# Water Problems and Challenges – Delhi NCR

*Supply, Quality, and Management Issues with Solutions*

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# DELHI


NORTH WEST DELHI
CENTH DELHI
NORTH DELHI
CENTRAL DELHI
EAW DELHI
NORTH WEST DELHI
CENTRAL DELHI
NORTH DELHI
SHAHDARA
NOUTH DELHI
WEST DELHI
EAST DELHI
SHAHDARA
SOUTH DELHI
NEW DELHI
DELHA
SOUTH WEST DELHI
UTTER PRADESH
YAMANA
SOUTH DELHI
Yamuna River
UTTER PRADESH
RANDENA

# INTRODUCTION

- Water as a critical life-support system
- Delhi NCR’s dual crisis: scarcity + contamination
- Impact of urbanization, industrial waste, and population growth

# STUDY AREA

- Location: 28°12′N–28°53′N, 76° 50′E–77°23′E
- Area: 1483 sq. km
- Population density: 36,155/sq.km
- 6343 slums, ~1 million households

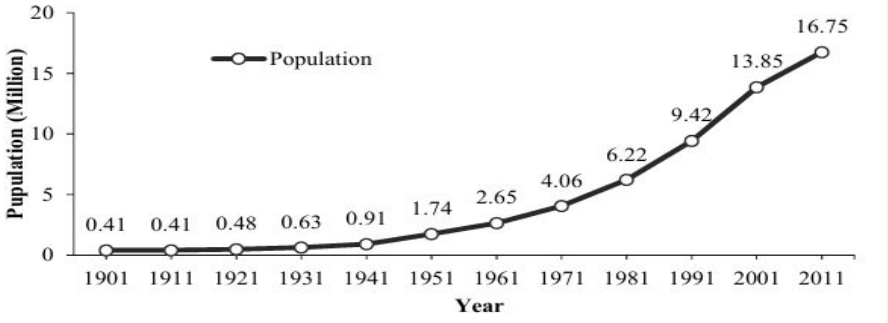



**Fig. 2** Population Growth of Delhi from 1901 to 2011 (Compiled from District Census Handbook-Delhi, 2011 and Prepared by Author)

# POPULATION INCREASE

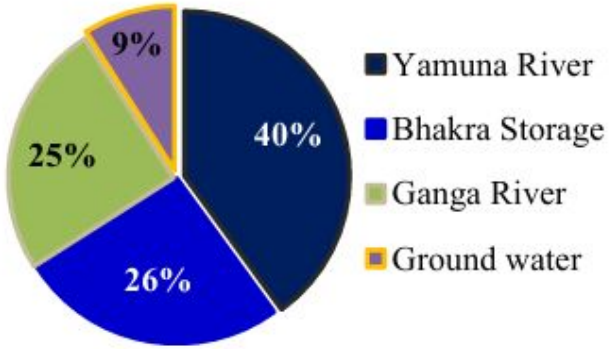
Population growth from 1901–2011 (graph)

# Character Name

Delhi Jal Board: 50 gallons per capita/day.
Increasing demand due to migration from neighboring states

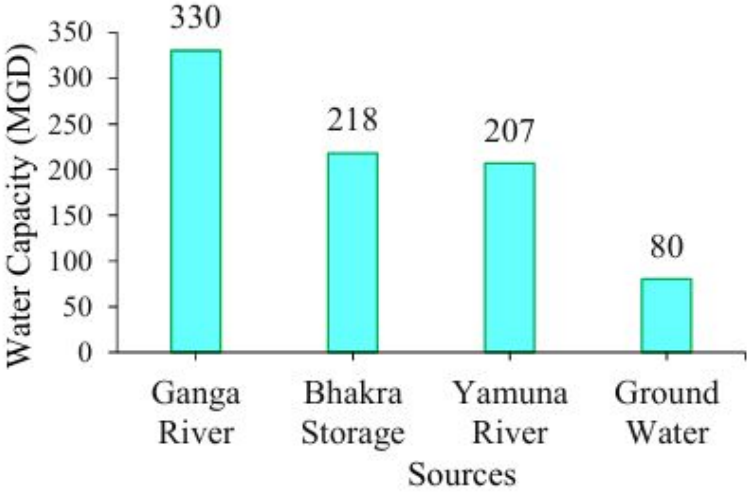
# SOURCES OF WATER

- Yamuna River (40%), Bhakra (26%), Ganga (25%), Groundwater (9%)
- Capacity growth: 650 MGD (2002) → 1016 MGD (2016)




Source: District Census Handbook, 2011 and Prepared by Author

**Fig. 3** Sources of Raw Water Supply to Delhi




Source: District Census Handbook, 2011 and Prepared by Author

# SOURCES OF DRINKING WATER SUPPLY

**Table 1** Sources of Drinking Water Supply in Delhi

| S.N. | Source of Drinking Water | Total Households (%) | Slum Households (%) |
|---|---|---|---|
| 1. | Piped water supply | 81.3 | 84.3 |
| | I. From treated source | 75.2 | 73.3 |
| | II. From untreated source | 6.1 | 11.0 |
| 2. | Covered well | 0.1 | 0.1 |
| 3. | Hand pump | 5.3 | 5.4 |
| 4. | Tube well | 8.4 | 6.1 |
| 5. | Tank, pond, lake | 1.2 | 1.4 |
| 6. | Other sources | 3.7 | 2.7 |
| | Availability | | |
| 1. | Within the premises | 78.4 | 50.9 |
| 2. | Near the premises | 15.4 | 39.6 |
| 3. | Away | 6.2 | 9.5 |

**Source** District Census Handbook, 2011 (Prepared by Author)

# Water Quality & Management Issues

- Contamination from sewage, industrial waste, and storm runoff
- 80% of diseases linked to water contamination

# WATER PURIFICATION

- TRADITIONAL METHOD:

1. FILTRATION
2. BEDS
3. BOILING AND USE OF ALUM

- MODERN METHODS:

1. STORAGE
2. FILTRATION AND DISINFECTION
3. CHLORINATION
4. PURIFICATION ON SMALL SCALE

# DATASET ON YAMUNA RIVER

- **Source:** CPCB water quality monitoring data (2012, 2014, 2019).
- **Scope:** Multiple monitoring stations across Yamuna.
- **Parameters Recorded:**
  - **Physical**: Temperature, pH, Conductivity
  - **Chemical**: Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Nitrate
  - **Biological**: Faecal Coliform, Total Coliform, Faecal Streptococci

**Key Insight:**

- Yamuna contributes ~40% of Delhi's water supply, but quality is severely degraded.
- BOD & Coliform values exceed permissible limits at most monitoring points.

## 🔴 Pollution Contributors

1. **Domestic Sewage** – untreated discharge from Delhi & towns along Yamuna.
2. **Industrial Effluents** – chemicals, dyes, heavy metals from factories.
3. **Agricultural Runoff** – fertilizers & pesticides entering river.
4. **Solid Waste & Urban Runoff** – plastics, oils, stormwater waste.

## ⚠️ Indicators from Dataset

- **Low DO** (below 5 mg/L) → insufficient oxygen, aquatic life at risk.
- **High BOD** (> 3 mg/L) → organic pollution load.
- **High Coliform counts** → direct evidence of sewage & health risk.
- **Elevated Conductivity & Nitrates** → chemical contamination.

# DATA ANALYSIS

https://drive.google.com/file/d/1Df91CWnxtYKOjyoZYNt2AdkHA_rQ3uAE/view?usp=sharing

# Thank You