# DELHI

The Earliest reference to Delhi, then known as Indraprastha, was made in the epic Mahabharata. Between the 12th and 19th century AD, Delhi was the capital for many rulers. The present New Delhi was built after the British Empire shifted its capital from Kolkata to Delhi in 1912.

Chronological Order of Development of Delhi: Seven – Seventeen Delhi's

| Order | | Year | Name of the settlement | Founder | Present Probable Site |
|---|---|---|---|---|---|
| I | 1 | 900 BC | Indraprastha | Yuddhistir | Purana Qila |
| | 2 | 1020 AD | Suraj Kund | Anang Pal | Near the road linking Mathura Road and Mehrauli |
| | 3 | 1052 AD | Lal Kot | Prithviraj Chauhan | Near Qutub Minar, Mehrauli |
| | 4 | 1180 AD | Qila Rai Pithora | Prithviraj Chauhan | |
| | 5 | 1288 AD | Kilokheri | Muiz-ud-din Kaiqabad | |
| II | 6 | 1301 AD | Siri | Alauddin Khilji (1295 –1315) | Near Hauz Khas |
| III | 7 | 1321-1323 AD | Tughlaqabad | Ghiyasuddin Tughlaq (1321–1325) | On the link road connecting Mathura Road with Mehrauli near Suraj Kund |
| | 8 | 1325 AD | Adilabad | Mohammad Tughlaq (1325 –1351) | Near Tughlaqabad |
| IV | 9 | 1327 AD | Jahanpanah (World's Refuge) | Mohammad Tughlaq | Between Siri and Raipithora |
| V | 10 | 1354 AD | Ferozabad | Feroz Shah Tughlaq (1351 – 1388) | Near Ferozshah Kotla |
| | 11 | 1415 AD | Khirabad | Khirakhan | (No trace) |
| | 12 | 1425 AD | Mubarakabad | Mubarak Shah | (No trace) |
| VI | 13 | 1530 AD (1533) | Deenpanah and Sher Garh | Humayun (1530, 1538; 1555 – 1556) left incomplete completed by Sher Shah Suri (1538 – 1545) | Purana Qila |
| VII | 14 | 1638 AD | Shahjahanabad (1638 – 1649) | Shahjahan (1628 – 1658) | Old Delhi (Walled City) |
| | 15 | 1912 AD (1911) | Delhi | British Capital | North of Shajahanabad; Old (Civil Lines) Secretariat etc. |
| | 16 | 1931 AD (opened) | New Delhi | British Capital (designed by Lutyens and Baker) | Central Vista, Connaught Place up to Lodi Road |
| | 17 | Aug. 15, 1947 AD | New Delhi | Capital of Free India (designed by TPO, TCPO and DDA) | Delhi Urban Area |

*Source: Delhi Fact Sheet, NCRPB*

Since the creation of New Delhi as the capital of British India, the city has undergone a sea change. The city has spread out in all directions beyond the confines of Lutyens' wide, tree lined avenues, with an exuberance that is characteristically Indian. Between 1941 and 1951, there was a sudden spurt of population growth due to Partition. Today, the main reasons for this growth are increased urbanisation and migration from the other neighbouring States of the country. Between 1981 and 1991, almost 50% of the population growth was contributed by migration. Migration has taken place mainly from

the States in the National Capital Region (NCR) - Uttar Pradesh (49.91%), Haryana (11.82%), and Rajasthan (6.17%) and far off backward states like Bihar (10.99%) (Source: 1991 Census report). The recent projection indicates that the population is likely to reach 195.1 lakh by 2011, cross the 2 crore mark by the end of 2012, and go on to 2.24 crores by 2021 AD. Delhi was made a Union Territory on November 1, 1956. With the 69th constitutional amendment, Delhi got a legislative assembly when the National Capital Territory (NCT) Act was passed in 1991.

The Metropolitan area of Delhi consists of two cities: Old Delhi, which was the capital between the 12th and the 19th centuries; and New Delhi, immediately to the south. Situated on the banks of river Yamuna, the State of Delhi spreads over 1,483 sq. km (148,300 hectares) between the latitudes of 28?24'17'' and 28?52' North and the longitudes of 76?50'24'' and 77?20'37'' East. It's greatest length and width is 51.90 km and 48.48 km respectively. It is 160 km south of the Himalayas at an elevation of 260 m above the Mean Sea Level (MSL).

Delhi occupies a strategic location on the Indian subcontinent. It is situated on the watershed dividing two major river systems – the Ganga draining into the Bay of Bengal and Indus flowing into the Arabian Sea. Thar Desert binds it in the west, Himalayas in the North, Indo-Gangetic plains in the northeast, Gangetic plains in the east and Aravalli hills in the south.

On the basis of the soil types, the area can be classified into four well-defined divisions:

- Khadar / riverine zone / new alluvium: along the river Yamuna; fertile and suitable for crops.
- Bangar / old alluvium: ridge tract near G.T. Road; very fertile.
- Dabar / soils of low-lying area: near Najafgarh area; flooded during monsoon; water logging due to insufficient drainage.
- Kohi / Pahari: near Mehrauli and Tughlaqabad; soil erosion and formation of gullies is a predominant characteristic feature.

The Ridge is actually an extension of the Aravalli hills, which enters Delhi from the south and extends straight to the Yamuna in a northeasterly direction. Encircling the city on the northwest and west, the Ridge appears like the rampart of a fort provided by nature to defend the "Heart of India". A branch of the Ridge separates itself from the main trunk near Bhatti and extends in a northeasterly direction up to Anangpur, where it turns to the northwest till it joins the main Ridge again. Numerous storm water drains traverse the Ridge. There are no permanent water bodies, though a few artificial ones have been made of late. It achieves the maximum elevation of 316 m near Bhatti. The Ridge consists of 6% of the total land area of Delhi. Due to insufficient water availability and the rocky nature of the terrain, the vegetative cover is poor and mostly of thorny shrubs.

The Ridge area is approximately 7776 hectares (ha) with the following four divisions:

- Northern/Old Delhi Ridge: about 87 ha; Delhi University in the north, Kamala Nagar in the south, Rajpur Road in the east and Malka Ganj in the west.

- Central / New Delhi Ridge: about 864 ha; Link road in the north, Dhaulakuan in south, Mandir Marg in the east and Naraina Industrial Area in the west.
- South Central Ridge: about 625 ha; Mehrauli Institutional area in north, Mahipalpur in the south, Aurobindo Marg in the east and Jawaharlal Nehru University in the west.
- Southern Ridge: about 6,200 ha; substantial tree covers in Sanjay Vana and Kishangarh forest and Jahanpath city forest. The remaining part of this Ridge is mostly the Asola-Bhatti WildLife Sanctuary.

The climate of Delhi is generally influenced by its remote inland location, the major contributing factor being the Delhi Ridge and river Yamuna. Owing to its geographical location, it has a unique semi-arid climate with extreme summers and winters and moderate rainfall. Delhi experiences mainly four seasons. The hot summer begins by early March and lasts till the end of June. It is followed by the monsoons, which continue until the end of September. The months of October and November mark the transition period between the monsoon and winter. By late November, the winter sets in, again giving way to summer in March.

Relative humidity is highest in July–August and minimum in April–May (32-34%); dust storms are common in pre-monsoon due to westerly winds from Rajasthan desert.

Temperature is extremely hot in summer with temperatures going up to 46-47 degrees Celsius during the day and 26-28 degrees Celsius in the night (June); summer period is end of March to end of July / beginning of August; winter season lasts 3-4 months from December to February with temperature variation from 3-4 degrees Celsius during the night and 20-22 degrees during the day.

Monsoon lasts about three months (July to September) and is caused by the penetration of cool oceanic air from the Bay of Bengal; average annual rainfall is 725 mm; average number of rainy days – 40; lean period is high. Thunderstorms, squalls and dust storms are also occasionally witnessed in Delhi during the summer.

## MAJOR ENVIRONMENTAL CONCERNS

From the various reports available on the city, it is evident that the distribution and use of resources and infrastructure is determined by social and spatial disparity. Only a handful of the population in the city is enjoying a large part of the common resources. The responsibility for the degradation of the resources also, therefore, lies at the door of this elite population rather than the onus being placed on the poor – as is currently being done by both the executive as well as the judiciary. The government deliberately favours the powerful and condones their unsustainable lifestyle, while continually prosecuting and harassing the weak. Whether it is housing, water, sewage, air, transport, or green areas – everywhere the inequity has led to unsustainable use of the natural resources. In the past this depletion was not evident because the total pressure from human activities was low and the capacity of nature to accommodate the impacts was correspondingly high.

However, ever since the coming of the industrial revolution and the growth of the town into a metropolis, the carrying capacity of the environment to mitigate the impact of such growth has been steadily depleted. The negative effects of this depletion are on every individual irrespective of his or her economic and social status. At the same time, some people are affected much more severely than others because of inequality in access to resources.

## Water

Poor availability of water in the city is not because of the increased load of population, but mostly due to lack of integrated planning, unequal distribution, and poor management of water resources. The present water distribution criteria are not based on the actual need of the residents. The city receives water from the following resources:

**Various Sources of water in Delhi**

| Source | Total Qty. (MGD) | Total Qty. (MLD) |
|---|---|---|
| Yamuna | 210 | 950 |
| Bhakra storage | 200 | 905 |
| Ganga | 100 | 450 |
| Surface water sub-total | 510 | 2305 |
| Ranney wells / tubewells | 81 | 365 |
| Total raw water (excluding ground water | 591 | 2670 |

*Source: DJB report*

Now the actual demand of water calculated by different government organisation is as follows:

Calculation of total demand based on different norms (MLD)

| **Demand as per CPHEEO and MUD norm** | **Demand as per Delhi Jal Board norm** | **Demand as per Delhi Jal Board norm in a pre-feasibility study** |
|---|---|---|
| 2170 | 2600 | 2030 |

*Source: The Status Report of Delhi 21*

The above figure clearly depicts the present available resources of fresh water to meet the various demands of the city is sufficient. So, the question is why the people of Delhi are suffering so much? The following table has the answer:

**Unequal water distribution in the city (lpcd)**

| | | | |
|---|---|---|---|
| Mehrauli | 29 | Narela | 31 |
| Najafgarh / Dwarka | 74 | Shahdara | 130 |
| New / South Delhi | 148 | Paharganj | 201 |
| West Delhi | 202 | Civil lines & Rohini | 274 |
| City | 277 | Karolbagh | 337 |
| NDMC | 462 | Cantonment | 509 |

*Source: NCRPB*

The residents of unauthorised colonies, resettlement colonies and slum clusters (who constitute 70 percent of the city's population) are the main sufferers due to irregular water supply. The paucity of water in the city is an artificial one created by unequal distribution consumption by a few prompted by the government directly.

**Rapid urbanisation**: In Delhi, land environment is under stress due to the pressures of rapid urbanisation. Population growth and in-migrated poor people, industrial growth, inefficient and inadequate traffic corridors, poor environmental infrastructure, etc. are the main factors that have deteriorated the quality of the city resources in the land. Delhi's urban area has grown from 182 sq. km (1970) to more than 750 sq. km. in 1999. Thus urban sprawl is mainly occurring at the expense of productive agricultural land. Further, increased land price due to pressures of urbanisation made agriculture less profitable and the cultivable land is kept unused prior to merging it with the urban zones.

**Air Environment**: Delhi faces air pollution problems due to three major sources: transport, domestic, and industrial sectors. The maximum contribution is from vehicles (72%), which is growing rapidly. The common major pollutant emitted from all these sources being dust, the SPM (Suspended Particulate Matter) levels were observed to be much beyond the permissible levels at all the monitoring stations. The major gaseous pollutants from all the three major sources include $SO_2$ (Sulphur Dioxide), $NO_2$ (Nitrogen Dioxide), and CO (Carbon Monoxide). Urban transport and industrial emissions are the major factors for high build-up of air pollution in Delhi.

**Forest and green cover**: With rapid urbanisation, Delhi has progressively lost its green cover. It has merely 88 sq. km. of forest cover in the total geographical area of 1483 sq. km, representing only 5.93% of the total area. The natural ridge forests, which served as the 'lungs' of Delhi, have dwindled considerably in some pockets mainly due to human interventions. The degradation of the ridge area started way back in 1920, and has continued until recently due to various encroachments for constructing buildings, roads, settlements, parks, garbage dumping, apart from extraction of fuel and fodder and grazing by livestock. Mining and quarrying activities, especially in the South-Central ridge, have also resulted in shrinking of ridge areas, causing enormous loss to its green cover.

**Sewage, Waste and Land filling**: It is a commonly propagated view that slums are the main contributors to the city's water pollution. But going by logic, the less the water used, the less will be the quantity of sewage generated. Hence, it can be demonstrated

that the sub-standard settlements produce the least amount of pollution, as they are not having access to sufficient water.

70 percent of the city is presently denied sewerage facilities. Different studies show that, out of 44 resettlement colonies, sewer line exists only in 19 colonies. Of these 19, only 10 are having sewer lines, which release their effluents into the river. Similarly, only 69 urban villages out of 108 under MCD jurisdiction have sewerage facilities. There are 600 unauthorised/non-regularised colonies and about 800 jhuggi clusters which, as per official policy, will not be provided sewerage facilities. Out of 553 regularised colonies, only 250 are provided with sewerage facilities. Presently there are 19 major drains that are discharging wastewater into the river Yamuna. Thus, it is clear that the majority of the pollution load coming from the domestic sector into the river is mainly because of the affluent colonies.

The present municipal waste generation in Delhi is 7000 tpd (tonnes per day) and the expected range of the waste quantity generated by 2021 is 17,000-25,000 tpd. Presently there is a huge gap that exists between the waste generation and collection. With the present handling capacity, the current gap of 44 percent in 2001, would increase to 59 percent in 2011 and 64 percent in 2021 AD. The above figures reflect that a big portion of this waste remains neglected.

Incineration being 10 times more expensive than landfill disposal, the least-cost choice will continue to be landfill. But existing landfill sites are not constructed in a scientific manner resulting in leachates. There are no provisions for gas and leachate collection and treatment. As a consequence of the gaps in disposal and inefficient land filling, the land and ground water gets degraded.

The most critical hazardous waste generated in Delhi is from small-scale industries such as pickling units, electroplating units, anodising units, and sludge from CETPs (Common Effluent Treatment Plant). Waste from certain other type of units such as dyeing and vehicle service stations invariably finds its way to municipal solid waste. The current estimated quantity of infectious biomedical waste in Delhi is 20-25 tonnes per year, most of which finds its way into municipal waste dumps in the absence of any dedicated disposal facility. In addition, informal practice of ragpicking and recycling of various hospital wastes poses a potential health hazard to ragpickers as well as to the general population who use such recycled waste items. Besides, most healthcare facilities use various hazardous chemicals in processes such as disinfection, radiotherapy, and X-ray film processing. The wastes generated from such activities are invariably discharged into sewer drains.

**Social and Environmental Health**: Population growth of Delhi is synonymous with the growth in the number of urban poor. The three most important factors responsible for environmental health is water, air and solid/hazardous waste. Therefore, the city faces a serious burden of disease – sickness from water and vector born diseases. Rising incidence of respiratory infections, heart problems, and occupational diseases due to

exposure to ambient and indoor pollutants and inappropriate disposal practices of municipal solid waste (containing toxic substances due to mixing of biomedical and industrial hazards waste with it) also imperil public health, particularly that of the urban poor.

**Green House Gas**

Delhi being the capital of India and a major commercial centre has a high density of human population and commercial activity as compared other metros of the world. If the emissions from three majors sectors, namely transport, residential and power sectors for Delhi are taken into account, the release of $CO_2$ is 15.9 million tonnes. These emissions can rise to 32.6 million tonnes if the present state of development continues without any major emission mitigation efforts in 2021.

Environmental Justice is the fair treatment and meaningful participation of all people irrespective of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socio-economic group should bear a disproportionate share of the negative environmental aftermath resulting from industrial, municipal, and commercial functioning or the implementation of programs and policies. It is a concept that has to be included in any strategy for conservation and preservation. But the practice of environmental justice is absent everywhere in our city.