load expected for a satisfactory operation of an STP. Numerous STPs which confront this circumstance take a long time to balance out and give treated sewage. Frequently, because of poor or wrong operation, STPs do not settle.
- **Poor design of the STP:** Other reasons due to which STP doesn't function initially could be because of its design. It is possible that the balancing tank is undersized, or the total

inflow of sewage is greater than the maximum the STP can handle, thus, resulting in satisfactory operation of STP.

- **Consistent mal-operation of the STP:** Another extremely normal element is that a large part of plant working faculty, utilized by offices that go up against Operation and Maintenance (O&M) contracts, are unskilled, unprepared and regulated by individuals with no knowledge of what O&M includes. Such offices often charge O&M charges that resident's association consider affordable. However, the residents' associations are reluctant to pay organizations with skilled faculty because of their high costs due to which a well-run/operated water infrastructure is missed.
- **Odour from the STP:** Numerous housing communities very often complain regarding the strong and unbearable smell coming from the STP in operation. The reason of the smell could be any one or all the problems listed above.
- **STPs are costly:** Setting up a sewage treatment plant is an expensive undertaking. The CPCB approximates that the ordinary cost for an STP is Rs. 1 crore for every million litres daily (MLD). This implies an STP with the limit of treating 300 MLD of sewage will require Rs. 300 crore to be set up. However, this is just the set-up cost. Extra expenses in establishment of an STP include arrangements of energy supply, establishment of power generators and employment of staff. Aside from these, the maintenance of a medium estimated STP (with a treatment limit of at least 100 MLD) requires a sum between Rs. 70 lakh to Rs. 2 crore yearly.

1) Other issues

- The large network of sewers and drains in the city are very old and most of them are small and also in damaged condition.
- Low flow of sewage to STPs
- No proper sewage management and planning
- High-cost treatment but low-cost recovery that forces DJB to depend on excessive loan help from the Government.

- Lack of infrastructure
- Weak financial base
- Corruption
- No co-coordinating body

Strategy for Water Supply and Sanitation

Delhi is dependent on outside sources for water supply as it gets less than half of total supply from internal sources. On the other hand, demand for water is continuously increasing. With increase in growth of income, residential demand for water is not only restricted to cooking, bathing and drinking, but extends to car washing, gardening cleaning of boundary walls etc. MPD 2021 has projected water demand as 1840 MGD with DDA estimates of 80 GPCD for a projected population of 230 lakh by 2021. DJB estimates are lower at 60 GPCD for a projected demand for water at 1380 MGD. DDA norms of 80 GPCA include 50 GPCD for domestic requirement and 30 GPCD for non-domestic purposes. Increasing affluence of the city leads to increase in demand for water in industrial and commercial sector as well.

Strategy for managing water supply should focus on (1) Water supply from outside sources, (2) Generation of water from internal sources without depletion of groundwater (3) Leakage of water and (4) Demand management.

(1) Water Supply from Outside Sources

- Political will plays a big role here. The state government needs to be politically prudent to work out a cordial relationship with other states so that supply is not affected by agitation and protests to support local demand.
- Storage capacity should be increased. Even if water is discharged from outside sources, there is not enough storage available in Delhi.
- Three reservoirs are planned, one in Himachal Pradesh, two in Uttarakhand, that when completed, will increase water supply to Delhi. The state government needs to be proactive in pursuing concerned states to expedite the projects. It needs to explore the possibilities of cooperation with them.

- The state should continuously be in touch with National Water Board to explore possibilities of getting water from outside sources.
- As construction of dams in outside states is not completed yet, some other options should be explored. In order to increase supply of raw water, a system of tube wells may be developed in the following regions of the NCR:
 - (a) Yamuna flood Plains; areas falling in Haryana and Uttar Pradesh.
 - (b) The area along Upper Ganga Canal from Baghpat –Meerut Road in north and up to Murad Nagar in south of UP.
 - (c) Ganga Flood Plain in UP.

Central Ground Water Board has earmarked these areas as one of the best and most potential for development of ground water to be supplied to Delhi.

(2) Generation of Water from Internal Sources

- Central Ground Water Board has earmarked potential area for 10 MGD from flood plains of Yamuna in Delhi through 50 tube wells. The construction of these tube wells must be taken on priority basis.
- Rain water harvesting and ground water recharging need simultaneous attention.

Ground water exploration needs to be matched with rain water harvesting. This should operate under proper legal basis.

- Water bodies in the NCT of Delhi have been affected with rapid urbanization process. The state should emphasise on rainwater harvesting to recharge these water bodies and check ground water depletion.
- Storage of flood water in Yamuna river basin through construction of barrage may be a source of raw water supply during lean period.

(3) Leakage of Water

Power Sector Reforms taken up by the state with enactment of Electricity Act, 2003, has resulted in bringing down transmission losses from 52 per cent in 2002 to 18 per cent in 2010. Water sector reform is urgently needed to check transmission losses and other leakages.

- Housing societies and colonies may shift to dual pipe system in limited ways for flushing purposes. Waste water collected from bath rooms and kitchens will be collected in a storage tank and pumped to a separate overhead tank and connected with the toilets for flushing purposes.
- At present, 54 per cent of supplied water is of non-revenue status. This policy encourages wasteful use of water and restricts the scope of revenue generation. This is not sustainable as DJB may not find enough revenue to meet the cost of water and other infrastructure. It will require major organizational changes to support structural reform.
- There should be performance based incentives against identified targets. Distribution and monitoring should be based on PPP mode with continuous supervision.
- Building by laws in Delhi have been amended to direct all buildings having a discharge of 10,000 liters or more for compulsorily constructing water recycling system. But its implementation needs to be adequately monitored. The wastage of water through RO system need to be looked into. This system causes wastage of water up to 60 per cent.

(4) Demand Management

With expansion of urbanization process and consequent urban infrastructure, water requirement of construction industry in Delhi is increasing. Increasing prosperity also leads to change in life style and increasing use of water for luxury purposes like bathing pets, gardening, cleaning cars etc. These must be done with recycled water. Adoption of water meters must be universal for all residential and non-residential uses. Industries must use recycled water and ensure zero discharge of untreated effluence. Demand for regular water must be restricted through tradable permits. Bench marks for water intensive industries must be established. Potentials for participation of national and international players in water management must be unlocked.

State specific water policy including an independent regulator with power to regulate water uses and pricing should be formulated.

Strategy for Sewage Treatment

In Delhi, more than 45 per cent of total population is residing in non-sewered areas. Huge allocation of investment is required for providing sewerage system in non-planned areas.

- Mini Sewage Treatment Plants (STP) should be constructed on priority basis in targeted residential areas.
- Involvement of local bodies, MLAs and MP should be encouraged in commissioning mini STPs and laying of sewer lines in their command areas.
- For laying of sewer lines in unplanned areas and allotment of suitable sites for STPs, cooperation from local residents and public awareness is imperative.
- Interceptor sewers need to be laid along with 18 major drains falling in river Yamuna. Of them, Najafgarh drain, Supplementary drain and Shahdara drain contribute for 70 per cent of pollutants in the river. Yamuna Action Plan must be taken at priority basis by the state for its assigned role.
- Reclamation of sewerage water based on available technologies should be taken on priority basis.

SDG 6 Water Supply and Sanitation						
Target/Sub-Target and Indicators	Source	2016-17 Baseline	Physical Targets			Remarks
		2017-18 to 2019-20	2017-18 to 2019-24	2017-18 to 2023-230		
Target 6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all					
	6.1a Households with access to piped water supply (%)	Census 2011	81.3	88.00	100.00	Increasing capital expenditure should continue.
	6.1b Basic water coverage (%)	Delhi Jal Board	68.96	83.84	86.07	Faster implementation of projects should be the priority..
Target 6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations					
	6.2a Households using improved sanitation facilities which are not shared (%)	NSS, Swachhta Status Report, Ministry of Programme Implementation	73	85	100	Increasing central grants and proper utilisation.
	6.2b Proportion of population using latrines (%)	Ministry of Programme Implementation	98.7			
	6.2c Local authority areas that have declared open defecation free (%)	Data not generated				Local bodies need to collect data and monitor.
	6.2d Proportion of waste water not seweraged (%)	Delhi Jal Board	10	5	3.09	1.51
						Schemes related to Swachha Bharat Mission are getting priority.

	6.2e Urban households that have toilets connected to sewer systems (%)	Delhi Jal Board					
Target 6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse						
	6.3a Proportion of waste water safely treated	Delhi Jal Board	8.35	15.05	17.93	23.30	The target is very low given the present capacity.
	6.3b Proportion of untreated industrial waste water						
	6.3c Proportion of bodies of water with good ambient water quality						
Target 6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity						
	6.4a Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	Data not available					Data need to be collected and monitored on a regular basis in order to achieve the targets.
	6.4b Change in water use efficiency over time						
Target 6.5	By 2030, implement integrated water resources management at all levels, including through trans boundary cooperation as appropriate						
Target 6.6	By 2020, protect and restore water-related ecosystems including mountains, forests, wetlands, rivers, aquifers and lakes						Refers to National Policy
							Discussed in the Environment Section.

CHAPTER VI: TRANSPORT (SDG 11.2)

Vision:

By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women and children, persons with disabilities and older persons.

Indicators

- A. Percentage of population with access to public transport
- B. No. of public vehicle per 1000 population
- C. Per-capita road availability
- D. Percentage of traffic intersections with pedestrian crossing facilities
- E. Percentage of disabled-friendly transport eg. Low-floor buses to accommodate wheel chair
- F. Coverage of passenger information system in traffic junctions
- G. Coverage of traffic surveillance system in public vehicles and traffic junctions

One of the most critical factors for preserving and refining the quality of life and ensuring sustainable growth is the transport infrastructure. Several instances have proved the importance of transportation and its contribution towards speed and efficiency to a country's growth. Hence, it is essential to focus on the required transport policies to prepare urban transport/ comprehensive mobility plans as well as to assist the required level of economic activities in urban areas.

Status

Delhi has a significant reliance on its transport infrastructure and with rapid growth of urban area in the NCT of Delhi; the transportation network has also expanded with many new features. In fact, it is important to maintain the transport system in the cities that have population more than 10 million such that there is a link between work place and residence, educational institutions and residence, and so on. Two major transport systems in Delhi that play a vital role in facilitating public transport are bus transport and metro rail. According to the Economic Survey of Delhi 2016-17, approximately 26 lakh persons per day use Delhi

metro and about 35.37 lakh daily use DTC. The ridership of metro is projected to increase up to 40 lakh per day after completion of the final stage of the construction of DMRC. Apart from this, there are also privately-owned vehicles which accounts for 30% of the total demand for transport and the rest is met by taxis, auto-rickshaws, railways etc.

As on 31st March, 2016 the total number of motor vehicles on road in NCT of Delhi was 97.05 lakh, thereby, indicating an increase of 9.94 percent over the previous year. The highest growth of vehicles during the period 2015-16 was observed in auto rickshaws at 142.72 percent followed by ambulance at 95.81 percent. Additionally, annual growth rate during 2015-16 in goods vehicles was 73.8 percent and 74.19 percent in the case of buses. A negative growth of vehicles was recorded in other passenger vehicles during 2015-16.

Table 6.1: Distribution of Households by Mode of Transportation

Components	2001	2011
Households (No.)	2554149(100)	3340538(100)
Bicycle (%)	37.60	30.60
Scooter/Motor Cycles (%)	28.00	38.90
Car/JEEP/Van (%)	13.00	20.00
No specified mode of transport (%)	43.10	37.10

Source: Census of India, 2011, Household Amenities and Assets

The table reflects that bicycle ridership has declined considerably, same with percentage of households with no specific mode of transport. Delhi's affluence motivates people to own personal vehicles as reflected in the increase in ridership of cars, scooters and the like. Maximum increase in the share of auto rickshaws also reflects the increasing dependency on private vehicles at least for short and medium distance. Metro has not been able to reduce road share of auto rickshaws though number of buses have been reduced in certain areas.

Moreover, number of vehicles per thousand of population incremented substantially from 317 to 530 during the same period. During the last decade, the percentage of household using scooter/motor cycles increased from 28 per cent in 2001 to 38.90 per cent in 2011. During the same period, the percentage of household using car/jeep/ van as the mode of

transportation in Delhi has increased from 13.40 percent to 20.7 percent. On the contrary, the percentage of household using bicycle as the mode of transport has declined from 37.6 percent in 2001 to 30.6 percent in 2011.

Based on the rate of increase in the number of trips between 1981 and 2001, it is estimated that the total trips would rise to 280 lakh by the year 2021, including 257 lakh motorized trips and 23 lakh non-motorised trips. Hence, the broad aim is to ensure safe and economical travelling between place of origin and destination, suitable and fast access to all areas for all sections of the society, deduction of pollution and congestion, energy efficiency and conservation, safety for all sections of the road and transport users and, towards meeting these objectives, providing a significant increase in efficient rapid public transport systems and facilities with a corresponding reduction in individual private transport usage.

Master Plan of Delhi- 2021 has suggested five ISBTs for Delhi. With the setting up of two new ISBTs at Sarai Kale Khan and Anand Vihar, three ISBTs are functioning at present. Further, two more ISBTs are proposed to be constructed at Dwarka and Narela. The Delhi government is also planning to have 413 km of metro, 292 km of BRT, and 50 km each of monorail and light rail by 2020. Moreover, the government has planned a mass scale shift to electronic vehicles (EVs) by 2030 such that all vehicles are powered by electricity whether it is private or commercial. It is planned that the state-run firm Energy Efficiency Services Ltd (EESL) will be procuring 10,000 electric cars. Electric vehicles are predicted to produce demand for electricity which will improve the consumption and the financial viability of power sector projects.

Table 6.2: Transport Situation in Delhi

Components	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	ACGR (%)
Vehicles (Number)	6947536	7452985	7785608	8258284	8827431	9704741	
No. Of Vehicles per 1000 persons	415	436	446	465	491	530	
Average Daily Ridership of Metro (No.)	1259000	1660000	1926000	2190000	2386000	2600000	
Fleet of DTC (No.)	6204	5892	5445	5223	4712	4352	
Fleet Utilisation of DTC (%)	75.03	84.27	85.77	85.51	83.99	83.63	
Vehicle Utilisation (km/bus/day)	185	199	202	190	188	191	
Passenger Carried /bus/day (No.)	700	863	973	952	930	927	
Daily Average Bus Passenger (lakh)	30.32	44.2	46.77	38.87	35.37		
Load Factor (%)	71.43	77.75	92.90	86.63	85.02	82.00	
Growth of Road Network (km.)	32442	32663	33198	33198	33198	33260	

Agencies

1. Delhi Transport Corporation (DTC)

Delhi Transport Corporation was established under the Road Transport Corporation Act, 1950. This establishment became an undertaking of Municipal Corporation of Delhi by an Act of Parliament in April, 1958. The Delhi Transport Corporation (DTC) has the world's largest fleet of CNG-powered buses. According to the Perceptions Survey, 2013, DTC buses are one of the most frequently used modes of transport and the usage of the mode is more among the lowest income groups. It is one of the India's largest bus transport systems catering to about 60 percent of Delhi's transport demand. According to the Economic Survey 2016-17,

DTC operates a total 4352 buses on 578 city routes and 18 NCR routes. During 2015-16, average ridership of the bus was about 35.37 lakh daily.

In order to make the DTC facilities more effective, certain concerns need attention. Insufficient number of DTC buses, prolonged waiting time for commuters at many routes, overcrowding and the absence of buses across all routes are some of them. Since buses are the most commonly used modes of public transport and alleged to be the most reasonable, especially for low-income groups, it is important for the services to improve.

The Perception Survey, 2013, indicated that a majority of the people felt that services of the buses have improved in the last three years; however, nearly half of the respondents felt that services have rather deteriorated. Further, a scheme has been proposed regarding the installation of CCTV cameras and surveillance system across Delhi for which Rs 200 crore has been allocated. The purpose of the CCTV camera is to ensure safety of women. Additionally, the government has also provided a grant-in-aid to DTC of Rs 1,500 crore.

2. Delhi Metro Rail Corporation (DMRC)

The Delhi Metro Rail Corporation Limited (DMRC) is a Joint Venture company registered on 3rd May, 1995 under the Companies Act, 1956 with equal equity participation of the Government of the National Capital Territory of Delhi (GNCTD) and the Central Government. It holds the responsibility of construction and operation of a world-class Mass Rapid Transport System (MRTS). Delhi's metro rail system is being constructed in four phases covering 245 kilometers, which is scheduled to be finished in 2021. It has 235 train sets of four, six and eight coaches. More than a hundred trains of six coach configuration and over 60 trains of eight coach configuration are currently operational.

DMRC has three functioning lines connecting central Delhi to east, north, and southwest Delhi. The network has also spanned outside the boundaries of Delhi to reach Gurgaon and Faridabad in Haryana and Noida and Ghaziabad in Uttar Pradesh. DMRC is in the process of building another 160 kilometers of Metro lines which will weave a web of Metro corridors

along the city's Ring Road besides connecting with many other localities in Noida, Ghaziabad and Bahadurgarh.

DMRC is not only responsible for construction of the system but also for its operation and maintenance. Supply chain partners provide critical support, including labour, machinery and components, and maintenance services. It has further contributed on the environment front tremendously by becoming the first ever railway project in the world to claim carbon credits for regenerative braking. DMRC has also been certified by the United Nations (UN) as the first Metro Rail and Rail based system in the world to get carbon Credits for reducing Green House gas emissions as it has helped to reduce pollution levels in the city by 6.3 lakh tons every year thus helping in reducing global warming. Delhi Metro has helped in removing about 3.9 lakh vehicles from the streets of Delhi, thereby, reducing vehicular congestion.

The completion cost of Phase I was 10,571 crore. Around 60% of this cost was financed by the government of Japan through the Japan International Cooperation (JICA). 28% of the cost was jointly financed by the central and the state government through equity contributions. They also provided a subordinate loan covering 5% of the cost. The remaining 7% of the funds were generated internally through property development. The total cost of phase II was 18,783 crore. In this, JICA loan contributed 54.47% of the funding and the governments of India and Delhi increased their equity 16.39 percent each. In the case of Phase III, the total estimated expenditure is 41,079 crore. In this, JICA will be providing 48.57% of the total fund requirement while the Government of India and Delhi will provide 10.04 percent each.

3. Delhi Integrate Multi-Modal Transit System

Delhi Integrated Multi-Modal Transit System (DIMTS) Limited was organised in 2006 to formulate, design, and implement compound transport related projects in Delhi. It is a transport consultancy and infrastructure development organization that has become a joint venture organization with equal equity of the Government of National Capital Territory of Delhi (GNCTD) and the IDFC Foundation (Infrastructure Development Finance Company Limited) in 2007.

The principle goal of DIMTS is to provide sheltered, open, dependable, feasible and user-friendly public transport for commuters. Further, it aims to set up a mechanism to convey open transport benefit that keeps pace with development. The company provides concept-to-commissioning consultancy, intelligent transport system solutions (ITS) and urban transport asset management services.

The issue of congestion on the streets of Delhi can be addressed with the execution of Intelligent Transport System (ITS) in a legitimate way, as embraced by DIMTS. ITS is an application that senses, examines, controls and advances technologies to ground transportation in order to enhance wellbeing, transportability and productivity. It offers data to ease congestion, enhance traffic management, limit environmental impact and increment the advantages of transportation to business clients and the general population as a rule.

ITS in Delhi, can realize an economical and adjusted transportation arrangement. It is essentially the utilization of ICT and advancements in the determination of transport issues.

A few cases of ITS incorporate:

- Advanced Traffic Management Systems
- Advanced Vehicle Control Systems
- Advanced Traveller Information System
- Electronic Toll Collection Systems
- Advanced Public Transportation Systems
- Wireless Traffic Signal Controller
- Red Light-Stop Line Violation and Detection System
- CCTV Junction Surveillance
- Variable Message Sign
- Video Incident Detection etc.

Further, some not-for-profit initiatives have been undertaken such as Delhi Transit Bus Info mobile application, Tell Tail Security mobile application, cycle station and rallies at the BRT corridor to promote the concept of cycling among the public.

Besides the transport service providers, there are several agencies responsible for road construction in Delhi. The road network is being developed and maintained by National Highway Authority of India (NHAI), State Public Works Department (PWD), MCDs, NDMC, DCB, DDA, DSIDC and some private agencies. MCD is responsible for the lion's share (more than 70%) of road construction.

Challenges

1. Congestion

Congestion is one of the most prevalent transport problems in large urban areas, usually above a threshold of about 1 million inhabitants. It is particularly linked with motorization and the diffusion of the automobile. Hence, it is one of the most common and infuriating problems face by the residents of Delhi NCT region. According to report of IBM's Global Commuter Pain Study in 2013, Delhi is marked among the top 10 cities in the world that have worst traffic jams.

There are numerous causes for this problem. The first is the increase in the number of vehicles on the road in the recent years. There is a contradiction regarding the actual number of vehicles plying on Delhi's roads. There is large number of vehicles registered in Delhi and plying in the NCR, while many vehicles registered in the NCR are plying in Delhi. Further, the roads are embodied with mixed traffic including personal vehicles, buses, cycles, auto-rickshaws, trucks, two-wheelers, three-wheelers, pedestrians and animal-driven carts. At the crossing points, the cycle time ranges from 120 to 180 seconds, thereby generating long queues, especially in the prime hours. Additionally, traffic rules are not being followed religiously. Red lights and lane driving are especially not followed leading to accidents and congestion.

Another major cause is the growing population in Delhi which includes the growing number of workforce. However, the road infrastructure is not in pace with the growing population. There is also insufficient public transport system in Delhi. Regardless of the services of metro and bus, the transport system is not being able to keep up with the growth of the population. This is further leading to an ever-increasing number of individuals utilizing their private

vehicles. Lastly, the ongoing construction of Metro network in various locations, damaged roads, repairing roads are all contributing to severe traffic congestion in the city.

2. Safety

One of the key challenges faced by the public transport is women's safety. According to study conducted by Thomas Reuters Foundation in 2014, Delhi was ranked at 4th position for most dangerous transport system for women. The poll was conducted in 15 of the world's largest capitals.

Many factors contribute to this:

- Poor urban infrastructure: This includes dark or badly lighted streets, derelict parks and empty lots, badly maintained public spaces, inadequate signage and lack of public toilets.
- Empty streets at night: This is because of early closing of shops and businesses or lack of a tradition of street life. As darkness descends, the number of women on the streets reduces. Women are also disadvantaged by a lack of gender diversity in public spaces. It is this lack of the presence of other women that has the highest impact on the discomfort women experience when out.
- Insufficient presence and unresponsive/aggressive attitudes of police and civic authorities.

In December 2011, Government of India setup Nirbhaya Fund to make public transport safe with Rs. 50 crore. However, the fund is still being unutilised. Further, measures like installation of CCTV camera and Live GPS Tracking have been undertaken. There are also separated sections and reserved seats for women in the buses and a separate coach only for women in Delhi metro. Most women feel safe inside the metro stations; however, they prefer reaching home by 9.30 pm because of lack of safe options. Further, many safety apps like Himmat by Delhi Police have been created. Moreover, taxis and buses have started having lady drivers as well.

4. Environmental Impacts

Pollution, generated by emission has become a serious impairment to the quality of life and even the health of urban populations. Two major environmental risks due to transportation are air pollution and noise pollution.

Vehicular emissions depend on age of vehicle and emission rate of different vehicle categories. The exhaust from diesel vehicles (whether cars, trucks or construction equipment) is hazardous. With deteriorating mass transport services and increasing personalized motor vehicle use, vehicular emission is assuming serious dimensions.

Delhi has been in a state of air pollution emergency continuously for several years. It has reached crisis levels because the level of fine particulate matter has exceeded daily national ambient air quality standards by a factor of 10 or more. Currently, the pollution level in Delhi, Gurugram, Noida, Ghaziabad and Faridabad are 198.7, 187.6, 255.9, 282.6 and 291, respectively. Even though, major contribution has been because of crop burning in the neighbouring state of Punjab, increasing number of diesel vehicles have further aggravated the issue.

In this respect, government initiated several reforms like odd-even scheme, increasing parking charges etc. in order to encourage the use of public transport. However, the most fundamental transportation reform that has failed to materialise in Delhi is upgrading and expanding the bus network. Delhi needs twice the number of buses it has, perhaps even three times as many.

Noise pollution is also a crucial factor. Noise includes road, rail and air traffic, industries, construction and public works. However, it is caused mainly by traffic. High noise levels interfere with speech and communication, decrease learning ability and scholastic performance. According to a 2011 WHO report, sleep disturbance and annoyance were the major components of health burden due to noise. In 2011, the Centre for Science and Environment (CSE) conducted a decibel survey which showed that Delhi had some of the noisiest roads in India.

5. Accidents

New Delhi is reported to have maximum number of road accidents, according to the latest report released by the Ministry of Road Transport and Highways, GoI. It recorded 17 deaths and 55 road accidents every hour in 2016, one of the highest in the world. In 2016, Delhi topped the list of million plus cities that reported the highest number of road accident deaths at 7375. However, it declined from the numbers recorded in 2014 for the unenviable reason of proportional increase in vehicular congestion in the capital city. Due to increase in vehicular population, there is congestion on Delhi's streets for 14 hours on an average day.

Table 6.3: Total Number of Road Accidents in Delhi

Year	Number of Accidents
2012	6937
2013	7566
2014	8623
2015	8085
2016	7375

Source: Statistical Abstract of Delhi 2016 and Road Accidents in India 2016, Ministry of Road Transport and Highways, GoI

6. Public Transport Inadequacy

Inherent inadequacy of public transport is touted as one of the prime reasons for people to switch to personal vehicles. It is reported that the private vehicles have increased from 8.8 million to about 10 million with decrease in the share of public transport. In 2016, share of public transport in the Capital's roads is only 65%. Delhi's bus fleet currently stands at 5,425 against the requirement of 11,000. The government has not been able to check the

consistent decline in the number of public transport buses and has been struggling to buy new buses.

In fact, the odd-even scheme got approved by National Green Tribunal with conditions like no exemptions for women and two-wheelers, but due to lack of options of commute, the Delhi government rolled the scheme back. Supreme Court had ordered 10,000 buses 19 years ago, but, the last purchase by Delhi DTC was made in 2009 with 32 buses being the last addition. According to the Delhi transport department, the two major reasons for the delay are DDA dragging its feet on allotting more land to the transport authority and the time needed to construct the depots after acquiring the land.

7. Parking Difficulties

Delhi faces a huge parking problem. As on January 1, 2017, it was estimated that the city had 10 million vehicles out of which over 9 million vehicles were personal vehicles i.e. 6 million motorbikes/scooters and 3 million cars. Because of this increase in the number of vehicles, parking problems in Delhi are compounding day by day. Colony roads, parking slots, basements and open parking areas in building and even open spaces now remain clogged with vehicles.

The problem is further leading to frequent, arguments and murder due to parking challenges in residential areas. Commercial hubs like Connaught Place and Nehru Place are swarming with vehicles leading to congestion on roads and sidewalks. The municipal corporations of Delhi have over 300 commercial parking lots that can cater to only about 75,000 vehicles. This problem is further intensified due to the traffic from neighbouring states.

Further, there are no adequate commercial spaces that could meet the professional needs of citizens of Delhi closer to their places of residence. Thus, for decades people from various parts of Delhi commuted to the Central Secretariat and other government offices, for work; and with the growth of suburbs like Noida and Guru Gram, the distances have just kept increasing. Despite the introduction of the Metro trains and air-conditioned DTC buses, public transport is inadequate to cater to the number of commuters. Additionally, designs of

residential areas did not imagine car-owning citizens due to which many DDA housing complexes have parking for scooters only.

Schemes

1. City Taxi Scheme-2017

Delhi Government announced its plans to launch ‘City Taxi Scheme’ 2017. This is being initiated to keep a check on the taxi fare. Two key features of the scheme will be to keep a cap on the number of taxis being run by an operator and the maximum fare that can be charged. The scheme will make installation of GPS and panic buttons mandatory for all taxis. The state also plans to penalise those who violate the norms laid down under the scheme.

According to the new scheme, licensee will ensure that every taxi is a motor cab with a valid fitness certificate issued by the transport department. It is driven on clean fuel (CNG, LPG), has an engine capacity of 600cc and sitting capacity not exceeding seven inclusive of driver.

The scheme aims to bring all taxis including app-based taxi aggregators under a uniform rule. It will fix the fares, benefits and terms of services for all taxis. The ride-rating applications can charge the commuters in between minimum and maximum fares set by the government.

Further, the scheme will facilitate tracking of all public transport vehicles in order to ensure safety for women. The new rules will also require cab aggregators to install panic button, PSV badges, fixed hours of work and no surge pricing.

2. Odd-Even Scheme

Because of growing pollution levels and toxic air, Delhi Government implemented Odd-Even rule in the capital city. The scheme was implemented twice in 2016.

According to the scheme, private vehicles were allowed across the city based on their registration numbers. This implied that if a vehicle's registration number ended with an odd digit, it was allowed on the road on January 1, while if it was an even number it was allowed

on January 2 and so on. The rule applied between 8 am and 8 pm, except on Sundays. Special arrangements were made like extra buses, a bike, taxi service and increase in the metro frequency to make the plan successful.

The VIPs, politicians, Supreme Court judges and defence vehicles, single women drivers and women drivers with children below the age of 12 and scooters were exempted from the Delhi odd even rule. People who violated the rule were fined Rs 2000. It collected huge sum of money through fines.

However, odd even rule did not lower pollution as much as expected, but, it significantly reduced traffic congestion.

A study published in the journal Environmental Science and Policy scientists found that there was only a marginal drop in the PM2.5 levels during the first phase of odd-even. In the second phase, 99.6 percent people complied with the rule and there was a 2.5 to 3 percent increase in the people travelling through metro.

3. Green Urban Transport Scheme

The central Government is planning to launch a new scheme to improve green urban transport named as Green Urban Transport Scheme (GUTS). The main objective of the scheme is to reduce the carbon footprint and bring in the sustainable transport system. The cities and urban areas with 5 lakh or more population are being considered for the implementation of the scheme.

Under the Green Urban Transport Scheme (GUTS), the government would focus on creating non-motorized transport infrastructure, adoption of Intelligent Transport Systems (ITS), increasing access to public transport, use of clean technologies and participation of private

sector would be encouraged. The government also plans to introduce hi tech facilities in public transport vehicles like Free Wifi to encourage people using public transports.

Since the plan to establish GUTS is in large scale including replacement of all public transport vehicles with the new form of eco-friendly vehicles, the estimated budget is high. It has invested an initial amount of Rs 25,000 crore and plans to invest more in the coming years. It also seeks to involve private sector to contribute to the scheme.

4. Public Bicycle Sharing Scheme (PBS)

DMRC launched the city's first public bicycle sharing scheme in 2015, which would help people to reach their destination via the metro rail. The aim is to provide pollution-free last-mile connectivity to its commuters. Bicycles are available on rent for commuting to the nearby localities.

It is already running a 'hire-a-cycle' scheme from its Vishvavidyalaya Station in partnership with city-based private firm Greenolution. However, in this facility at Vishvavidyalaya Station, the same cycle has to be returned. But under PBS, any cycle can be picked up, parked at the shelters and another can be picked up and returned. The charges for using the cycle facility is Rs. 10/- per hour. It is very popular among the students.

5. Green Bike – Cycle Feeder & Rental Scheme

Green Bike service was commenced in 2009 and a cycle rally was organized in collaboration with Delhi Cycling Club (DCC) to enhance the awareness about the Cycle Feeder and Rental Scheme along the BRT corridor.

This initiative integrated bus-based transport system with cycling. DIMTS constructed five cycle stations along the BRT Corridor on Build-Own-Transfer (BOT) model.

The main objective of this initiative was to create an eco-friendly environment near BRT Corridor in Delhi by discouraging petrol/diesel driven vehicles on roads and encouraging use of cycles amongst commuters. Further, it aimed to provide safe and public parking space for

the cyclists around the city, to encourage people to cycle for short distance trips and to make cycling a fashionable statement, mainly among the youth and school children. However, the AAP government has dismantled majority of BRT corridor stating traffic congestion as reason.

6. Public Safety

Delhi Traffic Police has established a Road Safety Cell in 1972 to generate awareness among the road users. It is taking various initiatives like conducting road safety campaign at schools and college level, educating the general public about road safety etc.

There is a State Road Safety Council under Transport Commissioner, constituted in 2005 with members from traffic police, local bodies, DDA, PWD and DTC for formulation and implementation of road safety programmes in Delhi. However, District Road Safety Committees under respective District Commissioners have been constituted in 2014 only. These committees are entrusted with functions like identification of black spots on roads and remedial measures, deployment of ambulances, trauma care, and blood bank facilities along with enforcement of traffic regulations. The major problem remains connectivity with people. One does not know where to go in case of emergency. There is no information prominently displayed at major public places.

DTC has augmented its night bus service with increase in number of buses from 38 buses on 8 routes to 85 buses on 24 routes. These buses are accompanied by Home Guards, Civil Defense Marshals and DTC Marshals for safety and security of women passengers. There are 28 Ladies Special trips at night. GPS devices and CCTV cameras are being installed to monitor the activities of the commuters.

Strategy for Transport

- Transport network must be planned holistically. At any point of time, the coordination between road capacity and flow of transport should be examined to avoid traffic congestion. In urban areas, congestion has a heavy price in terms of fuel consumption and time.
- Flow of transport affects use of roads in terms of wear and tear. But maintenance of road is with other departments. In Delhi, around 90 per cent of roads are maintained

by the local bodies, the rest is allocated between the central and state government. In absence of coordination among transport providers and road managers, this service is severely handicapped. This coordination should be ensured at all level.

- Existing land use need to be redeveloped and re densified. Delhi's growth path has changed from single road transport nodes to multi modal transport including metro rail. Spatial balance should be achieved, especially along the new corridors of mass movement. This will generate a dynamic potential for growth and employment as per capita trip rate is expected to increase from 0.87 in 2001 to 1.2 by 2021. Intra-city motorized persons trips are expected to increase from 117 lakh in 2007 to 174 lakh per day in 2021. Increase in number of cars far out grew the increase in road length. These results in increasing congestion and resultant pollution that needs to be addressed. In order to control vehicle movement, both physical and financial controls need to be imposed.
- Additional/alternative linkages and express corridors need to be identified. Alignment of such relief roads may be along the drain or covering by drain, elevated road or grade separators.
- In some critical areas of the city, construction of underground roads or tube roads may be explored. Grade separators on identified site need to be built to make the intersections signal free.
- Free way network in the city and the NCR areas is required so that a criss cross movement through Delhi is reduced.
- Integration of all public transport mode is essential to provide convenient public transport system to the commuters in the city. Last mile connectivity to all major transport mode is required. Park and Ride facilities need to be developed at important sites.
- New Bus Terminals need to be planned and developed in strategic locations to make bus ride and metro ride convenient for all.
- Bicycle/rickshaws could be an important mode of travel particularly for short and medium trip lengths.

- Pollution free transports like e-rickshaw, solar battery operated mode of transport need to be highly subsidised.
- Parking is a major problem in Delhi. Besides public parking, parking in residential areas requires urgent attention. Land developing agency and developers need to arrive at a practical solution. Multi level parking need to be developed at all possible places with PPP mode.
- High rates for parking and congestion fees need to be applied selectively.
- Adequate, convenient, integrated public transport must be given priority.
- Integrated passenger information system covering all modes through publication of common route guides, time table and information boards at all bus stops and terminals for providing up to date information is urgently required.
- Dedicated rail service should be developed between Delhi and other cities of NCR from where people commute daily for work. This will reduce traffic load on Delhi roads.
- Carriage way of major roads should be free of encroachment. A city wide parking plan need to be provided to clearly indicate parking and no parking zone. Foot paths need to be provided barrier free throughout the city.
- Street lights street signage, design of roundabout, dividers need improvement both from commuter utility and beautification.
- Frequent road cutting must be stopped. Coordination among all agencies like water supply, electricity, sewage department, PWD, telephone agency are urgently required to minimize digging and inconvenience to commuters.
- All modes of transport must be disabled friendly. All foot paths, road junctions, traffic lights must be coordinated in such a way as to provide maximum benefits to the disabled. This is a primary concern for inclusive city.

SDG Target 11.2 Provide access to safe, affordable, accessible and sustainable transport systems for all,						
Target/ Indicators	Source	2016-17 Baseline	Physical Target		Remarks	
			2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2029-30	
Target 11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons					
11.2a	Percentage of population with access to public transport	Economic survey of Delhi 2016-17 (Population projection from World UN Urbanization Prospects)	36.74 12.59 1.32	42.50 25.18 1.47	55.72 43.71 1.68	72.56 106.87 1.76
11.2b.	No. of public vehicle per 1000 population					
11.2c.	Per-capita road availability (m)					
11.2d.	Percentage of traffic intersections with pedestrian crossing facilities	Data generated	not			
11.2e.	Percentage of disabled-friendly transport eg. Low-floor buses to accommodate wheel chair	Data generated	not			
11.2f.	Coverage of passenger information system in traffic junctions	Data generated	not			
11.2g.	Coverage of traffic surveillance system in public vehicles and traffic junctions	Data generated	not			
11.2h.	Percentage availability of user-friendly footpath to road network	Data generated	not			
11.2i.	Percentage reduction in road accidents	Statistical Abstract, Delhi	28.69	21.49	16.49	11.84
						Proper implementation of traffic rules will make it possible.

CHAPTER VII: ENERGY (SDG 7)

Vision Document, Strategy and Action Plan with respect to Sustainable Goal Number 7

1.0 Introduction

The Vision Document of New Delhi, envisages to construct the nation's capital as an inclusive and livable global city that intends to provide equal opportunities (in terms of economic, social and legal aspects) to all those who reside within its administrative jurisdiction. The overarching objective is to eradicate poverty in all its forms and provide a beneficial environment for the citizens to grow and develop. In other words, Delhi aspires to provide its dwellers with a healthy neighbourhood that promises good air, clean potable water, a barrier free environment with seamless transportation and access to clean, reliable and modern energy that will ensure economic growth and sustainability.

With the objective spelled out in the Vision, the current paper explores the role essayed by the Sustainable Goal Number – 7, a part of the Global Goals and the targets, the common framework of which has been conscientiously craved by 193 governments to tackle 17 major world issues by 2030. The Global Goal number seven clearly spells out the following:

Ensure access to affordable, reliable, sustainable and modern energy for all

Subsequent to the Goal several targets has been designed by the Global body as unbundled below:

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries and small island developing State.

Energy is central to development and growth of a resilient economy. Energy, in common language, if we try to define is power derived from the utilisation of physical, chemical or renewable resources especially to provide the light and heat to work machines and perform daily chores. The availability and accessibility to modern energy that is reliable and sustainable is deemed imperative for the development of any economy.

Though energy is an essential component of growth and is the pivot around which all economic activities revolve, its impact on the social and environmental facets cannot be completely ruled out. This factor also has a bearing on other Global development goals viz.

Goal number 1 that stipulates No poverty – This signifies ending poverty in all its forms by 2030 and this includes plugging “**energy poverty**” too. Energy Poverty is often viewed as a lack of access to modern energy services that entails services like clean cooking fuel and household access to electricity denoting that the people who are economically underprivileged or deprived of are the least likely to have accessibility to a source of power- electricity and they are likely to remain underdeveloped and poor as long as they are not connected to a suitable source.

The second global goal target that is influenced by energy accessibility is ***Goal number 10 that advocates for Reduced Inequalities*** – It is understood that energy access is usually not uniform across the globe, within nations where there’s a strong urban rural divide or within different zones of a city. This goal aims to empower the impoverished and promote social, economic and political inclusion of all by 2030. The same can only be achieved by tackling the lack of access to energy by the most deprived segment of the society.

Goal number 12 of the Global Development Goals requires Responsible Consumption and Production – This particular goal requires Energy to be consumed and produced in a more efficient manner minimizing losses indicating broader link to the need for resource efficiency in production and consumption of energy and decouple economic growth from environmental degradation.

The fourth goal that has a bearing on the energy component is ***Goal Number 13 – Climate Action*** – It is universally known that climate and energy are undeniably connected. Economic growth of a nation is intertwined with the technological advancement in the energy sector.

However, the energy emissions principally from primary energy sources that are fossil fuel based have a bearing on the increasing global temperatures that requires to be delinked by decarbonisation of the energy sources.

Thus it is necessary to understand the implications of sustainable development goals and the need to prioritise the same.

2.0 Why energy matters?

Energy is the foundation upon which development and growth and human well-being in particular reposes. Energy consumption across the globe has multiplied considerably. In fact, according to an IEA estimate, we humans produced and **used** 5.67×10^{20} joules of **energy** in 2013, equivalent to about 18.0 terawatts. One TW is equivalent to 5 billion barrels of oil per year or 1 billion tons of coal per year; it also **used** to be the globe's entire **energy** consumption in 1890. Despite such colossal growth in production of energy one billion people lack access to modern energy and about more than three billion people still harness energy from kerosene, wood, charcoal or even cow-dung cakes for cooking and heating.

The United Nations sees transitioning to clean sustainable energy as fundamental to continued human prosperity over the coming years. As mentioned, the poorest still remain poor due to lack of access to source of power and are engulfed by 'energy poverty'. Poor access to energy in developing countries slows down the growth of GDP. Its not simply a question of access, its about ensuring, the quality, reliability, safety and affordability of the energy services that power homes and essential community services such as schools and clinics as well as economic activity.

Modern energy access typically entails three forms of energy that is deemed essential for social and economic development : a) less polluting household energy for cooking and heating involving improved cook stoves with traditional solid biomass fuels , from liquid and gaseous fuels such as kerosene and Liquefied Petroleum Gas (LPG) and renewable energy sources such as solar b) electricity which is a secondary energy source for powering household electrical appliances and equipments and c) energy services at public facilities like schools, health clinics, government offices d) industrial and commercial activities e)mechanical power from electricity or other energy sources that improve the productivity of labour.

Before delving deep into a discussion on the jargons associated with energy viz. energy security, energy efficiency and conservation, energy mix or intensity and energy balance coupled with issues of power of generation, transmission and distribution or advanced techniques of energy management it is necessary to understand the implication of the words affordable or affordability, access and accessibility, reliable and reliability, sustainability and modern energy above all that define the SDG 7.

Access is the state or the quality of being approachable. According to an IIASA, UNIDO and GEF publication “Access” has been defined with respect to who is the targeted beneficiary (e.g., villages or households, cities or households), the types of energy supply that are included (e.g., grid-connected or off-grid electricity), and the characteristics of service that make the service “accessible” (e.g., affordability, reliability, quality and adequacy).

Affordability usually refers to “having the financial means, or bear the cost believed to be within ones financial means or the state of being cheap enough to buy. Thus a product becomes affordable means the price of a product is reasonable enough to be bought by people of all class or by people who do not earn enough money that means the households should have a minimum level of electricity demand met and within a certain budget.

Reliable or reliability refers to something that can be relied upon or depended upon indicating that it is consistently good in quality and performance and therefore can be trusted. In case of energy it refers to stipulated period of uninterrupted power supply enabling one to accomplish activities necessary for one’s survival and growth and development or the quality of the end use equipments that converts energy and delivers services.

Further, an activity (in case of energy – generation, transmission and distribution) is deemed sustainable when it causes little or no damage to the environment and therefore able to continue for a long time capable of being sustained or refers to a method of harnessing or using a resource so that the resource is not permanently depleted or damaged.

These properties as well as the environmental impacts of providing energy services vary significantly based on a) the types of energy sources, b) the characteristics of the energy carriers, c) the end-use devices that convert energy into services and the conditions in which

these devices are deployed. **The simplest definition of universal access is the physical availability of modern energy carriers and improved end use devices such as cook stoves at affordable prices for all.** This is the basis for the target of energy access for all by 2030 set by the **United Nations Secretary-General's Advisory Group on Energy and Climate Change (AGECC, 2010)**. The publication on Access to Modern energy further enlists

"The global community should aim to provide access for the 2–3 billion people excluded from modern energy services, to a basic minimum threshold of modern energy services for both consumption and productive uses (100 kWh per of electricity and 100 kgcoe of modern fuels or roughly 1200 kWh per person per year). Access to these modern energy services must be reliable and affordable, sustainable and, where feasible, from low-GHG-emitting energy sources."

Domain experts have investigated the notion of thresholds for basic energy needs (Goldemberg et al., 1985; Imboden and Voegelin, 2000) and have not found any definite international norms for these indicators. Countries often define their own lifeline energy entitlements. These typically fall in the range of 20–50 kWh for electricity to households and 6–15 kg of LPG for cooking per month, and 10–30 kWh of useful energy per square meter of living space for heating per year.

Access to modern forms of energy usually endorses economic development and perks up the living standards of the impoverished or the deprived. Deprivation is defined as the deviation between actual energy access/or use and estimated basic minimum needs that is often measured at the national level by minimum energy needs based upon engineering estimates of a normative set of basic energy services, or the minimum energy needs estimated as the average amount consumed by households below poverty line or the minimum energy needs defined in useful energy terms and access to modern energy carriers. The other measurable dimensions of energy poverty at the national level are the physical availability or access to energy carriers, access to and availability of energy services measured by minimum level of energy services associated with lightning cooking etc. and affordability that is measured by the share of energy expenses in total household budget and share of energy expenses and annualised cost of end use equipments in total household budgets. At the international level, the dimensions of energy

poverty are measured by physical availability or access to energy carriers that is indicated by the number of households or population having access to : or the Energy Development Index that consists of three equally weighted indicators : a) per capita commercial energy consumption b) share of commercial energy in total final energy use c) and the share of population that has access to electricity (Index developed by IEA 2010 and 2004).

The transition to modern energy use has far-reaching benefits for economic development and poverty alleviation. The most direct benefits are the avoided ill health and time opportunity costs of women and children harvesting biomass fuels for use in traditional cook stoves. The negative health impacts that would be avoided from the use of improved cook stoves account for 2 million deaths per year, with a higher percentage of these being women and children in developing countries (WHO, 2009). The Global Energy Assessment (GEA) also estimates that about 2.2 million deaths in 2005 were on account of solid fuel use in households. The time savings from immediate access to liquid and gaseous cooking fuels for half the world's population who are dependent on traditional cooking methods has been valued at US\$44 billion (WHO, 2006). In addition to these opportunity costs, the lack of mechanical power for pumping water and grinding food grains results in hours of manual labour for repetitive pounding and grinding activities that pumps and mills could do much more efficiently.

Access to modern forms of energy enables economic growth and job creation. Energy use correlates strongly to per capita income and low levels of per capita income are further exacerbates energy poverty , as reflected in the relationship between the Energy Development Index (EDI), which encapsulates several indicators of energy access, and per capita income. Though this relationship is bidirectional – increased energy access fosters income growth, and energy use tends to increase with income – there is growing evidence of the influence of energy access on GDP and income growth. This further underlines the fact that increased per capita energy indicates development and alleviates poverty.

Usually, Electric consumption per capita measures the average kilowatt hours (KWh) of electric power generated per person in a particular country or region. Energy consumption in India is characterized by low per capita level and a large disparity between urban and rural areas. In 2015-16, our per capita energy and electricity consumption at 670

kgoe and at 1075 KWh/year, respectively, are just one-third of the world average. Nearly 25% of our population today is without access to electricity and 40% without access to clean cooking fuel. In 2014, the share of electricity in final energy demand was only 17% compared with 23% in the member countries of Organization for Economic Cooperation and Development (OECD). This low share means that a large proportion of energy consumption takes the form of solid and liquid fuels, exacerbating the air quality at the demand centres.

There is, however, growing consensus that enhancing access to modern, less polluting and affordable energy options has a key role to play in the alleviation of poverty. Poor people are trapped in an “energy-poverty” nexus, where the lack of access to energy services constrains productivity and the generation of livelihoods, which leave poor people with little surplus cash, and in turn the inability to purchase access to the energy services that could help alleviate their condition. Energy access thus enables reduction of income poverty and hunger and supports education, better health, gender equality and water and sanitation conditions.

Though a country is said to make progress when Energy/Electric consumption per capita soars (as energy/electricity consumption is directly related to affordability)it is to be remembered that such a measure should also include techniques (of production and consumption) that are less energy intensive and carbon intensive in nature indicating greater energy efficiency and also involve decoupling of economic activities from environmental degradation through decarbonised energy sources and further accentuating energy conservation.

3.0 Energy at the National Level

Energy policies of India have over the years directly aimed to raise per capita energy (and electricity) consumption. There are four key objectives of our energy policy: a) **Access at affordable prices**, b) **improved security and Independence**, c) **Greater Sustainability** and d) **Economic Growth**.

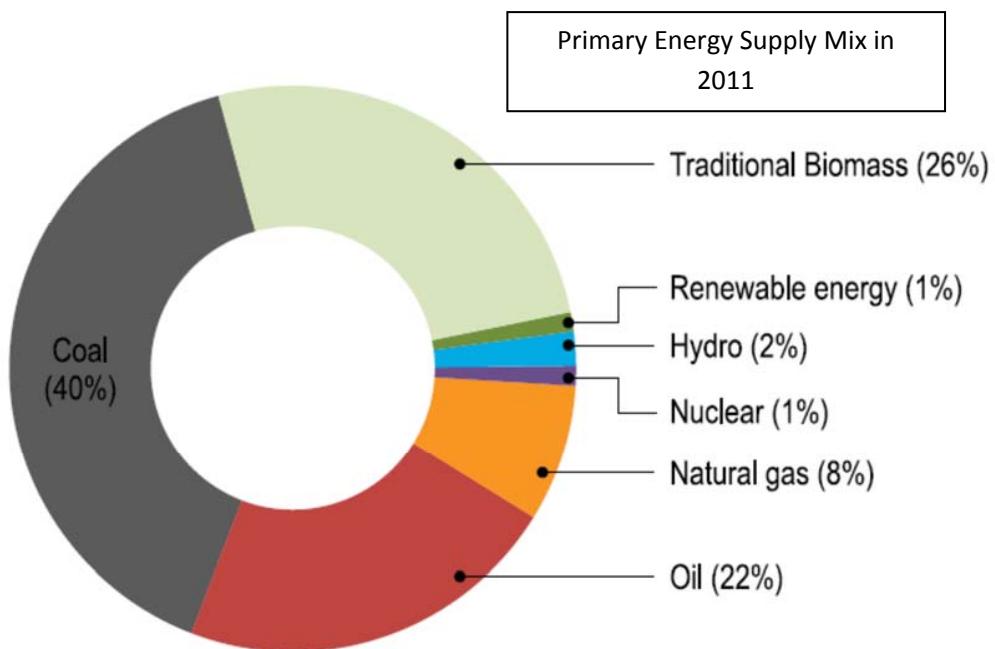
With nearly 304 million Indians without access to electricity, and about 500 million people, still dependent on solid bio-mass for cooking, it may be acknowledged that the country has to still go a long way in order to diminish energy poverty. While India strives to achieve a double digit growth rate in its national income, making clean energy available to all of its citizens, ought to be included as a key component of the poverty alleviation programmes and thus enable easing of poverty in all forms.

Improved **Energy Security**, normally associated with reduced import dependence, is also an important goal of the policy. The definition for **Energy Security** in India's context was first provided in the report of the Expert Group on the Integrated Energy Policy. However, the more recent 12th Five-Year Plan defines energy security in the following manner: "*Energy security involves ensuring uninterrupted supply of energy to support the economic and commercial activities necessary for sustained economic growth.*" It further goes on to state that "*Energy security is obviously more difficult to ensure if there is a large dependence on imported energy.*"

The indicators of energy security include share of fossil fuels in the primary energy supply mix diversification of the energy basket, import dependence on fossil fuels, diversification of the import sources, and energy intensity of the economic output, average per capita commercial energy consumption, access to electricity and access to modern cooking energy fuels and technology.

Energy supply in India is largely dominated by fossil fuels — coal, oil and gas — that form around three-fourths of the country's total primary energy supply. Energy supply in India is largely dominated by fossil fuels — coal, oil and gas — that form around three-fourths of the country's total primary energy supply.

Today, India is heavily dependent on oil and gas imports while also importing coal. In so far



as imports may be disrupted, they undermine energy security of the country. Energy security may be enhanced through both diversification of the sources of imports and increased domestic production and reduced requirement of energy thus emphasizing upon energy efficiency and energy conservation.

This will also necessitate a major transformation of the **Energy Mix** that refers to the combination of various primary energy sources that meets the energy needs within a given geographical region. It includes fossil fuel (oil, natural gas and coal), non-renewable wastes as well as nuclear energy and the many sources of renewable energy (wind, biofuel, solar, hydro, heat from heat pumps, geothermal energy, and renewable wastes). The primary energy sources are used for generating power and electricity providing for lighting, cooking in households, transportation and heating and cooling residential and industrial buildings. The global energy mix is dominated by fossil fuels accounting for over 80% of the total energy mix. Fossil Fuel dominates India's energy mix too. The country has imported nearly 31% of its primary energy in 2012, with 77% and 22% of oil and gas imports, respectively. The share of renewables

(excluding biomass) was 3%. The energy mix of India needs to have a high share of renewable which will sustain the present self-dependence scenario.

However, the energy intensity of the country has been declining over the years. **Energy intensity** is usually obtained by dividing total primary energy supply by GDP. Energy intensity, defined as the energy input associated with a unit of gross domestic product (GDP), is a measure of the energy efficiency of a nation's economy. High energy intensities indicate a high price or cost of converting primary energy into GDP and low energy intensity indicates a lower price of converting primary energy into GDP. India's energy intensity has been declining over the years and is expected to decline further. Falling energy intensity implies that the growth in energy used is less than the growth of GDP, which in turn implies that energy elasticity, that is, the ratio of the growth of energy to the growth of GDP is less than unity. In India, energy intensity had reduced from 1.09 kgcoe /US\$ in 1981 to 0.99 kgcoe /US\$ in 1999. It further depleted to 0.85 kgcoe /US\$ in 2001 and in 2011 it further plummeted to 0.62 kgcoe/US\$.

The goal of sustainability acquires added importance and urgency in view of the threat of climate change as well as the detrimental effects of fossil fuel usage on local air quality. Sustainability is also linked with energy security. Almost 90% of our commercial primary energy supply that constitutes of fossil fuels are met by imports. This means that cutting fossil fuel consumption would promote the twin goals of sustainability and security. Hence the policy lays heavy emphasis on de-carbonisation through the twin interventions of energy efficiency and renewable energy.

Finally, the energy policy must also support the goal of rapid economic growth. Efficient energy supplies promote growth in two ways. Energy is an important enabling factor of growth and its availability at competitive prices is critical to the competitiveness of energy-intensive sectors. Second, being a vast sector in itself, its growth can directly influence the overall growth in the economy.

In relation to its population, India is poorly endowed with energy resources. Its share in the world population is 17% but the shares in the world gas, oil and coal reserves are only 0.6%, 0.4% and 7%, respectively. This has meant heavy dependence on imports even at a rather low level of energy consumption. It is surprising that despite this severe supply constraint, only

recently have we begun to pay serious attention to demand-side interventions and management (DSM) that would help economize on the use of energy. DSM would include energy efficiency and energy conservation policy measures. **Energy Efficiency** usually means using less energy to provide the same service. For example, a compact fluorescent bulb is more efficient than an incandescent bulb. Energy efficiency is often used as a short hand to describe any kind of energy saving measure. The terminology is however different from **energy conservation** that is a much broader term for saving energy or for using less energy and is often co related with forgoing a service rather than changing the efficiency with which it is provided, as for example - walking to a nearby destination instead of driving. Increasing energy efficiency may initially have huge financial implications but in most cases this capital outlay is paid back in the form of reduced energy costs within a short time period. This makes efficiency improvements an alternative starting point for reducing carbon emissions.

The government aims to achieve the following in the energy domain and the draft energy policy charts the way forward for achieving the same. All the Census villages are planned to be electrified by 2018, and universal electrification is to be achieved, with 24x7 electricity by 2022. The share of manufacturing in our GDP is to go up to 25% from the present level of 16%, while the Ministry of Petroleum is targeting reduction of oil imports by 10% from 2014-15 levels, both by 2022. Our NDCs target at reduction of emissions intensity by 33%-35% by 2030 over 2005, achieving a 175 GW renewable energy capacity by 2022, and share of non-fossil fuel based capacity in the electricity mix is aimed at above 40% by 2030.

Further, the draft National energy policy of the NITI AYOG envisages that in 2040, with renewables comprising 7%-10% of India's energy mix, the overall import of primary energy is expected to rise substantially. Oil and gas imports will be responsible for the rise in imports, and are estimated to rise to 81-88% and 35-51%, respectively. Even technology is expected to play a major role, as the share of electricity in final energy will have risen to 23-26% in 2040 against 17% in 2014, with almost all demand sectors becoming amenable to its use.

In an increased electricity share, while in the immediate run-up towards universal coverage of electricity it may not be viable to tap rooftop solar for homes, but by 2040 it would have become the norm. The share of solar and wind is expected to be 14-18% and 9-11% in

electricity, and 3-5% and 2-3% in the primary commercial energy mix respectively. The advent of Electric vehicles will have helped curb a rise in share of oil and environment friendly gas would substitute oil in many uses. However, the share of oil and gas would have almost maintained their shares of 26% and 6.5% in 2015-16 to 25-27% and 8-9% in 2040, respectively. In spite of a more than three times increase in gas consumption, owing to large increase in total energy, the increase in gas would be less in percentage terms. While coal would have risen in absolute terms (nearly double), but in relative terms, it would have reduced its contribution from 58% in 2015 to 44-50% in 2040. The overall share of fossil fuels would have come down from 81% in 2012 to 78% in ambitious pathway in 2040.



4.0 Delhi's Energy Status

Delhi, the nation's capital is located at 28.61°N 77.23°E , and lies in Northern India. The city sprawls on an area of 1484 square kilometre and has a total population of 1,67,87,941 (as per census 2011) i.e. more than 16 million people. It is the 30th largest state of Indian union in terms of area, and the 18th largest by population in the country.

There are 8.75 Lakh total establishments operating in Delhi as per Sixth Economic Census conducted in 2013, out of them only 1.42% were in rural areas and 98.58% in urban areas. 27. Sixth Economic Census registered an annual growth rate of 1.94%, in absolute term there is

Brief Profile of Delhi

Sl. No.	Description
1.	Area (Sq. Km.)
2.	Population (Persons as per 2011 census)
3.	Per Capita income at current prices-FY 2014-15(in Rs.)
5.	State GDP growth rate (FY 2013-14)

GNCTD website,pib.nic.in&Delhi Statistical Handbook2015

has increased from 18907 crore in 2011-12 to 45689 crore in 2016-17. 29. Number of working factories in Delhi increased from 7793 in 2007 to 8954 in 2015.

Delhi, over the years have gradually urbanised and is a city state today with declining rural areas and agricultural activities. The growth in urban area during 2001-2011 was observed at 20.44 per cent. This pace of urbanization has reduced the number of villages in Delhi from 300 in 1961 to 165 in 2001 and 112 in 2011. The growth in urban area during 2001-2011 was observed at 20.44 per cent. This pace of urbanization has reduced the number of villages in Delhi from 300 in 1961 to 165 in 2001 and 112 in 2011.

The rural-urban areas change during the last three censuses in Delhi is presented in below:

S. No.	Classification of Area	1991		2001		2011	
		Sq. Km	%	Sq. Km	%	Sq. Km	%
1.	Rural	797.66	53.79	558.32	37.65	369.35	24.91
2.	Urban	685.34	46.21	924.68	62.35	1113.65	75.09
3.	Total	1483.00	100.00	1483.00	100.00	1483.00	100.00

Urban basic services are the lifeline of urban living. These essentially include potable water in the localities of the poor, i.e. slums, villages, unauthorized colonies, resettlement colonies etc. The poor need municipal services and waste management to keep the city clean and hygienic.

The total numbers of registered motor vehicles in Delhi during 2015-16 are 9704741 out of which 62.90% are of motor cycles/scooters, 30.77% are of cars & jeeps and rest are used for commercial purposes as Auto Rickshaw, Taxes, buses and goods vehicles. The total number of DTC buses in the fleet are 4352 in 2015-16 out of which 2506 are of low floor Non AC, 1276 are of Low Floor AC and 570 are Standard buses. The public transport ridership has plummeted to almost 40% over the last ten years.

With reference to access of clean cooking fuel Delhi fairs well as almost 90% of the urban Delhi rely on LPG and PNG as fuel for cooking. Of the remaining 10%, within the urban population of Delhi, about 5.58% use kerosene and 3.36% use wood as fuel and is a matter of concern.

Sources	Total	Rural	Urban
LPG/PNG	3003996	59510	2944486
Kerosene	175443	6123	169320
Cow Dung Cake	19487	2907	16580
Wood	112291	8927	103364
Coal/Coke/Lignite	4476	102	4374
Bio-Gas	3017	65	2952
Crop residue	9094	1241	7853
Electricity	1335	56	1279
Others	1866	27	1839
No Cooking	9533	157	9376
All Sources	3340538	79115	3261423

Source: Census 2011

As per 2011 Census data, the provisioning of services in Delhi improved significantly over the last decade. There is a near universal electrification and nearly 89% have access to sanitation facility. The supply of drinking water by Delhi Jal Board now reaches 81% of the households

AVAILABILITY OF BASIC FACILITIES IN DELHI

S. No	Items	2001 Census (in lakh)	Percentage of Total Households	2011 Census (in lakh)	Percentage of total Households
1.	Electricity	23.72	92.86	33.11	99.1
2.	Toilet facility	19.91	77.96	29.91	89.5
3.	Electricity and Toilet facility	18.74	73.77	29.80	89.2
4.	Electricity available but no toilet facility	4.98	19.49	3.31	9.9
5.	Toilet available but no electricity	1.17	4.59	0.11	0.3
6.	No electricity and toilet facility	0.65	2.55	0.19	0.6
7.	Water supply				
(i)	Piped water supply	19.24	75.33	27.17	81.3
(ii)	Hand-pumps/tube-wells	5.60	21.91	4.58	13.7
(iii)	Wells	0.01	0.04	0.03	0.1
(iv)	Other sources (river/canal/tanks)	0.69	2.72	1.63	4.8

Source: Census : 2011

against 75% 10 years ago. Less than 1% of the households are without both services in Delhi as depicted in the statement below:

It is estimated that in Delhi there are 1797 Unauthorised Colonies, which are to be regularized as per

government policy. These have about 40lakh population which needs to be effectively mainstreamed in the urban development. This will further necessitate provision of urban infrastructure services. The Economic Survey of Delhi 2014-15 states that about one-third of Delhi lives in sub-standard housing, which include 695 slum and JJ Clusters and 1797 unauthorized colonies.

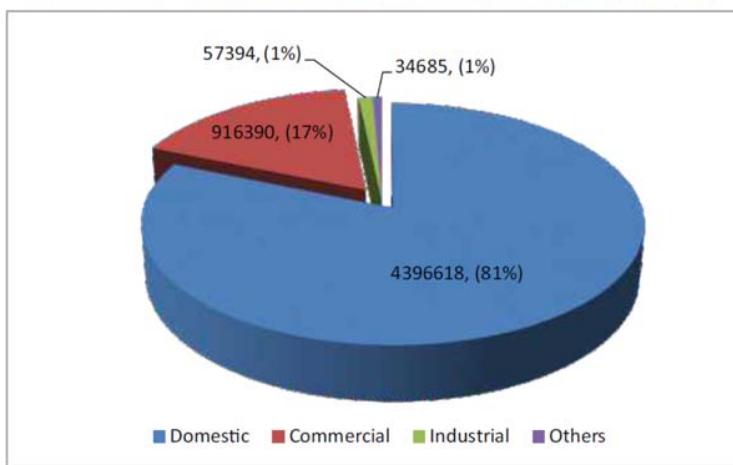
This has also told upon the power sector of Delhi. According to a publication by the Delhi Government, over the last forty years (approximately), there has been substantial growth in power sector in the State of Delhi.

Table 7.1: Electricity Available to Households

Items	1991	2001	2011
Electricity available to households	1479620	2371811	3310809
Number of Households *	1860748	2554149	3340538
Urban	1696828	2384621	3261423
Rural	163920	169528	79115

Source :2011 Census

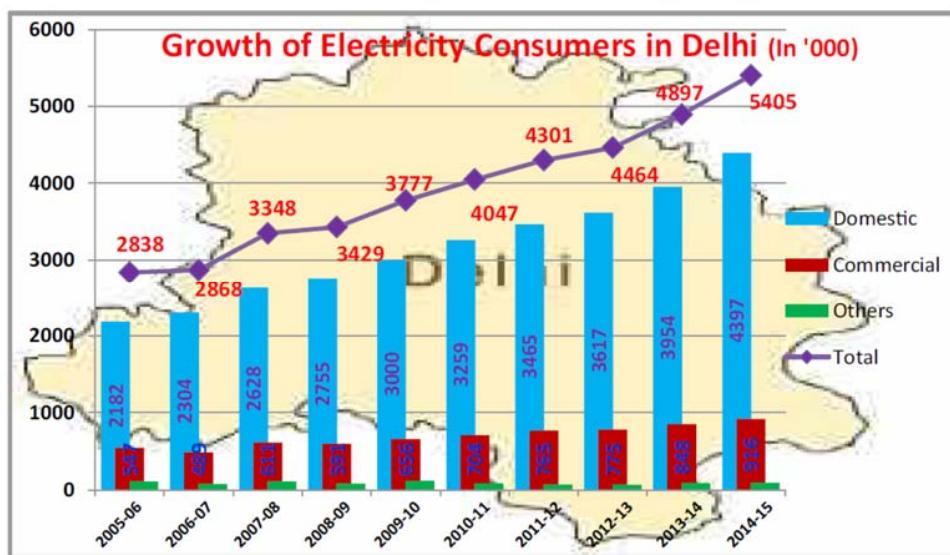
NUMBER OF CONSUMERS OF ELECTRICITY IN DELHI: 2014-15



The demand for power has risen from 275 MW in 1971 -72 to 6006 MW during 2014-15. During the period 2005-06 to 2014-15, the number of consumers of electricity in Delhi increased from 28.38 lakh to 54.05 lakh. The number of electricity consumers in Delhi has

grown by 90.47% during the last ten years, that has increased 25.67 lakh consumers from 2005-06 to 2014-15.

Growth of Electricity Consumers in Delhi (In '000)



Source: - Delhi Statistical Handbook, 2014, DERC, Discoms website for 2014-15

The current consumption stands i.e. In 2015-16 it is 24037 million units. Of the total consumption of electricity in Delhi 12560 million units used for domestic purpose, 6053 million units used for commercial purpose, 3135 million units used for industrial purpose and rest in others.

The total number of electricity consumer in Delhi is 52.62 lakh in 2015-16. The number of electricity consumers in Delhi has grown by 85.43% during the last ten years (2005 -2006). The Peak demand increased from 3626 MW in 2005-06 to 5846 MW in 2015-16. The Power consumption recorded an annual growth of apprx.3.39%.

According to a publication by the Delhi Government, this growth can be attributed to large scale regularization of unauthorized colonies leading to horizontal and vertical load growth and also better road transport, telecommunication network and regular power supply, liberalization and economic policies which have brought deregulation and favourable industrial policy requirements for investment and expansion.

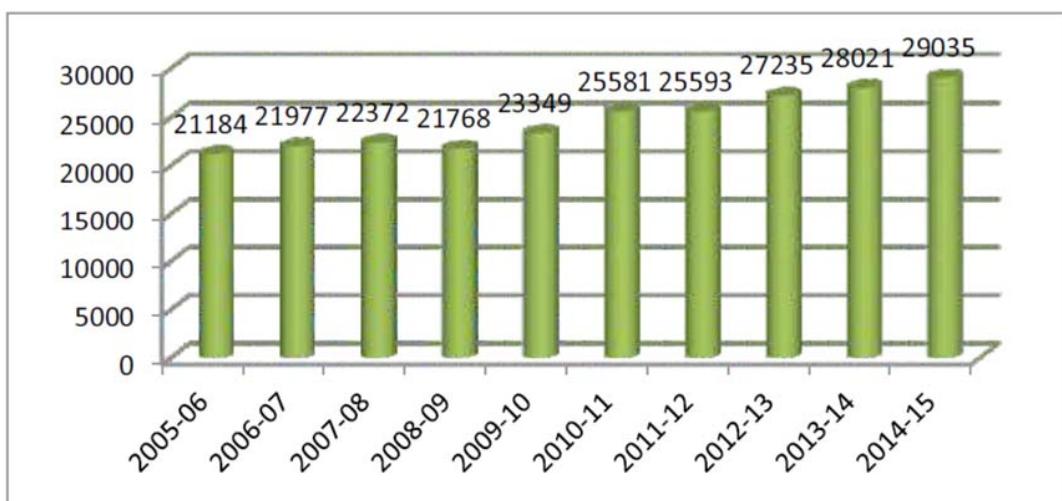
The same publication mentions that the average daily per household consumption for Delhi works out as 9.05 units. Since NCT of Delhi has attained a matured level of urbanization with almost NIL rural population, the growth in consumption can be attributed to normal growth

in households and therefore it is assumed that normal growth rates (CAGR's) based on past trends.

Table 7.2: Households in Delhi 2001 - 2011

Sl. No.	Particulars	2001	2011	Difference	CAGR	Total H/H by 2015
1	Total Households	2554149	3340538	786389	2.72%	3753651
2	Rural Households	169528	79115	-90413	-7.34%	0
3	Urban Households	2384621	3261423	876802	3.18%	3753651

ENERGY CONSUMPTION IN DELHI- 2005-15 (IN MUS)

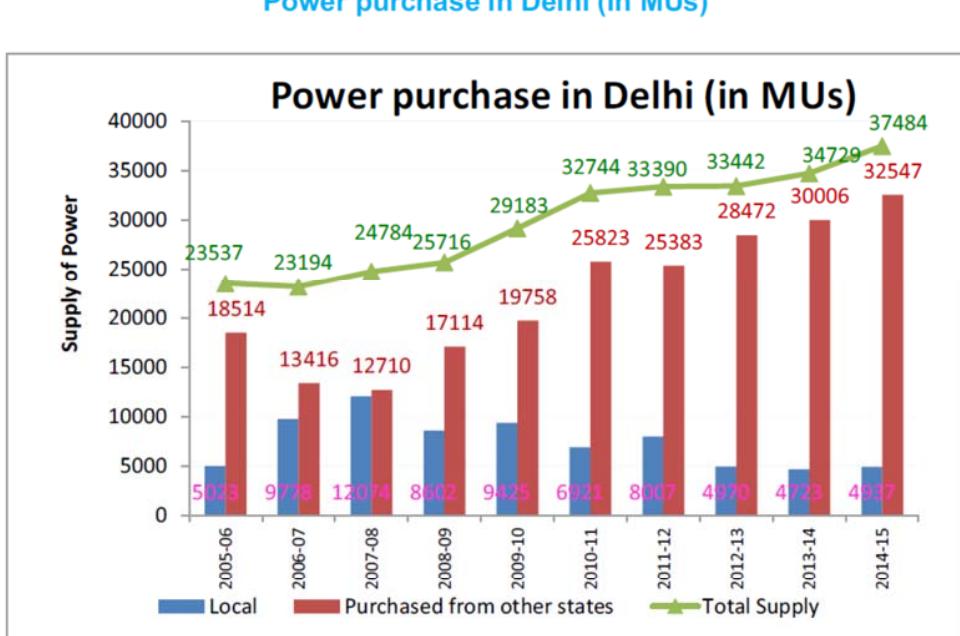


The report further mentions that there has been simultaneous growth of industries in unorganized sector. In addition, there has been establishment of new industrial estates like Bawana and Bhogarh for resettlement of industries which were earlier operating in the residential areas.

The thrust on energy front in Delhi is mainly to have uninterrupted power supply and to take care of increasing power demand owing to phenomenal growth of population caused by migrating population from other parts of country and also increased commercial activities.

Power Generation

Though the demand for power has risen over the years, Delhi has been unable to produce the same on its own soils and has been purchasing power from Central



Source: - Delhi Statistical Handbook, 2014, DERC for 2014-15

GOVT. EXPENDITURE IN ENERGY SECTOR

Sl. No	Years	Expenditure		
		Total Plan Expenditure	Energy Sector	% of Energy Expr. to Total Plan Expr.
1.	2005-06	4280.87	271.47	6.34
2.	2006-07	5083.70	257.24	5.06
3.	2007-08	8745.32	1256.75	14.37
4.	2008-09	9619.32	567.08	5.90
5.	2009-10	11048.14	461.00	4.17
6.	2010-11	10490.81	250.83	2.39
7.	2011-12	13642.54	1833.26	13.44
8.	2012-13	13237.53	1271.61	9.61
9.	2013-14	13963.63	326.00	2.33
10.	2014-15	13371.78*	581.26	4.35

* Provisional expenditure

Government and other states. The total power purchase in Delhi has grown by 59.26% over 2005 - 2006. It has increased from 23,537 MU in 2005-06 to 37,484 MU in 2014-15. While 13.17% of

total power purchase is sourced from own generation by Delhi Govt. Power Plants, 86.83% is purchased from Central Govt. and other sources. This tells upon heavily on the government's exchequer.

Furthermore, since Delhi sources over 80% of its power from others, it makes the case of supplying uninterrupted power supply to all its citizens further difficult and also may lead to conflict of interests in the near future thus underlining Delhi's local energy insecurity. In order to achieve 24X7 power supply, Delhi has to look into demand side management reducing its consumption over a period and also create a change in its energy mix by resorting to renewable energy.

Further, the total electricity available in Delhi during the year 2015-16 is 30559 million units which comprise 5941 of million units generated locally and 24618 million units purchased from other States.

The challenge before the Delhi Government in the energy sector is to meet the continuously increasing power demand to supply reliable and quality of power at a reasonable cost and to augment the infrastructure for transmission, generation and distribution of power. Distribution of power has been privatized in Delhi with effect from 1st July 2002 and both transmission and generation are with three Government owned companies, i.e. Delhi Transco Limited, Indraprastha Power Generation Company Limited (IPGCL) and Pragati Power Corporation Limited (PPCL). Power Sector Reforms has improved the power scenario of Delhi in terms of reduction of transmission and distribution losses, customer services, capacity addition of transmission and generation of power.

Indraprastha Power Generation Company Limited (IPGCL) and Pragati Power Corporation Limited (PPCL) are managing following power plants in Delhi having a total installed generation capacity of 2118.2 MW. There is 1500 MW Coal Based Indira Gandhi Super Thermal Power Plant set-up in Jhajjar, Haryana by Aravali Power Company Private Limited, a joint Venture of IPGCL, HPGCL and NTPC Limited. The power generated is being shared equally by Delhi and Haryana. The Commercial Operation of this plant started on 26th April 2013. The Plant, under Stage-I, has 3 units of 500MW capacity, and all the units have been

fully commissioned. There is a future provision of augmenting the capacity by 1320 MW (2 x 660 MW) under Stage-II.

STATEMENT 11.3
DISTRIBUTION OF ELECTRICITY IN DELHI

Year	Pattern of Electricity Distribution in Delhi (In Million Unit)									
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15*
Domestic	6107	6825	6945	7481	8753	9723	10396	10796	11609	12649
Commercial	3251	3730	3944	4701	4741	5074	6253	5569	6786	6370
Industrial	2383	2518	2831	2851	2991	3008	2989	2979	3064	3062
PWW& Street Lighting	246	275	498	198	404	734	748	870	838	1219
NDMC & MES	1296	1339	--	1286	--	75	--	--	--	--
Others	300	417	683	827	955	1144	1314	1147	1484	1810
Total	INSTALLED CAPACITY OF POWER GENERATION IN DELHI									
	25111									

(As on 30th September 2014)

S. No	Companies/Station	Fuel	Units
1.	Indraprastha Power Generation Company Limited (IPGCL)		
	a. Rajghat Power House	Coal	2 x 67.5 MW = 135 MW
	b. Gas Turbine Power Station (GTPS)	Gas	$\left. \begin{array}{l} 6 \times 30 \text{ MW (GTs)} \\ + \\ 3 \times 34 \text{ MW (STGs)} \end{array} \right\} = 282 \text{ MW}^*$
2.	Pragati Power Corporation Limited (PPCL)		
	c. Pragati-I Power Station	Gas	$\left. \begin{array}{l} 2 \times 104 \text{ MW (GTs)} \\ + \\ 1 \times 122 \text{ MW (STGs)} \end{array} \right\} = 330 \text{ MW}$
	d. Pragati-III Power Station, Bawana	Gas	$\left. \begin{array}{l} 4 \times 216 \text{ MW (GTs)} \\ + \\ 2 \times 253.6 \text{ MW (STGs)} \end{array} \right\} = 1371.2 \text{ MW}$
	Total	--	2118.2 MW**

Source: Indraprastha Power Generation Company Limited and Pragati Power Corporation Limited.

* Derated to 270 MW

** Total Capacity 2106.2 MW (Derated)

The supply of electricity in Delhi periphery increased from 23537 million units in 2005-06 to 37484 million units in 2014-15. The distribution of electricity in Delhi to various categories of consumers increased from 13583 million units in 2005-06 to 25111 million units in 2014-15. Category wise Consumption of electricity in Delhi during 2005-06 to 2014-15 is presented below:

Plant Load Factor

Load, in electrical engineering, is the amount of current being drawn by all the components (appliances, motors, machines, etc.). **Base Load** is the minimum level of electricity demand required over a period of 24 hours. This is often referred to as a continuous load. **Peak Load**

Statement 11.2
**PLANT LOAD FACTOR / AVAILABILITY FACTOR OF
 POWER PLANTS IN DELHI-2005-15**

Sl. No	Year	Indraprastha Power Station	Rajghat Power House	Gas Turbine Plants	Pragati-I Power Station	Pragati-III Power Station	(Percentage)
							Total
1.	2005-06	45.42	48.57	70.76	79.53		64.35
2.	2006-07	43.92	53.69	57.17	77.99		60.31
3.	2007-08	47.26	76.04	60.38	84.72		67.31
4.	2008-09	44.05	74.16	53.05	83.07		64.06
5.	2009-10	35.04 (64.09)	54.55 (54.64)	63.32 (73.28)	84.85 (85.50)		71.38 (75.34)
6.	2010-11	Decommissioned on 31.12.2009	66.05 (75.98)	57.85 (81.91)	80.80 (86.32)		68.23 (81.40)
7.	2011-12	--	69.01 (68.37)	52.21 (79.41)	88.32 (92.61)	38.36 (68.65)	69.14 (82.31)
8.	2012-13	--	67.04 (66.94)	55.28 (84.22)	86.77 (90.50)	30.24 (88.04)	54.15 (85.71)
9.	2013-14	--	32.12 (67.55)	44.01 (85.76)	83.90 (92.62)	9.16 (95.69)	33.71 (91.13)
10.	2014-15 (upto Sept.2014)	--	57.41 (65.82)	44.93 (61.21)	66.93 (69.93)	14.61 (95.86)	21.42 (88.56)

Sources: - Indraprastha Power Generation Company Limited and Pragati Power Corporation Limited.
 Figures in parenthesis relates to availability factor.

is the time of high demand. These peaking demands are often for shorter durations. It is the difference between the highest demand and the base load.

The plant load factor is the gross output of a power plant compared to the maximum output it could produce. It is the ratio between the actual energy generated by the plant to the maximum possible energy that can be generated with the plant working at its rated power and for a duration of an entire year. The availability factor of a power plant is the percentage of the time that it is available to provide energy to the grid. The availability of a plant is mostly a factor of its reliability and of the periodic maintenance it requires. It may be inferred from the above table that the average plant load factor of all power plants of Delhi during 2014-15 upto September 2014 was 21.42 per cent and availability factor at 88.56 per cent. The reason for low Plant Load Factor attributed to non-availability of gas for Bawana plant.

Transmission and Distribution

The challenge before the Delhi Government in the energy sector is to meet the continuously increasing power demand to supply reliable and quality of power at reasonable cost and to augment the infrastructure for transmission, generation and distribution of power. Distribution of power has been privatized in Delhi with effect from 1st July 2002 and both transmission and generation are with three Government owned companies, i.e. Delhi Transco Limited, Indraprastha Power Generation Company Limited(IPGCL) and Pragati Power Corporation Limited (PPCL). The distribution of power in Delhi has been handed over to Private companies. These are joint venture companies having majority stake (51%) of Pvt. Players and 49% of Govt. of Delhi. The power distribution in other two municipalities i.e. NDMC and MES respectively remains with Govt. Accordingly the distribution function is taken care of by following companies/ bodies:

- i) BRPL (BSES Rajdhani Power Limited, JV with Reliance Infrastructure) – South and West Delhi.
- ii) BYPL (BSES Yamuna Power Limited, JV with Reliance Infrastructure) – East and Central Delhi.
- iii) TATA Power Delhi Distribution Ltd. (JV with TATA Power) – North and North West Delhi.

- iv) NDMC – (Govt. owned deemed licensee) – Areas include Parliament house, Rashtrapati Bhavan, Residential areas of Ministers, Members of Parliament, Embassies etc.
- v) MES (deemed licensee under Defence Ministry

In fact, Delhi is one of the successful cases of Privatisation in India. The privatization process in Delhi started in Feb'1999 when a strategy paper was issued by the Govt. of NCT of Delhi. Privatisation has improved the power sector issues in Delhi in almost every area such as AT&C losses has been decreased significantly to 11% by TPDDL, Quality of the power supply has been increased, trend of losses has been decreased, Standard of Performance has increased significantly, Regulatory commission working independent from political interference compared to other states, surplus power capacity and power cuts has been decreased to almost zero hours.

The best case of multiple licenses was noticed in Delhi after privatisation in 2002, which resulted in improved operational performance, reduction in AT&C losses, and reduction in incidences of load shedding. NDPL, BSES, and BRPL, the three distribution companies, came into existence and took charge of power distribution in different areas of Delhi. The concept of distribution franchisees was introduced under the Electricity Act 2003, under which a distribution licensee could distribute electricity through another player within the distribution area.

A document published by the Delhi government for supplying 24X7 power for all claims that Delhi already has 100% electrification and is able to provide reliable 24 X 7 power supply to all its consumers. While other major States have power deficit from 2.6% to 12%, Delhi has surplus to the tune of 20%. The total area of Delhi is only 1500 sq. km but the power consumption of Delhi is 30,000 million units per annum which is much more than many large states. The peak demand is seasonal and varies from 3000 MW to 6000 MW. In 2009-10, Delhi's per capita electricity consumption was 1651.26 kWh where national per capita electricity consumption was 778.71units. **Based on the data available, the per capita**

consumption is 1561 units/ year during FY 2014-15 in the state of Delhi which is higher than the National average of 1010 units/ year.

Table-3.1
Power Supply Scenario (Peak Demand/Met DISCOM wise)

Sl. No.	Data description	Year-wise figures from FY 2012-13 to FY 2014-15		
		FY 2012-13	FY 2013-14	FY 2014-15
Power Supply Position				
	BRPL			
(i)	Peak Demand (MW)	2338	2235	2550
(ii)	Peak Met (MW)	2338	2235	2550
(iii)	Peak Deficit/Surplus (MW) (-/+)	0	0	0
(iv)	Peak Deficit/Surplus (%) (-/+)	0	0	0
	BYPL			
(i)	Peak Demand (MW)	1461	1487	1496
(ii)	Peak Met (MW)	1461	1487	1496
(iii)	Peak Deficit/Surplus (MW) (-/+)	0	0	0
(iv)	Peak Deficit/Surplus (%) (-/+)	0	0	0
	TPDDL			
(i)	Peak Demand (MW)	1567	1579	1691
(ii)	Peak Met (MW)	1550	1579	1691
(iii)	Peak Deficit/Surplus (MW) (-/+)	-17	0	0
(iv)	Peak Deficit/Surplus (%) (-/+)	-1	0	0
	NDMC			
(i)	Peak Demand (MW)	359	374	382
(ii)	Peak Met (MW)	359	374	382
(iii)	Peak Deficit/Surplus (MW) (-/+)	0	0	0
(iv)	Peak Deficit/Surplus (%) (-/+)	0	0	0
	DELHI			
(i)	Peak Demand(MW)	5727	5714	6006
(ii)	Peak Met (MW)	5642	5653	5925
(iii)	Peak Deficit/Surplus (MW)(-/+)	(-)85	(-)61	(-)81
(iv)	Peak Deficit/Surplus (%) (-/+)	(-)1.5	(-)1	(-)1.3
(V)	Energy Requirement at state periphery(MU)	27019	27927	28848
(vi)	Availability (MU)	42210	50942	49347
(vii)	Deficit/Surplus (MU) (-/+)	15191	23015	20499
	Deficit/Surplus (%) (-/+)	56.2	82.4	71.1

The details of existing generating capacity available as on 31.03.2015 for the State of Delhi are shown in Table below:

Table -4.1**Existing Generation Capacity/ Allocation of Power for Delhi - As on 31.03.2015**

Ownership/ Sector	Mode-wise Breakup (MW)								
	Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)		
	Coal	Gas	Diesel	Total					
State	0.00	1697.00	0.00	1697.00	0.00	0.00	0.00	1697.00	
Private/IPPs	1023.38	94.00	0.00	1117.38	0.00	0.00	16.50	1133.88	
Central	3679.67	205.01	0.00	3884.68	103.00	768.43	0.00	4756.11	
Total :	4703.05	1996.01	0.00	6699.07	103.00	768.43	16.50	7587.00	

*Source: Delhi Power Utilities***Table -4.1a****DISCOM-wise Capacity Allocation of Delhi - As on 31.03.2015(MW)**

Ownership/ Sector		State	Private/ IPPs	Central	Total
Share of	BRPL	693.98	232.14	1892.84	2818.96
	BYPL	328.23	257.73	1102.52	1688.49
	TPDDL	449.79	638.00	1507.75	2595.54
	NDMC	200.00	4.61	250.00	454.61
	MES	25.00	1.40	3.00	29.40
TOTAL		1697	1133.88	4756.11	7587.00

Source: Delhi Power Utilities

As shown in above table, the total generation capacity / allocation of power as on 31.03.2015 for the State is 7587.00 MW. Out of which 61.99% is from Coal based Thermal, 26.31% is from Gas based Thermal, 1.36% is from Nuclear, 10.13% is from Hydro and balance 0.22% is from Renewable Energy sources. In terms of ownership, Central Sector has the largest share i.e. 62.69%, followed by State (22.37 %) and IPPs (14.95%).

As the Demand of the power supply is increasing and number of consumers are increasing, Discoms are facing complexity in maintenance of the power supply, power procurement and load management. It was observed initially that electricity tariff was continuously increasing in Delhi with the increased power purchases from other states. Although Power scenario has improved in Delhi compared to other states but there is a need to maintain the power tariff at stable level and as minimum as possible to make the electricity feasible to every consumer in the state. To some extent this aspect has been taken care of by the AAP government. The new Government in Delhi is committed to resolve the problem of consumers and reduce the burden of tariff. Various steps in this regard has been taken like reducing the electricity bills of 90% of the consumers by half, containing the load shedding to lowest ever figures in the history i.e. 0.14% of the total consumption. Though the government has been successful in

reducing the power tariff of the domestic sector through subsidisation, the peak load from this sector has been increasing and also the growing demand has to be met.

A recent Centre for Science and Environment, Delhi study shows that there is little difference in Delhi in peak demand for electricity between day and night. The Load Generation Balance Report 2015 -2016 shows that Delhi consumes more electricity than the states of Himachal Pradesh, Jammu and Kashmir, Uttarakhand, Chattisgarh, Goa, Kerala, Bihar, Jharkhand, Odisha, Sikkim and all states of North East. It also consumes more power than all other metros put together. In Delhi, the household electricity consumption per capita is about 43 units per month, whereas the national average is 25. Currently, domestic power tariff is the lowest among all metros. The report argues that AAP government gives power subsidy of 5-% for monthly consumption upto 400kWh and Delhi's average consumption is only about 181 400kWh and nearly two fifths of Delhi's households consume less than 100 Kwh per month. The subsidy thus allows for a comfortable use of number of appliance like air conditioners and cushions substantial household energy costs. The CSE analysis has also shown that Delhi's peak demand has doubled in the last ten years, growing faster than the population of the city. In 20-14 June it registered a peak demand of 6006 MW. This demand was higher than the combined higher peaks of Mumbai, Kolkata and Chandigarh. CEA's projection shows that Delhi's peak demand will cross 6300MW in 2015 and 1200 MW in 2021. CSE also observed that day peak builds up in the late afternoon around 3.30 p.m and the second peak hits around midnight. There was barely any difference between night and day peaks during the month of May. Whilst the night peak demand on 24th May 2015 was 5091 MW, the day peak demand was 4667 MW. The night demand was higher or differed by 1to 4%. Though at and especially midnight all commercial establishments remain closed. Growing reliance on air conditioners upsets the energy balance in the city.

In Delhi air conditioners now account for the highest consumption of electricity during the hottest months accounting for about 28% of the total monthly electricity consumption. According to a BEE estimate Ac's contribute to about 60% of the peak energy demand. Delhi is confronted with the issue of peak demand shortfall and the deficit in peak demand can be reduced through proper implementation of DSM strategies and energy efficiency and energy conservation measures and by transmuting to a renewable energy through solar rooftop

generation. This also wants a reduction in the consumption load that needs to be regulated with Time of Use and Time of Day with proper energy pricing indicating sustainable consumption and production pattern.

The generation mix as of the State of Delhi as proposed by the government is shown in Table below:

Table -4.5

GENERATION MIX FOR THE STATE OF DELHI

Sl. No.	Description	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
a.	Thermal	88.30%	86.94%	86.12%	77.10%	73.07%
b.	Hydro (Renewable)	10.13%	10.70%	11.01%	9.86%	14.57%
c.	RES (MNRE)	0.22%	1.03%	1.54%	11.85%	11.27%
b.	Nuclear	1.36%	1.34%	1.32%	1.19%	1.09%

Renewable Energy

Solar Photo Voltaic (SPV) Power Plant of 2.14 MWp at Indira Gandhi International Airport has been successfully installed and commissioned. It is proposed to develop New Delhi Municipal Council (NDMC) area as Solar City by installing SPV panels on rooftop of Government buildings, Metro Stations, Bus Stops, etc. Govt. of India approved for installation of Grid Connected Rooftop Projects in NCT of Delhi. All the grid connected projects have contributed to nearly 7 MW of power in Delhi till November 2014 generating around 2.34 MUs in 2014-15. A 16 MW Waste-to-Energy plant utilizing Municipal Solid Waste to generate electricity is operational since 2012 at Old NDMC Compost Plant, New Delhi. Setting up of some more 'Waste-to-Energy' plants is under progress at Connaught Place and Bawana.

AT&C LOSSES IN DELHI – POST POWER SECTOR REFORMS PERIOD

Aggregate Technical & Commercial (AT & C)

Aggregate Technical and Commercial Losses is the difference between energy units put into the system and the units for which the payment is collected.

Transmission and distribution loss do not capture losses on account of non-realization of payments. AT&C loss is the actual measure of overall efficiency of the distribution business as it measures both technical as well as commercial losses.

The main reasons for

SI. No.	Year	BYPL	BRPL	NDPL
1.	Opening Level of AT&C Losses	57.20	48.10	48.01
2.	2002-03			
	a. Target	56.45	47.55	47.60
	b. Achievement	61.88	47.40	47.79
3.	2003-04			
	a. Target	54.70	46.00	45.35
	b. Achievement	54.28	45.06	44.86
4.	2004-05			
	a. Target	50.70	42.70	40.85
	b. Achievement	50.12	40.64	33.79
5.	2005-06			
	a. Target	45.05	36.70	35.35
	b. Achievement	43.87	35.53	26.52
6.	2006-07			
	a. Target	39.95	31.10	31.10
	b. Achievement	39.03	29.92	23.73
7.	2007-08			
	a. Target	34.77	27.34	22.03
	b. Achievement	29.80	27.17	18.56
8.	2008-09			
	a. Target	30.52	23.46	20.35
	b. Achievement	24.02	20.59	16.74
9.	2009-10			
	a. Target	26.26	20.23	18.68
	b. Achievement	24.32	20.53	15.16
10.	2010-11			
	a. Target	22.00	17.00	17.00
	b. b. Achievement	21.95	18.82	14.15
11.	2011-12			
	a. Target	18.00	15.00	15.33
	b. b. Achievement	22.07	18.11	11.49
12.	2012-13			
	a. Target	16.82	14.16	12.50
	b. b. Achievement	21.14	17.12	10.73
13.	2013-14			
	a. Target	15.66	13.33	12.00
	b. b. Achievement	21.53	16.20 (P)	10.35
14.	2014-15			
	a. Target	14.50	12.50	11.50
	b. b. Achievement	NA	NA	NA

Sources:- DERC, Discoms and websites.

technical losses may be due to overloading of existing lines and substation equipments, absence of up-gradation of old lines and equipments, low HT:LT Ratio, poor repair and maintenance of equipments, non- installation of capacitors for power correction, etc. On the contrary, commercial losses may be due to low metering/billing/collection efficiency, theft, tampering of metering system, low accountability of employees, absence of energy audit and accounting etc. After reforms in power sector the AT & C losses in Delhi reduced significantly

from 52% in the pre-reform era to 12.83% (T) in 2014-15. The information regarding AT&C losses in Delhi during 2002-15 is presented in Statement

The Aggregate Technical & Commercial (AT & C) losses in Delhi further reduced significantly to 12.15% in 2015-16. The total numbers of electricity and water consumers in Delhi during 2015-16 are 5262835 and 19,49,150 (Metered Connections), 389694(Unmetered Connections) respectively.

5.0 Energy Governance and Government Initiatives

Constitution of India defines that Central Government as well as state Governments can set up guidelines relating to power sector. Thus Power is a subject in concurrent list and it is the responsibility of both Union and State

Indian Power Sector has seen development after the Independence but yet to develop a lot in order to achieve 8.1% per annum growth rate. The Indian power sector has made significant progress over the years. The sector has also undergone substantial structural changes. Regulatory policies have played a predominant role in changing the landscape of the Indian power sector.

The industry has been regulated for almost a century and the Electricity Act 1910 was the first act that was introduced to govern the Indian power sector. The Electricity (Supply) Act 1948 was introduced after independence, but it did not achieve the desired results, as the power sector's performance started to deteriorate and a need was felt to restructure the sector. Several regulatory changes were made since 1991, which transformed the industry's performance.

The deteriorating health of the SEBs made it impossible for them to infuse fresh investments into the sector. Moreover, the country was facing a macroeconomic financial crisis that made



Source: D&B Industry Research Service

it difficult for the governments, both the Central and state governments, to fund power projects through budgetary support. Due to these events, the government decided to restructure the power sector in a phased manner in 1991; consequently, it opened up the power sector (liberalized) and invited foreign private companies to get funds and technology into the Indian power sector.

After the Electricity Act'2003, Indian Power sector is broadly divided into:

Generation, Transmission and Distribution

Before the unbundling of the power sector there is a belief that India has no sufficient installed capacity and hence India has taken initiatives towards the installed capacity in terms of capacity addition targets in every 5 year plans. But after unbundling it has been identified that major losses to the electricity business is on distribution side.

The distribution segment was not given more consideration in the earlier regulations, which lay more emphasis on the power generation segment instead. It was considered that by increasing power generation, the demand for power could be met to some extent, but the industry suffered huge losses (T&D and financial) on the distribution side. SEBs, the main

bodies involved in power distribution segment, were in bad financial shape, which made it difficult for them to pay the generator for the electricity supply. The risk of defaults from the SEBs worried generators and hindered new players from entering the industry. The Electricity Act 2003 came up with measures that could improve the performance of the distribution sector on almost all fronts.

The measures meted out included more than one distribution licenses permitted in the same area, which increased competition among the distribution licensees, and ensured better services for the end consumer.

The anti-theft provisions under the Act lowered the commercial losses of utilities as electricity losses arising from theft decreased continuously and investors started to show renewed interest.

In the distribution segment, open access was introduced, which opened up a new era of choice for consumers to choose their supplier. Many SERCs like Jharkhand, Madhya Pradesh, and Punjab have issued guidelines for open access and allowed it up to 1 MW capacity and above. Even though SEBs are handling the regulatory operations, the Act has mandated the creation of regulatory commissions in each state; these commissions have played a significant role in passing different regulations and monitoring performances of the state utilities. Few of the state regulatory bodies have set targets for their utilities, and achievement of these targets before the scheduled time which fetches them incentives and any delay gets them penalised. Thus, the structure is more regulated.

Among all the functions of regulatory commissions, tariff determination is the main function in which there are key challenges involved before regulatory commission to get trade-off between the benefit of both consumers and financially degrading Distribution companies (Discoms).

Delhi's Restructuring and Establishment of DERC

The Delhi Vidyut Board (DVB) was a State Electricity Board (SEB) set up in 1997 under the Electricity (Supply) Act, 1948, succeeding the Delhi Electricity Supply Undertaking (DESU), which had existed since 1957 as a wing of the Municipal Corporation of Delhi; it was an integrated utility with generation, transmission and distribution functions serving all of Delhi except the NDMC and MES (Cantonment) areas, to which it supplied power in bulk. The creation of DVB, replacing DESU, in 1997 proved to be merely a change in the legal status of the organization and was not followed by any real change in its structure, functioning and work culture: its reputation continued to deteriorate and its poor commercial performance—the best known thing about DVB perhaps being its high Transmission and Distribution (T&D) losses—made it a drain on the public exchequer and incapable of raising the resources necessary to improve its services. There were unprecedented, widespread expressions of public discontent during the difficult summer of 1998. Against the above background, one of the first major steps taken by the new Government of the NCT of Delhi was to bring out a Strategy Paper on Power Sector Reforms in February 1999. This paper envisaged:

- Setting up of a Regulatory Commission;
- Unbundling of the DVB into separate Generation, transmission and distribution companies;
- Disinvestment of distribution;
- Interim measures to improve the performance of DVB;
- Protection of staff interests.

Starting with a strategy paper, the then new Delhi Government moved quickly to restructure the electricity industry in the territory and privatize the distribution business. In a little over three years, in July 2002, the distribution business was handed over to private parties.

Delhi Electricity Regulatory Commission

The Govt. of India had enacted the Electricity Regulatory Commissions Act, 1998 (No.14 of 1998) on 2nd July, 1998 with the objective of providing for the establishment of a CERC and

SERCs, rationalization of electricity tariff, transparent policies regarding subsidies, promotion of efficient and environmentally benign policies and for matters connected therewith or incidental thereto.

The DEREC came into existence under section 17 of Electricity Regulatory Commission Act, 1998 (ERC Act, 1998) on 3rd March 1999 through a Notification of the Government of NCT of Delhi on the 10th of December 1999 to discharge the following functions.

1. To determine the tariff for electricity, wholesale, bulk, grid or retail, as the case may be, in the manner provided in Section 29 of the ERC Act, 1998;
2. To determine the tariff payable for the use of the transmission facilities in the manner provided in Section 29 of the ERC Act, 1998;
3. To regulate power purchase and procurement process of the transmission utilities and distribution utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in the National Capital Territory of Delhi;
4. To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of the Central Electricity Regulatory Commission Act, 1998;
5. Any other functions the Government of NCT of Delhi may notify further from time to time.

The Government of NCT of Delhi promulgated the Delhi Electricity Reform Ordinance, 2000 on 28th October 2000. The Commission constituted under the ERC Act, 1998 was deemed to be the first Commission under the aforesaid Ordinance. The DER Bill, 2000 after receiving the assent of the President, was later notified as the Delhi Electricity Reform Act, 2000 (DERA, 2000).

This Act provided for the constitution of an Electricity Regulatory Commission for the NCT of Delhi to be known as —Delhi Electricity Regulatory Commission to exercise the following functions.

- To determine the tariff for electricity, wholesale bulk, or retail, as the case maybe;
- To determine the tariff payable for the use of the transmission facilities;
- To regulate power purchase and procurement process of the licensees and transmission utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in the National Capital Territory of Delhi;
- To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of this Act;
- To aid and advise the Government in matters concerning electricity generation, transmission, distribution and supply in the National Capital Territory of Delhi;
- To regulate the operation of the power system within the National Capital Territory of Delhi;
- To set standards for the electricity industry in the National Capital Territory of Delhi including standards related to quality, continuity and reliability of service;
- To promote competitiveness and make avenues for participation of private sector in the electricity industry in the National Capital Territory of Delhi and also to ensure a fair deal to the customers;
- To aid and advise the Government in the formulation of its power policy;
- To collect and publish data and forecasts on the demand for, and use of, electricity in the National Capital Territory of Delhi and to require the licensees to collect and publish such data;
- To regulate the assets, properties and interest in properties concerned or related to the electricity industry in the National Capital Territory of Delhi including the conditions governing entry into and exit from the electricity industry in such manner as to safeguard the public interest;
- To issue licenses for transmission, bulk supply, distribution or supply of electricity and determine the conditions to be included in the licenses;
- To regulate the working of the licensees and other persons authorized or permitted to engage in the electricity industry in the National Capital Territory of Delhi and to promote their working in an efficient, economical and equitable manner;

- To require licensees to formulate prospective plans and schemes in coordination with others for the promotion of generation, transmission, distribution, supply and utilization of electricity, quality of service and to devise proper power purchase and procurement process;
- To adjudicate upon the disputes and differences between the licensees and/or transmission utilities and to refer the matter for arbitration;
- To aid and advise the Government on any other matter referred to the Commission by the Government.
- Subsequently Government of India notified the Electricity Act, 2003 which repealed the ERC Act, 1998.

The Act further provides that the Commission would be guided by the National Electricity Policy, National Electricity Plan and Tariff Policy published under section 3 of the EA, 2003. After enactment of EA, 2003, the provisions of DERA, 2000 so far as not inconsistent with the provisions of EA, 2003 would be applicable.

DERC is a three member body entrusted with a responsibility of regulating the electricity sector in the state in a rational, transparent and participative manner. Its responsibilities include tariff setting, overseeing service quality, approving Power Purchase Agreements between a DISCOM and a generating company etc. All deliberations before DERC are public. Therefore, any consumer can participate in the decision making process in the electricity sector ranging from setting the service quality standards to tariff revision. For example, if a DISCOM wants a hike in tariff, it has to approach the SERC with a detailed proposal. DERC invites public comments on the proposal, holds a public hearing where any consumer is allowed to present his views and then decides the revised tariff. As per the Electricity Act 2003, for better handling of consumer grievance, every DISCOM is expected to have one or more CGRFs and every state one or more offices of the Ombudsman. CGRF and Ombudsman in Delhi would function according to regulations notified by the DERC.

Government Schemes

A new scheme namely “Integrated Power Development Scheme (IPDS)” has been launched (earlier known as Restructured Accelerated Power Development and Reforms Programme (R-APDRP)) by Government of India with an objective to reduce Aggregate Technical and Commercial (AT & C) losses, to establish IT-enabled energy accounting/auditing and to improve collective efficiency. Its prime objective is for strengthening of the sub-transmission and distribution network in urban areas, metering of distribution /feeders/ transformers /consumers in urban areas and roof top solar panels. The project proposal under IPDS is under submission to Govt. of India for financing of distribution related works during 2015-16.

There has been growing recognition of the importance of energy efficiency in India's electricity sectors. The Ministry of Power (MoP) is the nodal agency for energy conservation in the country. The Bureau of Energy Efficiency (BEE), an autonomous body under the MoP, was set up in 1989 to coordinate initiatives and activities on energy conservation. Several state electricity boards (SEBs) have also set up Energy Conservation Cells, some of which have been assisting industries in conducting energy audits. Several reports have been attempted to estimate the potential for energy conservation in various consuming sectors and have also identified various Energy Efficiency technologies (EETs) for important end-uses.

The National Energy Efficiency Program (NEEP) of the Government of India (GOI) has targeted savings of about 5000 MW to be realized by the end of the Eighth plan through both demand (2750 MW) and supply side (2250 MW) efficiency improvements. In terms of Government policies, there are special equipment in the first year, subsidies for energy audits, reduced customs duty for selected control equipment for managing energy use, and so on.

The National Mission for Enhanced Energy Efficiency (NMEEE), launched under the National Action Plan on Climate Change (NAPCC) has not been able to achieve its intended goals due to poor inter-sectoral linkages.

The BEE would specifically look at convergence with existing national programmes and plan appropriate interventions: **100 Smart Cities, Housing for All by 2022, Power for All by**

2022, 175 GW of renewable energy by 2022 etc. to achieve synergy. The initiatives such as Smart Cities and solar pumps should mandate using only the most efficient appliances.

The Delhi Government has also drafted the Delhi Solar Policy for increasing the renewable energy share in the energy mix of Delhi.

In order to achieve local energy security and to ensure sustainable development, Delhi Government has also initiated many programs in the field of Renewable Energy, Energy Efficiency and Energy Conservation in order to reduce the dependence on fossil fuels.

6.0 Challenges

The Challenges for the energy sector listed out:

- a) Reducing dependence on Fossil Fuels as 88.29% of the generation/allocation of power to Delhi is based upon thermal or fossil fuel sources
- b) Reducing Peak energy demand. The average cost of electricity is going up, as shortage during peak and surplus during non-peak
- c) Achieving local energy security as Delhi imports more than 80% of its electricity requirements
- d) Correction of the skewed energy pricing of the residential sector curbing excessive usage of air conditioners for reducing peak energy demand
- e) Transmuting to energy smart grid system

7.0 Action Plan

Scrutinising the state of affairs, one needs to explore beyond the conventional mechanisms available for mitigating the aforesaid challenges. As evident, it can be concluded that Delhi has little reasons to worry with respect to accessibility of clean energy as over 90% of Delhi uses LPG/PNG for cooking. A further awareness programme for the slum areas, JJ colonies and the unauthorised colonies will enable Delhi to transmute to 100% clean cooking fuel.

The question arises as to how Delhi can transmute to a smart grid and maintain local energy security. A smart grid is usually an electric grid that entails a variety of operational and energy measures including smart meters, smart appliances, renewable energy resources and energy efficient resources

Access to energy is both a risk and an opportunity for business. Increasingly, sectors demanding energy especial industry and commercial activities are engaging more actively in managing their own energy supply by adopting smart energy management approaches in order to make them more resilient to price fluctuations and intermittency.

The short term measures that Delhi can take up in this sector are:

Improving the efficiency of various end-uses through better housekeeping correcting energy leakages, system conversion losses, etc ;

- Developing and promoting energy efficient technologies, and
- Demand management through adopting soft options like higher prices during peak hours, concessional rates during off-peak hours, seasonal tariffs, interruptible tariffs, etc.

Demand Side Management (DSM), In a wider definition, also includes options such as renewable energy systems, combined heat and power systems it is important to point out that DSM explicitly refers to all those activities that involve deliberate intervention by the utility in the marketplace so as to alter the consumer's load profile. The major Demand side management methods may include:

- Energy Conservation
- Demand Shift: Shifting of Demand from Peak hours to off-peak hours.
- Consumer Load Control (Load management)
- Energy Source shift (Renewables)
- Input control: Controlling the consumption pattern of the consumers

At the domestic level, which is major consumer in Delhi, demand side interventions may include:

- Purchase of Energy efficient appliances

- Subsidy limit changes in the use of electricity
- Time of day and time of Use based tariff
- National building codes
- Change of control after maximum usage limit

The long term measures are:

1. Constructing Green Building and Green Corridor

Green building (also known as **green construction** or **sustainable building**) refers to a structure and using process that is environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition.

Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

This will however, necessitate, close cooperation of the design team, the architects, the engineers, and the client at all project stages.

The ‘green energy corridor’ is aimed at synchronising electricity produced from renewable source such as solar and wind, with conventional power stations in the grid.

2. Develop a land use plan for reducing UHI effects, developing affable microclimatic conditions in zones through use of blue and green ecological assets.

This will require mapping of all natural resources of the city, heat emanating activities within the city, mapping of all green assets (vegetation open spaces), mapping of all water bodies and

methods for restoration/revival of degraded ecosystems for reducing the city's heat. This will require close coordination between design team, the architects, the engineers, ecologists, social scientists and the client at all project stages.

3. Develop a potent monitoring and evaluation mechanism

The road map prepared for reducing energy consumption and for transmuting to a smart grid system will require a strong monitoring and evaluation mechanism with capacity built at various levels.

Targets/indicators	Source	2016-17Baseline		Physical Targets		Remarks
		2017-20	2017-24	2017-30		
Target 7.1 Ensure universal access to affordable, reliable and modern energy services						
7.1.a Proportion of population with access to electricity						
7.1.b Per capita energy consumption						
7.1.c Proportion of population with primary reliance on clean fuels and technology						
7.1.d Proportion of people using liquid petroleum gas (LPG) for cooking and heating						
7.1.e Electricity consumption (KWH per capita)						
Target 7.2 Increase substantially the share of renewable energy in the global energy mix						
7.2.a Renewable energy share in total final energy consumption						
Target 7.3 Double the global rate of improvement in energy efficiency						
7.3.a Energy intensity measured in terms of primary energy and GDP						
7.3.b Percentage use of efficient lighting system- CFL (residential and commercial)						

7.3c Percentage use of efficient lighting system- LED					
7.3d Percentage use of electric vehicles in public transport systems					
Target 7a Enhance international corporation to facilitate access to clean energy, research and technology including renewable energy, energy efficiency and advanced and cleaner fossil fuel technology and promote investment in energy infrastructure and clean energy technology					
7aa Revenue allocated to sustainable development schemes					
Target 7b Expand infrastructure and update technology for supplying modern and sustainable energy services for all.					
7.b.a Coverage of area under electricity					
7b.b Capital outlet of new and renewable energy					

CHAPTER VIII: EDUCATION IN DELHI

Vision 2030

Delhi aspires to be a knowledge hub. It would provide quality education at all level in an inclusive way to cater to specific needs of all in safe educational environment. The vulnerable section must get its rightful share and opportunities in education.

INTRODUCTION

Education is being regarded the world over as a key area of focus for human development. Education provides young minds with the intrinsic value imbued in reading and writing skills, ability to connect and communicate with the world, and above all, the ability to reflect and act upon the reflection. Moreover, it lays the foundation for development of human capital of a nation.

SDG 4: ‘Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities for All’

THE DELHI CONTEXT

Education has been a priority area for the Delhi government. The budget for this sector has more than doubled from Rs 4799 crore in 2011-12 to Rs 10690 Crore in 2016-17. In 2016-17, the share of expenditure on education in the Gross State Domestic Product of Delhi was the highest at 1.72 per cent. This sector also received the highest share in budget allocation at 22.9 % in 2016-17⁵. The share of total expenditure by the government on education (plan and non-plan) including sports, arts and culture as a percentage of the total budget of the state has mostly been on an upward trajectory during the last six years, and has shown a jump from 18.18 % in 2011-12 to 21.44 % in 2015-16 (Revised Estimates) (Table 1). The latest budget estimates for 2016-17 indicate an even higher education expenditure share of 22.94%. The per

⁵Delhi Economic Survey 2016-17

student per annum expenditure incurred by the government on education has increased by one and a half times from Rs 29641 in 2012-13 to Rs 44640 in 2015-16.

Table 8.1: Expenditure on Education in Delhi and Share (%) in Budget and GSDP (Rs crore)

	Year	Expenditure on Education	Total Budget Delhi	% age Share of Expenditure on Education Total Budget	GSDP Delhi in Current Prices	%Share of Expenditure on Education to GSDP @
1.	2011-12	4798.76	26402.43	18.18	343767	1.40
2.	2012-13	5490.74	29858.80	18.39	391238	1.40
3.	2013-14	6169.11	34051.60	18.11	443783	1.39
4.	2014-15	6554.82	30940.10	21.19	492424	1.33
5.	2015-16	8138.28	37965.00	21.44	551963	1.47
6.	2016-17 (B.E)	10689.95	46600.00	22.94	622385	1.72

There are 5796 schools at present in Delhi, including those at pre-primary level through to Senior secondary level (Table 2). The overall enrolment in schools has increased by 13% between 2010-11 and 2015-16. Among the 5796 schools, Government schools account for 21% of the total, with 1011 Government schools and 211 Government aided schools⁶. However, the share of enrolment in government and government aided schools is quite high at 37.86% of total enrollment of all schools in Delhi in the same year. Are the rest in private schools? I have an estimate that 10 to 15% of children in the school going age, does not go to school at all. Can we indicate inequality estimates in this line?

The discussion will be framed around the individual targets under SDG 4, as applicable for Delhi. The status and present challenges will be discussed for each target, to the extent possible given data availability. This will be followed by vision for the targets and specific agenda for the short term till 2020.

⁶Note about aided and unaided

Table 8.2: Number of Schools in Delhi and Enrolment of Students (Pre-Primary till Senior Secondary)

		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Number of recognized schools in Delhi (Government + Government Aided + Unaided)						
	Pre-Primary+ Primary	2613	2632	2629	2709	2806	2779
	Middle	588	600	564	728	933	940
	Secondary	480	463	458	389	385	393
	Senior Secondary	1392	1427	1504	1627	1674	1684
	Total Schools	5073	5122	5155	5453	5798	5796
2	Enrolment of Students (in lakh)						
	Pre-Primary+ Primary	18.80	19.73	19.81	20.22	20.83	21.02
	Middle	9.83	10.10	10.63	11.16	11.16	11.20
	Secondary	6.34	6.79	6.44	6.44	6.52	6.92
	Senior Secondary	4.24	4.90	5.80	6.03	5.62	5.16
	Total Enrolment	39.21	41.52	42.68	43.85	44.13	44.30

Source: Delhi Economic Survey 2016-17

**Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
*School Access***

The enrolment for pre-primary, primary and middle level together is around 3.2 million, at the secondary level is 0.69 million and at the senior secondary level is 0.52 million, as seen from Table 2. The Gross Enrolment Ratio (GER) and Net Enrolment Ratio (NER) capture access to school education⁷. GER can include under-age and over-age students. On the other hand, NER reflects the age-appropriate enrolment. The GER and NER for Delhi is shown in Table 3 for the period 2008-09 to 2015-16⁸.

⁷GER indicates enrolment at a level, say Primary level, regardless of age, expressed as a percentage of the eligible official population (eg. primary school-age population) in a given school-year.NER refers to the enrolment at a school level, say Primary level, of the official primary school age group (6+ to 10+ years) expressed as a percentage of the corresponding population.

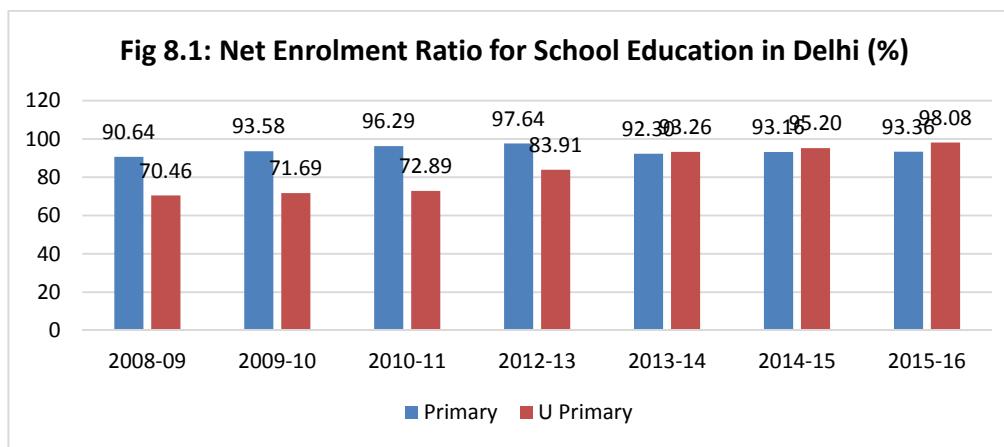
⁸GER and NER values for 2011-12 were not available.

Table 8.3: Gross Enrolment Ratio and Net Enrolment Ratio in Delhi

Year	Gross Enrolment Ratio (%)		Net Enrolment Ratio (%)	
	Primary	Upper Primary	Primary	Upper Primary
2008-09	112.71	99.45	90.64	70.46
2009-10	114.75	100.40	93.58	71.69
2010-11	119.90	99.88	96.29	72.89
2011-12	NA	NA	NA	NA
2012-13	117.81	109.99	97.64	83.91
2013-14	110.67	122.91	92.30	93.26
2014-15	111.75	125.24	93.16	95.20
2015-16	110.71	128.12	93.36	98.08

The GER for primary level was high in 2008-09 and has risen further till around 2012-13, after which it has declined to settle at around 110 percent. This indicates presence of some over-age or under-age students in Delhi schools. At upper primary level, the GER has increased steadily after 2012-13, highlighting the need to improve age-appropriate enrolment.

For NER, on the other hand, the primary level had high age-appropriate enrolment, but NER has declined since 2013-14 (see Fig. 1 also). For the upper primary level, there has been increase in NER over the



years and at present the NER is close to 100 percent. Thus, school access is good for Delhi for the elementary education.

At the secondary level, both GER and NER have been increasing over the past three years, but at the Senior Secondary level, both GER and NER have been on the decline in the same period (Table 4). Thus, access to schooling needs to be improved at the senior secondary level.

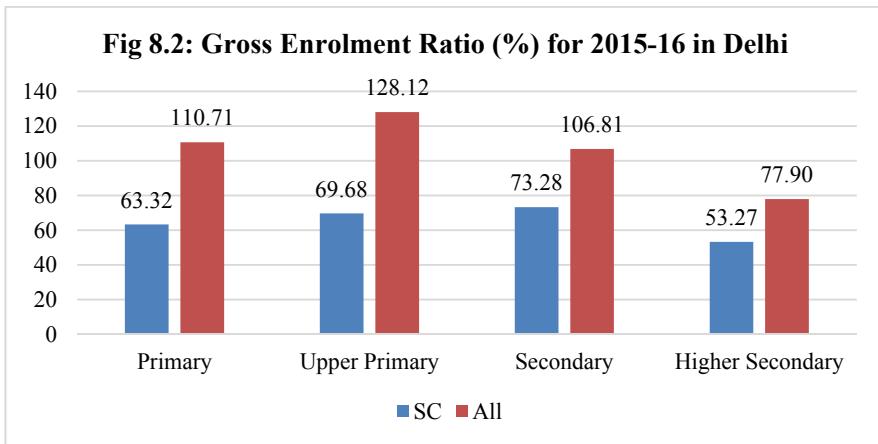
Table 8.4: GER and NER for Secondary and Senior Secondary levels

Year	Gross Enrolment Ratio (%)		Net Enrolment Ratio (%)	
	Secondary	Senior Secondary	Secondary	Senior Secondary
2013-14	102.40	100.42	64.35	57.42
2014-15	103.56	91.63	65.13	54.44
2015-16	106.81	77.90	68.73	50.71

Enrolment does not necessarily imply attendance. Considering current school attendance, data for 2014 indicate quite high Gross Attendance Ratios in Delhi for primary, and upper primary level at 96%. Even at secondary and higher secondary levels, the GAR is quite high at 79% and 93% respectively. The Net Attendance Ratios, which refers to more age-appropriate schooling, are, however, at much lower levels except for the primary level, indicating the need to bridge gaps in attendance to have better learning outcomes. Girls have higher NAR than boys for upper primary and secondary levels.

Disparity in access

The Delhi demographics is heterogeneous and segments of the population are often differentiated by earnings, asset holding, access to basic facilities, such as water and sanitation, as well as access to healthcare and educational opportunities, among others. Thus, not all its inhabitants have similar access to education. For instance, slum-dwellers comprise a large chunk of the inhabitants of Delhi, estimated at 1.9 million, and are at a disadvantage in this respect. Certain socio-religious groups such as Scheduled Castes, Scheduled Tribes and Muslims also tend to have additional barriers to accessing educational opportunities reflected in much lower achievements in this area vis-à-vis the general castes (Fig. 2). Youth literacy statistics show evidence of a gender gap, with female literacy (94.31%) below the male literacy (98.26%). Thus, school education in Delhi needs to be more inclusive and there should be equitable access. Is it related to private schools? In government schools, there cannot be such discrimination. May we conclude that more private schools, more disparity despite maybe qualitatively better?



Cost of Education

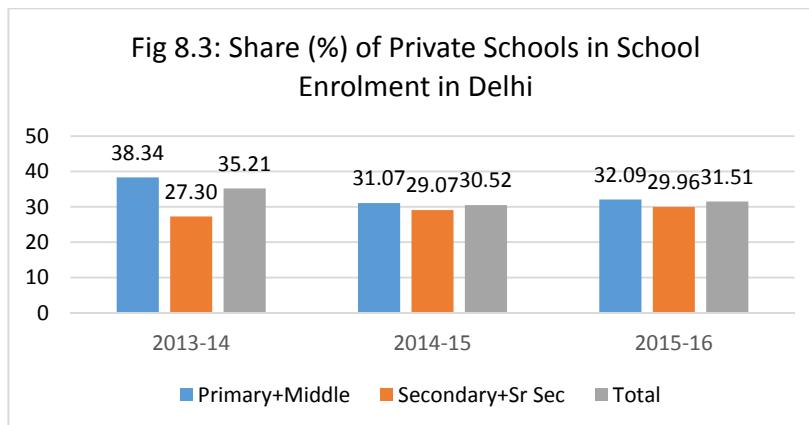
The cost of schooling at different levels of education in Delhi as on 31st March, 2014, are given below in Table 5, according to 71st Round of NSS information. A comparative estimate with all-India urban average costs shows that the average cost is higher in Delhi for all levels of education; it is closest to the all-India (urban) average for Higher Secondary and Post Graduate and above, while the gap is most for Upper Primary, and Diploma, followed by Primary level. The high cost of education in Delhi also brings

Table 8.5 Average Expenditure (Rs) per Student pursuing General Education during Current Academic Session as on 31st March 2014

Education level	Delhi	All India average (Urban)	Ratio Delhi to All India (Urban)
(1)	(2)	(3)	(2)/ (3)
Primary	16422	10083	1.63
Upper Primary	21444	11446	1.87
Secondary	17925	13547	1.32
Higher Secondary	22072	20179	1.09
Graduate	20527	16771	1.22
Post graduate and above	19341	17744	1.09
Diploma	41095	21947	1.87

focus on an important feature of the education landscape at present; namely, the increasing privatization of education. Private schooling is usually costlier than the education in government schools. Despite this, an increase in the share of the private mode of schooling is the trend all over India. In Delhi, too, the number of private school has increased enormously

from 1760 in 2007-08 to 2897 in 2014-15⁹ and the share of private schools in total school enrolment stood at 31.51 percent as of 2015-16¹⁰. But as Fig 3 shows, there has been a steep fall in the share of private schools in enrolment after 2013-14, from 35.21 percent in 2013-14 to 30.52 percent in 2015-16, possibly as a result of several government initiatives to improve and revamp government schools in the city. The graph shows that the dip in private share was



due to a fall in the share in enrolment at the primary and middle levels. For the higher levels, there has been a steady increase the share of private enrolment over the last three years.

Learning outcomes

The quality of education accessed by the children in schools can be assessed by how well they are learning. School pass percentages in Delhi are fairly good at 91.76 percent for Secondary and 87.06 percent for Senior Secondary. At the secondary level Delhi lags behind the all-India average of 96.21 percent, but at the Senior Secondary level, the performance of Delhi is better than the all-India average of 83.05 percent.

However, the school-leaving examinations may not be capturing the quality of education adequately, as indicated by learning outcomes at lower grades in school. At lower levels of schooling, it is seen that the performance for Delhi for various classes falls below the national average. The performance for class-III students in 2014 for Delhi was below the national average for both language and mathematics, and the gap was higher for mathematics (Table

⁹DISE State report card for Delhi accessed at

¹⁰Delhi Economic survey 2016-17

6). For both Delhi and All-India, the mathematics scores on an average are lower than the language scores. The Delhi data indicate that girls have performed better than boys in language and nearly equivalently for Math.

Table 8.6: Average Score (in a scale of 0-500) of students (Class III) in different abilities as per National Achievement Survey 2014

Proficiency in	Delhi			National Average		
	Boys	Girls	Total	Boys	Girls	Total
Language	250	256	253	256	258	257
Mathematics	245	244	244	253	252	252

Source: National Achievement Survey-2014, Cycle-3, Class-III

The proficiency in Language for Delhi students is higher than many northern state and UTs¹¹. The average score in Mathematics in Delhi is higher than Chandigarh, Haryana, Rajasthan and Uttarakhand, but the Delhi students performed worse than those in Punjab, Uttar Pradesh and Himachal Pradesh.

Tables 6.7 and 6.8 show the performance in terms of ability of students in class III and Class VIII respectively in language and mathematics related abilities. Although the percentage share of students able to listen and recognize words is higher in Delhi compared to the National Average, the weak areas are reading comprehension ability and Mathematical ability for Class III students.

Table 8.7: Proportion of Students in Different Abilities – Class- III (%)

	Delhi	National Average
Listening	67	65
Word recognition	87	86
Reading comprehension	55	59
Language ability (total)	61	64
Mathematics	63	66

Source: National Achievement Survey, Class-III, 2014

¹¹The states/UTs are Chandigarh (243), Haryana (238), Punjab (249), Rajasthan (238), Uttar Pradesh (252) and Uttarakhand (239).

Source: Baseline Data for Delhi Vision 2030, Delhi Government

At a higher level of Class VIII, too, the disadvantage in terms mathematical ability continues as shown in Table 6.8. The girls out-perform boys in both Delhi and at the national average level in terms of reading comprehension, while they are at par with boys in terms of Mathematics skills.

Table 8.8: Average Score (in a scale of 0 – 500) of Class VIII Students in Different Abilities (%)

Average Score	Delhi			National Average		
	Girls	Boys	Total	Girls	Boys	Total
Reading comprehension	255	241	248	249	246	247
Mathematics	227	228	228	245	246	245

Source: National Achievement Survey- Class-VIII, 2014

The learning disadvantage in Delhi appears to continue through the higher levels of schooling (Table 9). It is seen that with the exception of Modern Indian Language, for all other subjects, Delhi students have under-performed vis-à-vis the All-India average.

Table 8.9: Proportion (%) of Class X Students who have answered Correctly

	English	Mathematics	Science	Social Science	Modern Indian Language
Delhi	37	36	40	43	58
National	41	40	43	47	53

Source: National Achievement Survey- Summary Reports-2015, Class-X, NCERT 2014

If we unpack learning outcomes further and look specifically at educational outcomes in low income areas in Delhi, it reveals a more discouraging picture. An ASER(?) ward survey in 2014 in Delhi for Ward no. 243 in north-east Delhi, which is a mix of resettlement colonies, jhuggi-jhompris and urbanized village, reached 14,532 children in 2-16 years of age, out of whom 7550 were attending school in classes I-VIII. While enrolment was encouraging insofar as close to 98% children in 6-14-year age group were enrolled in school, the learning outcome left much to be desired (Table 10). It is seen that 43.7 % children in Std I-II can read only till

letter level. For children in Std. III-V, only 37.2% can read up to the level of Std.II text, and the remaining 62.8% are below this level, even though they are attending higher grades.

Table 8.10: Children by Class and Reading Level (Hindi) All Survey Schools 2014 (Percent)

Standard	Not even letter	Letter	Word	Level 1 (Std I text)	Level 2 (Std II text)	Total
Std I-II	18.5	43.7	15.5	12.2	10.1	100.0
Std III-V	4.7	18.5	15.7	23.9	37.2	100.0
Std VI-VIII	2.3	6.6	7.4	19.6	64.1	100.0

Note: Each cell shows the highest level of reading achieved by a child

Source: Urban Ward Survey 2014 Delhi (Provisional), ASER Centre, accessed at <http://img.asercentre.org/docs/Publications/Urban%20Ward%20Survey/delhi.pdf>

Even in Std VI-VIII, 35.9% children could not read Std II level text. The ward survey found that by and large, the private schools students have performed better than the students from Government schools, albeit at a low benchmark for assessment.

Government Initiatives

The government school system has to be sought to be strengthened by reforms under the following categories: (i) provision of school infrastructure (ii) ensuring adequate number of capable and dynamic teachers and (iii) improvement of curriculum and teaching practices.

Under (i), specifically, high student classroom ratio is being addressed by construction of 21 new schools which are near completion, 28 schools which are also being constructed, and acquisition of 60 new plots for building new schools. Construction of 8000 new classrooms in existing schools is in progress. Other infrastructural strengthening includes modernization of sanitation facilities, ensuring separate toilets for boys and girls and drinking water facilities with RO. A very important feature concerning security of students is installation of CCTV cameras for all schools.

Regarding (ii), addressing high student teacher ratio is a matter of urgency in Delhi government schools, which has suffered from huge gap in demand and availability of regular teachers. The

number of students per teacher available is 71 at present for Primary + Pre-primary levels together, according to Delhi government. At the primary level, the Pupil – Teacher Ratio(PTR) should be 30, according to RTE. According to DISE(?) data, the PTR in Primary, Upper Primary and Secondary level are 38, 26-29 and 30.

A persistent problem has been poor availability of regular teachers, which is being met by temporary guest teachers. Various litigations regarding reservations in promotion of regular teachers has posed long standing difficulty in resolution of this issue and the gap is being filled by guest teachers, who, apart from not being on par with regular teachers, also appear to have an uncertain future, affecting their incentive to continue in such posts.

About (iii), in particular, teaching pedagogies are sought to be improved with mentoring via CCTV cameras. Computer labs are also being set up in all schools with wi-fi, course content and instructors. An academic plan named ‘Chunauti 2018’ (Box no. 1) has been introduced in 2016 to strengthen the foundational learning skills of students at upper primary level, and this new plan was ushered in in the context of providing academic support to class IX students. This approach is based on the different learning needs of children within the same class and tries to adapt teaching method accordingly. This approach, in combination with the grade-wise learning outcomes under Right to Education are likely to lead to the desired learning achievement among students.

Box no. 1 Chunauti 2018

The pass percentage of Class 9 students in government schools in Delhi has declined successively from 55.96 % (2013-14), to 51.74 % (2014-15) to 50.78 % (2015-16) respectively, implying that around half the Class IX students failed in their exam in 2015-16. The gravity of the matter brought attention of the government to the discouraging state of learning achievement at the lower secondary level and the reasons behind the poor performance were ascertained to be the following:

- No Detention Policy
- Years of accumulated learning deficit
- Pressure on the teachers to complete the syllabi leading to inability to bring weaker children to the desired level, and above all,
- Huge variances in basic skills like reading/writing within a single classroom.

The outcome of deliberations with Heads of Schools led to the approach of re-grouping students in classes 6th to 9th according to the basic learning skills already acquired by them. For Class 6 students, this would be with the aid of a basic assessment test, while for the other three classes, combined scores of the two summative assessments of the previous year would be the basis of re-grouping. For Class 9, in particular, an important group on whom there would be focus would be those who have failed twice or more in the Class IX exams. In view of the focused re-grouping of these children, a special Teaching Learning Approach has been devised for different groups of Children.

Another new feature of the Chunauti scheme is that this group of students who could not clear Class IX exams twice or more, would be able to appear for 10th standard exams through Modified Patrachar Scheme of Examination (MPSE) in 2017, by enrolling with the Patrachar Vidyalaya, which provides a distance learning option. The MPSE 2017 is especially proposed to ensure retention of children who have failed in class 9th repeatedly and to minimize the possibility of their dropout.

Source: Circular of Directorate of Education, accessed at http://edudel.nic.in/upload_2015_16/230_dt_29062016.pdf on 21st December, 2017.

Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

The importance of pre-school education

Early Childhood refers to the formative stage of first six years of the life of a child, according to the National Early Childhood Care and Education (ECCE) policy. Scientific evidence indicates that during this period there are critical developments in a child's brain which influences the pathways of her physical and mental development. Deficits in this stage can be extremely damaging for the child's development and can have lifelong consequences. Acknowledging this important input to human development, the Indian State has directed that

‘The State shall endeavor to provide ECCE for all children until they complete the age of six years’.

Early childhood has distinct sub-stages and the needs for age three to six are as follows: protection from hazards, healthcare, nutrition, and attachment to an adult and developmentally appropriate play-based pre-school education with a structured and planned school readiness component for 5 to 6 year olds (ECCE National Policy). Thus, pre-school education is crucial since it helps in school readiness of a child as she proceeds to primary level. In this context, another reason why investment in early childhood education (ECE) is key is that it can help level the playing field by tackling the twin challenges of poor quality education and unequal opportunity faced by the poorest and most marginalised children in national education systems¹².

Status of pre-primary education in Delhi

Enrolment of children at the pre-primary level has steadily increased in Delhi, from 1.66 lakh in 2011-12 to 2.15 lakh in 2015-16 (Delhi Statistical Handbook 2016). Access to pre-primary education in Delhi is increasing, although it is far from complete. There are 414 Government Sarvodaya Schools in Delhi which have 24280 children enrolled in KG classes. Out of those, nursery classes have also been initiated in 155 schools; during 2017-18, admission has been offered to 6200 students. Thus, in these schools, two years of pre-primary education are being offered. In the coming years, the nursery facilities will be expanded so that all the Government school-going children can benefit from two years of pre-primary education.

Around 35 thousand children are enrolled in the pre-primary classes in schools run by the three Municipal corporations. However, these schools cater to children of 4 plus years of age and there needs to be a provision of offering ECE even for three plus children.

In the 2669 private unaided schools in Delhi, students are enrolled for two years of pre-primary schooling.

¹² ‘The urgent need for investment in pre-primary education’ by Pauline Rose and Ben Hewitt, accessed at <https://gemreportunesco.wordpress.com/2017/06/26/the-urgent-need-for-investment-in-pre-primary-education/>

Out of the two years of the pre-primary classes, focus is on school-readiness of the child in the second year. The SCERT Delhi has introduced the ECCE curriculum for setting up Early Childhood Education (ECE) classes in Government schools. The ECCE classes are expected to streamline the teaching and learning process in the pre-primary classes towards school-readiness in the second year of the pre-school classes.

Government has a key role to play in ECCE provisioning. There is a great deal of demand for pre-school education, as reflected in the behavior of even parents from low-income families, who approach low cost private schools for nursery education, while all government schools cannot offer the same.

Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

These two targets deal with the important areas of Higher Education and Technical Education.

Higher Education

Higher education access is still somewhat limited in Delhi, although the NER in Higher Education has improved significantly since 2011 (Table 6.11). Delhi has 208 educational institutions as of 2015-16, comprising 27 universities/deemed universities/institutions of national importance, 81 colleges for general education and 100 colleges for professional education. However, it may be noted that admission in higher education in Delhi includes considerable non-local students from outside

Table 8.11: Net Enrolment Ratio in Higher Education in Delhi

Year	Age (18-23)		
	Projected Population	Enrolment	Enrolment as % of Projected Population
2011	2118969	627417	29.60
2012	2148286	991878	46.17
2013	2177801	1100901	50.55
2014	2207522	1144733	51.85

Source: Delhi Statistical handbook 2015-16. MHRD, GOI

Delhi. This is partly the reason that despite a rising NER, there is a huge shortage of seats for admission for higher education level in Delhi. Annually around 2.5 lakh students pass out of the 10+2 school system and enter the higher education arena. But given the number of institutions available, only fifty percent or 1.25 lakh can be accommodated by institutions in Delhi for higher education. The rest of the students seek admission for higher education through Distance Learning options, or become entrepreneurs or join some job.

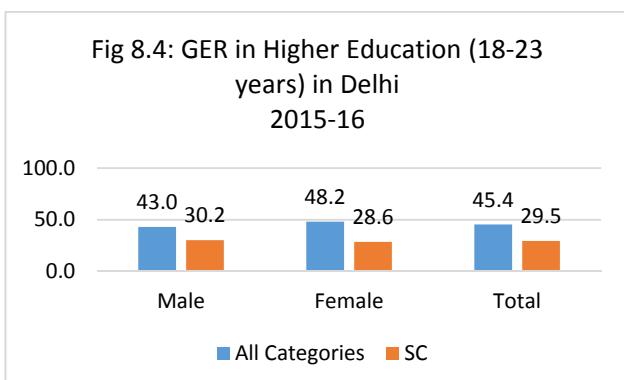
Specifically, for admission in 2016-17, against 56,432 seats, around 57829 students took admission in University of Delhi, out of whom half were from other state boards. GGSIPU saw admission of 32274 students and 17000 students were admitted in other universities. Moreover, around 2 lakh students got registered for UG courses through non-formal education such as School of Open Learning, Non-collegiate Women Education Centres of DU and regional centres of IGNOU in Delhi. Expansion is planned for various women's colleges including the Indira Gandhi Delhi Technological University and such initiatives are expected to go a long way towards increasing opportunities for women in Higher education and technical education.

In Delhi, GER in Higher Education for 18-23-year-old youth is higher than all-India levels for both men and women (Table 12). However, access to all segments of society is still a long way to go, as observed from relatively far lower GER for SC youth (Fig. 4).

Table 8.12: GER in Higher Education (18-23 years) in 2015-16

	All Categories		
	Male	Female	Total
Delhi	43.0	48.2	45.4
All-India	25.4	23.5	24.5

Source: AISHE 2015-16, MHRD



Women have a higher access to Higher Education compared to men as reflected also in Gender Parity Index for Higher Education at 1.12 for Delhi vis-à-vis 0.92 for all-India.

Table 5 had indicated that the cost of education in Delhi is considerably higher than the national average at Diploma level, Graduate level and slightly higher at PG level. Higher education and technical education clearly has to be made more affordable and more within reach for youth from all segments of society, else the differential access as seen in Fig. 4 will continue in the years to come. At the same time, just increasing the number of educational institutions is not always a solution, because much of the expansion in Higher Education has come from private sector which does not always ensure quality education¹³. The Indian higher education is at present characterized by a stratified system of education delivery, where there are a few high quality elite institutions that are typically public and a large number of relatively lower quality institutions, which are typically privately managed. Thus the area of higher education is marked by inequity, as the public institutions have limited access and the private institutions are usually out of reach for the poor and the marginalized due to their high fee structure.

Technical Education

Technical education, though always in focus in the education strategy in India, has again emerged as a priority area in national policy-making. This is in view of the surge in youth population in India, for whom quality education and market-oriented skill training are of paramount importance so that the demographic dividend can be reaped. Delhi has 101 technical institutes in all, comprising Industrial Training Institutes (17), Industrial Training

¹³See Tilak 2013 for more details, cited in Endow et al 2015

Centres (61), Basic Training Centres (1), Commercial Sector Institutes (1), Polytechnics (20) and a World Class Skill Development Centre (Table 13). The number of students enrolled in these institutions numbers 32250 with maximum enrolment in polytechnics (16982), ITIs (11675) and ITCs (2610). The enrolment in polytechnics showed a high growth of 38 % between 2010-11 and 2015-16 and also for ITI at 32 % during the same period.

Table 8.13: Technical Institutes (no.) and Student Enrolment in Technical Institutes in Delhi 2015-16

S. No.	Technical Institutes	No. of Institutes	Enrolment
1.	Industrial Training Institutes	17	11675
2.	Industrial Training Centres	61	2610
3.	Basic Training Centres	1	530
4.	Commercial Sector Institutes	1	90
5.	Polytechnic	20	16982
6.	World Class Skill Upgradation	1	363
Total		101	32250

Source: Delhi Economic Survey 2015-16

The deficit of availability of seats with respect to the number of aspirants is very severe for Technical Education (Table 14). For both ITIs and Polytechnics, the number of aspirants far outstrip the number of seats available.

Table 8.14 Deficit of Seats Available for Imparting Technical Education

Year	Institutes	No. of seats	No. of applicants	Available seats: Applicant ratio
2015-16	ITI	10090	39657	1:4
	Polytechnic	6233	50150	1:8
2016-17	ITI	9242	56357	1:6
	Polytechnic	6115	43101	1:7

Source: Working Group report

Delhi Government has expanded the technical education by way of introducing Bachelor of Technology. Expansion of the Netaji Subhash Institute of Technology has been planned to be expanded by converting it to an Autonomous University. The infrastructure of Technical Institutes is being augmented and 2nd phase expansion of the Campus of Indraprastha Institute of Information Technology already started. Delhi Government has 4 State Universities in Technical Education namely Delhi Technological University (DTU), Indira Gandhi Delhi Technical University for Women (IGDTUW), Indraprastha Institute of Information Technology (IIIT) and Delhi Pharmaceutical Sciences and Research University.

Besides, there are 7 degree level Institutions under Department of Training & Technical Education including premier institute “Netaji Subhash having an intake capacity of 32,250, details of which are as under. In this context, it is appropriate to highlight some recent initiatives of the Delhi Government in the area of skill development that is so crucial for strategic planning at the moment (see Box no. 2).

Box no. 2 Some Skill Development Initiatives in Delhi

Incubation Policy launched by Hon’ble Deputy CM on 07.03.2016, to make Delhi a hub of start-ups, distributed seed money amounting to Rs 1.5 crore to each of the premier higher education institutes of Delhi namely Ambedkar University Delhi (AUD), Delhi Technological University (DTU), Indira Gandhi Delhi Technical University for Women (IGDTUW), Indraprastha Institute of Information Technology - Delhi (IIIT-D), Netaji Subhas Institute of Technology (NSIT), Shaheed Sukhdev College of Business Studies (SSCBS). The Incubation Centres are made functional from the current academic session 2016-17.

Delhi Skill Development Mission was started in 2009 to provide training to students passing out from schools, unemployed youth and drop-outs, informal sector workers. More than 16,000 trainees were trained in 2014-15.

The Skill Development Initiative based on modular employable skills is a Centrally Sponsored Scheme being implemented by the Government of Delhi to give training to semi-skilled and unskilled people in unorganized sectors. GNCTD is planning to train 50,000 people in 2015-16 under this initiative, with resource augmentation from Delhi Government.

As a part of the National Skill Qualification Framework, vocational training has been initiated in 205 schools for students from Class 9 onwards.

A World Class Skill Development Centre is being set up in Jaunapur in collaboration with Institute of Technical Education, Singapore to enhance training skills in Delhi and to create skilled manpower according to Indian and global requirements. On completion the institute will train 15,000 trainees annually.

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

Table 6.15: Gender Parity Index in Primary, Secondary and Tertiary Education

Year	Delhi		
	Primary	Secondary	Tertiary
2001-02	0.95	1.01	-
2002-03	1.03	1.10	-
2003-04	0.99	1.08	-
2004-05	1.11	1.13	1.3
2005-06	1.04	1.14	1.14
2006-07	1.00	1.03	1.05
2007-08	1.02	1.04	1.21
2008-09	1.02	0.98	0.56
2009-10	1.02	0.97	0.89
2010-11	1.03	0.97	0.85

Source: Ministry of Human Resources Development (HRD), GOI

Gender Parity Index (GPI) in Delhi schools is high at around unity at the primary and secondary levels, implying that access to school education for girls and boys are quite similar, as reflected in their enrolment (Table xx). GPI at the primary level increased from 0.95 in 2001-02 to 1.03 in 2010-11. At the secondary level, however, the GPI declined slightly between 2001-02 and 2010-11. In the interim years, around 2003-04 to 2007-08, the girls' enrolment was much higher relative to boys' enrolment at the secondary level.

The ratio of the female to male in tertiary education, referring to any post-secondary education, measures progress towards gender equity and the level of learning opportunities available for women in relation to those available to men. It serves also as a significant indicator of the empowerment of women in society. At the tertiary level of education, there is evidence that GPI has declined since 2004-05 from a high of 1.3. In 2010-11, it stood at 0.85, but earlier in 2008-09, GPI dipped to a low of 0.56 only, emphasising need for more opportunities for women in tertiary education.

Gender Parity Index (GPI) in higher education is calculated for 18-23 years of age group. The Gender Parity Index in Delhi for higher education is better than the national average for all level of courses of higher education except for MPhil, certificate & Integrated courses.

Table 8.16: Gender Parity Index at Various Level of Courses in Higher Education in 2012-13

Level	Delhi	All India
Ph. D	0.84	0.71
M. Phil	1.15	1.29
Post Graduate	1.05	0.96
Under Graduate	0.88	0.86
PG Diploma	0.54	0.36
Diploma	0.45	0.39
Certificate	0.56	1.17
Integrated	0.39	0.59

Source: <https://data.gov.in>

Some Government interventions to reduce the gender gap and improve overall quality of education are:

- i) Kishori Yojana (Providing sanitary napkins to girl students of Class-VI to XII)
- ii) Separate toilets for Boys & Girls provided in all schools provided.
- iii) Free supply of Text books and Uniforms
- iv) Various Scholarship Schemes to Students
- v) Award to meritorious students and Teachers
- vi) Emphasis on Teachers training
- vii) Vocationalisation of school education
- viii) Delhi skill/vocational university,
- ix) Construction of building for new schools, ITIs, Polytechnics, Colleges
- x) Establishment of computer labs in all govt. schools

Government initiatives for education and training for vulnerable children and youth, including persons with disability:

There are 14 Child Care institutions run by the Government and 70 institutions run by NGOs for children in vulnerable situation in Delhi. The institutions run by NGOs include Open Shelter, Shelter Homes, adoption agencies and Child Care institutions.

There are also seven institutions exclusively for children in conflict with the law. Eight Child Welfare Committees and three Juvenile Justice Boards set up by the Department of Women and Child Development have the mandate to make decisions regarding a child in need of care/protection or regarding a child in conflict with law in the best interest of the child. Some children who have been housed in long term care have been enrolled in nearest government schools, and teachers have been empaneled for providing additional assistance to such children in education at the institutions.

Drop-out or over-age children to be enrolled in regular classes are supported by non-formal classes and efforts are made to enroll them at the National Institute for Open Schooling. Support is also provided to 16-18-year-old youth to join vocational courses at ITIs and polytechnics. In 228 government schools, for students in classes 9-12, a total of six vocational courses under National Skills Qualification Framework are available: in tourism & hospitality, financial marketing management, automobile technology, information technology, dynamics of retailing and security. A total of 83,885 students are enrolled in these courses. In another 253 government schools, 16,042 students in classes 11-12 are enrolled in these courses.

Target 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

Delhi has a variety of good quality schools, colleges and universities as well as centres for research and higher education and its inhabitants have a high literacy rate. At 86.3 percent (2011 census), the literacy rate in Delhi is substantially higher than the all India average of 74percent. However, mega cities such as Mumbai (90.8percent), Chennai (90.2percent), and Kolkata (88.3 percent) as well as states such as Kerala, Mizoram, Goa and Tripura have surpassed Delhi in literacy. The male literacy is 90.9 per cent and the female literacy is 80.8 percent, indicating a gender gap of 10.1 percent. The gender gap has declined moderately over the years from 12.62 per cent in 2001to10.1percent in 2011.

Table8.17: Literacy Rate (%)

Census	Male	Female	Total
1991	82.01	66.99	75.29
2001	87.33	74.71	81.67
2011	90.90	80.80	86.20

Source: Delhi Statistical Handbook, 2015

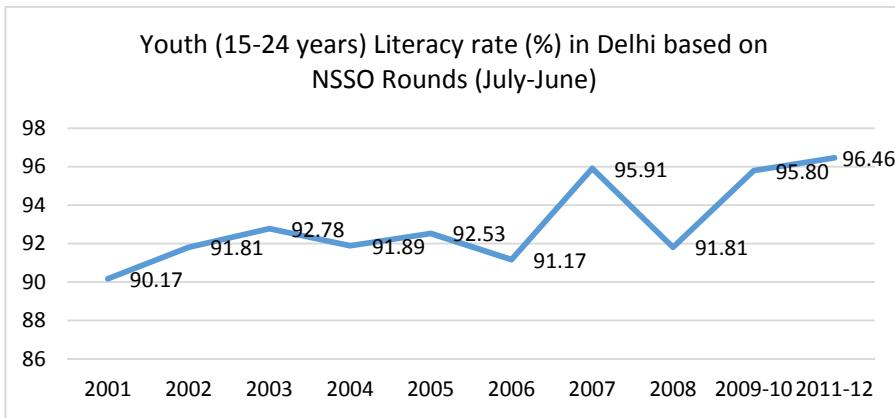
Youth literacy is vital for the nation, not only for the inherent value in being educated but also because they represent the future workforce. The better educated and skilled workforce has an edge over an uneducated workforce in today's competitive labour market and has a chance of accessing better employment opportunities. Table 18 and Fig. 5 show that the youth (15-24 years) literacy was high at 90.17 percent in 2001 and has increased substantially to 96.46 by 2011-12. The gender gap has narrowed

Table8.18: Youth Literacy Rate in Age Group (15-24years) in Delhi during 2001-11

NSSO Rounds	Period (July–June)	Literacy Rate			Ratio of Female to Male
		Male	Female	Total	
57 th	2001	94.64	85.07	90.17	0.90
58 th	2002	95.60	86.65	91.81	0.91
59 th	2003	95.19	90.05	92.78	0.95
60 th	2004	91.37	92.60	91.89	1.01
61 st	2005	93.48	91.28	92.53	0.98
62 nd	2006	95.76	85.59	91.17	0.89
63 rd	2007	95.88	95.93	95.91	1.00
64 th	2008	92.22	91.26	91.81	0.99
66 th	2009-10	95.41	96.42	95.80	1.01
68 th	2011-12	98.26	94.31	96.46	0.96

Source: MDG State Report 2014 of Delhi

Fig 8.5



during this period from 9.57 percent to 3.95 percent, which is also reflected in the improvement in the ratio of female to male literacy from 0.90 to 0.96 in the same period.

Target 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

The legal framework as defined by Right of Children to Free and Compulsory Education Act, 2009 and academic framework, the contours of which are provided by the National Curriculum framework, 2005, ensures that schools in Delhi are created and nurtured in an environment where sustainable development and values of global citizenship are promoted. This is reflected in the following considerations that must be kept by the academic authority, as mandated by RTE, while designing the curriculum and evaluation procedure:

- Conformity with values enshrined in the Indian constitution
- All round development of the child
- Building up a child's knowledge, potential and talent
- Development of physical and mental abilities to the fullest extent
- Learning through activities, discoveries and explorations in a child-friendly and child-centred manner

- Making the child free of fear, trauma and anxiety and helping the child to express views freely and
- Comprehensive and continuous evaluation of child's understanding of knowledge and his/her ability to apply the same

Similarly, in the case of NCF 2005, two general aims of education are stated for the purpose of expressing collective socio-political aspirations of the whole society and to provide direction to the teacher in the choice of content and method of education. These aims are:

- Value and ideals: education should promote equality of status and opportunity, freedom of thought, expression, beliefs, faith and worship. Autonomy of mind as independence of thinking based on reason and autonomy of action which is freedom to choose, ability and freedom to decide and ability and freedom to act. Care and respect for others and justice should also be observed.
- Capabilities of individual human beings including sensitivities to others, rational/critical attitude, ability to participate in economic process and aesthetic appreciation/creation.

Target 4.A Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

Among the targets for means of implementation, availability of infrastructural facilities in school is important. Schools in Delhi have, on an average, good infrastructure facilities and the situation has been improving over the years (Table 19). All schools have drinking water and toilets, while almost all have electricity and boundary wall. There is scope for improving access to computer facility (16.1 percent schools lack computer facility) and playground (12.6 percent schools do not have a playground).

Table 8.19: Infrastructural Facilities in Schools in Delhi

Percentage of Schools having access to	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Playgrounds	80.4	80.1	73.9	81.7	85.8	87.4
Boundary wall	98.1	98.3	97.8	98.7	99.4	99.5
Girls Toilets	80.3	99.3	100	100	100	100
Boys Toilets	79.9	100	100	100	100	100
Drinking Water Facility	100	100	100	100	100	100
Electricity Connection	99	99.8	99.7	100	99.9	99.9
Computer Facility	83.2	93.4	77.9	81.6	81.0	83.9

Source: Elementary Education in India, DISE Publications, NUPEA

Regarding children with disability (CWD) or children with special needs (CWSN), it is the statutory responsibility of appropriate governments to provide free education up to age 18 years and there is also emphasis in policies to promote integration of students with disabilities in the regular schools. The provisions under RTE Act reinforce the same.

The number of CWSN in schools under the government, aided and local bodies, is 18074 in 2016-17, according to UDISE statistics. In order to cater to the needs of CWSN enrolled in government schools, the Directorate of Education created 926 posts of Special Education Teachers in 2016.

The Directorate of Education is implementing both Inclusive Education Sarva Shiksha Abhiyan (IE-SSA) and Inclusive Education of Disabled of Secondary Stage (IEDSS) since 2009. Under the former, there are facilities such as escort allowance and transport allowance, training of general teachers on various themes in inclusive education, enrolment drive for out of school children, awareness campaigns, counselling for parents of CWSN, etc. There are annual assessment camps for identifying CWSN who need aids and appliances. In 2016-17, a total of 928 such children in elementary level received free aids and appliances.

IEDSS provides financial assistance to students in classes 9-12 in the form of allowance for escort, therapy, transport, readers, etc. as well as top-up scholarship and girl stipend, among others. There are orientation programmes for parents of CWSN, heads of schools, educational administrators, etc. and in-service training for Special Education Teachers. There are annual

assessment camps for identifying CWSN who need aids and appliances. In 2016-17, a total of 395 such children studying in secondary and above grades received free aids and appliances.

A State Level Steering Committee was formed in 2016-17 to provide quality inclusive education to CWSN and in this connection six working groups were constituted on:

- Cross-disability training on SETs
- Curricular adaptation for CWSN
- Academic assessment of CWSN
- Development of teaching aids for CWSN
- Resource Centre
- Administrative structure including recruitment rules

Individualized Education Programme (IEP) is being prepared for each CWSN in government schools and there is also a mechanism to monitor and review the same periodically. Special Education Teachers usually have specialization in one disability and cross disability training helps them to cater to CWSN with other types of disabilities.

Fourteen resource centres for CWSN—one each at district level and two at central level—with facilities for Special Education and related services such as physiotherapy, occupational therapy, speech therapy, behaviour modification, counselling, etc. are being set up.

Other initiatives for promoting inclusive quality education include:

- Zonal resource centres for CWSN
- Appointment of more SETs in schools
- Creating a home based education mechanism for CWSN who remain out of school till 24 years of age
- Creating resource group and onsite support for SETs
- Development of resource rooms in each government school with linkage to centres at district/ zone
- Working groups to adapt curriculum and assessment/evaluation of CWSN.

Target 4.B By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries

Such exchanges are part of bilateral agreements between the Government of India and the host country. The manner in which trainers/instructors in institutions in Delhi can benefit has been included in the discussion under Targets 4.3 and 4.4.

Target 4.C By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

Delhi schools are, according to statistics, suffering from a shortage of teachers. The pupil teacher ratio, at the primary level, should be 30, according to RTE. However, data from the government indicates that the average PTR at the primary + pre-primary level, the bulk of which will be accounted for by primary enrolment¹⁴, is very high at 71.07 (Table 20).

Table 8.20 Pupil Teacher Ratio in Schools of Delhi (All Management)

	Primary +Pre-primary	Middle, Secondary + Sr. Secondary
2011-12	70.14	24.12
2012-13	69.59	23.53
2013-14	70.98	21.66
2014-15	70.13	21.22
2015-16	71.07	19.98

Note: Based on enrolment and number of teachers

¹⁴The enrolment at pre-primary level is 2.15 million and that at primary level is 18.87 million.

At present there are 1, 35,182 teachers in schools in Delhi, among whom 57 percent are in government or aided schools. A total of 49 institutions affiliated with State Council for Educational Research and Training (SCERT) provide 2-year diploma in Elementary Education (numbering a total of 2490 diplomas) and Early Childhood Care and Education. Among these, 9 are government District Institutes for Education and Training (DIETs).

Each year, around 15 percent of teachers get superannuated and over and above this replacement requirement, there is an additional need of 19,682 teachers for around 6000 schools in Delhi, according to SCERT. In order to meet this demand for pre-service training, two more DIETs are being set up.

In 2016-17, SCERT conducted in-service training for 47,174 teachers. Other programmes include capacity development programmes for Heads of Schools, education administrators, teachers and SMC members. A Mentor Teachers Group has been set up by the Delhi government to provide onsite support for teachers. This group has been made familiar with best practices with the help of a course on innovative pedagogy at National University, Singapore.

At the university level, teachers' education programmes in Delhi are provided by central universities and affiliated institutions under GGSIPU.

Vision 2030

Target 4.1: The vision for Delhi would be to focus on improving the quality of education and surpass the all-India average by 2030. Quality education should be accessible to all, including children in slums and low-income areas; those belonging to marginalized segments such as SCs and Muslims, etc. Education should be affordable to all segments of population and the ratio of education in Delhi to all India (urban) average should be brought down to unity, especially for primary and upper primary levels.

Target 4.2: Focus on provision of nursery education/ECCE in all Government schools by 2030.

Target 4.3 and Target 4.4:

By 2030, every student who applies for admission in Higher Education or Technical Education, should be able to do so and the quality of institutions for Higher education and technical education should be comparable to global standards.

Target 4.5: Achieve gender parity for all levels of education in Delhi and also parity between mainstream children/youth and those in vulnerable situations

Target 4.6: All youth in Delhi should be literate

Challenges

The challenges in attaining Vision 2030 have already been discussed under the status for each target and some of the major challenges are presented in a nutshell below:

- Quality deficit in education at all levels, especially basic education
- Affordability of schooling and related privatisation issues
- Better access needed for marginalized segments such as SC, Muslims, etc.
- Access issues at Higher education
- Quality of institutions in at Higher education and Technical Education
- Vocational education still looked down upon and general courses preferred
- Government programmes such as Sabala are not effective everywhere on the ground as found from pilot study
- Informal sector—informal skills needing accreditation

Specific Agenda for Action (2016-17 – 2019-20)

4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.1 (a): To increase NER to 100 %

Agenda

- Prevent school drop-out

4.1 (b) To increase proportion of children at the end of primary, lower secondary achieving at least a minimum proficiency level in reading and in mathematics by sex

Agenda:

- Improve student and teacher attendance
 - Have periodic assessments of learning outcomes of students
 - Improve pedagogy and curriculum
- 4.1c. Reduce Ratio of students and teacher for Primary education (up to grade 5) to 30
4.1d. Bring Ratio of students and teacher for Upper Primary education (grade 6-8) to 30
4.1e. Maintain Ratio of students and teacher for secondary education (up to grade 12) at 30

Agenda:

- Resolve issue of shortage of regular teachers and fill vacant posts
- To increase supply of trained teachers

4.1f To increase total public expenditure on education as a percentage of GSDP to 2 %

Agenda:

- Allocate higher share of budget to education
- 4.1g To increase Literacy rate of 7+ year-olds to 90%

Agenda: Expand access to education

4.2: By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.

4.2a Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being by sex

4.2b Participation rate in organised learning (one year before the official primary entry age) by sex

Agenda

- Government to expand access to pre-primary education in Delhi schools

4.3: By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.3a Ratio of girls' enrolment in technical and vocational education

4.3b Ratio of girls' enrolment in tertiary education (graduate level)

4.3c Scholarship coverage of total students (%)

4.3d Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months

4.4 By 2030, increase by 75 percent the number of youth and adults who have relevant skills, including

technical and vocational skills, for employment, decent jobs and entrepreneurship

4.4a Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

Agenda for Targets 4.3 and 4.4

To improve quality of institutions for Higher education and technical education

- To attain competitiveness on a global level, close quality gaps in terms of equipment, teaching methods, infrastructure, curriculum
- Courses should be aligned to National Skills Quality Framework (NSQF), and multiple entry/exits should be facilitated.
- There should be training/retraining of trainers and restructuring of courses
- Incubation centres have been started in Delhi in established institutions to make the city a hub for start-up companies and seed money of Rs 1.5 cr distributed to each centre. The focus is thus on developing entrepreneurship. Some universities/institutions can even combine innovative research for manufacturing with profit-sharing model.
- Obtaining national and even international accreditation is a must for the educational and technical institutions in order for them to compete at the international level. They can strive for accreditation with National Board of Accreditation (NBA), Quality Council of India (QCI), international Standards Organization, Asia-Pacific Accreditation and Certification Commission, Manila, etc. Students coming out of accredited institutions will have increased employability in the market. At present, just 10-15 % of the education and technical institutions have such accreditation, and the

vision is to have all institutions in Delhi (except those recently set up) to attain such accreditation by 2030.

- Another way to attain competitiveness in the market is for the institutions to learn from best practices by entering into exchange programmes with other institutes of excellence in the country and abroad. There should also be attempt to attract more international students and increase the share to 15% as prescribed by AICTE, by 2030, compared to just 5% intake at present.

To accommodate every aspirant in higher and technical education

- This is expected to raise the target GER in Delhi to 70%. In order to achieve this, massive expansion in Higher Education institutions as well as technical institutions such as ITI and Polytechnics will be needed.
- Department of Training and Technical Education has proposed strengthening of Apprenticeship scheme and 'Earn While you Learn' model whereby they can support the cost of their education and are not a financial burden to their family (See Box no. 3).

Box no. 3 Apprenticeship Scheme in Germany

In Germany, under the 'dual training' system, trainees divide their days between classroom instruction at a vocational school and on-the-job time at a company. Under such Apprenticeship schemes, students apply directly to employers for apprenticeships and once accepted, the employers enroll them in a local training school, called a *Berufsschule*. Students, typically between the ages of 16 and 19, spend a few days of the week at work, earning a small stipend, and a few days at school, learning the theoretical side of their jobs. At work, apart from technical skills, they absorb important soft skills such as responsibility, teamwork and communication. The apprenticeship usually lasts two to three years and culminates in a certification exam.

Inputs from <http://www.oecd.org/edu/skills-beyond-school/43898338.pdf>,<http://www.theatlantic.com/business/archive/2014/10/why-germany-is-so-much-better-at-training-its-workers/381550/>,<http://www.bbc.com/news/business-16159943>,<http://www.yale.edu/ynhti/pubs/A16/persing.html> accessed on 31.3.2016)

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5a Gender Parity Index (GPI) (primary school)

4.5b Gender Parity Index (GPI) (secondary school)

4.5c Gender Parity Index (GPI) based literacy (above 15 years)

Agenda:

4.6 By 2030, ensure that all youth and at least 95 percent of adults, both men and women, achieve literacy and numeracy

4.6a Percentage of population in a given age group achieving at least a fixed level of proficiency in functional a) literacy and b) numeracy skills

Agenda

- Expand schooling network to reach almost every child under 14 years of age to attain universalization of elementary education
- Focus on attaining grade level learning outcomes under RTE Rules 2017 in elementary grades, which will be possible only when children attain proficiency in reading, writing and numeracy.

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Agenda

- Regular reviews of curriculum and books designed by NCERT/SCERT are needed to ensure that these remain relevant in enabling requisite acquisition of skills and knowledge by learners.

SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Targets/Indicators	Source	Base line	Physical Targets			Remarks
			2017-20	2017-24	2017-30	
Target 4.1 Access to quality and affordable education						
4.1a Net enrolment rate in primary education (%)	DISE Flash Statistics 2015-16	93.36 (2015-16)	100	100	100	The age-appropriate enrolment is very high at nearly 94 percent, so the state can aim for one hundred percent NER by 2020, and maintain the same afterwards.
4.1b Proportion of children at the end of primary, upper primary, secondary achieving at least a minimum proficiency level in reading and in mathematics by sex	Final Baseline Data—Delhi govt	228 (national avg 245)	241 (national avg 250)	241 (national avg 250)	241 (national avg 250)	No comprehensive data is available for projection.
Mean achievement score in Mathematics at the end of upper primary	Educational Statistics at a Glance, 2015-16, MHRD	240 (national avg 250)				
Mean achievement score in English at the end of lower secondary	MHRD					
Mean achievement score in Mathematics at the end of lower secondary						
4.1c Ratio of students and teacher for Primary education (up to grade 5)		38	30	30	30	The PTR is at present a little above the RTE-prescribed 30 for the primary level. Therefore the target for 2020 can be set at 30, which can be continued thereafter.
4.1d Ratio of students and teacher for Upper Primary education (grade 6-8)	DISE Delhi State Report Card	26-29	30	35	35	The RTE-prescribed level is 35 for the upper primary level.

4.1e Ratio of students and teacher for secondary education (up to grade 12)	Statistical Abstract of Delhi 2016 (data for Government Aided and Unaided recognized schools)	11.6	25	25	25	Declining enrolment and increasing number of teachers have contributed to low PTR. Enrolment should be boosted at Sr Sec level and PTR will then increase in future
4.1f Total public expenditure on education as a percentage of GSDP	Revised Estimate for 2015-16 from Delhi Economic Survey 2016-17	1.46	2.00	3.00	4.00	Education needs more resources and the aim should be to raise the percentage gradually to 4 percent by 2030.
Target 4.2 Early childhood education						
4.2a Proportion (%) of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being by sex						Data not available
4.2b Percentage of children aged 3-5 attending pre-school education	Rapid Survey of Children 2013-14, MWCD	73.8	80	100	100	The number of such centres is increasing.
Target 4.3 Technical, vocational and Tertiary education						
4.3a Percentage of girls' enrolment in technical and vocational education						The state is encouraging women education through various schemes.
4.3b Percentage of girls' enrolment in higher education	UGC Annual Report	48	50	50	50	
4.3c Scholarship coverage of total students (%)	Data not available					Data need to be compiled from various sources and monitored continuously.
4.3d Participation rate of youth and adults in formal and non-formal education	Data not available					

and training in the previous 12 months						
Target 4.4 Skill Development among youth						
4.4a Proportion of youth and adults with Information Communications Technology (ICT) skills, by type of skill	Data not available					Data need to be compiled from various sources and monitored continuously.
Target 4.5 Eliminate gender disparity in education						
4.5a Ratio of Girls to Boys (elementary level)	DISSE State Report Card	Delhi	0.88	0.90	0.95	1.00
4.5b Ratio of Girls to Boys (Secondary level)	Final Baseline Data—Delhi Govt	Delhi	0.87	1.00	1.00	1.00
4.5c Ratio of Literate Women to Literate Men (15 to 24 years)	Same as above		0.86	1.00	1.00	1.00
Target 4.6 Achievement of literacy and numeracy for all						
4.6a Literacy rate of 7+ year-olds	Final Baseline Data—Delhi Govt	Delhi	86.2	90.0	95.0	100.0
4.6b Percentage of population in a given age group achieving at least a fixed level of proficiency in functional a) literacy and b) numeracy skills	Data not available					Data need to be compiled from various sources and monitored continuously.
Target 4.7 Knowledge and skills for sustainable development						
4.7a Proportion of students having access to mid-day meals	DISSE State Report Card	Delhi	97.9	100	100	100
						Coverage and budget allocation for of Mid-Day Meals Programmes are likely to increase.

4.7b Proportion of disabled students to total students in elementary education (%)	Same as above	as 0.64	0.74	0.85	1.00	Proportion of disabled persons in the 7-15, 15-21 and 21 - 30 age groups are respectively 1, 1.25 and 1.13 per cent of total persons in the same age group.
4.7c Proportion of disabled students to total students in secondary education	Same as above	as 0.53	0.75	0.95	1.25	
4.7d Proportion of disabled students to total students in higher education (%)	AISHE 2015-16, MHRD	0.37	0.50	0.87	1.13	

Target 4.a Build and upgrade education facilities with effective learning environment for all

4.a.a Proportion of schools with access to electricity	DISSE State Report Card	Delhi 99.9	100	100	100	The state budget for education is impressive and increasing. However, data for some indicators need to be generated through survey and monitored continuously.
4.a.b Proportion of school with Computers for pedagogical purposes	Same as above	as 83.9	90	100	100	
4.a.c Proportion of schools with adapted ramp (if needed) for students with disabilities	Same as above	as 40.00	60.00	100	100	
4.a.d Proportion of schools with access to drinking water	Same as above		100	100	100	
4.a.e Proportion of schools with single-sex basic sanitation facilities	Same as above		100	100	100	
4.a.f Proportion of schools with hand washing facilities (as per WASH indicator/definition)	Data not available					

Target 4.b Scholarships for Higher Education including Vocational Training

4.b.a Number of scholarships given for higher education	Comprehensive data need to be released.			
4.b.b Number of scholarships given for vocational studies	Same as above			
Target 4.c Supply of qualified teachers				

4.c.a Proportion of trained teachers in pre-primary education	Same as above			
4.c.b Proportion of trained teachers in elementary education	Same as above			
4.c.c Proportion of trained teachers in lower secondary education (%)	29 th PAB meeting held in June 2013	100	100	As per policy, untrained teachers are not encouraged for employment. Hence, prospective teachers complete the training before they apply for jobs.
4.c.d Proportion of trained teachers Upper Secondary education	Same as above	100	100	

CHAPTER IX: HEALTH (SDG 3)

Summery

Vision

The state of Delhi is committed to provide universal and affordable access to quality healthcare to all residents to ensure the systematic reduction in mortality rate of vulnerable sections like infants, children and mothers. The state aspires to reduce the incidence of communicable and non communicable diseases in order to offer safe, secure and healthy long life to the citizens.

Reduction of overall inequality is dependent on some key indicators like health, serving as essential components of Human Development Index (HDI) and Multi-dimensional Poverty Index (MPI), specified by UNDP. Over all, Delhi has shown significant improvement in vital statistics in last three decades. There has been persistent rise in life expectancy with female life expectancy being higher and reduction in crude death rate. Maternal Mortality Rate (MMR), Infant Mortality Rate (IMR) and under-5 mortality rates also have declined. There is increasing access to institutional delivery system.

However, bed population ratio is much below the WHO norms. Sex ratio in Delhi is also below the national average. More than half of the total patients of communicable diseases in Delhi are suffering from diarrhea. This reflects directly on the quality of water and clean food. There are wide variations in district wise location of healthcare providers as well. Heterogeneity in the demographic and socio-economic composition of the state adds to the complications. The increasing pollution related to uncontrolled growth of traffic and economic activities account for deterioration of air quality while lack of waste management facilities lead to water pollution and depletion of ground water.

The vulnerable groups pose a major challenge to healthcare supply system in Delhi, the growing aged population being one of them. Rising life expectancy level and declining fertility level is bound to increase the share of aged in the population, implying special healthcare needs for better quality of life of the elderly. A large proportion of elderly (60+) population is expected to suffer from chronic health conditions requiring timely interventions.

Strategies to meet various challenges related to healthcare in Delhi should be based on the following:

- Public healthcare facilities should be well coordinated from primary healthcare provision to higher order referral level.
- Human capital should be created through professional courses with admission conducted in transparent manner. There should be proper checks and balance so that supply of professionals matches the demand.
- Private healthcare services should be coordinated as complementary, rather than competitive arrangement to public services.
- Public expenditure should increase significantly in order to make healthcare accessible and affordable. Capital expenditure in health should increase substantially to reduce the supply-demand gap in critical areas.
- There should be extensive application of ICT for identification and application of health related works to avoid duplication of work. Decision making at various level should be quick and effective.

SDG 3: Ensure healthy lives and promote well-being for all at all age

Delhi will be the fastest growing city in Asia, with the economy to be almost 50% larger in 2021 than it was at the end of last year, according to a new study from Oxford Economics (Mint, 10.08.17) that ranked the 30 largest cities of Asia. It will grow at 8% annually, based on financial and business services, projected as the fastest growing sectors in India. Delhi's dominance in this area will lead to higher growth and higher income.

However, distribution of high income to eradicate inequality is dependent on some key indicators like health. Health indicators serve as essential components of Human Development Index (HDI) and Multi-dimensional Poverty Index (MPI), specified by UNDP. Good health adds to economic productivity and quality development of human capital while bad health results in loss of man-hours and increasing medical bills with diversion of meager resources from other essential expenditures like education. Needless to say that non-availability of healthcare services hurts the economically weaker section most.

In order to achieve the SDG, we need to work on country-specific targets.

UN specified Targets for Health

- 3.1 Reduce maternal mortality ratio to less than 70 per 100,000 live births.
- 3.2 Reduce neo-natal mortality rate to 12/1000 live births and under 5 mortality to 25/1000 live births.
- 3.3 End the epidemics of AIDS, TB, and Malaria and combat all water-borne tropical diseases like hepatitis
- 3.4 Reduce by 1/3 rd premature mortality from non communicable diseases through prevention and treatment and promote mental health and well-being.
- 3.5 Strengthen the prevention and treatment of substance abuse including drugs and alcohol.
- 3.6 Half the number of death and injuries from road traffic accidents.

- 3.7 Ensure universal access to reproductive healthcare including family planning, education and information.

- 3.8 Achieve universal health coverage including financial risk protection, access to quality and essential health care services and safe, affordable medicines
- 3.9 Substantially reduce the number of deaths and illness from hazardous chemicals, pollution and contamination.

Health care infrastructure and services are provided in the National Capital Territory of Delhi by a number of agencies: the Ministry of Health and Family Welfare, the state government, five local bodies, the private sector and NGOs. There are various super specialty hospitals attracting patients from all over the country as well as from abroad, thereby making the national capital a very important destination for medical tourism.

In order to ensure quality health care service, the state government has decided to establish three tier systems for healthcare delivery. The first tier is Mohalla Clinic for primary health care at the ward level. Second tier is the polyclinics with specialist doctors and diagnostic test facilities. The third tier is the hospitals. The idea is to decongest hospitals from primary treatments.

Delhi constitutes around 1.5 per cent of the national population of 1.22 billion, as per Census 2011. The state's share of national population has remained almost the same over the last decade. It has a high population density of 11,297 persons per sq. km; the highest in India. The population base is highly variable as the number of people commuting to Delhi daily for work and for medical care are approximately the same. This makes it very difficult for planners and policy makers to ascertain the actual demand for public health utilities.

However, within the state, Delhi has witnessed a fall in rate of growth of population over the last three decades. The decline in the decadal population growth is the highest decline registered across the country. Fertility levels in Delhi have also been falling at a rapid rate with total fertility rate at replacement level of 1.7(Economic Survey of Delhi, 2016-17) with clear indication that the state is heading towards stabilized population.

Over all, Delhi has shown significant improvement in vital statistics in last three decades. There has been persistent rise in life expectancy with female life expectancy being higher and reduction in crude death rate. However, Infant Mortality Rate (IMR) shows irregular decline.

The IMR is reducing at the rate of 5.4 per cent annually which is very slow. Maternal Mortality Rate (MMR) also keeps fluctuating while bed population ratio is much below the WHO norms. Sex ratio in Delhi is also below the national average. (Table 9.1)

In spite of massive increase in plan outlay for health sector and expansion of expansion in road infrastructure and vehicular population, fatal road accidents remain a serious challenge.

Table 9.1: Comparison between Delhi and India for Different Health Indicators and WHO Norms --2015

S. No	Components	Delhi	India	WHO Norm
1.	Under-5 Mortality Rate/1000	24	47.7	25
2.	Infant Mortality Rate/1000	23	37	
3.	Neo-natal Mortality Rate/1000	16	25	12
4.	Maternal Mortality Rate/100000 live birth	37	158	<70/100000 live birth
5.	Bed/population Ratio/1000	2.76	0.8	5
6.	Sex Ratio (Female/1000 male)	868	940	1000
7.	Health Expenditure as % of Plan Expenditure	14.57	4.72	
8.	Per-capita Expenditure on Health at Current Prices(Rs)	2999.00		
9.	Institutional Delivery (%)	84.41	79.23	100
10	TB Incidence /lakh population	348	217	

Note: **Neonatal mortality:** Probability of dying in the first month of life
Infant mortality: Probability of dying before the first birthday

Under-five mortality: Probability of dying before the fifth birthday

Status of Health Infrastructure

The concept of universal coverage of healthcare facilities ensures that healthcare provisions are fair, responsive and effective. Needless to say that adequate supply of public sector healthcare facilities will increase affordable supply. The following table depicts the growth of healthcare providing institutes in Delhi (Table 2). Delhi boasts of elaborate supply structure responsible for provision of healthcare at different level. There are 1507 dispensaries and 69 clinics providing both allopathic and alternate healthcare facilities, 265 Maternal and Child Welfare Centres, 94 hospitals and 16 teaching hospitals. However, Primary Healthcare Centers (PHC) have declined in number. Generally, these are in the rural areas. Rural areas in Delhi are shrinking considerably as around 97 per cent of population resides in urban areas. It

should be explored whether the decline in PHCs is due to lack of need or lack of infrastructure. Dispensaries and clinics also provide primary healthcare. The state government is a significant contributor in this area owning 680(45.12%) of 1507 dispensaries including 107 Mohalla Clinics.

Table 9.2: Growth of Medical Institutions in Delhi during 2010—15 (Number)

S. No.	Institutions	2010	2011	2012	2013	2014	2015
1.	Hospitals	86	91	94	95	95	94
2.	Primary Health Centers	8	8	5	5	2	5
3.	Dispensaries	1101	1239	1318	1451	1389	1507
4.	Maternity Homes and Sub-centers	260	259	267	267	267	265
5.	Polyclinics	15	16	19	19	19	42
6.	Nursing Homes	676	679	750	855	973	1057
7.	Special Clinics	22	21	27	27	27	27
8,	Medical Colleges	11	12	13	16	16	16

Source: Economic Survey of Delhi 2016-17

Distribution of medical institutions and beds in the national capital shows the prominence of private sector in supply of healthcare facilities. It accounts for 48.39 per cent, almost half of total available beds. This leaves a question mark on the affordability of economically weaker section in availing the medical services (Table 3). Better indicator would have been to calculate per-capita availability of public sector facilities with number of lower income groups as denominator, rather than whole population. NSSO survey (71st Round 2014) reveals that private hospitals provided free ward facilities to only 1.86 per cent cases of hospitalization against similar arrangements in 95.03 per cent of cases in public institutions.

Table 9.3: Medical Institutions and Bed Capacity in Delhi—2015-16

S. No	Agencies	Institutions	Beds Sanctioned
1.	Delhi Government	38	10820
2.	Municipal Corporations of Delhi	63	3797
3.	New Delhi Municipal Council	2	215
4.	Government of India	27	10829
5.	Other Autonomous Bodies	1	128
6.	Private Nursing Homes/Hospitals/Voluntary Organizations	1057	24180
7.	Total	1188	49969

Source: Directorate of Health Services, GNCTD 2017

There has been very low growth of bed capacity in Delhi. Per-capita availability of beds has increased from 2.18 in 2006 to 2.76 in 2015. Population of Delhi during this period increased from 1.52 Crore to 1.80 Crore, the beds increased from 33278 to only 49969, while as per WHO norm, it should increase to 5 per thousand, about 2 times more, compared to current availability of 2.8. The state proposes to increase the bed capacity to another 14,000 by 2020 to reduce the gap between norm and availability.

However, there are wide variations in district wise location of healthcare providers. West, North-West and South districts together accounts for 593 (56.10%) out of a total of 1057 private hospitals. The rest are spread over other six districts. Maximum concentration of government hospitals is evident in North-West district. It also enjoys maximum number of dispensaries and primary health centres (Delhi Human Development Report, 2013). It reflects healthcare facilities are not evenly spread in Delhi. It causes enormous difficulties to travel from distant areas to access services, especially emergency, given the highly congested traffic conditions in the national capital.

Health Status

Mortality Rates

There has been a steady increase in life expectancy at birth in the state indicating general improvement in health status. However, SDGs are more focused on the vulnerable sections

like infants, children and maternal health components. Under-5 mortality is showing a steady decline during last decade. In 1990, this rate was 125 per thousand; it has come down to 29 by 2015. Infant Mortality Rate (IMR) has also declined steadily during last decade from 37 to 23 per thousand. However, it is still far behind the SDG goal of 15 per thousand. The state hopes to achieve that target with increasing expenditure on health. NMR was 9 in 2004. It has increased to 16 in 2015. Under-reporting of death may partly describe the low rate during earlier years, but in last five years, it is hovering between 14 and 16. Medical certification of causes of death became compulsory in 2003. All government and private hospitals were brought under the purview of Registration of Births and Death Act, 1969. The process of mentioning causes of death has improved considerably since then. It is possible to identify causes of death at various stages. Delhi HDR has suggested segregation of different stages of NMR as early NMR (within first seven days of birth), late NMR (between first to four weeks of life) and post NMR (between 28 days to one year) to focus on the clusters of infant mortality. However, such data are not available systematically. This will help to adopt more segregated approach to address the issues. Non-institutional deliveries provide acute challenge to health environment, aggravated by poverty and living conditions. Analysis of causes of death will help in understanding how many infant deaths could be prevented through timely medical interventions and better newborn care. The segregation will be indicative of gaps in reaching mothers during prenatal, natal and post natal period with appropriate facilities.

Civil Registration System (CRS) is the only source that provides regular information for maternal deaths in the state. It is difficult to generate a trend analysis as better reporting may lead to occasional spikes in the graph. Reduction of MMR level could be consolidated through proper screening of high-risk pregnancies and ensuring that deliveries are monitored and conducted in healthy environment.

One reason of declining MMR and IMR is increasing access to institutional delivery system. It has increased from 77.92 to 84.41 during last decade. MMR has remained under 40 for last five years, thereby achieving the target (below 70) much earlier. The state provides several financial incentives for institutional delivery that seems to bear fruits. There should be

aggressive policy interventions to increase the coverage of formal healthcare system to cent per cent population.

Prevalence of Other Diseases

Several communicable and non-communicable diseases dot the health map of Delhi, making its population exposed to serious challenges. Several of these are life style related while some are environment related. Vector born diseases are directly related to living environment. Delhi's prosperity has not come without a cost. The increasing pollution related to uncontrolled growth of traffic and economic activities account for deterioration of air quality while lack of waste management facilities lead to water pollution and depletion of ground water. Heterogeneity in the demographic and socio-economic composition of the state adds to the complications.

Life style diseases not only affect the rich, they cover poor community also. Growing burden of chronic diseases in the state includes a large number of poor residing in unhealthy environment of slums, with limited means to afford any preventive and curative healthcare programme. It affects the working population thereby causing serious economic loss on both counts for the families.

The other vulnerable group is the growing aged population in Delhi. Rising life expectancy level and declining fertility level is bound to increase the share of aged in the population, implying special healthcare needs for better quality of life of the elderly. A large proportion of elderly (60+) population is expected to suffer from chronic health conditions requiring timely interventions.

Vector borne diseases like malaria, dengue and chikungunya are largely responsible for significant loss of productive person days.

Delhi ranks first in terms of incidence of TB during last decade. In 2015, TB incidence per lakh population in Delhi was 348 while for India, the figure was 217.

National AIDS Control Programme is a centrally sponsored programme. Activities under this programme for prevention and control of HIV/AIDS are implemented through Delhi State

AIDS Control Society. There are estimated 60,000 truckers and 2.77 lakh migrants who come to Delhi annually. They are largely target population for AIDS Control Programmes.

The following table shows the spread of communicable diseases in Delhi (Table 4).

Table 9.4: Spread of Communicable Diseases in Delhi and Targets for Reduction -- 2015

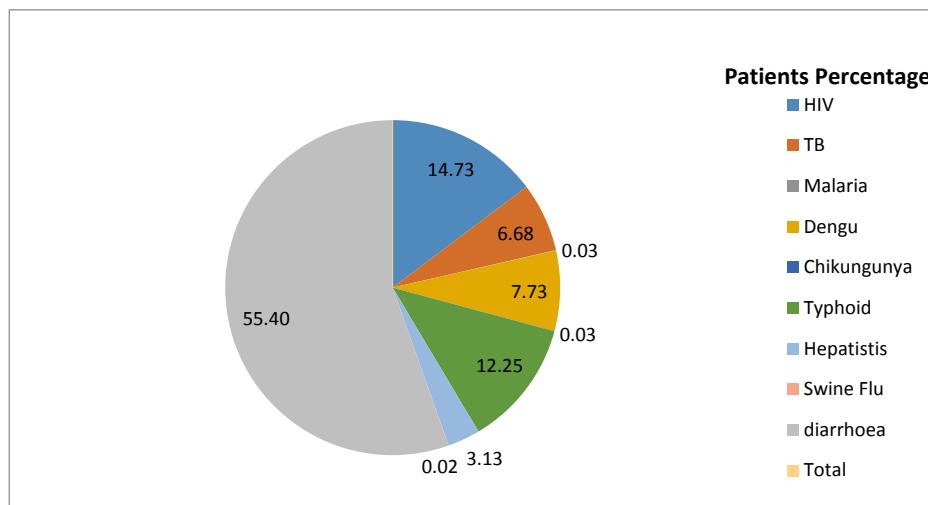
S. No	Components	Estimated Affected Persons (No.)	Target 2020	Target 2024	Target 2030
1.	HIV/AIDS	30216	Reduction by 50%	Reduction by 75%	Reduction by 90%
2.	TB	314/lakh	Reduction by 50%	Reduction by 75%	Reduction by 90%
3.	Acute Diarrhea	113677	Reduction by 50%	Reduction by 75%	Reduction by 90%
4.	Malaria	54	Reduction by 50%	Reduction by 75%	Reduction by 90%
5.	Dengue	15867	Reduction by 50%	Reduction by 75%	Reduction by 90%
6.	Swine Flu	38	Reduction by 50%	Reduction by 75%	Reduction by 90%
7.	Chikungunya	64	Reduction by 50%	Reduction by 75%	Reduction by 90%
8.	Typhoid	25131	Reduction by 50%	Reduction by 75%	Reduction by 90%
9.	Hepatitis	6425	Reduction by 50%	Reduction by 75%	Reduction by 90%

Source: Directorate of Health Services, Delhi State AIDS Control Society, 2016

The chart below shows that more than half of the total patients of communicable diseases in Delhi are suffering from diarrhea. This reflects directly on the quality of water and clean food. Improvement in living environment will go a long way to reduce the incidence of communicable diseases in the state. It requires a holistic approach including all stakeholders. Various ministries including water supply and sewerage, environment, roads, electricity besides health ministry need to act with proper coordination along with the state government and local bodies. In several cases, it has been observed that services could not be provided owing to lack of clarity over jurisdictions. Provision of adequate number of doctors, supporting staff and beds are necessary but not sufficient conditions so long as the root causes are not eliminated. Healthy living environment with access to safe, potable drinking water, regular

garbage collection and sewage cleaning, properly lit homes with clean air are primary deterrents to communicable diseases.

Chart 9.1: Spread of Major Communicable Diseases in Delhi



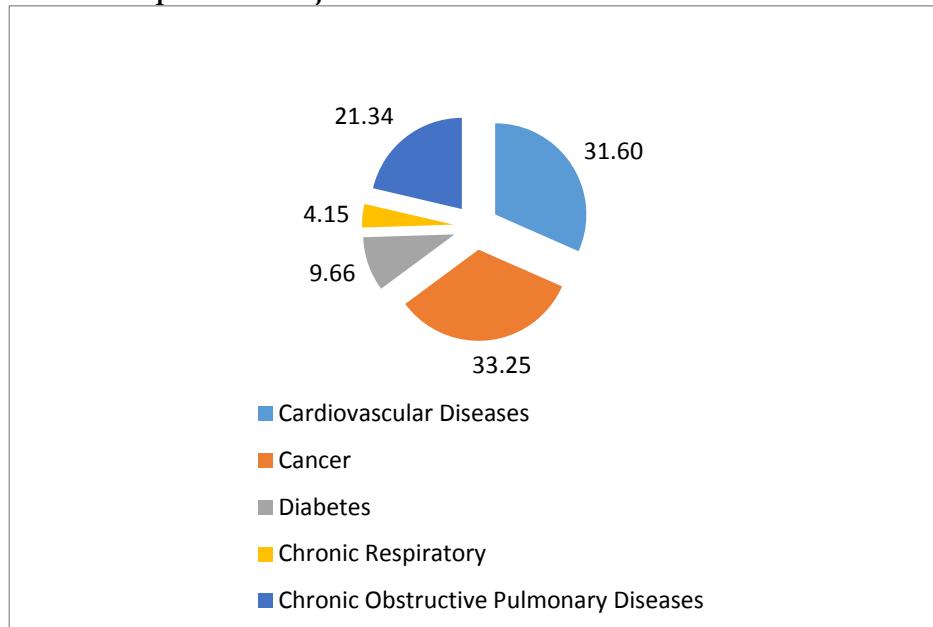
Source: As above

Trend for spread of communicable diseases during 2006-2015 shows that estimated affected persons by HIV/AIDS have increased from 0.21 per cent of total population to 0.23 while confirmed malaria, dengue, chikungunya and typhoid cases have declined. There has been a fall in incidence of TB cases and viral hepatitis.

Incidence of non-communicable diseases also presents a mixed scenario in the state. Death due to cancer increased as percentage of total death from 1.49 in 2006 to 3.75 in 2015. But, mortality rate due to pulmonary circulations and other forms of heart diseases has declined from 3.75 to 2.41 during the same period. Death from respiratory system has increased from 0.19 per cent in 2006 to 0.47 in 2015 but death from diabetes mellitus has drastically declined from 5.17 per cent in 2006 to 1.09 in 2015. The chart below (Chart 2) shows that cancer and cardio-vascular diseases account for more than 60 per cent of non-communicable diseases.

In comparison, communicable diseases account for around 94 per cent of total patients. It is very alarming but at the same time, it reflects this burden can be reduced with drastic improvement in living environment, provision of clean potable drinking water and effective waste disposal and management.

Chart 9.2: Spread of Major Non- Communicable Diseases in Delhi



Source: Directorate of Health Services, Report on MCCD Delhi

Other Causes of Death/Injury

A serious cause of mortality in Delhi is road accident. During last five years, death due to road accidents was more than death due to diabetes. Hopefully, number of people dying from road accidents has reduced from 2104 in 2010 to 1671 in 2014. On the other hand, number of people injured from road accidents increased steadily from 2010 (5116) to 2014 (8283) as per Delhi Police sources.

It is encouraging that the state government has decided to remove 141 black spots prone to fatal accidents from the city's roads in next three to four months to ensure safety of commuters. It has decided to form district level committees to identify such spots. The State Road Safety Council has been reconstituted in 2017 to focus on this issue and to share the information with the traffic police, PWD and other concerned agencies.

Another cause of concern is the suicide rate. Since 2007, this rate per lakh population has increased from 8.90 to 10.30 in 2014. This should be explored as serious mental health cases. Economic stress, social conditions, misuse of technology and various other issues contribute to such fatal decisions. The city that aims to transform itself as world city cannot ignore its happiness component.

Provision of Health Services in Delhi

The state government has tried to address health issues through a number of programmes and schemes.

Delhi State Health Mission (DSHM)

The mission started in Delhi from 2006, with priority intervention in covering the unserved areas, following the central government guidelines for implementation of National Rural Health Mission. The financing of this mission was 75:25 in proportion with the central share being 75 per cent. From 2016, it has been totally centrally sponsored scheme. This is primarily targeted to improve maternal and child health. But it conducts other health related awareness programmes as well. Specially trained workers are selected for this mission. They are known as Accredited Social Health Activists (ASHA). Women volunteers from local community are trained to reinforce community action for universal immunization, safe delivery, new born care, prevention of water borne and communicable diseases, improve nutrition and promotion of households and community toilets.

At present, there are 5100 ASHAs (Economic Survey of Delhi 2016-17), selected on basis of one per 2000 population. Master trainers are identified from Department of Health, each unit having 50 ASHAs and 5 trainers. This programme is supported under NRHM.

DSHM conducts various programmes like sterilization, health check up, immunization, screening for diabetes and Hypertension in clusters, School Health Programmes, mobile dental clinics, mobile mental health units as well as spreading awareness related to various aspects of health.

It also implements National Health Mission of the central government with focus on reproductive, maternal, newborn, child and adolescent health as well as routine immunization programmes.

National Urban Health Mission includes various communicable disease restriction programmes like National Leprosy Eradication programme, National Vector Borne Disease Control programme and Revised National Tuberculosis Control programme.

Janani Suraksha Yojana

Under this centrally sponsored programme, pregnant women of BPL, SC and ST families both in urban and rural areas get financial incentives for institutional delivery. There are various awareness generation programmes as well. Seed money is provided for establishing Primary Health Care units (PHU) in unserved areas.

Janani Shishu Suraksha Karyakram

This is another central scheme to provide free facilities to pregnant women and infants (below 1 year) in terms of food, supplements, medicines and diagnostic services. All government hospitals and medical centres provide free two way transportation and blood transfusion for delivery and pre-natal/post natal complications.

Secondary Level (Level II) healthcare services are provided in 16 hospitals through State Neonatal Care Units (SNCU) to cater to sick newborns (from birth to 28 days). There are 61 New Born Care Corners (NBCC) at all 61 delivery points within labour room and OTs in the state.

There are 25 Infant and Young Child Feeding (IYCF) counseling services in the state till now. Pregnant and lactating women from weaker sections get these benefits.

Mission Indradhanus Kawach (MIK)

It has been introduced in 2015 for full immunization coverage. This programme has covered 2.46 lakh children and 0.75 lakh pregnant women till June 2016. Besides this, special catch up

campaigns for immunizing children up to 5 years of age, who have missed their vaccination earlier, are organized as a regular feature twice a year, with special focus on residents of slums and JJ clusters.

Nutritional Rehabilitation centres (NRC) are working in 8 hospitals to take care of Severely Malnourished Children (SAM) less than 5 years of age who have medical complications.

Kangaroo Mother Care (KMC) units in 16 special newborn care units and five medical colleges have been established and Mother Absolute Affection (MAA) programmes have started at all delivery points to increase awareness.

Integrated Child Development Schemes (ICDS) have liaison with Anganwadi Centres to immunize children in Anganwadis. The state is trying for convergence of various programmes like NRHM, MCD and others to distribute health care facilities in more cost –effective and targeted ways.

Chacha Nehru Sehat Yojana (School Health Scheme)

This programme was launched in 1979 to improve health and nutrition status of school children and to provide them with useful education on hygiene. These clinics are set up in school premises for easy accessibility. Currently, there are around 67 clinics and 4 special referral centres catering to 18 lakh school children in government and aided schools.

Alternative Medicines

Directorate of AYUSH was set up in 1996 in order to promote alternative systems of medicines utilizing indigenous materials. Various regular and super specialty services are being provided in AYUSH dispensaries and hospitals. The state government has taken several important steps to popularise functioning of AYUSH. There are colleges offering both degree courses and post graduate courses in alternate medicines like Homeopathy, Ayurveda and Unani. Nehru Homeopathic Medical College and hospital is imparting BHMS Degree and have a capacity of 100 beds. Besides, there are other teaching hospitals also offering additional 300 regular beds. Ayurveda Medical College has started with 210 bedded IPD services. This Directorate also took up health awareness campaign especially in life style diseases.

The National Sample Survey (State Sample) on Social Consumption of Health (71st Round, Jan- July 2014), shows that out of total ailing persons in Delhi, about 9.86% persons opted for AYUSH treatment. In rural areas, 19.82% persons opted for AYUSH in comparison to 9.48% persons in urban area.

Affordable Healthcare

Twelfth Five Year Plan (2012-17) made Universal Health Coverage (UHC) a core component of social security, as per recommendation of High Level Expert Group. It is a major cornerstone of National Health Mission. The prime components of UHC are as follows:

- To increase public expenditure on health to 2.5 per cent of GDP by the end of 12th Plan.
- To ensure equitable access to medicines and other healthcare facilities.
- To increase availability of healthcare workers through proper training.
- To prepare a national health package as an entitlement to all with special focus to poor.
- To establish Health System Management cadres at national and state level to strengthen the UHC.
- To establish Participatory Health Councils for improving access to healthcare with special focus to women and other vulnerable groups.

The UHC vision in India states that every citizen be entitled to basic health care services at all levels, guaranteed by the state. It includes promotive, preventive, curative and rehabilitative health services at different levels.

In the NCT of Delhi, there are various types of service providers at different level, both in public sector and private sector, as described in details in earlier sections. Coverage of unserved area has become a priority intervention by the state through Delhi State Health Mission, supported by the National mission. It has also percolated at the school level as School Health Scheme covering all government schools. The Directorate of Health Services (DHS) has mapped all the government facilities for health services in every district.

This shows the district wise inequality in health services that need to be addressed in order to make accessibility universal.

Delhi is one of the few states to have a policy of widespread availability and accessibility of free drugs for those in need since 1994. Delhi Society for Promotion of Rational use of Drugs (DSPRUD) works in close collaboration with the state government. It has prepared an Essential Drug List (EDL) with centralized, pooled procurement system of drugs. The EDL is revised every two years. The financial sustainability of drug purchase is ensured by adopting a rigorous selection of suppliers with a minimum annual threshold turnover and quality records. The state spends significantly through EDL. It is the largest purchaser of medicines in India. This model has been able to provide essential drugs to more than 80 per cent of healthcare units. There are estimated 1.50 crore persons benefiting from this system.

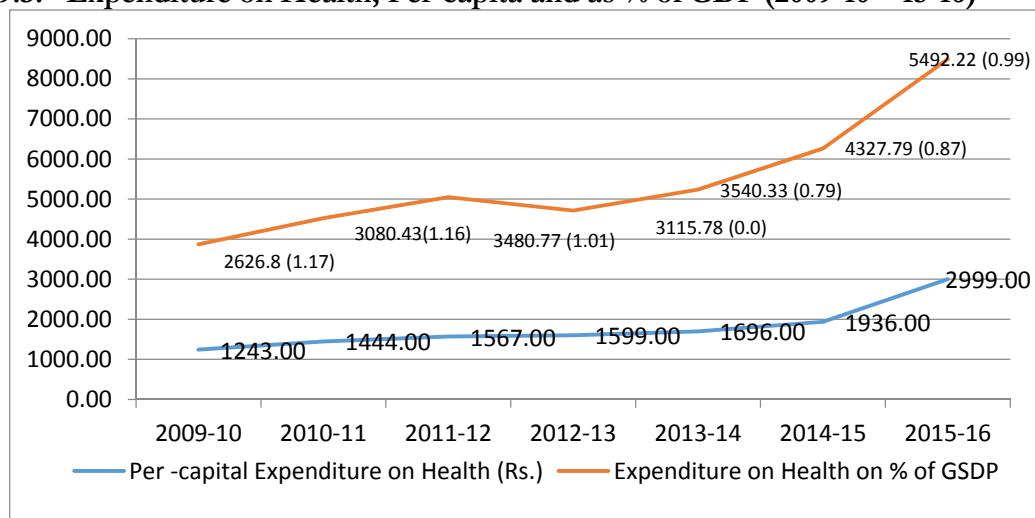
The Delhi State Health Mission (2006) recognized provision of Universal Health care and expanded public sector healthcare facilities in a major way in hierarchical manner with focus on covering unserved areas. Primary health care services including Mohalla Clinics provide basic health care services while following a proper referral system. The PHCs are equipped with basic laboratory facilities. They offer a variety of services including reproductive healthcare, immunization, family planning, general OPDs and referral services. They also carry on outreach services in vulnerable locations with the help of Auxiliary Nurse Midwives (ANM) and ASHAs. The civic bodies operate Maternal and Child Welfare Centres with a large pool of ANMs and ASHAs for outreach services related to maternal and child health. There are mobile health clinics, operationalised since 1989 to cover JJ clusters and construction sites. Many of these centres are run in PPP mode with help of NGOs. These are important additions to conventional PHCs. They provide almost all the services available in PHCs. They are operational during religious gatherings and other occasions where large crowds are expected and also in times of sudden diseases outbreak. They also provide services in night shelters and other centres with homeless population. They have catered to more than three million patients during last ten years.

At the secondary and tertiary level, there is a large pool of hospitals run by different government bodies. Private hospitals are provided land at concessional rates to provide

mandatory free treatment to weaker patients to a certain percentage (25 per cent of out patients and 10 per cent of in patients). The state has issued a directive recently where all health institutes in the state, private or public, are bound by law to attend emergencies, specially related to road accidents and crime.

All these elaborate arrangements of public healthcare unfortunately cannot keep pace with burgeoning demand for health care in the state. High price and poor availability of medicines along with low affordability of patients remain a formidable challenge. There are high out of pocket expenses on medicines that results in expensive health care and impoverishment of certain sections. People go to private health care but are often forced to pay high price for medicines supplied by unregulated private sector. Delhi is one of the first states to have a drug policy formulated as early as in 1994. Government facilities at the primary, secondary and tertiary level are also mandated to provide essential medicines free of cost to all patients. However, all these policies and activities are not adequate to reduce health care expenditure significantly.

Chart 9.3: Expenditure on Health, Per-capita and as % of GDP (2009-10—15-16)



Source: Economic Survey of Delhi 2016-17

Per-capita expenditure on health in the state has increased by 140 per cent during 2009-10 – 2015-16 (Chart 3) as per Economic Survey of Delhi 2016-17. This conceals the increasing burden on the poorer section. The higher income group goes for private healthcare in general

in order to save time. But a substantial number of lower income groups also avail private health care system for various reasons. The private hospitals do not provide such data separately. Partial data is available when the poor is hospitalized under mandatory free indoor facility requirement. The primary surveys are only source of such data. Delhi Human Development Report (2013) has discussed the IHD-IRMA (2010-11) study in details. It observes that the poor and the vulnerable often settle for less costly options of health care as it is easily available. The study also establishes that a significant proportion of urban households in Delhi reduced their other non-food expenditure considerably (the range being from 10 to 40 per cent) while paying for the treatment of their ailing family members. Any household spending on health care is considered to be catastrophic when it is required to reduce its basic expenditure in order to cope with healthcare costs. The study has estimated that the proportion of households experiencing financial catastrophic situation ranges from 9 to 3 per cent. Households relying more on informal means of occupation show more than three times the incidence of experiencing financial catastrophe.

It is estimated that 92 per cent of non-hospitalization expenditure and 89 per cent of hospitalization expenditure is financed with household income and past savings, around 6 to 8 per cent of such expenditure is financed through borrowing and the rest through sale of assets.

The Perception Survey, 2013 also shows, that very low proportion of households have been able to finance healthcare through individual insurance or employer supported schemes. Households belonging to low-income classes and high vulnerability groups are more dependent on informal sources of risk sharing with borrowing from relatives and friends to finance healthcare. Economically better off, quite expectedly, depends more on formal sources of risk sharing. The formal sector provides more security to their employees than the vast informal sector. The IHD-IRMA survey has estimated that households in the informal sector spend more than twice of their capacity to pay on healthcare against the households engaged in the formal sector. In case of major illness, the disparity is much deeper. The better off households manage to get almost a quarter of their medical expenses covered through formal sources. For the economically weaker, the formal safety nets account for less than 2 per cent of their expenses. These households have no other option than to take informal loans at very

high rate of interest besides relying on their own income or other help. Households with informal livelihoods are exposed to serious financial risks.

The state government has introduced various initiatives to address financial risks of the vulnerable section of society. There are many health insurance schemes like Delhi Government Employees Health Scheme, Employees State Health Insurance Scheme, Rashtriya Swasthya Bima Yojana to take care of formal sector employees. Individuals also can contribute to these schemes irrespective of their employment status. The state has two schemes, i.e. Delhi Arogya Nidhi and Delhi Arogya Kosh, designed to provide cash assistance to patients from the economically weaker section. These schemes are aimed to cover high financial risks like dialysis related expenses at empanelled private hospitals and government hospitals.

A major barrier in this area is lack of awareness among prospective consumers of health services. Enrolment of beneficiaries and consequent disbursement of benefits remain unequal because of this deficiency. Many families remain outside the coverage areas and enrolment remains low. This applies equally to other public benefits as well. Lack of awareness deprives the real needy from accessing the benefits. Information technology need to be used to map the area wise vulnerability for targeting need based assistance in health care.

The state has focused on strengthening healthcare service delivery through various budgetary measures.

The per-capita budgetary expenditure in Delhi is nearly double the national estimate. Yet the proportion of expenditure in health in GSDP hovers around 1 per cent since 2009-10. This shows the low expenditure coverage in respect of health. This should be increased to at least 10 per cent if Delhi is hoping to emerge as a global city.

Challenges

Delhi has seen massive increase in plan outlay for health sector during 11th and 12th plan. The primary, secondary and tertiary level health infrastructure has also expanded significantly. Delhi's per capita expenditure on health is the highest in the country. Yet the bed/population ratio is far below the WHO norm.

The ratio between government and private sector hospital beds was 57:43 in 2010. At present, the ratio is 51:49. It reveals private healthcare facilities have increased at much faster pace than government facilities. Given that private sector caters to less than two per cent of the vulnerable section, we are still far away from universal access to health care.

The decline in number of PHCs shows the distance between the service providers and receivers is widening. There is plan for 1000 Mahalla (Neighbourhood) Clinics but only 180 have been constructed, out of which, 160 are operational. Non-availability of land is cited as a major reason.

Land is a major challenge in expanding healthcare infrastructure. DDA should allocate adequate and suitable sites to both public and private sector for timely expansion in order to increase bed/population ratio. The floating population from neighboring states poses significant pressure to the available infrastructure and contributes towards increase in cost of health care.

Low sex ratio in Delhi compared to national average is a pointer towards need for more provision of institutional delivery, focus on pre and post natal care. Given that families with baby boy spend more on neo natal care, it is imperative to focus on the girl child at least till she crosses the survival threshold. Major challenge is to reduce the number of home deliveries to zero with special focus in slums and JJ clusters.

Low IMR and low MMR are related challenges that need priority attention. Delhi has much better record compared to national average, but it is yet quite far from target. That MMR is within the target is a poor consolation when compared to absolute number of deaths in this context. The quality of healthcare provision is as challenging as the expansion of physical infrastructure.

Immunization coverage is not yet 100 per cent, leaving a good number of children under perpetual risk. Increase in both medicine and manpower is of prime concern to deal with increasing number of children. Spread of awareness activities, especially within vulnerable section is a major challenge.

Both communicable and non-communicable diseases are increasing the burden of diseases, affecting the socio-economically vulnerable groups more. Majority of these diseases are life style related. This does not affect the economically better off only. The eternal contradiction between developmental pursuit and environmental concern pose a major challenge for the country with limited resources. The working and living environment have a lot of bearing on health. This is dependent on coordination among all the major departments like Water Supply, Electricity, PWD, Waste Management and the like. Improvement of living and working environment depends on availability of clean drinking water, timely and regular garbage removal, proper waste management, dust-free construction, well lit parks and roads etc. Clean environment accounts for prevention of vector born and other communicable diseases to a large extent and reduction of burden of diseases. This cannot be the responsibility of Ministry of Health only. The major challenge remains in coordinating with the concerned departments.

The private sector is expanding fast in the national capital but it remains much above the affordability level of common citizen. Out of pocket expenditure for health in Delhi is very high. The burden of reducing this expense falls totally on the public sector.

Reach of health insurance schemes is not yet adequate in the state to prevent financial catastrophe significantly. Public expenditure on health as per cent of GSDP is alarmingly low to meet all these challenges. Budgetary allocation should be very carefully examined to align the expenditure with SDG goals in a time bound manner.

The number of fatal accidents is one major challenge in the national capital. It records highest road accidents per month compared to national average. Adequate number of Trauma Centres with all diagnostic and treatment facilities for accident cases along with properly equipped ambulances should be provided at the earliest. Implementation of regulatory measures on driving, proper road signage and signaling system, effective speed control practices on the road remain challenging.

The proportion of ageing population is very high in Delhi. They need special type of treatment, both mental and physical. All hospitals need to set up Geriatric Clinics. Special healthcare persons should be trained to reach them at the earliest in time of need.

Delhi has a thriving market for street foods. This brings jobs to a significant number of informal sector workers. Food safety is a major challenge. Unhygienic and adulterated food creates life threatening risks to the consumers. Food samples need to be collected regularly to be tasted in efficient and quality laboratories. Some enforcement system and timely implementation will help in preventing disease.

Similar challenge is faced in unlicensed medicine shops selling impure medicine. Regular and effective monitoring and consequent heavy penalty will act as a major deterrent.

Human resource management is in a critical condition in Delhi. Posts are vacant at all levels of healthcare supply side. There is huge scope of job creation with proper training of paramedical staff. First trimester antenatal registration is low. Adequate number of doctors, trained nurses and laboratory staff are not available at health care centres. This has led to low quality of delivery care services and more out of state referrals.

Post delivery services should be followed up with special care on cases with low birth weight and premature birth. Infrastructure should be adequate for at least 48 hour stay in the hospital following delivery. Low birth weight babies should only be discharged only when they are able to breastfeed satisfactorily.

Strategy

Strengthening Public Healthcare Institutions

Public healthcare facilities should be well coordinated from primary healthcare provision to higher order referral level. Administrative structure need to be aligned in terms of staff, service, infrastructure efficient and effective delivery. Huge shortage of doctors and specialists need to be filled in time-bound manner to reduce supply side deficiency. Capacity building should be strengthened to develop linkage between healthcare provisions with management skills. There should be continuous skill up gradation for using new technologies. Adequate emergency services need to be provided with demarcated catchment areas to reduce duplications and delivering facilities at the earliest. Round-the clock emergency services should

be kept ready in accident prone areas and other places so that well-equipped ambulance can reach in shortest possible time.

Human Capital Development

Admission to professional courses should be conducted in transparent manner. There should be proper checks and balance so that supply of professionals matches the demand. Scholarships and other incentives should be geared in such a way that professional can serve the unserved areas during course of study. There should not be concentration of professionals in urban areas only. This aspect should be considered from the level of curriculum development. Similar consideration should be present at para-medical level also to reduce the urban-rural gap. There should be a clear, transparent policy related to recruitment, transfer, placement and skill up gradation. The density of health workforce should be as per standard requirement.

Private Healthcare Service

Private healthcare services should be coordinated as complementary, rather than competitive arrangement to public services. There should be proper regulations so that there is no exploitation of consumers. At the same time, the government should be cooperative through smooth mechanism so that private sector is encouraged to extend the supply of such services. There should be compulsory registration of private medical establishments with clearly display of prices of different services.

Affordable Healthcare

Public expenditure should increase significantly in order to make healthcare accessible and affordable. Capital expenditure in health should increase substantially to reduce the supply-demand gap in critical areas. There are several health insurance schemes which need to be realigned to suit the needs of vulnerable sections. There should be elaborate awareness building and counseling arrangements to reach the benefits to target groups.

E-governance

Healthcare is one critical area that requires application of e governance desperately. Every transaction and application of health related works should be recorded to avoid duplication of work. Decision making at various level should be quick and effective. Health related requirements should be mapped so that all data are available for effective policy decision. Tele conference and tele medicine should be attempted wherever possible. Before outbreak of any epidemic potential catchment areas for risk should be identified through ICT in order to prevent such incidence and reduce risk of death.

Specific Agenda for Action (2016-17 – 2019-20)

3.1 By 2030, reduce Maternal Mortality Ratio (per 100000 live birth) <70

3.1 (a): To reduce MMR <70

Agenda:

- Registration of all pregnant women to avoid duplication.
- Provision of more ASHAs in non-ASHA areas, rationalization of ANM deployment.
- Deployment of more councillors to spread awareness related to nutrition, ANC care, PNC care, birth preparation, dangerous signs etc.
- Provision of blood storage/blood bank facilities at all delivery points.
- Display of standard operating procedures in all delivery rooms.
- Rejuvenation of all hospitals as per the new guidelines for HDU and ICU

3.1 (b) To increase Proportion of births attended by skilled health personal.

Agenda:

- Increase in awareness of institutional delivery through ASHAs and ANMs.
- Verify area-wise number of pregnant women registered.
- Increase in number of ambulance.
- Provision of delivery related facilities in delivery points.
- Utilisation of financial incentives from various government schemes for institutional delivery.

3.2: By 2030, end preventable deaths of newborns and children up to 5 years.

3.2 (a): Neo natal mortality Rate (per 1000 live birth)

3.2(b): Below- five mortality Rate (per 1000 live birth)

Agenda

- Increase number of trained human resources and fill up the vacancies for relevant posts at the earliest.
- Distribute healthcare infrastructure homogeneously within all districts.
- Improve the quality of existing infrastructure to prevent infection to new born and lactating mother.
- Streamline the referral system.
- Provide for ambulance to deal with neo natal cases.
- Provide proper co ordination between the agencies responsible for health of new birth and under – 5 children. Some of the agencies are Women and Child Health Department. Water and Sanitation Department, Health and Family Welfare Department etc.

3.3: By 2030, end the epidemic of AIDS, tuberculosis, malaria and neglected tropical diseases and combat other communicable.

Agenda

Core High Risk Group for sexually transmitted diseases consists of around 45000 female sex worker 18000 males having sex with male, 7000 transgender and 12000 drug users. Besides, there are bridge population comprising of approximately 60,000 **truckers** and 3 lakh high risk migrants. Prevalence of HIV in Delhi population is 0.25 per cent. Another cause of worry is the prevalence of 0.13 per cent amongst antenatal females which is an indicator of prevalence amongst general population. This target group should get all the preventive and curative measures.

- To create awareness with the help of trained functionaries under specific AIDS Control Scheme supported by the centre and the state.

- To deliver combination prevention services tailored to population, location and intervention.
- To make HIV testing services accessible for people at risk of HIV infection.
- To update the mapping of such population. The last mapping was conducted in 2006. Current estimates are based upon site validation. It is imperative to map un-recovered areas in regular periodic interval.
- To involve more HRG/Sexual network stakeholders into programme activities and early registration. This will reduce the gap between years of initiation into high risk behaviour and registration under the programmes.
- To identify young population into substance abuse in early stage for proper counselling and treatment.
- To equip blood banks with proper arrangements and blood vehicles for safe and hassle free organization of blood donation camps in order to generate stock for blood transfusion.
- To train appropriate manpower to handle blood banks and delivery of services on demand.
- To install bio metric machines to keep a track of donors.
- Accreditation of blood banks for improving service quality.
- To evaluate presumptive TB patients for drug sensitivity pattern.
- To medicate all presumptive patients and monitoring through ICT tools.
- To screen presumptive TB patients for other related diseases.
- Active case finding and provision of preventive and curative facilities.
- To monitor quality of service.
- To coordinate patient enablers with other public sector programmes and NGOs.
- Identification and mapping of high risk areas for communicable diseases including water-borne diseases.
- Adult vector control intervention in and around houses and open spaces, drains etc.
- Adequate case- based surveillance and inter-sectoral coordination with MCDs and other concerned agencies.

- To carry out surveillance at different levels of health care system.
- To ensure regular water supply 24/7 from DJB to minimize water storage practices in vulnerable areas.
- To avoid water logging and act on vector control measures on priority basis to control mosquito breeding.
- To ensure proper immunization against hepatitis and other virus.

3.4 Control of non -communicable diseases and mental health related issues

National Programme for Prevention, Control and Judicious treatment of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPPCDCS) has been dovetailed to some common factors, applicable to all life style diseases. The adoption of good life style habits goes a long way in preventing these chronic diseases with positive impact on early morbidity and mortality. Early diagnosis and judicious treatment is also equally important for prevention of early death and long term sequel leading to prolonged morbidity.

Agenda

- To initiate and continue screening and concealing activities.
- To provide adequate manpower in NCD cells at state and district level, supplemented by district level clinics.
- To provide medicine, food and fruit supplements to target groups.
- To provide and encourage daily physical activities in common places like parks with trained professionals.
- To initiate facilities for regular check up especially for the aged people.
- Regulation of street vendors and quality control of street foods for food safety.
- Provision of adequate number of ambulance for emergency situation.
- To conduct regular activities under District Mental Health Programme Network.
- To identify mental health patients especially from homeless group.
- To activate Mobile Mental Health Units more frequently.

3.5 Prevention and treatment of substance use

- To discourage substance use like drugs, tobacco through proper and elaborate awareness and advocacy programme.
- To provide de addiction centres for target groups.
- To conduct regular workshop and sensitizing meetings including community and school children.
- Regular enforcement of Tobacco Control Act and Drug Control Act.

3.6 Reduce death and injuries from road activities

This needs total cooperation from Department of Transport in improving traffic management. Delhi has very high number of death due to road accident. Strict implementation of traffic laws with heavy penalty for traffic violation need to be followed. Road sign boards in Delhi are not up to the mark and create confusion. Speed limit should be strictly monitored.

Agenda

- To increase accessibility to trauma centres.
- To provide emergency clinics near accident prone areas.
- To attend to accident victims at the earliest. In such conditions, every minute counts.
- To develop quick networking system with concerned agencies.
- To provide adequate all equipped ambulances for emergency handling.
- To provide mobile emergency units

3.7 Reproductive health and family Planning Agenda

- Integration of Family Planning Services.
- Building quality services at PHCs
- Creating awareness among couples regarding mother and child health issues.
- Awareness regarding medical and financial implications of periodic gap between child births
- Provision of financial and other benefits to discourage frequent child birth.
- Widen the choice for reproductive health services.

3.8 Universal health coverage with financial risk protection.

Agenda

- To increase health expenditure as a percentage of GSDP to 3 per cent at least annually
- Ensure all vaccination programme are aimed effectively from new born to pre teen age group.
- Create awareness regarding all government programme related to financial support in health care.
- Proper networking with hospitals for cashless admission.
- Timely payment of all dues. Private sector hospitals do not want to be empanelled with government medical schemes as payments remain long overdue.
- Widening the coverage of such schemes.
- Spreading network so that patient and relatives do not suffer hassles of paper work.
- Making all financial schemes user friendly.

3.9 Death and illness due to pollution

Essential coordination between multiple agencies responsible for civic services including transport and construction departments is of prime requirement to work on this component. It is not public for any single agency to significantly have any influence in reducing such illness or death.

Agenda

- To have all household water connections as metered connection to supply safe water.
- Prioritize free private water connection for vulnerable groups.
- Ensure water supply and other components of cleanliness in community toilets.
- Ensure functional toilets and safe sanitary system in all government schools and pre schools at all level.
- Ensure waste disposal with proper garbage collection and transportation.
- Regular cleaning of drains.
- Prevent emergence of stagnant water for long.
- Introduce low cost waste management techniques in schools and communities.

- Involving private sector for installation and operation of technology driven waste management procedure.
- Managing vehicular pollution.
- Managing construction pollution.

The health department can be engaged in preventing and curing respiratory and water-borne diseases as mentioned earlier. The department is at the receiving end in case of pollution related diseases.

Another severe health related challenge is death and illness related to hazardous chemicals.

The industry uses these chemicals and discharge industrial waste water without treatment into municipal drains, thereby polluting ground water as well. Industrial activities should be strictly monitored. There should be compulsory compliance for waste treatment plant for the industries using hazardous materials. The health department need to identify the potentially risk prone people both from occupational hazard and contamination hazards. It has to build proper network for early detection and proper treatment of such vulnerable groups in order to prevent long illness and serious damage.

All the agenda for achieving SDG III need to concentrate on the following common components:

- Adequate trained manpower
- Use of IT network
- Adequate finance
- Availability of required personnel at all level

SDG 3 Ensure healthy life and promote wellbeing for all						
Target/ Indicators	Source	Base line (2015-16)	Physical Targets			Remarks
			2017-20	2017-24	2017-30	
Target 3.1 By 2030, reduce Maternal Mortality Ratio(MMR) to <70 per 100,000 live births						
3.1a MMR (per 100,000 live birth)	CRS	37	29	26	24	There has been significant increase in number of health workers to reach people with services.
3.1b						
3.1c Percentage birth attended by Skilled Birth Professionals	HMIS	84.41%	90%	95%	100%	
Target 3.2 Reduction in Neo-natal, under 5 mortality rate						
3.2a Reduction in under 5 mortality rate	SRS	21	18	14	<8	The government is actively encouraging to reach service delivery to the doorstep.
3.2b Reduction in NMR (per 1000 live births)	SRS	13	8	7	<4	
3.2c Percentage of children aged 9 - 12 months fully immunized (BCG and others)	Department of Health and Family Welfare	96.4	100	100		

Target 3.3 By 2030 end the epidemic of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne and other communicable diseases

3.3a	Number of HIV infections per 1000 unaffected population	Delhi State Control Society RNTCP	65	80	90	100	The government plans to reduce the incidence by 5% annually since the public expenditure on health is increasing considerably along with public awareness. The success rate in treatments is also very high in the state.
3.3b	Tuberculosis incidence per 100000 population	(MOHFW- Annual reports of TB India)	348	320	261	183	
3.3c	Malaria incidence per 1000 population	Department of Health	60	75	90	100	
3.3d	Percentage reduction in other tropical communicable diseases		10	20	30		

Target 3.4 Reduce pre mature mortality from non-communicable diseases by 1/3rd

3.4(a)	Percentage Reduction Premature mortality from communicable diseases	Department of Health	15	20	35	50	This is possible as facilities to treat such diseases are increasing.
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Target 3.5 Strengthen the prevention and treatment of substance abuse

3.5a	Percentage reduction	Department of Health	40	60	75	
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prevention and treatment of substance abuse						
Target 3.6 By 2020, halve the number of deaths and injuries from road traffic accidents						
Discussed in the transport section						
Target 3.7 By 2030, ensure universal access to sexual and reproductive healthcare services						
3.7a Percentage of births attended by skilled birth attendants (Home Delivery)	15.59	10	5	0		Increase in healthcare services per person and coverage of areas under these services lead to institutional care extended to a wider range of population.
3.7b Percentage Antenatal Care(ANC) coverage (3 visits)	100	100	100	100		
3.7c Percentage Women getting PNC up to 42 days after delivery	67.32	76	90	100		
Target 3.8 Achieve universal health coverage including financial risk protection, access to quality essential healthcare services and quality and affordable medicine						

3.8a Percentage of population with universal health coverage				
3.8b Percentage of children under 2 years receiving all vaccinations				
Target 3.9 Substantially reduce the number of deaths and illness from hazardous chemicals, pollution and contamination				
				Discussed in the Environment section
Target 3a Strengthen the implication of the World Health Organization framework convention on tobacco control				
3a.a Percentage of population using tobacco				
Target 3b Support the research and development of vaccines and medicines to protect public health and in particular provide access to medicines for all				
Target 3c Substantially increase health financing and trained health workforce				
3.c.a Percentage of vacant positions of specialists at district hospitals	40.2	36.00	20.00	10.00 The government has increased budget provisions for reducing vacancies at all levels. There is increasing number of training centres also.
Target 3d Strengthen the capacity of all countries for early warning risk reduction and management of national and global health risks				
				Relates to National Policy

CHAPTER X: WOMEN AND CHILD DEVELOPMENT, VULNERABLE SECTION (SDG 5, 10)

Vision

Delhi will be a global city with gender equality, equality to the vulnerable section and empowerment to women. It will be a just, peaceful and safe city with impartial and accountable institutions at all level.

Goal 5: Achieve gender equality and empower all women and girls

Goal 10: Reduce inequality within and among countries

Delhi, with an impressive track record of development has also shown wide gender inequality. The sex ratio in the state is below national average. Child sex ratio is alarmingly low. The gains in sex ratio have been the highest for Delhi over the decade 2001 – 11, but the gains in child sex ratio is still negligible and remains a serious area of concern.

The literacy level in Delhi has risen steadily since the last decade, with 90.90 per cent males and 80.80 per cent of women literate with an overall improvement of 5 per cent since the 2001 Census. The overall literacy level has increased from 81.67 per cent in 2001 to 86.20 per cent in 2011. Meanwhile, the gap between male-female literacy ratios in Delhi has dropped from 12.63 per cent to 10.10 per cent. This is an encouraging development but female Workforce Participation Ratio (WPR) has not matched the trend of increasing literacy rate.

The state has very low level of female WPR (11.1%), while male WPR is significantly high (52.7%). Close to 50 percent of the slum households have no toilet facilities within their premises. This lack of facility affects the vulnerable section including women and children most. Other vulnerable sections in Delhi include the street children, child labourers, elderly and differently able persons. An inclusive city that Delhi aspires to be, must take note of all such groups catering to their specific needs. It must provide user-friendly infrastructure to these groups as well as employment opportunities wherever the need be.

Size of the Vulnerable Section

There are around 51,000 street children of whom, 62 percent are working as rag pickers, street vendors, beggars and helpers in roadside stalls and shops. It is estimated that 11.8 per cent of total children in the age group 5 –14 years are working (Annual Report, Ministry of Statistics and Programme Implementation). As per Census 2011, there are 11.47 lakh persons aged above 60 years. Their percentage has increased from 5.2 to 6.83 per cent of total population since last Census. Degree of vulnerability is more pronounced for the elderly widows who form 46.6 per cent of total elderly population. There are also 234882 persons with different types and levels of disabilities, of which 41 per cent are women.

The vulnerable section has variety of socio – economic problems. There are concerns for economic stability, social exclusion, loneliness, mobility, health issues, psychological issues and safety. The state should address these issues with micro level effective coordination and good governance. An inclusive city must make the lives of the vulnerable section safe and comfortable.

The SC population of Delhi as per Census 2011 is 16.75 per cent of total population. There are 65 castes notified as OBC by the Delhi Backward Classes Commission but the state does not have any authentic estimate of OBC population. Growth rate of SC population (20.02%) remained a little below that of total population (21.20%) during 2001 – 2011. Both the growth rates have declined slowly during last six decades.

However, Delhi is one of the states with highest literacy rate in SC/ST/OBCs. Many schools and colleges in Delhi facilitate reservation of seats. In Delhi University, 15% seats for Scheduled Caste, 7.5% seats for Scheduled Tribes and 27% for OBCs are reserved.

Literacy rate among the scheduled caste population of Delhi has registered a steady rise, with the figure going up from 20.86 per cent in 1961 to 70.85 per cent in 2001 and 78.89 per cent in 2011.

Table 10.1: Literacy Rate and WPR of Total and SC Population 2011 (Percent)

Category	Total Population	SC Population
Male	90.90	86.77
Female	80.80	70.01
Total	86.20	78.89
Workforce Participation Rate (WPR)	31.60	32.06

Source Census Handbook 2011

Literacy rate among the SC population is increasing though it is much below that of total population. Difference between male female literacy is much more among the SC as compared to total population. This issue should be addressed on a priority basis.

As per Census 2011, Delhi recorded a Scheduled Caste (SC) workforce population of 9.01 lakh which is 16.14 per cent of the total workforce (55.87 lakh). Out of a SC population of 28.12 Lakh, 32.06 per cent were employed whereas 31.60 per cent of Delhi's total population was employed.

SC population has higher WPR than that of total population.

Government Initiatives

The government has taken several programmes for improvement in living conditions of Economically Weaker Sections, educational &economic upliftment of SC/ST/OBC/Minorities, empowerment of women, welfare and educational upliftment of the children, financial and other supports like healthcare, insurance, night shelter, food etc. to various categories of the persons i.e. senior citizens, women in distress, shelter-less persons, street children, persons with disabilities, construction workers, drug addicts, beggars who need care and special attention. There are various agencies for implementation of several programmes.

Agencies

1. Department of Women and Child Development

Government of National Capital Territory of Delhi created a separate Department for Women and Child Development in 2007. It has been working for the overall

development of women and children through a host of specially designed schemes and programmes. The Department has made concerted efforts to provide welfare services and development programmes for women in distress, institutional and non - institutional services/ programmes for the care, treatment, rehabilitation and protection of the children, and further initiating steps for the economic empowerment of women.

2. Delhi Commission for Women

Delhi Commission for Women was constituted in 1994 by the Delhi Commission for Women Act, 1994 and it started functioning in the year 1996. The Commission's dictate includes investigation and examination of all matters relating to the safeguards provided to women under the Constitution and other laws. The Commission is also enjoined to make recommendations for effective implementation of safeguards, which are necessary for improving the conditions of women in the capital.

The DCW has made significant effort to improve women's safety. Since the reconstitution of the Commission in August, 2015 to 31 July, 2016, it has dealt with 11,268 complaints, which in previous year was 3498 cases, according to the Annual report of 2015-16. Further, 2.21 lakh calls were handled in the past 6 months, 6,588 effective hearings were attended by lawyers of Rape Crisis Cell, 2,250 cases of sexual violence were dealt by counsellors of Crisis Intervention Centre of the Commission and 7,561 field visits were undertaken by the entire commission.

Apart from this, the Commission has launched four new programs in 2015-16 i.e. Acid Attack Watch and Survivor Support Cell, Anti-Human Trafficking and Rehabilitation Cell, Crimes against Women Research Cell and the 181 Women's Helpline Programme which was passed on to the Commission by the Delhi Government in February 2016.

3. National Centre for Promotion of Employment for Disabled People (NCPEDP)

National Centre for Promotion of Employment for Disabled People (NCPEDP) is working as an interface between the Government, Industry, International Agencies, and the Voluntary Sector towards empowerment of persons with disabilities.

Registered in 1996, NCPEDP has since then, successfully advocated several policy changes that have positively impacted the lives of people with disabilities, working across to encourage employment of disabled people; increase public awareness on the issue of disability; empower disabled people with knowledge, information and opportunities; and ensure easy and convenient access to all public places, products, services and technologies.

4. Department of Social Welfare

The Social Welfare Department deals with the matters pertaining to the welfare of senior citizens, physically challenged persons and other vulnerable sections of the society.

The Department of Social Welfare aims at upliftment and rehabilitation of various socially unprivileged and vulnerable sections of the society such as destitute, physically and mentally handicapped, beggars, needy senior citizens and the like. It is running

- 5 schools for deaf and dumb with 1306 students
- Training centre for differently able persons
- 1 school for blind with 130 students
- 6 homes with 1083 inmates and 1 school for mentally challenged children

5. Department for the Welfare of SC/ST/OBC/Minorities

Delhi has a separate department for the Welfare of the SC/ST/OBC/Minorities. The department facilitates accelerated development of the SC/ST/OBC/Minority people and is implementing more than forty plan schemes in the field of educational, social & economic development by way of providing monetary support both as grant and loan. In the starting of 21st century welfare activities relating to Minorities was also

assigned to this department but in 2015-16, activities relating to minorities) was transferred to Revenue Department.

The state has liberalized the guidelines for issue of SC /ST certificates. This has benefited the SC /ST people who have migrated to Delhi from other parts of the country. Earlier, only the people who migrated prior to 1951 were being issued SC/ST certificates as natives of Delhi. Until recently, the benefit of reservation in jobs in Delhi was available only to the native of Delhi and not to the migrated SC/ST people. An order has been issued in 2005 making all the SC /ST candidates, irrespective of their nativity, eligible for the jobs under the Government of NCT of Delhi.

6. The Delhi SC/ST/OBC/Minorities/Handicapped Financial and Development Corporation

The Delhi Scheduled Caste Finance and Development Corporation (DSFDC) was established in 1983 to provide financial assistance for economic development of scheduled caste people living below poverty line in Delhi. Subsequently, the Corporation was nominated as a channelizing agency for providing financial assistance to other backward classes, scheduled tribes, minorities and physically handicapped persons. The main sources of funds for the Corporation are the Governments of India and NCT Delhi and other national level organizations. The authorised share capital of the Corporation is Rs 100 crore.

The DSFDC runs several schemes for all-round development of the vulnerable classes with focus on:

- Formulation of economic development schemes
- Mobilising institutional credit
- Functioning as promoter and catalyst
- Facilitating pursuit of higher/ technical professional education through interest free loans for the deprived sections of society

Schemes

1. Integrated Child Development Scheme (ICDS)

ICDS is a Centrally Sponsored Scheme implemented by States/UTs and launched in 1975 representing one of the world's largest and most unique programmes for early childhood development. This scheme was launched to provide for the holistic development of children below the age of six years of age and for proper nutrition and health education of pregnant and lactating mothers. The project of ICDS was launched with 33 projects and 4891 Anganwadi Centres (AWCs).

Services provided are health check-ups, immunisation, growth promotion and supplementary feeding, referral services, early childhood care and pre-school education, nutrition and health education. According to the Economic Survey of Delhi 2016-17, ICDS is operating 95 projects with 10,897 Anganwadi Centres (AWC) running in various parts of Delhi. Further, it is covering a population of approximately 11.98 lakh children up to the age of 6 years and pregnant and nursing mothers, who are economically deprived. Apart from this, ICDS is providing supplementary nutrition to 6.90 lakh children and women.

During last two years i.e. 2014-16, it was decided to convert/modify 30 AWCs into AWC cum crèche. Out of these thirty, 23 are operational with 15 in North East district and another 8 in South district. Moreover, many of the AWCs have already been shifted to better place and with better infrastructure with enhanced rent.

2. Ladli Scheme

This scheme had started in 2008. The main objective of this scheme is to promote socio-economic development of the girl child by providing education-linked financial assistance. The scheme was based on the premise that monetary aid should be promoted to the parents of daughters in a phased manner to ensure her safety and well-being.

The Ladli Scheme is available only to impoverished parents of girl children in Delhi. For a girl to be eligible, her annual family income should not exceed INR 1 lakh. The Ladli Yojna is available only to girls who are born, brought up, and educated in Delhi. Her school must be a

recognized institution. Only two girl children of each family are deemed eligible to avail the benefits of the scheme.

The state spent about INR 3.83 crore in 2008 and INR 2.39 crore in 2009 to generate awareness about the Yojna. However, around 80-90 percent of the applications could not be renewed because of lack of awareness about paper works.

Between 2001 and 2013, 2008 was the only year when the sex ratio in Delhi's population remained favourable to women. The sex ratio in 2008 increased significantly and was pegged at 1004:1000 – the only year in the decade with more birth of girls than boys. Though the Ladli Scheme is still open to the girls of Delhi, not much has been done in recent years to promote the scheme.

3. Integrated Child Protection Scheme

The Integrated Child Protection Scheme (ICPS) is a centrally sponsored scheme which was proposed in 2006 and launched by the Ministry of Women & Child Development in the year 2009. It aims at building a protective environment for children in difficult circumstances, as well as other vulnerable children, through Government-Civil Society Partnership.

The framework of the scheme includes strategies to institutionalise services, emergency outreach services, family and community based care, counselling and support, sensitization and awareness programmes for representatives in the system towards child protection and raise public awareness.

The State Child Protection Society (SCPS) established in 2010 in Delhi, is responsible to implement the ICPS scheme in the state of Delhi. According to the Economic Survey of Delhi 2016-17, The Department has set up a State Child Protection Unit and 4 District Child Protection Units to implement the objective of the scheme. Currently, 7 Shelter Homes, 14 Open Shelters and 3 State Adoption agencies have been given Grant in Aid through Integrated Child Protection.

The cost sharing ratio is 75% by Central and 25% by State. In the financial year of 2015-16, a grant of Rs. 1.7 crore was sanctioned by Central for the implementation of the ICPS scheme.

4. Scheme for Financial Sustenance, Education and Welfare of Children of Incarcerated Parents

The scheme was notified in 2014. It aims at providing financial sustenance, education and addressing other welfare issues of children who are left to their own resources on incarceration of one or both earning parents. The quantum of Financial Assistance to a child shall be fixed as Rs. 3,500 for the first child and additional Rs. 3,000 for the second child. Hence, a maximum amount of Rs 6500 shall be utilized for welfare till the child attains the age of 18 years or if the parents are released whichever is earlier.

The financial assistance is eligible to those children who have a single parent or if both parents are in jail, parents should be living in Delhi for the past five years and the period of imprisonment of parents should not be less than 30 days. Further the annual income of the imprisoned parents should not be more than Rs 2, 00,000 and the child between 5-18 years must attend the school under the scheme.

5. Financial Assistance to Women in Distress

This Plan Scheme was introduced in year 2007-08 to support economically poor widows with regular source of income in term of monthly pension. In order to get the pension, the women must be a citizen of Delhi for five years and should be in the age group of 18 years to 60 years with income less than Rs 60,000 per annum.

Under the scheme, financial assistance of Rs 1500 per month is being provided to women who are eligible. Delhi Government has increased the financial assistance by Rs 1000 from 2016 – 17. This benefit will be provided to only those who are receiving the pension through Direct Benefit Transfer (DBT) after linking with Aadhar. The Government has also increased eligible income limit to 1, 00,000 per annum from 60,000 per annum.

6. Financial Assistance to Widow for Performing Marriage of their daughter/orphan Girls

This scheme is currently being executed by Department of Women & Child Development GNCTD. The objective of the scheme is to provide a financial assistance to the poor widows for performing marriage of their daughters to enable them to meet expenses as well as to orphan girls for their marriage.

The eligibility criteria require the beneficiary to be a citizen of Delhi. Earlier, an amount of Rs 25,000 was being provided but in 2012, it has increased to Rs 30,000 by the Cabinet. This benefit is provided only up to two girls in the family if the family income is less than Rs 60,000 per annum.

7. National Family Benefit Scheme

The National Family Benefit Scheme had started by Central Government (Ministry of Women and Child Development). The main objective behind implementing this scheme is if in case accidentally any death of the primary bread earner of families living below the poverty line, the bereaved families are assisted with a financial assistance of Rs. 20,000.

Eligibility criteria requires age of the deceased to be between 18 to 64 years, family income of the applicant should not be more than Rs. 60,000/-p.a. and applicant must be a resident of the NCT of Delhi for at least 5 years.

During the financial year of 2015-16, an expenditure of Rs 5.39 crore was undertaken and the number of beneficiaries was 5396.

8. Financial Assistance to Senior Citizens (Old Age Pension)

This scheme is being executed by Department of Social Welfare. Under this, pension is given to the beneficiaries on a monthly basis, through APBS as per the Aadhar Number of beneficiaries or Electronic Clearing System (ECS) of RBI.

In order to acquire the benefits of the scheme, the applicant must be a resident of NCT of Delhi for minimum five years and the person's age should be at least 60 years old with no sufficient means of support. Further, he/she should have a 'singly operated' account in any Bank or Post Office, the family income should not be more than Rs 1,00,000 per annum from all sources of income and should not be linked with any other pension or financial assistance from any other source. Lastly, the citizen must also have an Aadhaar number.

The Quantum of financial assistance to senior citizen is as follows:

- Senior citizens of age 70 years and above are given Rs 1500 per month.
- Senior citizens of age between 60-69 years are given Rs 1000 per month.
- An additional assistance is provided to beneficiaries of SC/ST/Minor category with age between 60-69 years.

The amount has been increased by the Delhi Government by Rs 1000 for those who are receiving pension through direct benefit transfer (DBT) linking with Aadhaar.

9. Old Age Homes

The Department of Social Welfare, Government of Delhi is running two old age homes.

The objective of this scheme is to provide a place to senior citizen where they can live graciously in an amiable atmosphere.

The following services are provided:

- Free boarding at the state run Old Age Homes for free seats
- Medical care and Counselling
- Recreational facilities and Rehabilitation programme.

Eligibility criteria require age to be minimum 60 years, no other source of support, must not have any infectious/communicable disease and are residents of NCT of Delhi.

10. Rehabilitation Centre for Leprosy Affected Persons

A Rehabilitation Centre for Leprosy (RCL) was started since 1981. This scheme was meant for those Leprosy Affected Persons who were permanently residing in Delhi prior to 1981.

In the beginning, the leprosy affected people were provided with facilities such as dry ration, clothing, bedding, medicines etc.

At present, Social Welfare Department is paying Rs 1800 per month to RCL beneficiaries as financial assistance. In these centres, Department provides training facilities to enable leprosy persons to make them economically independent and training facilities in handloom weaving, shoe-making, chalk making and candle making etc.

11. Financial Assistance to Differently able Persons

Under this scheme, a financial assistance if Rs 1500 is provided to the person who are more than 40 percent disable, are between the age group of 0-59 years, have residence proof in Delhi for minimum five years, with family income not more than 1.00 Lakh per annum.

12. Scheduled Castes Sub Plan

This Plan was evolved to expedite socio – economic development of the SCs. It is a plan within a plan where each department formulates need – based programmes to generate direct flow of benefits to the SCs.

The main objective is to give a thrust to family oriented schemes of economic development of SCs below the poverty line, by providing resources for filling the critical gaps and for providing missing vital inputs so that the schemes can be more meaningful.

A specific budgetary provision under all sectors of the Annual Plan is made for socio – economic development of SCs. The table below shows the progress of the sub-plan during last seven years:

Table 8.2: Approved Plan Outlay and SCSP Component (Rs. Crore)

S. No	Annual Plan	Approved Outlay	SCSP Component	Percent
1	2010-11	11400	1931.56	16.94
2	2011-12	14200	2419.95	17.04
3	2012-13	15000	2760.46	18.40
4	2013-14	16000	3003.25	18.77
5	2014-15	16700	2797.25	16.75
6	2015-16	19000	3470.39	18.27
7	2016-17	20600	3603.86	17.49

13. Merit Scholarship for Class I to XII Students

This scheme is being implemented through Education Department in recognized public schools/ Kendriya Vidyalaya and schools under DMCs/NDMC/DCB. Department for Welfare of SC/ST/OBC/Minority disburses the scholarship to the students of Kendriya Vidyalaya (KV) and recognized public schools. The main objective of the scheme is to improve the literacy rate and promote education among the SC/ST/OBC/Minorities students.

Family income is not applicable to the students belonging to SC/ST, but, for OBC and minority communities, annual family income should be less than Rs 2 Lakh.

14. Merit scholarship for College/University Students

Delhi Government is also providing merit scholarships to the students belonging to SC/ST/OBC/Minorities communities studying in college/professional institutions from Rs 420/- per month to Rs 1860/- per month. The objective of the scheme is to encourage SC/ST/OBC/Minorities students to continue their studies at college level by providing them a scholarship so as to reduce financial burden on their parents.

15. Financial Assistance for Purchase of Stationary

This financial assistance is provided to students studying in Central Govt. / Govt. of Delhi/ Aided/ Recognized/ Municipal schools. There are no family income criteria for the students belonging to SC/ST category, whereas for OBC and Minority communities, student's annual family income should be less than Rs 2 Lakh to benefit from this scheme.

The amount of Rs 1000/- per annum to the student studying in Class 1st to 8th and Rs 2000/- per annum to the students studying in Class 9th to 12th are being provided.

16. Reimbursement of Tuition Fee for SC/ST/OBC/Minority Students in Public Schools

Under this component, talented/meritorious students of SC/ST/OBC communities who are either already studying or wish to seek admission in recognized public/convent schools as day scholars on the strength of their merits but whose parents find it difficult to cope with their educational expenses due to financial constraints, get reimbursement of their school fees including tuition fee, sports, science, lab, co-curricular/admission fee etc. The repeaters in a particular class will not be eligible for such benefits for that particular year.

The SC/ST/OBC students studying in Ist to Vth will be entitled to get reimbursement of tuition fee and other compulsory fee irrespective of the percentage of marks, keeping in view the policy of the Govt. for promoting all students from class I to V. But in case of students studying VI to XII, tuition and other compulsory fee will be reimbursed to only those students scoring 50% and above marks and having attendance not less than 80% in the preceding years.

The reimbursement is 100% to the students whose family income do not exceed Rs 60,000/- per annum. In case of students whose family income is more than Rs 60,000/- & below Rs 2 lakh per annum, 75% of the fees is reimbursed.

17. Improvement of SC Basties

Its objective is to improve the living conditions in basties predominantly habituated by scheduled castes people by carrying out civil works such as repair of chaupals, construction of common bathrooms & community latrines, repair/relying of drains & pavements, construction of bituminous roads or C.C. flooring approach roads or kharanas as per requirement, repair of SC Dharamshalas etc. This is one of the most popular schemes under this sector and has gone a long way in improving the living conditions in scheduled castes clusters.

18. Hostel facilities for SC/ST/OBC/Minority students

It has been observed that in most of the cases dwelling units of the Scheduled Caste people in Delhi are very small and do not have adequate space to provide congenial study environment for the students. In order to provide congenial study environment hostel facilities are being provided to the communities to both male and female students studying in class XI and above belonging to SC/ST/OBC/Minority communities.

The facilities in the hostel are provided free of cost. The intake capacity of boys' hostel is 100 students and girls' hostel is 60 students.

Table 8: Spread of Major Welfare Schemes

Sl. No.	Schemes	Beneficiaries
1.	ICDS No. Of AWCs	11.90 lakh children up to 6 years and 6.90 lakh women 10897
2.	Financial Assistance to women in distress	1.76 lakh
3.	Financial Assistance to widows for marriage of daughter	12000 approx.
4.	National family benefit scheme	10000 approx.
5.	Leprosy Programme	25000 approx.
6.	Financial Assistance for disability	1.71 lakh
7.	Merit scholarships for college/University Students	24000
8.	Financial Assistance for purchase of stationeries	10.7 lakh
9.	Reimbursement of Tuition fees	65000 approx.
10.	Improvement of se basties	52 Chaupals, 52 Basties
11.	Ladli Scheme	7.46 lakh
12.	Recreation Centers for Senior Citizens	102

Source: Ministry of Social Welfare

Labour Welfare

The Bombay Labour Welfare Fund Act has been extended to Delhi in 1998.

Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 is also being implemented in Delhi. The two separate Boards have been constituted for implementation of these two labour welfare acts in Delhi.

The labourers registered under Building and Construction Workers Act are being provided medical assistance, financial assistance on marriage of their children, maternity benefits, stipend to their children studying in schools, pension after the age of 60, family pension in case of death, pension in case of injury and permanent disability etc. Similarly, a no. of facilities and benefits are being given under the Bombay Labour Welfare Fund Act extended to Delhi to the workers employed in shops and establishments and industrial units.

The state is trying to touch lives of the deprived through various schemes and programmes. Monetary contribution is increasing in every budget. The number of beneficiaries is recorded but there is no estimate of how many are left. There is no proper gap analysis to decide the coverage area. Also, there is no outcome analysis to note the impact of such programmes and extent of monetary leakage, if any. Extensive use of IT is a must to realise the effectiveness of these programmes.

Moreover, in case of SC/ST, there is no income criterion for eligibility. But in case of OBC/Minorities, this criterion is applied. It deprives the economically weaker sections to get their due in financial kitty.

Social Audit of various welfare schemes may be undertaken from time to time so as to ensure that only eligible persons get the benefit of the respective schemes and non-eligible persons are not allowed.

Challenges

Safety of Women

In the last few years, crime against women in Delhi has increased to a great extent. It is found that every two out of three women have suffered around two to five times sexual harassment in the last year. According to Delhi government's Women and Child Development Department data, around 80% of the women in national capital are afraid regarding their safety.

The reasons of sexual harassment are the lack of gender-friendly environment and improper functional infrastructure such as consumption of alcohol and drugs in open area, lack of

adequate lighting, safe public toilets, sidewalks, lack of effective police service, lack of properly working helpline numbers, etc. Besides, there is huge pressure of social stigma attached to rape victims for which, women related problems are generally avoided rather than solved.

Women normally avoid unsafe areas, never travel alone at night, stay away from crowded places, and just shy away from any problematic situation in their personal and professional lives. Most of them are also not willing to seek help from police or any other relevant authority.

Approach to Education

Many societies and a vast population in India still believes that proper place for women is to remain at home, serve husband and his family and give birth to the children. The marriage of girls is a determining factor in women education. Today, however, early marriage is not very common, and women education has been encouraged by its increasing demand in their marriage markets especially among the upper and middle classes. Thus, due to socio-economic reasons, women in India are still not coming in as much in number in the educational institution especially higher education.

Many people do not like that their daughter leave the village for going to school. Many people still condemn and dislike the idea of co-education. They feel that when both boys and girls study together in a same educational institution, their proximity may generate social problems. Therefore, many parents are not prepared to send their daughter to a co-education institution.

The lack of women teachers in primary and middle schools has been largely responsible for the low enrolment of girls, especially in the backward states. In spite of various programmes to spread and support education, the rate of drop-outs among SC/ST students is much higher than other category students. The impact of schemes providing stipend of Rs.1000/- to all SC/ST/Minority students studying in Govt. and Govt. aided schools from Class-1st to Class-8th started in 2011, need to be assessed in reducing the number of drop-outs among SC/ST/Minority students.

In spite of a no. of programmes to ensure all school age children get admitted in the schools and complete their elementary education, the literacy rate gap between male and female among SC/St and Minorities is significant.

Aanganwadi centres taking care of pregnant and lactating mothers and children of 06 years are reported to be facing problem of adequate and suitable space for proper functioning. The present ceiling of rent of Rs.750/-per month is too little to get adequate and suitable space on rent for Aanganwadi Centres in Delhi. The rental ceiling needs to be suitably enhanced.

Overlapping Benefits

MCD & NDMC are also implementing the programmes like old age pension, widow's pension, financial assistance to widows on marriage of their daughter, financial assistance to persons with disability, the programmes being implemented by the Govt. of Delhi for all target groups. The implementation of these programmes by the local bodies may create the problem of availing the benefits by the same beneficiary both from Delhi Government as well as local bodies' programmes. To avoid such duplication, local bodies may be requested to refer such cases to the Govt. of Delhi rather than providing financial assistance at their own level.

Child Labour

India continues to have the largest number of child labourers in the world with majority of them being forced to work more than 8 hours a day. Girls comprise a larger share of domestic child labourers, many of whom are trafficked, employed in households and face sexual harassment. In many households, servants aged 11-12 are very common. With rising salaries of maids, many just choose minors as they're easier to deal with.

According to an estimate, around 25-30 lakh households across NCR have employed kids as servants. In fact, the demand for domestic help in the region is such that the so-called maid agencies have turned into human trafficking agencies.

In five years, the Nobel Prize winner Mr. Satyarthi's Bachpan Bachao Andolan has rescued 5254 children across the country of which 2222 were rescued from Delhi. Of these, 3022 children were below 14 years and 21% of them were working with their families.

Lack of Care for Senior Citizens

More than 80 per cent of older people in their twilight years complain of feeling isolated and experience loneliness in their present life. They attribute their loneliness to no or little interaction with family members or within society.

The most common problems being faced by older persons are feeling marginalised, little or no access to medicines and healthcare, concern about safety and security of their life and property, no work opportunities, financial problems, restricted mobility and psychological problems because of loneliness.

Moreover, older women are more prone to suffer abuse due to factors like gender discrimination, longer life span than older men, longer span of widowhood and no source of income as traditionally most of them are housewives.

According to AgeWell Research and Advocacy Centre 2012, 83.8% older persons were found isolated in old age (60+) in Delhi & NCR. 37.5% elderly feel isolated because they were living alone or with their spouse only. 44.2% said that no/less interaction with family members or within society is major cause of their state of isolation or loneliness in Delhi & NCR.

Lower Education Accomplishments of PWDs

According to the India Social Development Report (SDR) 2016, about 45 per cent of all Persons with Disabilities (PWD) in India are illiterate. The report further found that in each category of disability, a greater proportion of women are illiterate than men, with 76 per cent of women with multiple disabilities being illiterate. However, Delhi had the lowest proportions of the PWDs in India.

In 2016, AAP government asked special educators to prepare an Individualized Education Programme (IEP) to give personal attention to every disabled child studying in Delhi government run and aided schools. Teachers will have the liberty to modify any particular

child's module as per requirements. In 2016, there were around 20,000 disabled children enrolled in Delhi government schools.

Less Economic Engagement of PWDs

PWDs are more likely to be unemployed and generally earn less than people without disabilities, even when they are employed. In fact, they have extra costs due to medical care, assistive devices, or personal attendants, and may thus need more resources. Further, because of discrimination in employment, limited access to transport and lack of access to resources to promote self-employment and livelihood activities, PWDs find it difficult to benefit from social and economic development.

According to the Report of Employment and Unemployment (66th Round of National Sample Survey (NSS), in Delhi, 5175 males (4.60%) and 532 females (0.28%) of the total disabled population were not able to work in urban areas.

Strategy

The vulnerable groups in Delhi are very divergent. Group – specific strategies are required to include them in the development process.

Women and Children Specific Strategy

The state must have a strong Gender Budgeting Cell for integrating gender budgets with outcome data. Increasing budgetary allocation for gender related schemes are not enough.

A host of issues are associated with increasing women participation in the work force.

Along with increasing educational and skill development opportunities, safety is a major concern that should be addressed urgently. Public transport and public places should be made woman – friendly. Safety is not only a social concern. It has profound economic implications as well.

With reference to a large number of working women in the city migrated from other parts of the country, the requirement of more new working women hostels should be addressed with

the involvement of private sector as well as NGOs and VOs working in the field of empowerment and welfare of women.

Delhi Skill Development Mission may start suitable training and skill up gradation programmes for women under financial stress like widows so that they may have better employment potential both in the form of self-employment or job employment.

The women should get financial autonomy in terms of property rights and access to loans. They should be brought into formal lending sector through training in financial literacy. Many banks have started introducing Business Correspondents (BC) to take the bank to the doorstep of the stakeholders. There should be more women BCs to connect housewives to the formal banking system and encourage home based works.

The number of child labour should be brought to zero with increasing financial support to these working children to bring them back to school. There are street children and child workers who should get special focus in getting into school. There are several children working as rag pickers handling hazardous materials. This practice should stop immediately with adequate support to their families so that they disengage the children from work and send them to school. These families need to get job supplements through skill development.

The Environment Department has started a programme to educate the rag pickers in safe handling of the municipal solid waste. However, in view of the large number of rag pickers in Delhi, the role of local bodies in providing social security, training and necessary appliances to the rag pickers may be promoted as ultimately, they contribute in recycling and reuse of municipal solid waste.

Facilities in AWCs should be up graded with adequate capacities for Anganwadi workers. They cater to early childhood needs. There should be enough crèche facilities in order to make their works economically productive. Various studies have shown that these AWCs have contributed significantly to child development. Adequate infrastructure should be provided to these centres so that their workers are not overloaded. These provide job opportunities to women as well.

Conditional Cash Transfer schemes that encourage girls to be sent to school should be implemented on priority basis. It should cover every girl so that illiteracy among girls turns to zero. State Committee for Protection of Child Rights should be very much proactive to address grievances in effective and time bound way. There should be zero tolerance for child abuse of any form.

National Institute of Public Cooperation and Child Development is situated in Delhi. The state should take advantage of its expertise to sensitise the Child Welfare Officers in the police stations and establish linkage with academic and training institutes to introduce professionalism in child protection. The Child Line service should be activated and extended to all districts with effective supervision.

Registration of birth and death should not be a routine job of the local bodies. It should be disseminated systematically in order to plan the schemes for development of children as well as causes of their death. This will also help in keeping a track of missing children.

The state has a large population aged between 15 and 29 years of age. It should capitalize this demographic dividend by addressing the challenges faced by the youth in terms of access to quality education, employment, health and other social and cultural opportunities. The state policy should be linked with national Youth Policy, 2014 in order to take advantage of central schemes.

Schools and colleges in the minority dominated areas need special attention so that girls from these communities are encouraged in large numbers to join schools and continue higher education as well. These issues and issues related to skill development have been taken up in details in the education section. Environmental safety should be taken as priority as it is the baseline for success of any educational or social schemes.

Representation of women, especially from minority communities must be ensured in all institutes related to empowerment of women.

Strategies related to SCs and OBCs

There has been significant improvement in the incidence of poverty and literacy rates among the SC and OBCs in the state. There is no ST population here. However, challenges like high dropout rates, low enrolment ratios and high unemployment rates are very serious.

Functional residential schools need to be established for them in order to check the drop out rate. It is seen that there is only one boys' hostel and one girls' hostel for such purpose. This is highly inadequate. Adequate hostel facilities with proper infrastructure are the need of the hour if the educational schemes are to be effective. Moreover, the scholarship schemes should be continuously evaluated and monitored so as to properly identify the meritorious poor. Funds should be released on time. Number of scholarship holders should be increased periodically to provide adequate coverage.

For economic empowerment, targeted coverage of SC and OBCs need to be ensured through provision of soft loans and financial assistance for employment and training. National SC Finance Development Corporation and National Safai Karmachari Finance Development Corporation should expand state wide activities to generate awareness and encourage entrepreneurship.

Persons with Disabilities (PWD)

Socio- economic empowerment of PWDs is an inter sectoral issue. Proper coordination among several departments is a must for success of any PWD related scheme. Buildings, schools, recreation centres, bus stops and other public places including public toilets need to be disable- friendly. There need to be proper data related to disable population. Many people do not disclose disability because of social stigma and humiliation.

There need to be dedicated employment training centres like ITIs for the PWDs according to needs of the private sector. The National Handicapped Finance and Development Corporation should increase its budget to cover all employable PWDs with adequate help. The Unique Disability Identity Card (UDIC) should be provided to every PWD without hassle and it should be honoured everywhere.

Senior Citizens

The number of senior citizens is expected to increase every year with rise in life expectancy and increasing span of medical facilities. Senior citizens are more prone to illness and disability. Other challenges are financial insecurity and lack of family support.

There should be adequate old age homes depending on the demand. The management of such homes are generally of very poor quality. The state should ensure that motivated and dedicated people are in charge of such homes. The inmates also should be part of the management team to ensure proper service and address grievances adequately.

The state must have a dedicated department to address issues of senior citizens along the line of the Central Government.

Care givers and Old Age Home managers should be given proper training to handle service properly. District level help lines should be launched to address grievances in a time bound manner.

There is enough scope for application of IT in the vulnerable sector. IT can help in generating and up grading data, monitoring and evaluating effectiveness of schemes, identify the gaps in demand and service delivery, strengthening the mechanism for handling emergency, mapping the area of operation and forecasting the quantum of service requirement. There is enough scope of job creation in these services. Even the vulnerable section can be part of employment market through direct involvement and monitoring.

Development and quantification of proper indicators are absolutely necessary to monitor the progress of development activities in this sector. Such indicators, based on UN description, are discussed in the following table. For some indicators, data need to be compiled on regular basis and for some, detailed socio – economic survey is needed to generate baseline data.

SDG 5 Achieve gender equality and empower all women and girls						
Target/Sub-Target and Indicators	Source	2016-17 Baseline	Physical Targets			Remarks
			2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2029-30	
Target 5.1 End all forms of discrimination against all women and girls everywhere						
5.1a Ratio of girls to boys in primary level education					Discussed in chapter on Education	
5.1b Ratio of girls to boys in secondary level education						
5.1c Ratio of literate women (15-24 years) to literate men (15-24 years)						
5.1d Share of women in wage employment in the non-agricultural sector (%)	Sixth Economic Census, Delhi (2016)	12.45	15.00	30.00	50.00	There are several women-centric educational, skill development and employment generating programmes sponsored by the government. This projection depends majorly on safety concerns.

5.1e Ratio of women to men on wage equality for similar work	Data need to be generated and monitored				Socio – economic survey is needed.
Target 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation					
5.2a Sex ratio at birth	Economic Survey of Delhi	898	900	902	905 Women centric nutrition and health programmes are implemented and monitored.
5.2b Ratio of women to men in life expectancy rate	Delhi Human Development Report 2013- Health	1.026	1.029	1.032	1.039

5.2c Women and girls trafficking (number per lakh population)	NCRB - Crime in India Statistics	207	Reduce by 30%	Reduce by 50%	Reduce by 70%	Implementation of various women safety related schemes need to be followed rigorously. Slow achievement of targets is related to slow action and slower conviction
5.2d Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner		2.8	1.8	1.2	0.5	
5.2.e Proportion of Crime against women to Total Crime in 12 months		15.89	13.90	12.37	9.96	
Target 5.3: Eliminate all harmful practices, such as child, early and forced marriage						
5.3a Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18	NFHS 4 (2015-16), NFHS 3 (2005-06)	12.3	9.12	5.24	0.00	Increase in gender-based programmes will lead to target achievement. Regular socio-economic audit is required.
Target 5.4: Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and family as nationally appropriate						
5.4a Ratio of women to men participation in labour force	Sixth Economic Census	2:8	3:7	4:6	5:5	Increase of women development programmes and effective monitoring will help.

5.4b Average hours spent in domestic work by women	Data not released			Socio – economic survey is required
Target 5.5: Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life				
5.5a Seats held by women in national parliament (%)	Electoral Statistics Pocket Book 2011	22	33	40
			45	Incentive – based community works will help in achieving targets
5.5b Seats held by women in local government bodies (%)	State Election Commission	50	50	50
				Women come forward more in local politics. This proportion should be maintained.

5.5c Ratio of women to men in professional and technical work	Employment and Unemployment Survey 2011-12, NSSO	0.34	3.15	15.75	40.00	Regular data need to be generated and monitored.
Target 5.6: Ensure universal access to sexual and reproductive health and Reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of its review conferences						
5.6a Proportion of women aged (15-49 years) who make their own informed decisions regarding sexual relations, contraceptive use and re-productive health care.	Data not available					Socio – economic survey is required

CHAPTER XI: LAW AND JUSTICE (SDG 16)

Vision

Delhi aspires to be an inclusive city where every resident will be protected impartially by law, having affordable hassle free access to law enforcing agencies.

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Issues of governance are intrinsically related to all aspects of development. There are certain development activities that may be left to private sector and individual entrepreneurship but some activities only the government can do. Maintenance of law and order through proper institutional mechanism is one such concern that provides the foundation for sustainable development and inclusive society. Unfortunately, with all its economic strength, Delhi has failed miserably in implementing legal measures to ensure the social, cultural and economic safety of its residents.

UN Specified Targets:

- 16.1 *Significantly reduce all forms of violence and related death rates everywhere.*
- 16.2 *End abuse, exploitation, trafficking and all forms of violence against and torture of children.*
- 16.3 *Promote the rule of law at the national and international levels and ensure equal access to justice for all.*
- 16.4 *By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime*
- 16.5 *Substantially reduce corruption and bribery in all their forms.*
- 16.6 *Develop effective, accountable and transparent institutions at all levels*
- 16.7 *Ensure responsive, inclusive, participatory and representative decision-making at all levels.*
- 16.8 *Broaden and strengthen the participation of developing countries in the institutions of global governance.*
- 16.9 *By 2030, provide legal identity for all, including birth registration.*

16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.

16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime.

16.b Promote and enforce non-discriminatory laws and policies for sustainable development.

The state government should try to meet all these targets (except 16.8 and 16. a that are not applicable at state level) within stipulated time.

National Crime Record Bureau (NCRB) collects state wide data on women related crime and missing persons. Delhi Commission for Women also collects data for women related crimes in the state. NCRB has collected data on missing children for the first time in 2016. The following table shows the details.

Table11.1: Missing and Traced Children (Pending + New)- 2016 (Number)

States	Rank	Boys	Girls	Total
West Bengal	1	4595 (27.21%)	12286 (72.8%)	16881(100%)
Delhi	2	6125(41.78%)	8536 (58.22%)	14661(100%)
MP	3	3446 (28.55%)	8622 (71.45%)	12068 (100%)
(58.22%)All India		41175 (36.90%)	70394(63.09%)	1, 11,569 (100%)
Traced		20365(49.45%)	35580(50.54%)	55944(50.14%)

Source: NCRB Report 2016

Delhi ranks second among the Indian states in number of missing children. It is further alarming that the percentage of missing girls is more than the boys indicating possible increase in girl trafficking in the states. Around half of the missing children have been traced so far in the country. This is a very serious threat to safety of people, especially in Delhi which is one of the three richest states in India.

Safety in public places is another area of concern. A study by Action Aid (2016) reveals that public toilets in Delhi suffer from serious deficiencies.

Table11..2: Dismal Conditions of Public Toilets in Delhi

Components	Percent
No separate section for women	35
No guard outside	46
No doors	28
Could not be locked from inside	45
No lights inside	50

Source: Action Aid – 2016

These public toilets are becoming the centres of crime as there is no security and lights are insufficient. These are more dangerous in the underprivileged neighbourhoods. These become favourite spots for drug peddlers at night. The guards lock the toilets at night for their own safety, thereby defeating the very purpose of public toilets.

Local bodies are trying to outsource the maintenance of toilet complexes for better service and safety. The SDMC has done it for 118 of its 788 toilet complexes. The numbers only reveal the inadequacy of proper infrastructure in such an important service like public conveniences.

An internal report prepared by the Delhi Urban Shelter Improvement Board (2017) states that out of 15 lakh slum dwellers of the city, around 3.5 lakh (25 per cent) use community toilets. Along with the user charges and cleanliness, safety becomes a major issue for under utilisation of public toilets. The central government and state government have set a target of an open defecation free Delhi by 2019. It means construction of additional 50,000 toilets in Delhi by that time. Even if the toilets are constructed, they will remain underutilised if the safety issues are not addressed.

Public Parks

Public parks in Delhi have turned into havens for criminals for lack of proper lights and security. These open spaces are often prone to stabbing, rape and murder. A primary reason for this is the huge size of the parks and lack of enough security guards. The 22-acre Picnic Hut in North Delhi has only one security guard. In general, of the 15,750 parks in Delhi, only 1000 have guards. 15,000 parks are maintained by the local bodies and the rest by the DDA. The parks maintained by the local bodies are smaller in size and located in the neighbourhoods. They can be guarded by the neighbourhood security forces and RWA guards. The parks of more than 3 acres in size need special guards. All such parks are maintained by the DDA. It is in these parks, notorious crimes take place. Lack of maintenance like broken walls, stolen lights and the like add to the woes.

The Delhi Police is conducting security audit and working out the concept of Crime Prevention through Environmental Design. But, the volume of work is still very inadequate.

Civic Mess

Misuse of municipal norms poses serious safety threats to the residents of Delhi. The markets are in a mess, even potential death traps, as serious violations that can cause loss or damage to life and property go unchecked. Haphazard commercialisation in violation of Master Plan and municipal norms are rampant with illegal conversion of residential units into shops, offices, restaurants, showrooms and the like. Once this gains a critical mass, it is almost impossible to shut them down. The government has passed amnesty laws periodically with option of paying one time conversion charges and the assurance of following rules thereafter.

These structures are great safety hazards. There is no proper fire exits excepting narrow staircases connecting floors. The fire department relaxes rules for eateries with a seating capacity of less than 50 persons. Majority of eateries are, consequently, 40+ seaters with perpetual fire threats.

Parking is another safety hazard. The Master Plan says any plot approved for mixed land use, has to unconditionally surrender the front setback. They cannot have a boundary and the open space can only be used for parking.

But in most markets, such open spaces are commercialised and ropes and chains are used for barriers. Hence, smooth traffic movements are disturbed, causing congestions thereby increasing accident risks and damage to property.

In many areas, commercialisation requires giant water tanks and generators overloading the aged structures and exposing the fragile state of buildings with dangers of roof collapse. Exempt from municipal bylaws, the narrow alleys, framed by frail multi storey constructions remain a civic threat. Such areas see a footfall of 5000 plus during weekdays and more than 15,000 during weekends.

Crime against Women

Latest Data (2016) from National Crime Records Bureau (NCRB) has established that Delhi contributed to one in every three crimes against women committed in metropolitan cities. The national capital has consistently reported an increase in sexual crime against women. It topped the charts for crimes such as dowry deaths, acid attacks, cruelty by husbands, kidnapping, stalking and abduction among 19 metropolitan cities for which data has been analysed. It reported 13,803(33.0% of total cases in India) cases of crime against women in 2016, which is higher than 13,260 cases reported in 2014. Mumbai is a distant second in 2016 with 5128(12.3%) such cases. It also has the highest rate of cognizable crime.

Table11.3: Crime in Selected Metro Cities - 2016

City	Rank Based on Crime Rate	Rate of Cognizable Crime (per lakh population)	% Share of City
Delhi	1	1222.5	38.8
Kochi	2	757.9	3.1
Jaipur	3	756.5	4.5
Patna	4	681.8	2.7
Indore	5	638.1	2.7
Ghaziabad	11	343.6	1.6

Source: NCRB Report 2016

Delhi ranks one in cognizable crimes with more than one third share of total crime while Kochi with second rank has only 3.1 per cent share. This shows how alarmingly crime is concentrated in Delhi. In public perception, neighbouring Ghaziabad is a notorious city with miserable law and order. It also ranks eleven. But it has only 1.6 per cent of total crimes committed in India. The national capital has not only the highest share in crime; it has also the highest rate of cognizable crime, far higher than others.

More alarming data shows the increase in number of crime in the capital over the years.

Table11.4: Increase in Crimes in Delhi over the Years

Year	Murder	Kidnapping and Abduction	Crime against Women	Crime against Children	Crime done by Juveniles	Crime against Senior Citizens	Economic Offence
2014	472	6016	13260	8139	1671	875	5138
2015	464	6630	NA	8035	1981	1176	6396
2016	479	5925	13803	7392	2368	643	5942
3Year Rank	5	1	1	1	1	2	1

Source: NCRB Data 2016

Agencies

1. The Department of Law, Justice & Legislative Affairs

The department is engaged in the functions such as tendering legal advice on variety of issues referred to by various departments of Government of National Capital Territory of Delhi and also performing consultative role in regard to proposals for legislations, framing of statutory rules/regulations, notifications, byelaws and finalization of important MOUs etc.

This Department is also vested with the responsibility of preparation of panels of advocates in respect of Delhi High Court, CAT, District Courts, Sales Tax Appellate Tribunal and appointment of advocates out of such panels to defend interest of the departments of the Govt. of National Capital Territory of Delhi. The functions were

allocated to this department under the Government of National Capital Territory of Delhi in the year 1993.

2. Delhi High Court

The High Court of Delhi was established under the Delhi High Court Act, 1966.

The Delhi high court has emerged as a hub for Intellectual Property Right (IPR) cases. The institution has helped shape intellectual property law by interpreting various facets of the trademark, copyright, patent law and coming up with innovative solutions. Many of its rulings have become path breaking in their own ways and have become a precedent for other courts both at home and abroad.

The court has taken cognizance of all kinds of commercial and company intellectual property (IP) matters through the years and set out important principles under IP law such as that of “trans-border reputation”, “well-known trademarks”.

Delhi Police

Delhi Police is under central government. It is responsible for maintaining internal law and order. Recently, it has taken various measures to help women in distress. There are various help lines for making distress calls. They have increased patrolling specially in deserted areas like parks. Their increased vigilance has produced some results. The number of robbery cases has been reduced by 50% in 2017 as compared to 2016. This is the first time there has been a reduction in robbery cases since 2014. Snatching has become the most common street crime. It also has declined this year, compared to last year. Delhi police has proposed a law that calls for very harsh sentence for the snatchers to act as deterrent. Their focus is now on preventive policing. They have galvanised the beat system in a major way. They identify the vulnerable areas to increase patrolling in general and specific times in particular.

Challenges

1. Corruption and Hardships of the Under trials

Like many other institutions of the Government, the Indian judicial system is also corrupted. Bribes are paid in order to get a speedy and a favourable judgement, obtain bail, manipulating witness or for other activities like issue of affidavits, registrations etc. As per the constitutional provision, there is no provision yet for registering an FIR against a judge who has taken bribe without taking the permission of the Chief Justice of India.

A weak infrastructure, chronic judicial vacancies, manual processes, a weak law and order enforcement system, prolonged trials and delayed judgments have been major contributors to corruption at all levels of judiciary. In 2010, New Delhi witnessed the Commonwealth Games (CWG) scam, one of the major scams, involving a pilferage of around Rs 70,000 crore. It was estimated that only half of the allotted amount was spent on Indian sportspersons.

In Indian jails, most of the prisoners are under trials, who are confined to the jails till their case comes to a definite conclusion. In most of the cases, they end up spending more time in the jail than the actual term that might have had been awarded to them had the case been decided on time and, assuming, against them. Plus, the expenses and pain and agony of defending themselves in courts is worse than serving the actual sentence. Under trials are not guilty till convicted. On the other hand, the rich and powerful people can bring the police to their sides, and the police can harass or silence inconvenient and poor persons, during the long ordeals in the courts.

2. Lack of transparency

Another problem facing the Indian legal system is the lack of transparency. In the police stations, FIRs are not recorded on time. Sometimes, people are persuaded to withdraw the cases, if the accused is powerful. Delhi police has introduced an on line system of recording the FIRs. If this system works, it will be a serious step in bringing transparency in the system.

3. Backlog of pending cases

India has the [world's largest backlog of cases](#), at nearly 30 million. Of them, over four million are High Court cases. Data showed that district courts across the country are grappling with a backlog of 2,81,25,066 civil and criminal cases in the period between July 1, 2015 to June 30 2016. One of the key reasons for the huge figure of pending litigation is the shortage of judges. High Courts have 464 vacant judges post and 4,166 at the subordinate courts.

The time between filing and final disposition in extreme cases can be up to 20 years in civil cases and 30 years in criminal cases. Because of these chronic delays, citizens feel compelled to bribe at all stages to hasten the trial process, hence, leading to corruption. Worse, the opportunities for illicit gain created by the delays create perverse incentives to keep the judicial system inefficient.

Schemes

1. Tele Law Scheme

'Tele Law', is aimed at facilitating delivery of legal advice through an expert panel of lawyers – stationed at the State Legal Services Authorities (SLSA). Under the scheme, a portal called 'Tele-Law' will be launched, which will be available across the Common Service Centre (CSC) network. This will connect the citizens to legal service providers with the help of technology enabled platforms.

In the first phase, the 'Tele-Law' scheme will be tested as a pilot across 500 Common Services Centres (CSC) in Uttar Pradesh and Bihar to understand the challenges and make necessary corrections to the scheme before it is scaled up and rolled out across the country in a phased manner.

Tele-Law will enable people to seek legal advice from lawyers through video conferencing available at the Common Service Centres (CSC). Additionally, law school clinics, District Legal Service Authorities, voluntary service providers and Non-

Government Organisations working on legal aid and empowerment can also be connected through the CSCs anywhere and anytime, in order to strengthen access to justice for the marginalised communities. Delhi government is working on the state components of this national scheme,

2. Pro bono legal services

Pro bono publico means for the public good. Many lawyers provide poor and underprivileged clients with valuable legal advice and support without seeking any professional fee. The Department of Justice has invited lawyers and legal professionals to register and provide information regarding their areas of expertise, in order to create a database of lawyers willing to provide pro-bono services to litigants.

Objective of the Pro Bono Legal Service is to encourage lawyers and legal professionals to provide pro bono legal services, to recognize pro bono legal work being provided by lawyers and legal professionals, and to create a database capturing vital information of lawyers for appropriate positions in the relevant field.

3. Nyaya Mitra Scheme

Nyaya Mitra scheme is aimed at reducing pendency of cases across selected districts, with special emphasis on those pending for more than 10 years. A retired judicial officer, or an executive officer with judicial experience, will be put in charge for assistance.

Strategy

The task of governance of Delhi is very challenging. With significant growth of population and continuous flow of migration and the need to provide infrastructure and civic services befitting the seat of capital of the country, make it a formidable task. Multiplicity of authorities leads to delays in project completion and complications as coordination is inadequate.

Delhi is governed by four institutions; the elected government, the Lt. governor, the MCDs under the control of Ministry of Home Affairs and the DDA, controlled by the Ministry of

Urban Development. Delhi police is under the Lt. Governor, acting on behalf of the central government. Delhi needs to take up law and order problem in Mission mode to make it a global city with human face.

It is of primary concern that Delhi police concentrates on core police functions rather than take up additional burden of activities not related to law and order. The whole city needs to be mapped to identify areas prone to crime. Relatively deserted areas need to be patrolled more frequently and all police help lines need to be pro active. Proper allocation of police force is of prime concern.

An increasing number of police force is engaged in protecting the VIPs at the cost of safety of common people. This is a major area of concern. It is time to rethink on various safety methods. If the whole city is safe, VIPs also will be generally safe. Emphasis should be given to increase general level of safety.

Use of public places should be made gender centric. Women and children emerge as particular vulnerable groups. The process of policy formation need to be more participatory involving social groups so that safety perceptions become clear and areas of actions are earmarked. Public toilets and streets with inadequate street light should be heavily patrolled and coordination established with the electricity service providers. It is always more effective to address grievances with coordination among concerned public agencies then at individual level. Public grievance cells in Delhi police need to be pro active in order to build trust among residents regarding police activities. People do not want to seek police help as they perceive police as harassing force. This perception need to be changed urgently so that people willingly become eyes and ear of police. Alert citizenry is a great deterrent to crime. But deep, cordial and trustworthy relationship should be developed with common man with assurance to keep utmost secrecy in sharing information.

Categories must be prioritized before taking up issues in abatement of crime. Women, children, disabled cannot be clubbed together as crimes towards them vary in nature and handling. Strict vigilance of the places they reside, work and spend time is the need of the hour.

Safety is not merely an issue of short term policing. It needs to be interlinked with wider socio-economic and political framework of planning and provisioning of basic services.

The government departments like transport, excise and concerned ones need to be strengthened in order to lessen the burdens on police. Local bodies also must have their own enforcement force to lessen the burden on police force.

The number of female police force and women only police stations need to be increased with concerned efforts for their safety as well.

There is a serious shortage of police staff in Delhi with 448 police officers per 1, 00,000 persons. International standard is 222/1, 00,000 but standard varies with frequency of crimes committed.

Performance evaluation of police officers based on reduction of crime and preventive actions lead to under reporting of crimes and unnecessary arrests and harassment. This leads to further alienation of police with people. Reporting of crime should be monitored properly.

Delay in justice delivery is a great deterrent to crime free environment. The police need to prepare strong cases, cater for protection of witnesses as well as the victims and coordinate with all stakeholders to argue for speedy decisions, so far as it is possible. It is quite common that the accused, released on bail, can harm or terrorize the victims. Police has a big role to play here in checking such deeds.

Safety is not related to policing only. The citizens are vulnerable to fire hazards, congested roads, hanging electric wires, absence of foot paths and other problems of unregulated development.

Law enforcing authorities need to prepare a clear road map in assessing all such illegalities and preventing their occurrence as these developments are threat to property and life.

Local bodies need to keep a track of all compliances while sanctioning building plans. There should be properly identified accountability for any legal lapse. It is observed that around seventy per cent of Delhi is full of unauthorized construction. These constructions cannot happen without negligence of zonal officers in local bodies, if not with their connivance. Such

constructions weaken the foundation and may cause massive damage, leading to loss of human life. Delhi is on service zone 4, implicating very high vulnerability to earthquakes. Studies have established that majority of damage is caused by people losing their lives through collapse of building during earthquakes.

Random change of agricultural land and residential units into commercial establishments also create threats in polluting living environment as infrastructure critically falls short of demand. The places are not planned for so many foot falls as caused by commercialization. Consequently, there is pressure on water supply, roads, electricity and sewer system. Recently, the government has reduced the conversion charges on land use by three fourth. The Supreme Court appointed monitoring committee has been active after five years to seal the establishments that do not pay conversion changes within a stipulated period. This does not seem to be a deterrent. The profits are so high in commercial establishments that they readily will pay the conversion charges. But that will not solve the basic problems if there is no space to provide required infrastructure.

The foot paths are also being encroached by commercialization and there are no conversion charges for such activities. Encroached foot path increase possibilities of accidents along with other inconveniences. Master plan is a statutory document, but non compliance of Master Plan does not always imply penal action. The local bodies need to be associated with Master plan implementation so that they have legal power to prevent unplanned development.

The state government needs to be actively associated in preparation and execution of master plan. As land is under central government, the state cannot do very much if master plan is violated. The state suffers the consequences of mushrooming unauthorized construction in violation of building by laws and encroachment of government land but cannot do much. It should actively negotiate with the centre in addressing these issues.

A major bottleneck of proper implementation of law and order, that creates a travesty of justice, is corrupt practices. It hinders the process of economic growth and under... trust is governance and has a broader corrosive impact on the process of human development. Clean governance need to be the guiding force of all strategies.

Public redressal cells, where bribery are reported, need to be regularly monitored and addressed in shortest possible time. It should also be monitored if the complaint is genuine. The major delays that need to be plugged are delay in detection, preliminary enquiry, appointment of enquiry, appointment of enquiry officer and submission of report. Delay in obtaining justice encourages the corrupt and discourages the honest. Protection of honest need to be affirmed through all procedural steps.

Unaccounted for income is a major source of corruption. Tax levels should be kept moderate and tax administration should be simple so as to encourage people to pay their dues. Cases of assets disproportionate with income should be dealt in special courts on priority basis. It is unaccounted income that is partly channelized into construction activities. Control of corruption leads to control of various illegal activities.

Use of ICT is imperative in enhancing effectiveness of governance. It expedites tracking criminals and victims and reaching help in crucial times. It helps in enhancing data base and crime mapping process in collaboration of NGOs and other stakeholders. E-governance goes a long way in reducing scope for bribery and creating trust among people in the system of governance.

Electronic registration of FIRs and other complaints across local police stations should be automatically linked to central database. Web portal may be used for generating public awareness and sharing experiences. Provisions to receive important alerts and sending SOS messages on phone should be widely disseminated.

peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

and Indicators	Source	2016-17	Physical Targets			Remarks
			2017-18 to 2019-20	2017-18 to 2023-24	2017-18 to 2030-31	
incidents of intentional deaths per 100,000 population	Crime in India Statistics	545	Reduce by 30%	Reduce by 50%	Reduce by 70%	Data need to be generated by sex, age and cause so as to look into the problem in depth and focus on root cause analysis.
deaths per 100,000 population subject to physical or sexual violence and related death rates everywhere	(National Crime Records Bureau)	79	Reduce by 30%	Reduce by 50%	Reduce by 70%	Comprehensive data need to be generated through survey and monitoring. Social audit need to be introduced.

Target 16.2		End abuse, exploitation, trafficking and all forms of violence against and torture of children						
16.2a	Child labour (% of children aged 5-17 years)	Census 2001 and 2011	26.47	18.00	10.00	0.00	Rigorous survey and social audit are required to generate and monitor relevant data on a regular basis.	
16.2b	Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18	Data not released	-					
16.2c	Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month	Data not released	-					
16.2d	Number of victims of human trafficking per 100,00 population	Crime in India Statistics (National Crime Records Bureau)	264	Reduce by 30%	Reduce by 50%	Reduce by 70%	Data need to be generated by sex, age and form of exploitation with regular monitoring.	
Target 16.3		Promote the rule of law at the national and international levels and ensure equal access to justice for all						
16.3a	Proportion of victims of violence in the previous 12 months who							

	reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms					
16.3b	Unsentenced detainees as a proportion of overall prison population	Prison Statistics of India	76.70	60.00	42.00	25.00
Target 16.4	By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime					
16.4a	Proportion of seized small arms and light weapons that are recorded and traced, in accordance with international standards and legal instruments	Data not available in comparable form				Data should be generated in comparable form for regular monitoring.
16.4b	Volume of illicit financial flows					
16.4c	Stolen assets recovery initiatives					
Target 16.5	Substantially reduce corruption and bribery in all their forms					
16.5a	People's perception on corruption (% of people with at least one instance in the past 12 months that CMS-India corruption)	CMS-India corruption	35	20	5	0
						Vigorous checks and balance through E-Governance should be implemented.

	required to give a bribe/present (corruption index score)	n Study 2017			
Target 16.6	Develop effective, accountable and transparent institutions at all levels				
16.6a	Primary government expenditures as a proportion of original approved budget	Data not released regularly			Need to generate comparable data, by sector (or by budget codes)
16.6b	Proportion of the population satisfied with their last experience of public services	CMS- India corruption Study 2017	42	56	85
Target 16.7	Ensure responsive, inclusive, participatory and representative decision-making at all levels				
16.7a	Number of user departments for e-office	Data not released			By 2024, 100 per cent targets need to be achieved in all these components.
16.7b	Number of employees and organization registered on Aadhaar based biometric system				
16.7c	Number of department/agencies integrated for mobile governance				

16.7d	Number of operation of Common Service Centres (CSCs)					
16.7e	Voter turnout (%)	Electoral Statistic Pocket Book (Election Commission of India)	67.12	78.99	90.53	92.90
						This is possible with voters' awareness generation programmes of the Election Commission.
Target 16.8	Broaden and strengthen the participation of developing countries in the institutions of global governance					
Target 16.9	By 2030, provide legal identity for all, including birth registration					Refers to National and International Policies
16.9a	Proportion of children whose births have been registered with a civil authority	Annual Report on Registration of Births & Deaths in Delhi, Govt. of Delhi	100	100	100	100
						The state need to maintain the records regularly.

					Data is very much scattered and not comparable. E – Governance should be introduced rigorously.
16.9b	Citizenship by social and gender groups	Data not released regularly and systematically.			
16.9c	Marriage certificate by gender and social groups				
Target 16.10	Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements				
16.10a	Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade and unionists and human rights advocates in the previous 12 months	Data not released			Need regular data generation and monitoring

GREEN GROWTH (SDG 13, 15)

CHAPTER 12: ENVIRONMENT (Goals 13, 15)

Vision

Delhi aspires to provide environmentally resilient habitat with adaptive capacity to climate change, sustainable management of terrestrial eco systems and forests.

SDG 13: Take urgent action to combat climate change and its impacts

Delhi SDG 2030 Vision Statement Goal No:13 Delhi SDG 2030 envisions a transformed future for the people of Delhi free from all forms of deprivation, inequalities and insecurity to be achieved within the next fifteen years. It envisages a Delhi where there is no poverty and hunger, where basic education is accessible to all children, where girls and women have equal opportunity as others; where all citizen have access to affordable health care. It also envisions a Delhi where every citizen is skilled; and gainfully employed and contributes to his or her own well being of the state. It envisions Delhi as a state able to maintain its natural resource well; effectively protect its environment; and fully preserve its unique biodiversity. Recognizing the wide range of projections of climate change, noting the linkages between development and climate change adaptation, and appreciating the development goals of its population, the Delhi SDG 2030 Vision aims to increase the resilience of the people and the economy of Delhi to future climate change. This requires identifying those who are most vulnerable to the potential adverse impacts of climate change. It requires understanding the limits to how people cope and to help them adapt.

Targets

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all
- 13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Responsible Departments: Environment, DPCC

Current Status

The Climate Change Agenda for Delhi 2009-12 by the Government of NCT Delhi put forth several action items that the Government intended to undertake upto 2021. The Study on “Inventorization of Green House gases – Sources & Sinks in Delhi” carried out by Delhi University in 2012, covered different emission sources namely, transportation, industrial, residential, commercial, and power plants which estimated CO2 emission from Delhi is around 15.42 million metric Tons. Sector wise emissions of GHG identified in Delhi are as follows:

ROAD TRANSPORT SECTOR: CO2 emission for the year 2007-08 is estimated to be 7.66 MMT using the top-down approach, whereas using the bottom-up approach it was estimated to be 8.17 MMT.

POWER SECTOR: Delhi had five thermal power plants (TPP) which served as a major point source of CO2 emissions in the city. The total CO2 emission from these thermal plants in the year 2007-2008 was 9.76 MMT. The reduction after closure of Rajghat and Badarpur power plants needs to be estimated.

DOMESTIC SECTOR Pollution from domestic sector is mainly due to use of kerosene, LPG, diesel (DG sets) and huge consumption of electricity. Average CO2 emission from domestic sector of Delhi in the year 2007-08 was 5.35 MMT

INDUSTRIAL SECTOR CO2 emission from the industries of Delhi was 1.37 MMT

COMMERCIAL SECTOR Estimated CO2 emissions from commercial sector of Delhi were 1.87 MMT with power consumption alone contributing 1.69 MMT. Contribution from the combustion of fossil fuel in the DG sets was 0.177 MMT.

SOLID WASTE SECTOR Presently the solid waste is being dumped at three landfill sites which fall under the category of uncontrolled disposal facilities and have no gas recovery systems in place. Landfill gas generation comprises mainly of methane which has a global warming potential of 21.

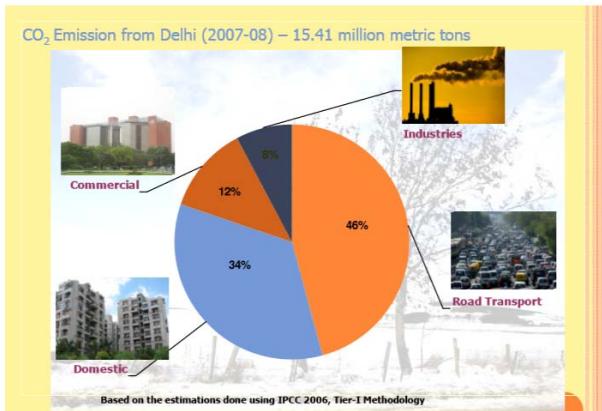


Fig. No.: 12.1

Source: Dhamija, P; CLIMATE CHANGE AGENDA FOR DELHI 2009-12; Energy Efficiency & Renewable Energy management Centre Department of Environment Govt. of Delhi

A study done in 2012 on the progress of the Agenda assessed that Delhi has done a lot but not focused on the aspects adequately. It further identified integration of 20 departments in the process of mitigating climate change impacts due to growing urbanisation upto2021 with an assumption that by 2021, 85% of Delhi will be urban. Based on the relevant Missions of NAPCC (National Action Plan on Climate Change), six were identified in the context of Delhi to address its CLIMATE CHANGE AGENDA

1. Solar Mission,
2. Enhanced Energy Efficiency,
3. Sustainable Habitat,
4. Green India,
5. Water and
6. Strategic Knowledge

The Comprehensive Study on Green House Gases (GHGs) in Delhi undertaken by IIT Kanpur, 2016 estimated carbon equivalent (tCO₂e) Greenhouse gas (GHG) emission load in the city of Delhi as 37.91 million tonne in the year 2014. The top four contributors to tCO₂e emission are: power plants (electricity generation and consumption) (43%), vehicles (32%), burning of municipal solid waste (MSW; 8%) and domestic fuel (7%).The annual per capita tCO₂e emission in the city of Delhi was estimated as 2.26 tonne, which is lower than many large cities; Beijing 10.8; London: 6.2 Tokyo: 4.9 (<http://www.unep.org/>). However, annual per capita tCO₂e emission from Delhi is about

1.5 times of national average. This high per capita emission in Delhi could be attributed to the fact that it is a capital city with high gross domestic product (GDP) and it represents a large urban agglomeration.

The green areas of the Delhi consist of forests, plantations, avenue trees, gardens and parks. The total estimated green area is 327.62 sq km; of which, 176.62 sq km is forest and 151 sq. km is mixed species in gardens, parks and major avenues. The data related to annual CO₂ capture by trees and plants in the city of Delhi are estimated as: (i) total biomass: 1.7 million tonne; (ii) total carbon: 0.85 million tonne and (iii) total CO₂ captured 3.1 million tonne.

The GHG mitigation measures for various sources were analyzed. These sources include: power plants, livestock, coal usage, domestic fuel, street lights, burning of MSW, and vehicles. The major reduction in emission can be achieved by (i) successive use of low carbon fuels (switching from coal to natural gas in power plants) followed by shifting about 20% generation to solar energy (estimated reduction of 11 million tones tCO₂e i.e. 27% of total tCO₂e emission) and (ii) stop burning of MSW and converting the MSW into energy (estimated reduction of 3.12 million tonne tCO₂e i.e. 8% of total tCO₂e emission). (Sharma; Dikshit; 2016)

Table 2.15: Overall Baseline GHG Emission in the Delhi City (in tonnes): year 2014

S.N o	Sources	CH ₄	CH ₄ (%)	CO ₂ X 10 ⁶	CO ₂ (%)	N ₂ O	N ₂ O(%)	HCF	tCO ₂ e X 10 ⁶	tCO ₂ e (%)
Power Sector										
1	(1a) Power Plants (Within Delhi)	1105	3.0	13.40	40.1	160	2.1	-	13.48	35.6
	(1b) Power Consumption (From Outside Delhi Sources)	315	0.8	2.88	8.6	47	0.6	-	2.90	7.6
	Total	1420	3.8	16.28	48.7	207	2.7	-	16.38	43.2
2	Vehicles	6606	17.8	9.98	29.9	7132	91.5	-	12.27	32.4
3	MSW Burning	1077	2.9	3.05	9.1	142	1.8	-	3.12	8.2
4	Domestic	148	0.4	2.44	7.3	36	0.5	-	2.45	6.5
5	Refrigerant	0	0.0	0.00	0.0	0	0.0	875	1.25	3.3
6	Livestock	22693	61.2	-	-	-	-	-	0.57	1.5
7	Industry (Area source)	38	0.1	0.52	1.6	17	0.2	-	0.53	1.4
8	Cropland	176	0.5	0.35	1.1	126	1.6	-	0.39	1.0
9	Incinerator	88	0.2	0.26	0.8	12	0.2	-	0.27	0.7
10	Green Cover	147	0.4	0.16	0.5	72	0.9	-	0.18	0.5
11	Restaurant	19	0.1	0.17	0.5	3	0.0	-	0.17	0.5
12	Landfill	3263	8.8	0.00	0.0	30	0.4	-	0.09	0.2
13	Agriculture	873	2.4	0.06	0.2	2	0.0	-	0.08	0.2
14	DG Set	3	0.0	0.05	0.1	1	0.0	-	0.05	0.1
15	Cremation	3	0.0	0.04	0.1	2	0.0	-	0.04	0.1
16	Industrial (point source)*	2	0.0	0.03	0.1	1	0.0	-	0.03	0.1
17	Aircraft	11	0.0	0.01	0.0	0	0.0	-	0.01	0.0
18	Drain	493	1.3	-	-	-	-	-	0.01	0.0
19	Wetland	18	0.0	0.01	0.0	11	0.1	-	0.01	0.0
20	Total	37078	100	33.41	100	7794	100	875	37.91	100

*Industries excluding power plants.

Fig. No.:

Source: Sharma; MDr. Mukesh; Dikshit, Dr. Onkar; Comprehensive Study on Green House Gases (GHGs) in Delhi 2016; IIT Kanpur; Department of Environment Govt. of Delhi

Challenges

Taking into account the point, line and area sources and the carbon stock available in the biomass of trees and green areas the issues and challenges as discussed in the above study are listed below:

Hotel/Restaurant: There are approximately 36000 Hotels/Restaurants in the city of Delhi, which may use coal (mostly in tandoors). It is proposed that all restaurants of sitting capacity more than 10 should not use coal and shift to electric or gas-based appliances (e.g. LPG, etc). A careful examination shows that about 4% reduction of tCO₂e (172312 to 164959 tonne/yr) emission from this source can be achieved by stopping usage of coal.

Domestic Sector: Although Delhi is kerosene free and 90% of the households use LPG for cooking, the remaining 10% use wood, crop residue, cow dung, and coal for cooking (Census-India, 2011). LPG may be made available to remaining 10% households to make the city 100% LPG-fueled. This action is expected to reduce about 10% of tCO₂e (241837 tonne/yr) emissions from domestic sector.

Municipal Solid Waste (MSW) Burning: The MSW burning is wide spread in Delhi and NCR, more frequently in winter. A study by Nagpure et al. (2015) in Delhi has estimated 190 to 246 tons/day of MSW burning (~2–3% of MSW generated). Any form of garbage burning should be strictly stopped and monitored for its compliance. It will require development of infrastructure (including access to remote and congested areas) for effective collection of MSW and disposal at landfill site. A complete ban on MSW burning can almost reduce GHG emission by 99% from this source.

Diesel Generator (DG) Sets: For Delhi and NCR, all efforts should be made to minimize uses of DG sets and strengthen the uninterrupted power supply. Small DG sets are used at the ground level which creates nuisance and high pollution. It is recommended that all DG sets of size 2 KVA or less should not be allowed to operate; instead, solar powered generation, storage and inverter should be promoted. Calculations showed that this mitigation option can lead to reduction of 49570 tonne/yr in GHG emissions.

Agriculture and Livestock: Emissions in livestock occur due to two major processes: Enteric fermentation and manure management. Hence, to control the emissions, primarily CH₄, one can focus on the manure management.

Two possible measures could be taken to reduce GHG from livestock

- Controlling the way in which manure decomposes so to reduce N₂O and CH₄ emissions. Example of it can be storing the manure on some solid areas rather than liquids as the emissions resulting from latter will be a lot more compared to the former.
- Capturing CH₄ from manure decomposition to produce renewable energy. Example of it can be storing manure in anaerobic containment areas to maximize CH₄ production and then capturing the CH₄ to use as an energy substitute for fossil fuels.

Landfills: CH₄ is a major GHG that is emitted from landfill sites. Delhi has three major landfill sites with total estimated emission of 0.09 million tonne of tCO₂e per year. Thus, by 2022, provisions could be made to capture and convert this efflux to make energy. Landfill gas (LFG) is produced from the decomposition of organic matter in MSW. This gas consists of CH₄, CO₂ and a small amount of non-methane organic compounds (NMOCs). LFG has a heating value of approximately half of that of natural gas and can often be used in place of conventional fossil fuels in certain applications. The important advantage of this gas is that it is a reliable local source of renewable energy because it is generated 24 hours a day, 7 days a week from household and commercial wastes that are continuously deposited in landfills.

Power Plants: In power plants, coal, diesel and natural gas are used to generate electricity. Natural gas is more efficient fuel than both coal and diesel. In 2014, the share of natural gas in total calorific value was about 36% in power plants. Hence, to reduce the overall emissions from power plants, it is recommended to switch from coal to natural gas. This would reduce total emissions of power plants from 19.24 to 11.13 million tCO₂e. This would be one of the major reductions in total GHG emissions of Delhi city. Being the capital city of India, Delhi could also generate this percentage of electricity using solar power. This additionally reduces emissions from electricity sector by 27%. The final reduction in GHG emissions could be from 16.37 to 8.12 million tCO₂e (i.e. 21% which is equal to the share of solar energy of total generation in power plants).

LED lights: Efforts should be made to convert the existing street lights to LED lights as it will not only decrease the emissions, but decrease the overall cost of public lighting. It has been estimated that about 320 million units of electricity annually will be saved by using LED lights in Delhi (Existing sodium vapor lights [Average wattage=325W] to be replaced with 60W LED streetlights). Thus, this additional saving of electricity will not only decrease the emissions in the city, but it is also cost efficient. This reduction in electricity consumption reduces the GHG emissions from 0.13 to 0.02 million tCO₂e (about 82%).

Vehicles: It has been seen that vehicles is the second largest source of GHG emission in Delhi. Thus, there is a need to introduce efficient fuels or vehicles to reduce the emissions by transport sector. Introduction of Electric/Hybrid Vehicles: if electrical and hybrid vehicles are introduced, it is assumed that by every year, 2% of 2-Ws, 10% of 3-Ws and 2% 4Ws of conventional vehicles will be replaced by electric/hybrid vehicles. Reduction in emissions was calculated to be about 5%. The additional electricity needed by the vehicles is not accounted for in the GHG emissions due to unavailability of data.

Table 4.1: Control Options, Emission Load and Reductions in tCO₂e (tonne/yr)

Source	Options available for reducing emissions	Description option	Existing tCO ₂ e emissions	Controlled tCO ₂ e emissions	Percent reduction in respective source	Percent change of total reductions
Hotel/ Restaurant	1	Stop use of coal and shift to LPG	172312	164959	4	0.06
Domestic Cooking	2	LPG to all	2450591	2208754	10	1.84
MSW Burning	3	Stop MSW burning	3123102	26925	99	23.50
DG Set	4	Uninterrupted power supply and banning of 2-KVA or smaller DG sets	49570	0	100	0.38
Agriculture and Livestock	5	Manure management of livestock	-	-	-	-
Landfill	6	Capture methane to produce fuel	93664	81575	13	0.09
Power plant	7.1	Use only natural gas as a fuel in power plants in Delhi	16375918	9548560	42	51.81
	7.2	Obtain 21% energy from renewable sources like solar energy (alternative to natural gas) after option 7.1 is implemented by the year 2030	9548560	8114984	15	10.88
LED street light	8	Convert street lights to LED	1161661	213912	82	7.19
Vehicle	9	Electric/Hybrid Vehicles: 2% of 2-Ws, 10% of 3-Ws and 2% 4Ws every year	12270785	11708609	5	4.27
Total			34535942	21359057	38	100

This study is not proposing any time-bound action plan.

Fig. No.:

Source: Sharma; M, Dr. Mukesh; Dikshit, Dr. Onkar; Comprehensive Study on Green House Gases (GHGs) in Delhi 2016; IIT Kanpur; Department of Environment Govt. of Delhi

3-year Agenda for Action

ACTION AREAS FOR IMMEDIATE THREE YEARS

- Identification of Vulnerable areas and vulnerable population
- Awareness of disaster preparedness
- Up gradation of health infrastructure

- Up gradation of solid and liquid waste management
- Protection of Green areas and water bodies

Apart from the above the; Energy Efficiency & Renewable Energy management Centre Department of Environment Govt. of Delhi had suggested in 2012 actions related to the six Missions:

Solar Mission:	four actions
Energy Efficiency:	Seven actions
Sustainable Habitat:	twenty two actions
Green India:	eleven actions
Water Conservation:	ten actions
Strategic Knowledge:	eleven actions
Implementing agencies:	twenty
TOTAL ACTIONS:	65

SOLAR MISSION: Aims to reduce dependence on coal fired electricity and promote use of solar energy to reduce GHG emissions.

Targets

- Promote use of Solar water heating of 5 lakh litres capacity
- 5% electricity from renewable sources
- 10% of all energy is used is reduced through Energy Efficiency measures.

Progress

- Solar Water heating made mandatory in all industries, hostels, hotels and residential buildings on plots above 500 Sqm
- Subsidy scheme of Rs. 6000/- 100LPD for domestic users and up to Rs. 60,000/-for 1000LPD for Non Commercial Users
- More than 5 lakh LPD installed as on 31st March, 2010
- All Delhi Govt. Housing will be provided with SWH system at 30% subsidy from EEREM Centre
- Solar tariff announced by DERC for projects on Rooftop PV and Small Solar Generation programme of MNRE.

- Small Rooftop (grid & off grid) demonstration projects setup by DISCOMs.
- 1 MW Rooftop Solar Power plant setup at Thyagraja Stadium to provide green power for Common Wealth Games.
Aims to reduce GHG emissions and save natural resources through improving the efficiency of conventional energy devices
Targets •Building Retro fitment for energy efficiency for 100 existing buildings having covered area of 10,000 sq ft
- Use of CFL & LEDs to be enhanced
- Star rating of electrical equipments to be promoted
- Create Database on energy consumption.
- To encourage conservation consciousness through media, publicity and awards
- Adoption of mandatory Energy Conservation Building Code in all Government Building and in all new building projects. Energy efficiency of existing Government Buildings through retrofitting to be carried out so as to achieve at least rating of one star from BEE under their Building labelling programme. 100 such buildings have been identified and in first phase 15 buildings are being taken up.
- Mandatory use of Compact Fluorescent Lamp and Electronics Chokes in Govt. Building/Govt. aided institution/Boards, Corporations
- Mandatory use of ISI marked Motor pump sets, Power capacitor, Foot/Reflex valves in Agriculture Sector
- Promotion of CFL/LED in all buildings, street lightings and hoardings, advertisements etc

SUSTAINABLE HABITAT: •Aims to improve urban environment adoption of new technologies for better infrastructure, water, power, transport and welfare services

Targets

- Augment public transport on CNG and restructure Bus Transport System
- Financing public transport infrastructure
- Improve fuel quality to 50 ppm sulphur
- Tax concessions for clean fuel vehicles
- Promote use of biofuels
- Shut down coal fired power plants
- Convert waste to energy
- Use of demolition waste for construction material
- Green Building Code to be implemented
- Safe disposal of Biomedical waste, mercury waste, electronic waste

GREEN INDIA MISSION: Aims to increase the green cover to 33% through greening of existing greens, opening of new city forest and intensifying the green cover

Targets

- Increase green cover from 289 sq km to 500 sq km
- Increase city forests
- Parks and gardens to be rejuvenated by community involvement
- Green entire Delhi ridge
- Composting of waste leaves and green foliage
- Herbal gardens, vegetable gardens in schools
- Five million potted plants for CWG 2010

WATER MISSION: Aims to increase water use efficiency of 20% through better regulatory mechanisms and new strategies to conserve water and use waste water efficiently

Targets

- Water reuse to be done
- Conservation strategy to be implemented
- Interceptor sewers to be built
- Clean river Yamuna
- Build sewer systems and storm water systems in unauthorised colonies and rural areas to conserve water
- Water recharging of water bodies 620 identified so far and to be rejuvenated

STRATEGIC KNOWLEDGE MISSION: Aims to develop an effective knowledge base and rare time management so as to evolve effective policies for development

Targets

- Promote of use of bio fuel like waste oil
- Education and Training for restricting use of fossil fuel in Delhi
- Promote awareness on climate change issues Regulation and bench marking of energy consumption in buildings •Hold international and Asian conference on Climate Change •Create database for waste handling processes

7-year Strategy

The Long term strategy is based on the assumption of ensuring the meeting of targets and goals by 2030. This would include:

Development of monitorable parameters for each target

A time bound mechanism related to the indicators and targets needs to be worked out to ensure an ongoing fulfillment of the actions and thus reaching the targets

Manpower with requisite skill to monitor and attached to concerned departments

The concerned Departments would train manpower to collect and analyze the data related to the actions and targets to prepare achievement logs and report to higher authorities of successful targets, shortfalls and innovations in the process.

All projects to be executed at Local area level with community participation and skill development

Since the actions are either sector specific or relate to local areas the involvement of Local Government would help in monitoring and assisting in implementation of the targets. Each District of NCT Delhi and The Local Bodies would need to be made aware of the action agenda and targets and develop capacity to ensure implementation of the same.

SDG 15: Protect, restore and promote sustainable use of terrestrial Eco systems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Delhi SDG 2030 Vision Statement Goal No: 15 Protect restore and promote sustainable use for terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Forests are critical to global sustainable development; Forest are amongst the most important habitats for biodiversity; tropical forests support over 80 per cent of the world's terrestrial species. Forests provide crucial ecosystem services, including water management and the prevention of soil erosion and landslides. They store more carbon than the atmosphere and have the potential to absorb about a tenth of the global carbon emission projected for the first half of this century. The Government of NCT of Delhi, in recognition of the unanimous adoption of the Sustainable Development Goals (SDGs) by all countries at the United Nations General Assembly on September 25, 2015 and acknowledging their relevance and critical importance for the greater interest and well – being of the people of the state, has decided to implement of SDG in the state. It identifies, among its objectives, the strengthening of forest-related national institutions, the enhancement of the scope and effectives, the strengthening of forest-related national institutions, the enhancement

of the scope and effectiveness of activities related to the management, conservation and sustainable development of forests, and the sustainable utilization and production of forests; goods and services in both the developed and the developing countries.

Targets

Target 15.1	<p>By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements</p>
	<p>15.1a Forest area as a proportion of total land area 15.1b Conservation of lakes and ponds (number)</p>
Target 15.2	<p>By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and increase afforestation and reforestation</p>
	<p>15.2a Percent change in Forest Area Coverage</p>
Target 15.3	<p>By 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation- neutral world</p>
	<p>15.3a Proportion of land i.e. degraded over total land area</p>
Target 15.4	<p>By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p>
Target 15.5	<p>Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>
	<p>15.5a Threatened flora (medicinal and aromatic plants) (%)</p>
Target 15.6	<p>Ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources</p>

Target 15.7	Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both the demand and supply sides of illegal wildlife products
Target 15.8	By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
Target 15.9	By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
	15.9a Plant (floral) species under conservation plans (number)

Responsible Departments: Environment, DPCC

Issues

NCT Delhi lies in the Semi- Arid Bio geographic zone; the natural vegetation of this zone consists primarily of Tropical Thorn Forests. Delhi's **Ecosystem Diversity** can be classified into a variety of ecosystems. The ecosystem diversity has been based on the physiographic characteristic of Delhi and has been divided into six categories detailed below:

- | | |
|------------------------|--|
| 1. LOWLANDS | - Flat agricultural/ horticulture, grazing lands |
| 2. HILLS, | - Rocky outcrops with arid vegetation |
| 3 FOREST ECOSYSTEMS | - Dry deciduous arid forest of the Ridge. |
| 4. VALLEYS | - Natural storm water drains. |
| 5. FRESHWATER WETLANDS | - Lakes and ponds. |
| 6. RIVERINE ECOSYSTEM | - River and flood plains |

The process of urbanization has modified most of the above ecosystems- lowlands have been encroached by urban development, natural forests have been denuded, many storm water drains have been covered up or stopped abruptly, and lakes and ponds have been filled upon or converted into garbage dumps. Apart from the modification of the spatial extents of these ecosystems, qualitatively the ecosystems have degraded. The species composition and

vegetation densities in the forests have changed. The water quality of existing lakes, drains have deteriorated. In fact, the water quality of River Yamuna has been classified as 'E' (CPCB's nomenclature for Designated best use, indicating the river water to be unfit for any use).

Forests

The total recorded forest area in Delhi is 85 sq. km. i.e. 5.73% of the geographic area of which the Reserved and Protected Forests constitute 91.76% and 8.24% of the total forest area respectively.

a. Reserved Forest (Proposed Reserved Forests (PRF):

"Ridge" which is the rocky outcrop of Aravali hills in Delhi, has been notified as Reserved Forests under Section 4 of the Indian Forest Act, 1927 vide Notification No.F.10(42)-1/PA/DCF/93/2012-17(I) dated 24th May, 1994. The Hon'ble Supreme Court, through various orders passed in Writ Petition (Civil) No. 4677/1985 (MC Mehta vs. UOI & Ors.) has directed that ridge should be maintained in its pristine glory.

b. Protected Areas (Asola-Bhatti Wildlife Sanctuary):

Gaon Sabha land in village Sahurpur, Asola, Maidan Garhi ad-measuring 4707 Acres (1882.80 Ha.) and 2166.28 Acres (866.512 ha.) of village Bhatti in the Southern Ridge has been notified vide No.F.3(116)/CWLW/84/897-906 dated 09.10.1989 and No.F.2(19)/DCF/90-91/1382-91 dated 15.04.1991 as Asola and Bhatti Wildlife Sanctuaries respectively under the Wildlife (Protection) Act, 1972.

c. Protected Forests: The following areas in Delhi have been notified as Protected Forests under Section 29 of the Indian Forest Act, 1927 vide Notifications as mentioned against each.

d. **City Forests:** The Department of Forests & Wildlife, over the years has raised plantations on the gaon sabha and other government lands and maintaining them as City Forests. Besides, thirteen old City Forests, the Department during the year 2007-08 and 2008-09, has developed eighteen New City Forests and developing nine new during the current financial year. The location-wise details of the old and new City Forests are as under.

Sl. No.	Name of the Protected Forests and Agency	Area in Acre	Notification No. Date.
1	Mitraon (Forest)	105	F.8(2)/48 (IX) P&D, Dtd. 6.05.1948
2	Sultapur (Forest)	120	F.8(2)/48-(I)P&D, Dtd. 6.05.1948
3	Mukhmelpur (Forest)	133	F.11 (38)/54-P&D-I Dtd. 2.3.1955
4	Rajokhari (Forest)	600	EV-7/97/58(i) Dtd. 21.08.1959
5	Tughlakabad (Forest)		F.8(2)/48(V) P&D dated 6.5.1948
6	Distt. Park I/c Hauzkhlas picnic Hut ,lake, Garden etc (DDA)	400.00	SCO.32(C)/Noti-80-81/6974 –81 Dt. 10.04.80
7	City Forest (DDA)	800.00	-do-
8	Basant Nagar, Moradabad Pahari Area (DDA)	200.00	-do-
9	Vasant Vihar Distt. Park (DDA)	20.00	-do-
10	Dhaura Kuan Complex ((DDA)	200.00	-do-
11	Nehru University Afforestation (DDA)	200.00	-do-

12	Distt. Park Gokulpuri (DDA)	7.50	-do-
13	Distt. Park Jhilmil Taharpur (DDA)	20.00	-do-
14	Zonal Green Area Kalyanpuri, Trilokpuri, Khichripur, Ghazipur etc. (DDA)	373.00	-do-
15	Orchard between Sindhora Kalan, Nimri, Gulabi Bagh & Darbar Khan Nursery and Other Areas (DDA)	100.00	-do-
16	Area Between Hill Road & Ludlow Castle Road (DDA/L&DO)	17.00	-do-
17	Orchard in Wazirpur Near Bharat Nagar and Nimri Colony (DDA)	120.00	-do-
18	Mayapuri Green belt (DDA)	5.00	-do-
19	Hastsal Afforestation (DDA)	40.00	-do-
20	Area between Inderpura Narayana J. J. Colony (DDA)	32.00	-do-
21	Afforestation M P Green area Tagor Gargen (DDA)	55.26	-do-
22	Orchard Nangloi Sayed (DDA)	257.56	-do-
23	Distt. Park Rohtak Road Co-operative Society (DDA)	35	-do-
24	Afforestation MP green G-8 Tihar	65	-do-
25	Afforestation M.P.Green Area Najafgarh Drain (DDA)	54.58	-do-
26	Distt. Park in between Pritampura Co-operative Society (DDA)	185.00	-do-

TOTAL	4144.90 (1658 Ha.)
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i. Old City Forests: There are thirteen old city forests maintained by the Department, namely, at Nasirpur (28.00 Ha.), Alipur (19.50 Ha.), Hauzrani (28.80 Ha.), Mitraon (40.00 Ha.), Sultanpur (48.00 Ha.), Ghumenhera (32.00 Ha.), Ghoga (10.40 Ha.), Shahapur Garhi (08.00 Ha.), Mamurpur (56.00 Ha.), Jindpur (47.60 Ha.), Mukhmelpur (53.00 Ha.), Bawana (32.00 Ha.) and Garhi Mandu (300.00 Ha.).

ii. New City Forests (2007-08): The Department has undertaken creation of nine new city forests during 2007-08 at Issapur (66.25 Ha.), Rewla Khanpur (22.85 Ha.), Kharkhari Jatmal (50.00 Ha.), Sultanpur Dabbas (24.76 Ha.), Mungeshpur (13.5 Ha.), Qutabgarh (27.77 Ha.), Hindon Cut Ghazipur (9.33 Ha.), Harewali (24.80 Ha.) and Mukhmelpur (19.43 Ha.).

iii. New City Forests (2008-09): During 2008-09, the Department had undertaken development of nine new city forests, namely, at Rewla Khanpur (20 Acre), Shikarpur, (10 Acre), Rajokhari, (15.5 Acre), Nazafgarh Drain (29.64 Acre), Qutubgarh, (20 Acre), Mukhmelpur, (13Acre), Raj Vidya Kendra, Sahurpur (37Acre), Aya Nagar (25Acre) and Burari Bund (8 km. of the slope of Burari Bund Road towards supplementary drain).

iv. Proposed New City Forests (2009-10): Rewla Khanpur, Pendwala Khurd, Malikpur, Daurala, Goylakhurd, Kharkhari Jatmal, Garhi Mandu, Jaunapur and Neb Sarai/ Dera Mandi. The plantation in these locations was to be completed by.

The Department has also initiated action for their notification as Protected Forest for providing them the legal status and ensuring their protection.

The National Forest Policy, 1988 provides that a minimum of 1-3rd of the total land area of the country should be under forest or tree cover. As per the India State of Forest Report (SFR)-2015, the total Forest and Tree Cover of NCT of Delhi is 299.77 sq. km. (20.22%) as against 297.81 sq. km. (20.08%) reported in SFR-2013. This is made up of

111 sq. km of tree cover and 188.77 sq. km of forest cover making a total of 299.77 sq. km. Thus there is an increase of Green Cover of Delhi from 20.08% to 20.22% which works out to 0.14% of the geographic area.

During 2000 - 2001, the Government of Delhi sanctioned a project of rehabilitation of 2100 Acres of degraded Bhati Sanctuary through the Eco-Task force of Territorial Army and Center for Environmental Management of Degraded Ecosystems of Delhi University. The objectives of the project are - reclamation of degraded Bhati area through afforestation & grassland development, restoration of habitat for indigenous wildlife and other faunal species, improvement of ground water regime, improvement of soil quality and fertility in the area, addition to the recreation & bio-aesthetic value of the sanctuary and improvement in biodiversity of Aravali ecosystem. This project is still continuing in five years. This would improve the habitat of the Wildlife Sanctuary, increase forest cover of Delhi and also act as shelterbelt to check the advancing desert from the western part of Delhi. Saplings have been planted and seeds of various indigenous tree species have been sown at various locations by the Territorial Army and their presence has the biotic interference and illegal mining to a great extent.

Sl. No.	Year	Area (in Acres)	Plantation Raised
1	2001-02	300	58800
2	2002-03	600	92600
3	2003-04	400	150000
4	2004-05	400	128000
5	2005-06	400	130000
6	2006-07	400	140000
7	2007-08	400	171000
8	2008-09	427	141703
9	2009-10	429	104632

Eco-restoration of Degraded Bhatti Mines through Eco-Task Force: The Department has undertaken a project for eco- rehabilitation of 2100 acres of degraded and abandoned Bhatti Mines in the southern ridge (Bhatti Wildlife Sanctuary) w.e.f. October, 2000 through 132 Infantry Batallion (TA) ECO Rajput (Eco- Task Force). The Task Force had successfully protected the forest land from encroachment and illegal mining in the area temporarily handed over to them. Over passage of time, the Gaon Sabha lands of Dera Mandi were also handed over by the Govt. to ETF for raising plantations. The year-wise details of the plantation raised by ETF w.e.f. 2001 onwards are as under:

Source: Commanding Officer – 132 Inf. Bn. (TA), ECO Rajput (ETF)

Lakes and ponds:

Wetlands are characteristic ecosystem of Semi Arid zones. In Delhi the Najafgarh Jheel, marshy areas in the northern part of Delhi, some ponds and the canal networks were the water bodies mentioned up to the independence period though many ponds and water bodies, marked in the Survey of India toposheets. A joint survey conducted by INTACH,, MCD, Development Department - Govt. of Delhi, I&FC, DDA, ASI, CPWD, PWD, DJB, DVB , (Oct. 2001 to Jan. 2002) had identified **508**, water bodies in NCT Delhi. Out of these about 46 are above one Hectare in surface area. As per the studies conducted during formulation of Climate Action Plan for Delhi in 2009-10, **621** water bodies with their details - their name, Village/location , area, if dry, dry and wet area, whether encroached were documented. These water bodies in some areas are being revived and the rest are in various stages of neglect. These water bodies are habitats of various flora and fauna and lung spaces in the city. Some of the major wetlands are shown in the Figure below.

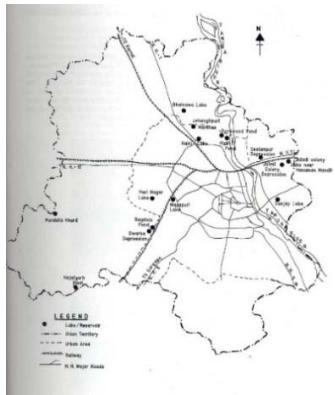


Fig. No. Major Lakes and Wetlands of Delhi

Source: Water Quality Status of Lakes & Reservoirs in Delhi CPCB, 2001.

Land use and Land cover

A comparison of the Land use and land cover of 2005-06 and 2011-12 shows a decrease in areas under wetland and water bodies.

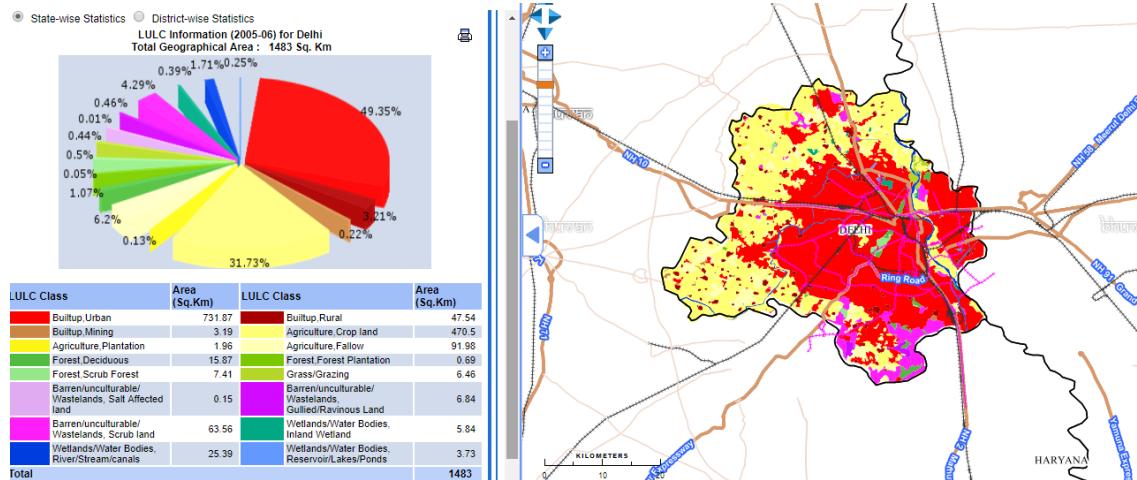


Fig. No.

Landuse and land cover 2005-06

Source: Bhuvan

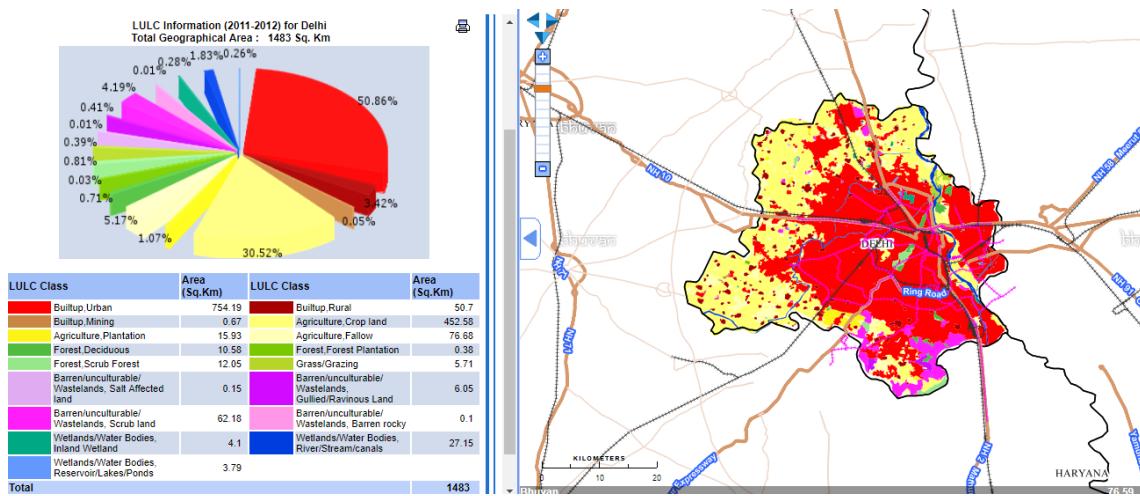


Fig. No. Land use and land cover 2011-12

Source: Bhuvan

Flora of Delhi

The first systematic study of the flora of Delhi was carried out by Maheshwari (1963). An overview of the study indicating the statistical synopsis shows that the ratio of genera and species is 1:1.63, which is typical of smaller flora, it also indicates higher diversity even though less species richness. At the level of whole India the ratio is 1:7 and for Gangetic Plain it is 1:2.2. Also, the cultivated species are more than the indigenous species (ratio 3:2 approximately). The major vegetation types of Delhi are as follows:

Vegetation Types of Delhi

VEGETATION TYPES	APPROXIMATE NUMBER OF SPECIES
INDIGENOUS OR NATURALISED	(160)
Ridge	(141)
1. Permanent woody species	31
-indigenous	17
-introduced	14

2. Thorny shrubs/climbers/twines	11
3. Lianas (epiphytes)	3
4. Under shrubs	8
5. Temporary vegetation	42
6. Temporary climbers	15
Yamuna River, Its Basin & Embankments	(29)
1. Muddy flats and islands	29
Ponds, Lakes, Marshes, Canals	(58)
1. Submerged	8
2. Attached floating	7
3. Free floating	9
4. Reed Swamp	24
5. Crops	7-10
Ruderal Formation	(140)
1. Roadside weeds	15
2. Weeds of cultivation	74
3. Escapes (associated with vegetables, garden shrubs, herbs.)	24
4. Saline and Alkaline patches	9
5. Flora of old walls, monuments rocky crevices	15-18
CULTURED/CULTIVATED	(350)
1. Food Crops	(31)
1. Kharif	22
2. Rabi	9
2. Garden Crops	(36)
1. Winter	24
2. Summer	12
3. Fruit Plantation	(136)
1. Summer and Rainy Season	23
2. Winter	6
3. Hedge Plants	12
4. Climber, Twiners & Ramblers	2
5. Plants Along Canals	38
6. Ground Flora Of Fruit Orchards	18
7. Weeds	18

INTRODUCED FLORA	(169)
1. Roadside Trees & Shrub	24
2. Parks & Gardens	46
3. Hedge	59
4. Climbers	25
5. Weeds	14

Source: Compiled from Flora of Delhi.1969.

(The present status needs to be quantified.)

Fauna of Delhi

In all nine faunistic surveys of the metropolis were undertaken by the task forces of Northern Regional Station, Zoological Survey of India, Dehra Dun, between June, 1993 and December 1995, covering about 71 localities from various ecosystems available in Delhi. The principal objective being to prepare a strong baseline data, which could be used as bench mark study in any present or future action plan for the protection and anthropogenic pressure on the urban biodiversity. Delhi is well represented by most groups of Fauna from the unicellular Protozoa to the highest group of Mammalia. On a general analysis it is observed that all the groups are not equally represented. The largest group is Aves with a maximum of 434 species. However, if all the orders of insects represented are grouped together under *Insecta*, then the total number of insect species amounts to 872. Interestingly some group like *Porifera*, *Coelenterata*, *Crustacea* and *Diplopoda* recorded only 1 to 3 species each. Even known insects, orders like *Thysanura*, *Mantodea* and *Dermaptera* have 1 to 3 species. Three insects order only recorded more than 400 species-namely *Hymenoptera* (178 spp), *Hemiptera* (152 spp) and *Lepidoptera* (101 spp). Acari, comprising of Plant Mites, Soil Mites and House Dust Mites formed a considerable number with 145 spp.

Among the vertebrates, as mentioned earlier, **birds formed the largest group, followed by the fish, mammalia and reptilia.** The amphibians accounted for only 7 species. Among the fishes, of a total of 87 species spread over 24 families- it has been seen that except for Cyprinidae, which has 33 species, all other families recorded only 1 to 5 species. Amphibia has only 3 families and Ranidae is the only family with 4 species while the other two have only 1 or 2 species except the family Colubridae which recorded 7 species. **Of the 434 species under Aves, the group Passeriformes has more than 50% of the total recorded species,**

itself recording 287 species. Mammalia is represented by 17 families and as seen in other except family Muridae which recorded 10 species, the other are represented by only one species and three families by 2-3 species each. As was expected of the faunal biodiversity of any region, **Delhi fauna also revealed values in that the vertebrates were nearly half of that of the invertebrate fauna.**

Table 3.4: Fauna of Delhi

S. No.	Type	Type	Family	Species	No. of Species in Schedule II
1.	VERTEBRA	Mammals	17		6
2.		Birds		434	11
3.		Reptiles	11		6
4.		Fish	24	87	
5.		Amphibians	3		
6.	INVERTEBR A	Proto zoa		44	
7.		Porifera		1	
8.		Coelenterata		2	
9.		Helminthes		20	
10.		Nematoda			
11.		Mollusca			
12.		Annelida			
13.		Crustacea			

14.		Thysanura				
15.		Odonta				

Source: Fauna of Delhi, Zoological Survey of India
, 1996

A further analysis revealed that **among the vertebrates 6 species were Mammals, 11 species of birds and 6 species of reptiles-belonging to Schedule-II**. This is itself is sufficient to be more conscious of Delhi environment and conserve the bio-diversity wealth of Delhi. A study of the birds of Delhi indicates a majority of them are wetland birds. Delhi has the distinction of possessing the largest number of bird species compared to other metropolitan cities in India. This could be also due to the presence of the major Asian fly path of birds (Delhi Bird Organization) along the River Yamuna.

Delhi has declared the House Sparrow as its state bird in 2012 because of its diminishing numbers. House sparrow is important for both environment and mankind. It preys on insects, avoiding its attack on other plants, forms a major part of the food chain for other birds and helps in studying general biological problems, such as evolutionary mechanisms, temperature metabolism and pest control. House Sparrow, as is evident from the name, was originally a part of every home. It is part of the culture of many religions. It acts as a green living component in a home by using our waste like cotton pieces, paper and others.

Non-availability of tiny insects as food due to the loss of vegetation around our modern buildings, the excessive use of mosquito repellents indoors and insecticides outdoors, our concrete architectures with no nesting sites for sparrows, and air-conditioning which leaves no entry or exit points for feeding sparrow nestlings are some of the reasons for the dislocation of sparrows. Further, increasing noise from automobiles and their gaseous pollutants in our cities may be deterrents. Above all, the recent increase in electromagnetic radiations from cell phone towers outdoors and the explosive use of diverse wireless devices indoors have also chased away the birds. It could be the synergistic effect of all these environmental pollutants that has compelled sparrows to fly away from their long-trusted human companions. The House sparrow in reality is but only one among the several other species of birds and biodiversity that have been declining in numbers for the past 60 years.

Challenges

Urban Environmental Accords, Green Cities Declaration of United Nations Environment Programme 2005, emphasizes actions for greening urban areas :

- Action 10- Ensure that there is an Accessible public park or recreational open space within half-a-kilometer of every city resident by 2015.
- Action 11- Conduct an inventory of existing canopy coverage in the city and then establish a goal based on ecological and community considerations to Plant or maintain canopy coverage in not less than 50% of all available sidewalk planting sites.

Action 12- Pass legislation that protects Critical habitat corridors and other key habitat characteristics (e.g. water features, food-bearing plants, shelter for wildlife, use of native species, etc.) from unsustainable development. Convention on Biological Diversity through its AICHI TARGETS for 2020 has put forth the following goals :

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use
- Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building Urban Biodiversity

Between 1999 – 2012 as per NCRPB and INTACH Study:

- Built-up Area in Delhi increased by 9.02% (13,374 Ha or 133.74 Sq. Km.)
- 250 Sq. Km Planned for future between 2006 and 2009

Between 2006 and 2009 as per FSI, 0.38 Sq Km of Forest Cover lost, but Total Other Forest Increased

- Delhi Metro alone has resulted in 21,000 trees getting cut
- NWIA Inventories of Wetlands states 25% loss of wetlands in a decade

It is thus essential to bring additional areas into the Green Area Network, change Vegetation Characteristics of Existing Areas as far as possible, increase Foliage Density within area constraints with a view to:

- Ensure Ecological Services from Underutilized Areas
- Naturalizing Of Large Urban Greens
- Enhance Density of Green Cover
- Enhance Habitat Availability for Flora and Fauna
- Connectivity amongst Isolated Green Fragmented Area through the Urban Landscape

As far as Possible (Bhatnagar, Manu; INTACH)

8.15.3 Agenda for Action

As per the recommendations of Convention of Biodiversity, Action Plans need to be prepared as State level – State Biodiversity Strategy Action Plan (SBSAP) and for Local areas – Local Biodiversity Strategy Action Plan (LBSAP). Along with this at the planning area level the protected areas and ecosystem diversity has to be mapped. The buffer area needs to be demarcated, and listing of permitted and not permitted land uses and activities has to be undertaken. Detailing of sensitive habitat units within these areas to protect the species has to be mapped.

Green land uses - low density residential/ green neighborhoods, institutions, heritage areas, large parks, critical urban gradients, and landscape elements (patch, corridor, and matrix) have to be spatially identified and assessed for their biodiversity value. These areas have to be protected from unsuitable development as they serve as habitats for species as well as contribute to environmental protection. Conservation status of the species has to be available with the planning authorities with sensitive habitat locations.

In various land use zones – Residential, Commercial, Mixed Use, Institutional, Industrial, Transport Recreation, Water Bodies, Agriculture, Forest -each land use represents a patch,

corridor or matrix. In the rural zone and urban zone, the land uses and their landscape element classification are;

RURAL ZONE	URBAN ZONE
Patch Residential, industrial, public utility, water bodies, forest etc.	Patch Agriculture, commercial, recreational, industrial, public utility, water bodies, forest etc.
Corridor River, stream, roads	Corridor River, stream, roads
Matrix	Matrix
Agriculture	Residential use

Each land use/patch can be classified as a habitat – terrestrial or aquatic or both – scrub, woodland scrub, woodland, undulating scrub etc. depending on species composition. The species composition is related to the age, size and landscape design of the land use patch and may vary for similar land use – area under trees, shrubs, climbers, ground covers, water bodies, landforms. The age and type of floral species would determine the faunal species. The more the variety of floral species larger the number of faunal species observed. It follows that within the development controls/ bye-laws, the type of landscape that supports biodiversity can be made mandatory while sanctioning plans, as is already being done for water harvesting systems. A combination of large trees, small trees, shrubs, climbers and wherever the size permits, creation of water body would result into habitats of many species.

Since a metropolitan city has many environmental problems – water scarcity, air and noise pollution, water pollution, heat buildup, waste generation, the selection of species should also contribute to reducing the environmental stress, by fulfilling some of the functions – recharge water, abate pollution, treat waste and improve microclimate. The ambient air quality, temperature, humidity, soil conditions, existing vegetation, water recharge potential, existing development controls, activity pattern, waste type and generation specific to land uses has to be assessed to propose the modifications in landscape development to enhance the habitat quality.

In the case of Delhi some of the guidelines for habitat enhancement for land uses could be

1. Land use patches situated along major arterial, sub arterial, major roads, local roads should have species tolerant to air pollution. They should have plantations, landscaping for noise control.
2. Land uses in Zones D, G, F, H, J, K, should allow for maximum water recharge as they have a thick unsaturated layer below. For Zones C, P and M it has to be selectively undertaken as it may result in flooding (based on data of CGWB).
3. Recreation areas - housing area parks, Neighborhood Park, district parks should be landscaped with a variety of floral species - large trees, small trees, shrubs, ground covers, climbers and wherever the size permits, creation of water body. Species for pollution control and enabling water recharge should be the added functions.
4. Storm water drains are corridors for species movement, while being potential water recharge areas. Since they are also waste carriers – sewage and solid waste, control in waste discharge, adequate vegetative methods (root zone treatment) to treat waste have to be included in their up gradation.
5. Water bodies are major bird habitats. Delhi has the distinction of possessing a high variety of bird species and presence of water bodies – rivers, canals, wetlands are their habitats. Pollution control, waste treatment, plantation of fruit trees, trees which allow for nesting should be consciously propagated to enhance habitat quality.
6. Areas where urban agriculture is practiced – floodplains, railway lands, home gardens and fringe areas should be propagated due to their environmental and economic role.

Development Controls related to each land use has to be studied for the habitat type it generates with appropriate landscaping before suggesting any modification in Floor Area Ratio or Ground Coverage. With the present byelaws the suggestions to enhance habitats to conserve biodiversity could be addressed.

LONG TERM STRATEGIES FOR SEVEN YEARS

Development of monitorable parameters of protected areas - Change in species richness, conversion of green areas to non-green use, breaks in corridors need to be known for their impacts to conservation of biodiversity

Manpower with requisite skill to monitor the forest cover, wetlands, ecosystems and species needs to be trained; skill needs to be developed to be attached to concerned departments.

SDG 13 Take urgent action to combat climate change and its impact

Targets/Indicators	Source	2016-17 Baseline	Physical Targets		Remarks
			2017-20	2017-24	
Target 13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disasters					
13.1a Number of people affected by disaster per 100000 population	Govt. of NCT Delhi	-	-	-	data needs to be generated for international level compression
13.1b Percentage change in forest area coverage	Dept. of Forests, NCT Delhi	-	-	-	data needs to be generated for international level compression
13.1c Per capita change in availability of water	Delhi Jal Board, NCT Delhi	-	-	-	data needs to be generated for international level compression
13.1d Per capita change in water storage	Delhi Jal Board, NCT Delhi	-	-	-	data needs to be generated for international level compression
13.1e Annual CO ₂ emissions (metric tons per capita)	IIT Kanpur, Study 2014	-	-	-	Baseline 2014 data needs to be generated for international level compression
13.1f Greenhouse gases (GHG) emitted by transport sector	IIT Kanpur, Study 2014,	-	-	-	Baseline 2014 data needs to be generated for international level compression

13.1g Greenhouse gases (GHG) emitted by industrial sector	IIT Kanpur, Study 2014	-	-	-	-	Baseline 2014 data needs to be generated for international level compression
Target 13.2 Integrate climate change measures into national policies, strategy and planning						
Refers to National Policy						
Target 13.3 Improve education, awareness rising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning						
13.3a Proportion of population covered by climate change education	-	-	-	-	-	data needs to be generated for international level compression
13.3b Trained person in climate change education (number)	-	-	-	-	-	data needs to be generated for international level compression
Target 13a Implement the commitment undertaking by developed country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 Billion annually by 2020 from all sources.						
Refers to Global Policy and Action						
Target 13b Promote mechanism for raising capacity for effective climate change related planning and management						
Refers to National Policy						

SDG 15: Protect and restore and promote sustainable use of terrestrial ecosystems, sustainably managed forests, combat desertification and halt and reserve land degradation and halt biodiversity degradation						
Targets/Indicators	Source	2016-17	Physical Targets			Remarks
		Baseline	2017-20	2017-24	2017-30	
Target 15.1 Ensure conservation, restoration and sustainable use of territorial and in land fresh water ecosystems and their services in particular forest, wetlands, mountains and dry lands in line with obligation under international agreements						
15.1a Forest area as a proportion of total land area	Forest Department, NCT of Delhi	-	-	-	-	Base line 2011 data needs to be generated for international level compression
15.1b Conservation of lakes and ponds (number)	NCT of Delhi	-	-	-	-	Base line 2009
Target 15.2 Promote the implementation of sustainable management of all types of forests, half deforestation, restore degraded forests and increase afforestation and reforestation						
15.2a Percentage change in forest area coverage	Forest Department, NCT of Delhi	-	-	-	-	Data needs to be generated for international level compression
Target 15.3 Combat desertification, restore degraded land and soil, including land affected by desertification, drought and flood						
15.3a Proportion of degraded land over total land area	I.U.L.U.C Bhuvan, JSRO	-	-	-	-	Base line 2011 data needs to be generated for international level compression
Target 15.4 Ensure the conservation of mountain ecosystems including their biodiversity						
Doesn't apply to Delhi						
Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity, and protect and prevent the extinction of threatened species						
15.5a Proportion of threatened flora (medicinal and aromatic plants)	-	-	-	-	-	Data needs to be generated for international level compression
15.5b: Proportion of threatened fauna (mammals, birds, fishes, etc)	Forest Department, NCT Delhi	-	-	-	-	Data needs to be generated for international level compression
Target 15.6 Ensure fair and equitable sharing of benefits arising from the utilization of genetic resources and promote appropriate access to such resources						
Target 15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wild life products						
Target 15.8 Introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species						
Target 15.9 Integrate ecosystem and biodiversity values into national and local planning, development process, poverty reduction strategies and accounts						

15.9a Plants species under conservation plans (number)	Forest Department, NCT Delhi	-	-	-	Data needs to be generated for international level compression
Target 15a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems					
15b Mobilize significant resources from all sources and at all levels to finance sustainable forest management					
15c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities					