

## CHAPTER 13

# WATER SUPPLY AND SEWERAGE

Access to safe, adequate and affordable potable drinking water, accessible and hygienic sanitation is the basic public services required to be ensured by the Government for its citizen for a healthy life. Government has been consistently trying to ensure 24X7 clean water supply to all households, treatment of both waste water and solid waste to a high proportion of the volume generated, treatment of all industrial effluents. One of the important Sustainable Goal under SDG-6 is “Availability and sustainable management of water and sanitation for all”.

2. The Delhi Government ensured free lifeline water of up to 20 kilolitres to every household having metered water connection and around 6 lakhs consumers have benefitted under this scheme since its inception. Recently Government has started implementing the scheme for a limited period for providing regular sewer connection free of cost to keep the city and Yamuna clean by motivating unwilling residents in unauthorised colonies to connect their houses to the sewer lines. By exempting development charges required for taking sewer connection, more and more households are now being motivated to take sewer connection.
3. Priority areas of GNCTD in water and sanitation sector is to augment water supply from sources outside Delhi such as: Renuka Dam in Himachal Pradesh, and Kishau Dam and Lakhwar-Vyasi Dam in Uttarakhand getting underground-water from Yamuna flood plains by way of recharging the ponds, augmenting internal sources including through recycling of water, water harvesting, plugging leakages of water, reducing non-revenue water through proper water accounting, installation of bulk meters etc. In a remarkable achievement, GNCTD has been able to provide the regular water supply to the un-served and under-served areas and has covered 1565 unauthorized colonies, which is about 87% of total un-authorised colonies in Delhi and very soon, the remaining un-authorised colonies will also be covered.
4. There are still many issues in Water and Sanitation sector that needs focused attention: depleting groundwater level due to excessive exploitation, a high concentration of fluoride and salinity at some places, distribution losses in water supply estimated at about 40 percent (Non-Revenue Water), wider implementation of rain water harvesting etc. Inadequate sewage treatment capacity; uneven flow of sewage waste to pumping stations; non-availability of land for constructing new infrastructure; inter-mixing of sewerage pipes with storm-water drains etc.

5. Delhi depends on neighboring states to meet around 50 per cent of drinking water demand of its residents. The city being located in a semi-arid zone depends to a great extent on raw waters from the Ganga basin, Yamuna sub-basin, Indus-basin, in addition to its own internal aquifers and its groundwater resources. The water is then treated before distribution. Next, both liquid and solid wastes are generated in large volumes. All liquid as well as solid wastes are expected to be treated and then disposed or recycled. Delhi treats and also recycles both forms of wastes though in limited capacities, and part of the flows to other states. Growth of the city beyond reasonable limits imposes unbearable strain for provisioning of two most basic services: water and sanitation.
6. DJB had managed to improve upon its working and monitoring vis-a-vis water and sewage management. It had an increased revenue collection despite poor economics as the positive outcomes of good governance. DJB has launched “Seva App” for bill generation, online payments and the resolution of inflated bills to deliver efficient and transparent services and to instill more confidence in the citizens of Delhi. Factors attributable to the increased DJB’s revenue: are Price of the non-free water was increased by 10%, increase in the number of connections/meters, One-time window was offered to people to clear of their previous dues, several water leakages were fixed. There were several other revenue-generating measures such as ads on water tankers, renting out property and tap solar power, Innovations/ new schemes like water ATMs, “toilet to tap” and GPS-tracking of DJB water tankers.
7. About 83.42% households of Delhi now have access to piped water supply. Water production during summer season is being maintained at 921 MGD consistently. Water is supplied to about 18 million population of Delhi through existing water supply network comprising of 14697 km long pipelines and more than 110 underground reservoirs (UGRs). Besides, a total of 407 new water tankers with stainless steel containers fitted with GPS have been engaged in improving the water tanker supply delivery system in the city. Apart from approx 450 M.S hired tankers, 250 newly purchased SS tankers are being added to the existing fleet to supplement water supply in water deficit areas.

## 8. Water Requirement

- 8.1 Based on the norm of 60 Gallon Per Capita per Day (GPCD) the total requirement of water for NCT of Delhi in March 2021 would 1380 MGD for the projected population of 23 millions. The per capita water requirement norms for various usages are presented in Statement 13.1.

### Statement 13.1

#### DETAILS OF WATER REQUIREMENT NORMS - DJB

S.No.	Details	Requirement of Water
1	Domestic	172 LPCD
2	Industrial, Commercial and Community requirement based on 45000 liters per hectare per day	47 LPCD
3	Fire protection based on 1% of the total demand	3 LPCD
4	Floating population and special uses like Hotels and Embassies	52 LPCD
	<b>Total</b>	<b>274 LPCD (60 GPCD)</b>

Source: - Delhi Jal Board

8.2 Master Plan of Delhi - 2021 prepared by Delhi Development Authority proposed water requirement with the norm of 80 Gallon Per Capita Per Day (GPCD), out of which 50 GPCD is for domestic requirement and 30 GPCD for non-domestic purposes. The domestic water requirement of 50 GPCD comprises of 30 GPCD for potable needs and 20 GPCD for non-potable water.

8.3 The estimated demand of water in Delhi based on the norms of 60 GPCD by 2019 would be around 1260 MGD to meet the requirement of population of about 210 lakhs.

## 9. Water Supply Capacity

### Statement 13.2

#### INSTALLED CAPACITY OF WATER TREATMENT PLANTS: 2009-2019

(As on 31<sup>st</sup> March 2019)

SN	Name of Plants	Capacity (MGD)										
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Chandrawal Water House I & II	90	90	90	90	90	90	90	90	90	90	90
2	Wazirabad I,II & III	120	120	120	120	120	120	120	120	120	120	120
3	Haiderpur	200	200	200	200	200	200	200	200	200	200	200
4	North Shahdara (Bhagirathi)	100	100	100	100	100	100	100	100	100	100	100
5	Bawana	20	20	20	20	20	20	20	20	20	20	20
6	Nangloi	40	40	40	40	40	40	40	40	40	40	40
7	Sonia Vihar	140	140	140	140	140	140	140	140	140	140	140
8	Ranney Wells & Tube Wells	100	100	100	100	80	80	80	80	80	80	85

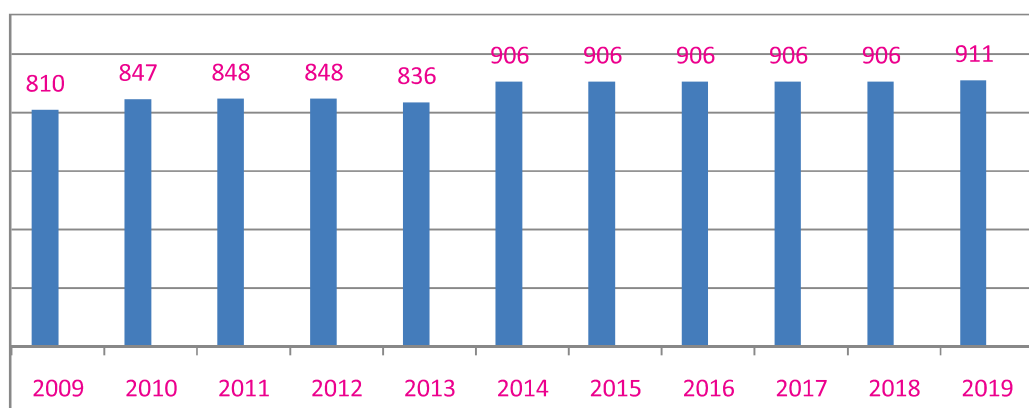
SN	Name of Plants	Capacity (MGD)										
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
9	Recycling of Water at Bhagirathi, Haiderpur & Wazirabad	--	37	37	37	45	45	45	45	45	45	45
10	Commonwealth Games Village	--	--	1	1	1	1	1	1	1	1	1
11	Okhla	--	--	--	--	--	20	20	20	20	20	20
12	Dwarka	--	--	--	--	--	50	50	50	50	50	50
	<b>Total</b>	<b>810</b>	<b>847</b>	<b>848</b>	<b>848</b>	<b>836</b>	<b>906</b>	<b>906</b>	<b>906</b>	<b>906</b>	<b>906</b>	<b>911</b>

Source: - Delhi Jal Board

- 9.1 The installed treatment capacity of Water in Delhi during 2009-19 is depicted in Chart 13.1. The installed capacity of DJB has been augmented by 12% during last 10 years. The capacity, which was 810 MGD in 2009, has been increased to 911 in 2019.

**Chart 13.1**

**INSTALLED TREATMENT CAPACITY OF WATER TREATMENT PLANTS  
DELHI- 2009-2019**



- 9.2 Two new Water Treatment Plants constructed at Dwarka (50 MGD) and Okhla (20 MGD). Raw water for these two plants has been made available with the commissioning of the pucca parallel channel from Munak to Haiderpur. Further Bawana Water Treatment Plant (20 MGD) has been constructed and is commissioned.

## 10. Water Consumption

- 10.1 Water supplied and billed to various categories of consumers by Delhi Jal Board during 2017-18 and 2018-19 is presented in Statement 13.3.

### Statement 13.3

#### CATEGORY-WISE WATER CONNECTIONS, SALES AND % OF SALES

SN	Category	Connections (in lakh)		Sales (MGD)		% of Sales	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
1.	Domestic (Active)	21.62	22.68	386.29	450.97	91.72	93.50
2.	Commercial & Institutional (Active)	0.80	0.80				
3	Supply to NDMC & MES (Active)	02+02=04 (Bulk Connection)	02+02=04 (Bulk Connection)	34.88	31.35	8.28	6.50
	<b>Total</b>	<b>22.45</b>	<b>23.48</b>	<b>421.17</b>	<b>482.32</b>	<b>100.00</b>	<b>100.00</b>

Source: - Delhi Jal Board

### 11. Sources of Water Supply

The water supply treatment plants of Delhi Jal Board treated 851 MGD surface water and 86 MGD ground water as on March, 2019. The water resources of Delhi Jal Board are indicated in Statement 13.4

### Statement 13.4

#### WATER RESOURCES OF DELHI JAL BOARD

(as on March 2019)

S. No	Resources	Quantity (MGD)
1	Yamuna River	380
2	Ganga River	250
3	Bhakra Storage	221
4	Ground Water/Ranney well/ Tube well	86
	<b>Total</b>	<b>937</b>

Source: - Delhi Jal Board

### 12. Ground Water

- 12.1 There are more than 5000 Under Ground sources i.e. Tube-Wells and Ranney - Wells being operated by DJB with setup to examine/analysis water samples in each DJB Tube wells. It is observed that the Ground Water quality is deteriorating every year due to over extraction as compared to natural recharge. During routine survey, Excess Conductivity has been found across the Delhi, while Nitrate has been found in excess in South and South West Delhi. Besides the action of Central Ground Water Commission, DJB has also started necessary measure to improve the Ground Water quality by sealing of illegal bore wells and rejuvenation of Water Bodies in Delhi under

the direction of Monitoring Committee constituted by Hon'ble NGT. In case Ground Water quality of any tube wells is found abnormal, the source is either stopped or used for other than drinking purpose.

- 12.2 Apart from In-house testing, Delhi Jal Board, further confirmed water quality through 3<sup>rd</sup> party agency i.e. NEERI (National Environmental Engineering Research Institute) Ministry of Science & Technology, Govt. of India annually and take further action accordingly to maintain water quality at every stage as per norms.
- 12.3 Delhi Jal Board has 4150 functional Tube Wells and 09 Ranney Wells. The Flood plains downstream of Wazirabad and the area adjacent to Najafgarh Lake are being explored for extraction of water on sustainable basis. Pre-feasibility studies for ground water recharge through the abandoned Bhatti Mines and Canal system in the North Western region of Delhi have also been taken.
- 12.4 Delhi Jal Board, in consultation with Govt. of NCT of Delhi has prepared an Action Plan for rejuvenation of 155 numbers of Water Bodies and creation of water bodies to improve ground water resources. The work of creation of water body at Timarpur oxidation pond, Dwarka, Pappankala, Rohini, Nilothi, revival of Satpula Lake and creation of lake at the abandoned land of Ash ponds owned by M/s Indraprastha Gas Power Ltd is being taken up.
- 12.5 The scheme amounting to ₹ 376.79 Cr for revival of 155 water bodies has been approved by DJB. M/s CSIR-NEERI has been entrusted the work of 83 water bodies. IIT Delhi was awarded the work of rejuvenation of 72 water bodies in Dec. 2018. Work is being taken up in phased manner. Rejuvenation of 16 water bodies has been taken up and the rejuvenation of all the 155 water bodies are likely to be completed by Dec. 2020.

### **13. Parallel Channel from Munak to Haiderpur**

About 30-50 per cent of the raw water discharged from Tajewala Head works got lost through seepage during transit in the present water carrier system comprising of Western Yamuna Canal system and River Yamuna. To minimize the en-route losses, a parallel pucca channel has been constructed from Munak to Haiderpur by the Haryana Govt as a deposit work on behalf of Govt of Delhi. Commissioning of CLC has resulted in increased availability of water of Delhi within the existing releases at Munak and WTP at Dwarka (50 MGD) and Bawana (20 MGD) & Okhla (20 MGD) have been commissioned.

**13.1 Reservoirs** Renukaji, Kishau and Lakhwar Vyasi Dam Projects are proposed to be constructed on the River Yamuna and its tributaries. These upstream Projects have been declared as National Projects. The interim seasonal allocation of Yamuna water to each state as per the MOU of 12<sup>th</sup> May 1994 is presented in Statement No. 13.5. On completion of the upstream storages, seasonal allocation of Yamuna Water will be revised by the Upper Yamuna Board and Delhi will get its share in Yamuna water from these storages as per the MOU of 12th May 1994 and interstate agreements on these National Projects.

13.2 The interstate agreements on Renukaji and Lakhwar Dams have been signed on 28.08.2018 and 11.01.2019 respectively. Delhi has already conveyed its consent on the interstate agreement for the Kishau Dam Project vide letters dated 24.10.2017 and 21.06.2018 from the Hon'ble Chief Minister, Delhi. A work has been awarded on 07.06.2019 to National Institute of Hydrology, Roorkee for carrying out, Water Availability Study at Hathnikund Barrage Pre & Post Construction of three storage projects viz Lakhwar, Kishau & Renukaji in Upper Yamuna Basin.

### Statement 13.5

#### APPROVED INTERIM ALLOCATION OF WATER FROM YAMUNA RIVER TO STATES

SN	States	Allocation (BCM)			Annual Allocation (BCM)
		July to Oct.	Nov. to Feb	March to June	
1	Haryana	4.107	0.686	0.937	5.730
2	Uttar Pradesh	3.216	0.343	0.473	4.032
3	Rajasthan	0.963	0.070	0.086	1.119
4	Himachal Pradesh	0.190	0.108	0.080	0.378
5	Delhi	<b>0.580</b>	<b>0.068</b>	<b>0.076</b>	<b>0.724</b>

Source: - MOU of 12th May, 1994

Note: - BCM Billion Cubic Meter.

### 13.3 Renukaji Dam Project:

- The project is being implemented by Himachal Pradesh Power Corporation Limited (HPPCL). The Project envisages construction of 148 m high rock fill Dam across River Giri (a tributary of the river Yamuna) at Dadahu in Sirmour district of Himachal Pradesh and a Powerhouse at toe of the Dam to generate 40 MW of power. The project will provide 49800 hectare metre (0.498 BCM) of live storage of water in its reservoir.
- The interstate agreement on the project include that;

- *Govt. of NCT of Delhi has agreed to bear 90% of the cost of power component for the project.*
- *In respect of hydro power, if Himachal Pradesh desires, Power generated and cost thereof can be shared with other beneficiary State (s) through mutual/ multilateral agreement to be entered separately.*
- *Additional water available due to construction of storage as result of implementation of Renukaji Dam Project, shall be regulated by UYRB (Upper Yamuna River Board). The additional water available due to construction of this dam will be made available to Delhi on priority to meet the drinking water needs of Delhi as worked out by UYRB. The arrangement will be only until other storages viz. Lakhwar and Kishau MPPs (Multi Purpose Projects) in upper Yamuna catchment are created at which stage releases from Renukaji Dam shall be carried out keeping in view the overall annual allocation of Yamuna water as per MoU dated 12.05.1994 between the States. Interim seasonal allocations given in the said MoU shall be modified accordingly by UYRB and put up to Upper Yamuna Review Committee (UYRC) for approval.*
- Revised cost estimate of Renukaji Dam Project on October, 2018 Price Level has been approved by the Central Water Commission (CWC) for ₹ 6946.99 crores on 20.02.2019.
- The revised Environment Clearance has been accorded by Ministry of Environment & Forest (MoEF), GOI on 15.01.2019.
- HPPCL has submitted the Investment Clearance proposal to CWC vide letter dated 29.09.2018 and the same is with the Ministry of Water Resources for approvals. Submitted proposal is to be updated as per the latest cost.
- The project was put up for consideration of Advisory Committee on Irrigation, Flood Control and Multipurpose Projects, in its 132<sup>nd</sup> meeting held on 06.03.2017. The committee accepted the proposal with certain conditions that include submission of final Forest Clearance (Stage-II) for the project for diversion of 909.00 hectare of forest land. It has been decided that necessary funds to be deposited in CAMPA account for Stage-II Forest Clearance shall be made by GOI after obtaining approval from the cabinet once TAC and Investment Clearance of the Project is accorded.
- UYRB had conveyed Delhi's proportionate share of seed money/cost of ₹ 26.13 crores. Delhi had already paid ₹ 214.84 crores to HPPCL/Himachal Government.



#### 13.4 Lakhwar Dam

- The project is being implemented by M/S Uttarakhand Jal Vidyut Nigam Limited and is to be constructed on river Yamuna in Dehradun district of Uttarakhand. The project envisages drinking/industrial water benefits of 78.83 MCM.
- The interstate agreement on the project include that Storage created as a result of implementation of Lakhwar Project, shall be shared by the basin States in proportion to their overall annual allocations given in the MoU dated 12.05.1994. Interim seasonal allocations given in the said MoU shall be modified accordingly by Upper Yamuna River Board (UYRB) and put up to Upper Yamuna Review Committee (UYRC) for approval.
- Delhi has contributed 50 percent of its contribution i.e. ₹ 7.79 crores on 26.03.2018, out of Delhi's proportionate share on seed money of ₹ 15.58 crores.
- The major works of the projects were commenced in 1987 and progressed up to 1992. Till 1992 substantial construction work had been completed for Dam stripping, diversion tunnel, underground power house structure, adit to control room and adit to erection bay, tail race tunnel etc.
- Revised estimated cost of ₹ 5747.17 crores @ Price Level of July 2018 has been accepted by Advisory Committee in its 141<sup>st</sup> meeting held on 11.02.2019 and conveyed vide letter MOM through letter no. 16/27/2012-PA(N)/583-611 dated 18.02.2019.
- Approval from Cabinet Committee of Economic Affairs for Financial Assistance is awaited.
- Principal Bench of the Hon'ble National Green Tribunal, New Delhi vide its Order dated 10.01.2019 in the matter of O.A. No. 431 of 2015 directed that Environment Assessment Committee (EAC) to appraise the project afresh in terms of EIA notification 2006 and impose additional general and specific conditions as may be considered necessary. EAC was free to call for any reports which it may consider necessary. EAC was further directed to complete the appraisal by 15.04.2019. It was also directed that till the project is reappraised, status quo shall be maintained. UJVNL Requested NGT vide Misc application no. 155/2019 for vacating its status quo order dated 10.01.2019, but NGT in its order dated 20.05.2019 stated that status quo order is only up to the completion of appraisal by EAC and therefore, there is no good reason to modify their earlier order.

- In compliance to 21<sup>st</sup> & 23<sup>rd</sup> EAC minutes dated 28.01.2019 and 23.04.2019, Order for collection of pre-monsoon & Monsoon season's baseline data as per EIA Notification, 2006, UJVNL has placed it on 21.06.2019, and the work is in progress.
- Regarding "Carrying out water availability study at Hathnikund Barrage Pre & Post Construction of three storage projects viz Lakhwar MPP 300 MW, Kishau MPP MW & Renuka MPP in Upper Yamuna Basin", work has been awarded on 07.06.2019 to National Institute of Hydrology, Roorkee.

### **13.5 Kishau Dam:**

- Kishau Dam Project is a storage scheme on river Tons (a tributary of the river Yamuna) in Dehradun district of Uttarakhand & Sirmour district of Himachal Pradesh. This will provide 1324 MCM of assessed live storage of water to irrigate 97076 hectare land and 617 MCM water for drinking and Industrial use.
- Project cost was ₹ 7193 crores at June 2010 Price Level. Central Water Commission has revised the Project cost to ₹ 11550 crores at March 2018 Price Level.
- MOU has been signed on 20.06.2015 between Government of Himachal Pradesh and Government of Uttarakhand for implementing the project through a Joint Venture.
- Kishau Corporation Limited was incorporated on dated 16.01.2017 as mandated in MOU dated 20.06.2015.
- The earlier DPR of the Kishau Dam Project needs to be updated in the current scenario. To updated DPR, site survey, some detailed studies and geotechnical investigation will be required for which Terms of Reference will be essentially required from Ministry of Environment, Forest & Climate Change, GOI. The project proponents are taking up the matter on updation of DPR and field activities.
- Delhi has paid ₹ 8.1 crores in March 2018, out of its proportionate share of seed money of ₹ 16.2 crores.

- 13.6** Rehabilitation & Resettlement clearance obtained from Ministry of Tribal Affairs. Environment clearance has been accorded by MOEF in October, 2009, 1<sup>st</sup> stage Forest Clearance accordance awaited. NOC/Consent from NCT of Delhi & Rajasthan has been received.

**13.7** Chairman UYRB stated that Central Assistance could be provided only after the investment clearance and approval of Cabinet. Meanwhile, he urged the beneficiary States to deposit the seed money for the execution of the project.

#### **14. Water Accounting and Auditing**

14.1 As per JICA report of 2011, assessed NRW was 64.80% in year 2010-11 and JICA had proposed to subdivide entire DJB network into a total 1010 DMAs (of size 1500-2000 connections) to improve the system & reduce NRW. DJB is now moving ahead in implementing the DMAs works in entire DJB network comprising of 1010 DMAs as per JICA report. Status of same is as under:

- Improvement works including creations of DMAs & reduction of NRW are in progress in 3 PPP areas of Malviya Nagar, Nagloi and Mehrauli/Vasant Vihar areas comprising 82 DMAs as per JICA. All 9 DMAs in Malviya Nagar, 5 DMAs in Nangloi and 1 DMA in Vasant Vihar have been completed and further works are in progress. NRW in Malviya Nagar PPP area reduced from 67% to 36%, Nangloi from 79% to 62%, Vasant Vihar from 24% to 8%.
- DJB started in-house Phase-I of DMAs creation in 2016 and 33 (restructured 39) DMAs were taken up, which were further increased to 96 (restructured 102) DMAs.
- 170 DMAs in Chandrawal & 160 DMAs in Wazirabad WTPS command areas are planned in JICA & ADB funded projects respectively.
- Consultancy services to create DMAs in remaining areas to cover entire DJB network have been awarded and consultancy period is 15 months. Scope of consultancy work include survey, verify the existing network/infrastructure, asses the UGR wise NRW and submit the UGRs wise DPR with rehabilitation estimates/capital works for reduction of NRW in Delhi. Though, the preparation of DPR of all the UGRs in a circle will take 15 months completion period but consultant will be asked to submit UGR wise reports in phased manners so that capital works can also be planned /executed simultaneously on priority.

14.2 Assessment of water distribution losses through proper water accounting and auditing system has been given top priority by DJB. Delhi Jal Board has started a comprehensive programme for installation of bulk meters at all water treatment plants and about 302 bulk meters have already been installed. Delhi Jal Board has also decided to install bulk meters on all distribution mains, underground reservoirs and

booster pumping stations for correct measurement of water supply from these points upto different localities/consumer points.

- 14.3 Complete and correct water supply accounting could not be maintained by Delhi Jal Board. As on 1<sup>st</sup> April 2019, there were 1.54 Lakh un-metered connections (Table 13.1). Fixing of maximum average of 20 KL/30 KL per month (as the case may be) for domestic consumers, if water meters are non-functional and till defective water meter is replaced.
- 14.4 Delhi Jal Board has streamlined its system for obtaining water meters for metering of un-metered supply of water. The existing system of supply of water meter along with sanction of water connection has been amended and now consumers can purchase water meters of approved specifications from the open market. The consumers having Delhi Jal Board's defective meters have been allowed to get the defective meter replaced with private water meter and have been given option either to get the refund of meter security or get the same adjusted towards water charges in future

## 15. Water Tariff

- 15.1 The tariff is based on the principle of "use more pay more". Present water tariff policy acts as a deterrent for consumers consuming excessive water or having wastage of water. DJB had collected ₹ 1819.60 crore during 2018-19.
- 15.2 DJB has provided Rain Water Harvesting in its 368 installations. The Rain Water Harvesting Cell of DJB provides technical assistance to individuals/ institutions for providing Rain Water Harvesting. DJB has provided the information regarding Rain Water Harvesting on its website for public facilitation.
- 15.3 As per DJB amended tariff Regulations (March 2016) rebate of 10% in the water bills is provided for having functional RWH system and non provision will make water bills increased by 1.5 times till functional RWH system is installed. These provisions are applicable for plots of 500 sqm and above.
- 15.4 Special subsidy in water charges has been allowed to resettlement colonies and rural areas where water charges are being recovered on assumed average of 10 KL per month per floor. Salient features of existing water tariff are as under:
- Existing water tariff has two parts. One is Service Charge and other Volumetric Water Consumption Charge applicable w.e.f. 1.12.2004 and 1.4.2005 respectively.

- 60 per cent of water consumption charges are recoverable towards Sewerage Maintenance Charge from such colonies/areas where sewerage services have been provided / maintained by the Delhi Jal Board.
- In case of bulk connection for a colony / group housing society serving a number of residential premises, water charges will be worked out as per residential unit-wise at the domestic rates applicable from time to time.

**15.5 Water Tariff for Un-metered Connections in JJ Resettlement Colonies and Rural Areas:** Water charges are applicable on assumed average of 10 KL Per month per floor for unmetered water connection in JJ resettlement colonies. For Unmetered water connections in case of rural areas assumed average 25 KL per month per connection is charged. Water consumption rates and service charge are levied slab-wise. Sewerage maintenance charge is also recoverable, if sewerage services are being managed by Delhi Jal Board. Besides above, water cess is recoverable from all consumers at the rates determined by the Central Government from time to time.

15.6 All domestic consumers of Delhi Jal Board consuming water up to 20 KL per month and having functional water meters are being given 100% subsidy and fully exempted from payment of water bill including all components namely, water charges, sewerage maintenance charge, service charges, meter rent (wherever applicable) and cess w.e.f. 01.03.2015.

**15.7 Water Tariff w.e.f. 01.02.2018 is as under: -**

**CATEGORY –I (DOMESTIC CONNECTIONS)**

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per KI in ₹)
Upto 20	146.41	5.27
20-30	219.62	26.36
>30	292.82	43.93
Plus Sewer Maintenance Charge: 60% of water volumetric charge		

**CATEGORY –II (NON- DOMESTIC CONNECTIONS- COMMERCIAL/INDUSTRIAL)**

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per KI in ₹)
0-06	146.41	17.57
06-15	292.82	26.35
15-25	585.64	35.14
25-50	1024.87	87.85

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per KI in ₹)
50-100	1171.28	140.56
>100	1317.69	175.69
Plus Sewer Maintenance Charge: 60% of water volumetric charge		

- **Simplification of Procedure for Sanction of New Water Connection**

Procedure for sanction of new Water/Sewer Connection in Unauthorized/Regularized Colonies, Urban/Rural Village and Slum Katras has been simplified. In these areas, now, water / sewer connection may be sanctioned who submits any proof of identity of his/her present address i.e. Voter ID Card or Ration Card or Passport or PAN Card or Driving License, or Unique ID Card (UID/Aadhar Card) or Bank Pass Book or Photo Identity Card issued by any Government Agency and last 3 months paid electricity bills in the name of the applicant where water / sewer connection is being applied alongwith an Undertaking.

- **Provision of Rain Water Harvesting / Waste Water Recycling System**

- Ground water resources in many parts of the city are over exploited. The extent of replenishment of ground water is much less than what the city as a whole is withdrawing due to its rapid urbanization. There is need to preserve ground water resources and to take effective measures for its sustainable availability.
- Therefore, Rain Water Harvesting is considered as a simple, viable and eco-friendly method of conservation of water and a simple solution for ground water recharge. Ministry of Urban Development and Poverty Alleviation (Delhi Division), Government of India by its Notification dated 28-07-2001 has made Rain Water Harvesting mandatory in all new buildings on plots of 100 Sq. Mtrs. and above and Waste Water Recycling System for horticultural purposes, in buildings having a minimum discharge of 10000 Ltrs. and above per day.
- To ensure proper implementation of Rain Water Harvesting and Waste Water Recycling norms, following amendments in Regulation 50 of Delhi Water and Sewer (Tariff & Metering) Regulations 2012, has been approved by the Board vide Resolution No.829 dated 19-08-2019 for plots/properties size 100 sq.m. to less than 500 sq.m. except para (iv) & (v) below:
- It will be mandatory for plots/properties having area of 100 Sq. Mtrs. or more to have functional Rain Water Harvesting System, even if the property is constructed prior

- to 28-07-2001. Such plot/property owning consumers would be required to install functional Rain Water Harvesting System within One year from the date of issue of Public Notice in this regard i.e. upto 25.09.2020 (Public Notice issued on 19.09.2019 and 26.09.2019). In case consumers whose construction was before 28-07-2001, fails to comply with the aforesaid mandatory provision within the time limit prescribed, the tariff as applicable for the respective consumer category will be increased by 1.5 times, till the system is installed and intimated to the respective Zonal Revenue Officer.
- v. Further, in case of properties having area of 100 sq.m. or more, constructed after 28-07-2001 who have not intimated about the Rain Water Harvesting provision made to the respective area ZRO, may also inform the area ZRO by 31st March 2020, failing which, tariff as applicable for the respective consumer category will be increased by 1.5 times, till the system is installed and intimated to the respective Zonal Revenue Officer.
  - vi. Besides (i) & (ii) above, Board may disconnect water connection of all consumers who fail to install functional Rain Water Harvesting System or intimate area ZRO within prescribed time limit. This provision will, however, be applicable in case of all properties having area of 100 Sq. Mtr. and above but after timelines provided in both the aforesaid cases is over.
  - vii. New water/sewer connection to the existing and newly constructed properties having plot area of 500 Sq. Mtrs. and above will be sanctioned only after confirmation of installation of functional Rain Water Harvesting System. Necessary functionality certificate in this regard would be given by the respective Maintenance Division as per Instructional Orders issued by the Rain Water Harvesting Cell, in this regard.
  - viii. New water/sewer connection to newly constructed properties/buildings having a minimum discharge of 10000 Ltrs. and above per day will be sanctioned only after confirmation of installation of functional Waste Water Recycling System, as per norms. Necessary functionality certificate in this regard to would be given by the respective Maintenance Division.
  - ix. Implementation of (iv) above for plots/properties having area of 100 Sqm and above but below 500 Sqm. would be applicable after timelines provided in (i) and (ii) above are over.
  - x. In cases where installation of Rain Water Harvesting System is not technically feasible, for any reason, CEO, DJB may take appropriate decision in respective case, on merits.

## 16. Rain Water Harvesting

- 16.1 Ministry of Housing and Urban Affairs, GOI has issued guidelines for Urban Water Conservation under Jal Shakti Abhiyan. Thrust areas include Rain Water Harvesting (RWH), For Rain Water Harvesting, the guidelines include that ULBs should ensure that all government buildings (Central/State/ULB) must have RWH structures. The guidelines also include that ULBs should ensure that in future all building permissions granted must have RWH structures incorporated, as per building bye laws, and same should be checked before issuing Occupancy-cum-Completion Certificate (OCC). Therefore, in urban areas, ULBs have to play major role in ensuring implementation of Rain Water Harvesting Systems.
- 16.2 Roof top rain water harvesting has been made mandatory for plots size of 100sqm and above in the Building Bye Laws for Delhi, in terms of the notification dated 28.07.2001 issued by the Govt. of India. To promote its implementation Delhi Jal Board has made provisions in its tariff regulations for rebate and penalty in water bills for implementing and non-implementing Rain Water Harvesting Systems.
- 16.3 The following provisions have been made in the Delhi Water & Sewer Tariff and Metering Regulations, July' 2012 for promoting Rain Water Harvesting:

Regulation 8 (d) of Chapter II provides that for category the consumers, the following rebate is given in tariff for provision of Rain Water Harvesting, Waste Water Recycling or both:-

- i. Such plot/properties which have an area of 500 square meter or more and having installed functional rain water harvesting system or waste water recycling system, shall be granted rebate of 10% in the total bill amount and 15% if both the above systems have been set up and functional.
- ii. If the Rain Water Harvesting system is adopted by a society then the individual member of that society will be entitled to above mentioned rebate in water bill.
- iii. The area Zonal Engineer or such other suitable agency as authorized by the board will provide a functional certificate in respect of the above systems mentioning therein that substantive portion of the plot/ property has been covered as far as Rain Water Harvesting is concerned. Similarly, he will certify that substantive quantity of the waste water generated has been recycled by the consumer. A certificate will be issued after every six months.



- iv. Delhi Jal Board has implemented rain water harvesting system in 368 installations of DJB and more are being targeted for implementation of rain water harvesting. Rain Water Harvesting Systems have been implemented in 3595 schools/colleges out of the 4805. Further in 489 schools /colleges the rain water harvesting systems are under construction and in the 519 schools and colleges action for taking up construction has been initiated.
- v. People are being sensitized for the judicious use of Potable water for the demand side management through public outreach program. There is a dedicated Rain Water Harvesting cell in DJB which is providing technical assistance to facilitate the public in implementation of Rain Water Harvesting system. It also has a dedicated telephone numbers (011-23541223 and 011-23558264) to guide the callers who seek assistance.
- vii. As per the Delhi Government Cabinet decision 2709 dated 02.07.2019 all Govt. departments have to make provision of RWH in their buildings. Delhi Jal Board has been assigned to implement Rain Water Harvesting Systems in Government Building installations which are not maintained by the PWD, GNCTD. For Delhi Government buildings which are maintained by PWD, GNCTD, the implementation of Rain Water Harvesting System is to be carried out by PWD, GNCTD itself.
- vii. To sensitize the citizens of Delhi a continuous process of disseminating information on Rain Water Harvesting through platforms like print, electronic, visual, workshops, exhibitions, seminars, booklets, pamphlets etc. have been done by Delhi Jal Board. Recently interactive workshops (33 in numbers) on Rain Water Harvesting have been held at the circle level (Superintending Engineers level) and divisional level (Executive Engineer level) by DJB with the RWAs, across Delhi.

#### **16.4 Incentive:**

- i. Rebate provision in water bills which is given to extent of 10% to the consumers of Delhi Jal Board and is applicable on plots size of 100 sqm and above. Rebate of ₹ 32.57 crores has been given from 1.7.2017 onwards.
- ii. The area Zonal Engineer or such other suitable agency as authorized by the Board will provide a functional certificate in respect of the above systems mentioning therein that substantive portion of the plot /property has been covered as far as Rain Water Harvesting is concerned. Similarly, he will certify that substantive quantity of the waste water generated has been recycled by the consumer. A certificate will be issued after every SIX months.

## **16.5 Penalty:**

For all the consumers irrespective of their consumer category Rain Water Harvesting penalty at enhanced tariff of 1.5 times will be applicable if they have plot area 500 sq meter or above and do not have a functional rain water harvesting facility w.e.f. 01.07.2017 (in case of Dwarka sub-city, penalty on account of non-provision of RWH system is applicable w.e.f. 01.11.2018).

## **16.6 Exceptions:**

- i. If the consumer lives in the area which has rocky ground or it is on the banks of Yamuna River then Rain Water Harvesting penalty will not be imposed if the consumer does not install Rain Water Harvesting system in his/her premises.
- ii. RWH through artificial ground water recharge structures is not recommended where post monsoon ground levels are shallower than 5 Mtrs. Penalties as per the Delhi Water and Sewer (Tariff & Metering) Regulation, 2012 will not be levied on DJB consumers for non-provision of RWH System in such areas. However, in such areas Rain Water Storage for its use in no-portable purposes after required treatment may be carried out as a voluntary option.

## **16.7 Water Conservation**

- i. Delhi has a network of about 14697 Kilometers of water supply mains, of which, a significant portion is as old as 40 to 50 years and prone to higher leakage losses. Normally, water losses are calculated by water billed or consumed subtracted from the water produced. In the case of Delhi, water billed or consumed and leakage losses there from cannot be calculated exactly as a majority of houses do not have working meters. According to the estimates of Delhi Jal Board, the total distribution losses are of the order of 40 per cent of the total water supplied. These are quite high as compared to 10-20 per cent in the developing countries. The distribution losses include losses due to (a) leaking pipes and (b) theft of water through unauthorized connections.
- ii. Delhi Jal Board has taken several steps to minimize leakage losses. To address this problem, a leak detection and investigation (LDI) cell was set up. The Board has replaced about 1200-km length of the old, damaged and leaking water mains during the last five years. As a result of these initiatives, the Board expects to bring down the distribution losses to 20 per cent level in the near future.

- iii. Delhi Jal Board has formulated a programme for recycling of backwash water in four major water treatment plants at Haiderpur, Bhagirathi, Chandrawal and Wazirabad. The work for commissioning of recycling plant at Haiderpur, Bhagirathi, Wazirabad recycling plant has been completed. About 45 MGD water supplies will be available without any additional raw water from these four plants.

### 16.8 Ground Water Charges:

In compliance of orders of NGT, DJB has approved fixation of Ground Water Cess/ Usage charges on the Industries for Operating their Tube-wells/ Bore-wells for extraction of Ground Water.

- Ground Water (Non- Water Packaging Industries) or Category IIIA(3A)
- Ground Water (Water Packaging Industries) or Category IIIB(3B)

The Delhi Jal Board vide resolution No. 200 dated 19.03.2015 has approved fixation of Ground Water Cess /Usage Charges on the Industries for Operating their Tube-Wells/Bore-Wells for extract of Ground Water which is circulated by CE (Planning) Water vide letter No. DJB/CE (Plg.)W/2015/58-69 dated 06.04.2015 as under :-

a.	For non – water packaging Industries	₹ 1670/- per Tube-well/Bore-well per month
b.	For water packaging Industries	₹ 4170/- per Tube-well/Bore-well per month

### 17. Sewage Treatment Capacity

- 17.1 Adequate sanitation is essential for the protection & promotion of individual's and community health. Various schemes are being implemented by the DJB to improve sanitation conditions. Sewage treatment capacity of Delhi Jal Board increased from 402.40 MGD in 31<sup>st</sup> March 2001 to 607.26 MGD in 31<sup>st</sup> March 2019. The information regarding the sewerage treatment capacity and percentage of utilization is presented in Statement 13.6.

### Statement 13.6

#### SEWERAGE TREATMENT CAPACITY AND ITS UTILIZATION

(MGD)

S No	Name of Sewerage Treatment Plants (STPs)	Capacity		Actual Treatment as on 31.3.2019	% of Utilization
		31.3.2001	31.3.2019		
1	Okhla	140.00	140.00	108.80	77.71
2	Keshopur	72.00	72.00	69.60	96.67
3	Coronation Pillar with Oxidation Ponds at Timarpur	46.00	30.00	24.97	83.23
4	Rithala *	40.00	80.00	61.53	76.29
5	Kondli I, II, III, IV	45.00	70.00	65.11	93.01
6	Yamuna Vihar I,II	10.00	35.00	20.21	57.74
7	Vasant Kunj	5.00	5.20	3.11	59.81
8	Ghitorni	5.00	5.00	0.39	7.80
9	Pappankalan	20.00	40.00	34.82	87.05
10	Narela	10.00	10.00	1.83	18.30
11	Najafgarh	5.00	5.00	2.42	48.40
12	Delhi Gate	2.20	17.20	17.61	102.38
13	Sen Nursing Home	2.20	2.20	2.32	105.45
14	Rohini	0.00	15.00	4.67	31.13
15	Nilothi	0.00	60.00	39.94	66.57
16	Mehrauli	0.00	5.00	3.84	76.80
17	CWG Village	0.00	1.00	0.22	22.00
18	Molarbad	0.00	0.66	0.50	75.76
19	Kapeshera	0.00	5.00	1.87	37.40
20	Chilla	0.00	9.00	9.19	102.11
	<b>Total</b>	<b>402.40</b>	<b>607.26</b>	<b>472.95</b>	<b>77.88</b>

Source: - Delhi Jal Board; \* 20MGD Rithala STP is presently under rehabilitation.

- 17.2 It is evident from the above statement that the percentage of utilization of sewerage treatment plant in Delhi as on 31st March 2019 was about 78 per cent. The sewerage treatment plants are not functioning up to their optimum level due to various reasons such as low flow of sewage to STPs, trunk and peripheral sewer lines still to be connected to these STPs, Rehabilitation of Silted and settled Truck Sewer Lines yet to be completed, etc. The sewage generation, at present, is estimated to be around 720 MGD = (900 water production x 0.8) and treatment is around 473 MGD only.

- 17.3 Delhi Jal Board has a network of branching, peripheral sewers of about 8400 kms. Also there is network of 200 kms of trunk sewers. The rehabilitation/de-silting has been completed in a trunk sewer and is in progress in peripheral sewer.
- 17.4 The consultant for World Bank funded, "Delhi Water Supply & Sewerage Project" estimated 5259 MLD water supply requirement for Delhi in 2021 and waste water generation from this level of water supply will be about 3760 MLD. The information regarding the same is presented in Statement 13.7.

### Statement 13.7

#### WATER SUPPLY REQUIREMENT AND WASTE WATER GENERATION ESTIMATED

S. No	Details	Volumes (MLD)				
		2004	2005	2006	2011	2021
1.	Total water demand	2685	3763	4090	5181	6272
2.	Total net water supply	2265	2362	2461	3573	5259
3.	Waste water generated	1812	3010	3272	4144	5017
4.	Treated at CETP	200	217	234	346	755
5.	Proportion not sewerred	14%	13%	13%	10%	5%
6.	Outside sewerred area	254	302	302	294	210
7.	Net generated waste water	1358	1722	1798	2218	3242
8.	Infiltration	518	518	518	518	518
9.	Gross Wastewater to treatment	1876	2240	2316	2736	3760

*Source: - Delhi Jal Board*

## 18 Expenditure Incurred on Water Supply and Sewerage Programmes

- 18.1 The expenditure incurred on water supply and sewerage programmes in Delhi during 2007-08 to 2019-20 is presented in Statement 13.8.

**Statement 13.8**

**EXPENDITURE INCURRED ON WATER SUPPLY AND SEWERAGE PROGRAMMES IN DELHI DURING 2007-2019**

(₹ Crore)

S N	Details	Water Supply	Sewerage	Total
1.	<b>Approved Outlay (2007-2012)</b>	<b>4361.50</b>	<b>3132.50</b>	<b>7494.00</b>
	Fund Released			
	a. 2007-08	962.01	383.96	1345.97
	b. 2008-09	1015.17	441.73	1456.90
	c. 2009-10	1080.35	568.55	1648.90
	d. 2010-11	1080.14	527.93	1608.07
	e. 2011-12	1033.02	528.02	1561.04
	<b>Total (a+b+c+d+e)</b>	<b>5179.69</b>	<b>2450.19</b>	<b>7620.88</b>
3.	<b>Approved Outlay (2012-17)</b>	<b>6087</b>	<b>4913</b>	<b>11000</b>
4.	Fund Released			
	a. 2012-13	964.97	752.40	1717.37
	b. 2013-14	796.77	753.23	1550.00
	c. 2014-15	854.50	934.50	1789.00
	d. 2015-16	646.50	1077.43	1723.93
	e. 2016-17	850.15	534.50	1384.65
	<b>Total (a+b+c+d+e)</b>	<b>4112.89</b>	<b>4052.06</b>	<b>8164.95</b>
5	<b>Approved Outlay 2017-18 - BE</b>	<b>939.00</b>	<b>816.00</b>	<b>1755.00</b>
6	Fund Released 2017-18	999.50	730.50	1730.00
7	<b>Approved Outlay 2018-19 - BE</b>	<b>1258.00</b>	<b>1092.00</b>	<b>2350.00</b>
8	Fund Released 2018-19	1271.37	1044.61	2315.98
9	<b>Approved Outlay 2019-20 - BE</b>	<b>1463.40</b>	<b>906.60</b>	<b>2370.00</b>
10	Revised Outlay 2019-20	1310.65	899.35	2210.00

18.2 It may be observed from Statement 13.8 that the fund released for water supply and sanitation to DJB increased from ₹ 1346 crore in 2007-08 to ₹ 2316 crore in 2018-19.

## 19. Re-use of Waste Water

- 19.1 The major reuse of treated waste water in and around the city is for irrigation, horticulture and industrial use. There is demand for use of treated waste water for cooling in the power stations. Other options include ground water recharge, return to be raw water source, and the treatment and reuse of treated waste water, for flushing of toilets, i.e. use for non-potable purposes like washing of Railways, Buses, Construction industry.
- 19.2 Presently, Delhi Jal Board supply about 89 MGD of treated waste water to the Irrigation Department, Power Plants and for irrigation purposes by CPWD and in Rohini area by DDA & Flood Control and Irrigation Department. Efforts are being made to increase the treated waste water supply from 89 MGD to 210 MGD in subsequent years. Treated water supply to various purposes in Delhi is presented in Statement 13.9.

### Statement 13.9

#### TREATED WASTE WATER SUPPLY FOR VARIOUS PURPOSES

S. No.	Details	Units (MGD)
1.	Treated effluent supplied from Keshopur STP for Irrigation, horticulture purposed	5.5
2.	From Okhla STP to CPWD and Irrigation department for horticulture/Irrigation purpose	37.00
3.	From Coronation Pillar STP for DDA Golf Course at Bhalswa, Gammon India for construction purposes. Minor Irrigation Department at Palla	19.02
4.	From Rithala STP to PPCL for their plant at Bawana and NDPL for their owner plant at Rohini, DDA for horticulture	6.15
5.	From Vasant Kunj to Sanjay Van	3.70
6.	From Mehrauli STP to Garden of Seven Senses	3.40
7.	From Delhi Gate and Sen Nursing Home STP to PPCL	4.80
8.	From Nilothi STP to Flood Control & Irrigation Deptt. for Irrigation purposes	0.50
9.	From Papankalan STP for Irrigation purposes to DDA	1.33
10.	From Commonwealth Games Village STP to DDA horticulture	0.18
11.	From Yamuna Vihar to STP's horticulture	3.0
12.	From Narela to Pvt. Agency for washing of vehicle	0.05
13.	From Najafgarh to WTP Dwarka for Horticulture	0.07
14.	From Chilla STP to Internal Horticulture of STP	1.00
15.	From Kondli STP to DDA, PPCL & Horticulture	3.0
	<b>Total</b>	<b>89 MGD</b>

Source: - Delhi Jal Board.

- 19.3 Estimates for many reuse projects are being framed. Besides, Sewerage Treatment Plants of Delhi Jal Board, treated waste water is available from Common Effluent Treatment Plants in industrial areas being maintained by DSIIDC and Mini Sewerage Treatment Plants of Delhi Urban Shelter Improvement Board (DUSIB).
- 19.4 For abatement of pollution in river Yamuna, DJB is executing the project of laying of interceptor sewer along three major drains (Najafgarh, supplementary & Shahdara). Sewage to tune of 123 MGD has already been trapped. Present progress of work is 97% and the project is targeted to be completed by next year. Commissioning of interceptor sewer will trap total 242 MGD of sewage which is presently flow into drains. This will significantly improve the quality of waste water flow in the major drains.
- 19.5 Delhi Development Authority is responsible for 4,451 hectares of open spaces, all of which are irrigated via tube wells. There are also irrigation open spaces of Delhi Municipal Corporations, Central Government properties, private properties, road verges, sports stadiums etc. The information regarding the green areas being maintained by the various agencies is presented in Statement 13.10.

### Statement 13.10

#### GREEN AREAS MAINTAINED BY VARIOUS AGENCIES

S. No	Agencies	Green Areas (in hectares)	% age
1.	New Delhi Municipal Council	445	2.17
2.	Municipal Corporations of Delhi	2,428	11.83
3.	Delhi Development Authority	4,451	21.69
4.	Central Public Works Department	2,200	10.71
5.	Forest Department	11,000	53.60
	<b>Total</b>	<b>20,524</b>	<b>100.00</b>

Source: - Delhi Jal Board

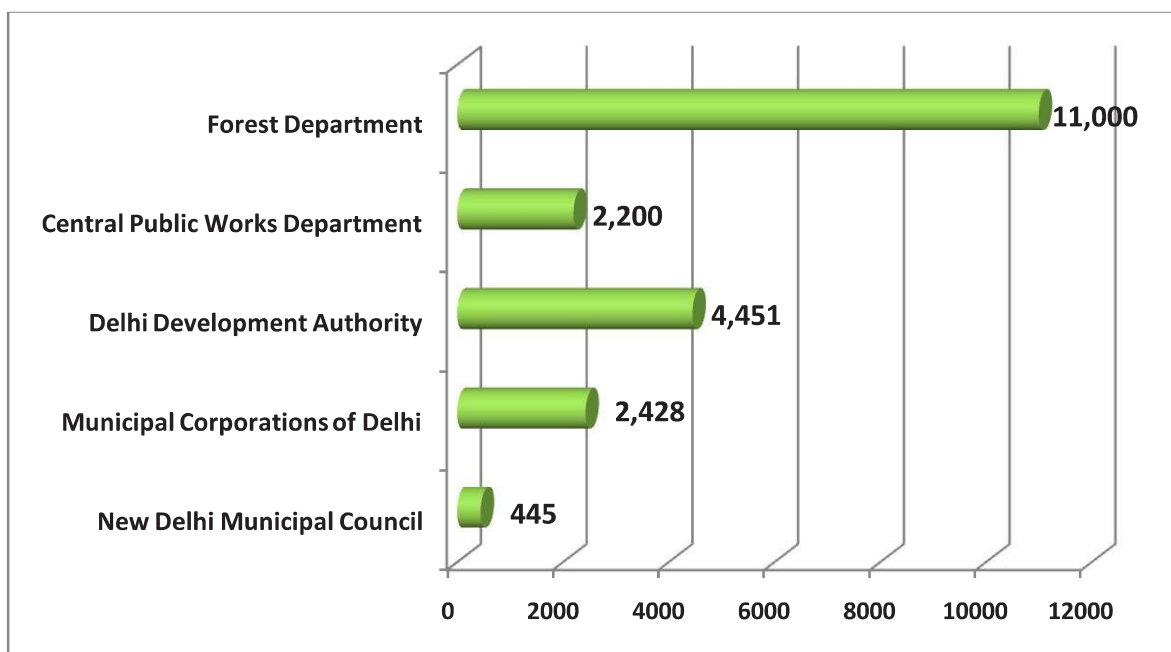
- 19.6 The green areas maintained by various agencies in Delhi are depicted in Chart 13.2.



**Chart 13.2**

**GREEN AREAS MAINTAINED BY VARIOUS AGENCIES**

(Hectares)



19.7 The colonies/category wise progress of sewerage system is given in statement 13.11.

**Statement 13.11**

**COLONIES/CATEGORY WISE PROGRESS OF SEWAGE SYSTEM**

S.N.	Colonies / categories	Total no of colonies	Colonies with Sewerage System
1.	Un-authorized Regularised Colonies	567	557
2.	Urban Village	135	130
3.	Rural Villages	219	54
4.	Un-authorized Colonies	1639	384
5.	Resettlement Colonies	44	44

**20 Challenges for Water Supply & Sanitation**

20.1 **Depletion of Ground Water:** The falling groundwater level due to excessive drawing of groundwater in Delhi is a concern. The water level has sunk to 20-30 metres

below the ground level in many places. In a few zones the nitrate content has been observed to be more than 1,000 mg/litre in the groundwater. A high concentration of fluoride more than the recommended limits has also been found. Large areas have salinity in the groundwater. All of these are unhealthy for human consumption.

- 20.2 **Unsustainable Approaches to Water Use:** An official DJB estimate of 2016 showed that the total distribution losses were at about 40%; this is in contrast to losses in the 4-20% range in some other countries. There are large water losses at different stages of water supply system, ranging from 30-50% in the treatment plants, conveyance systems and distribution systems, apart from leaks and pilferage.
- 20.3 **Wasteful Approaches:** People use Reverse Osmosis (RO) systems for water filtration since the tap water is not potable. RO causes water wastage of about 40-60% of the water used.
- 20.4 **Neglecting Natural Resources:** During the rainy season, Delhi experiences water-clogged roads and overflowing sewers. There is little rainwater harvesting, resulting in wastage of a precious resource.
- 20.5 **Public Awareness:** Public awareness and their role in water conservation and scientific use are presently unsatisfactory.