



ENVIS CENTRE, CHANDIGARH

NewsLetter

P a r y a v a r a n - P a t r a

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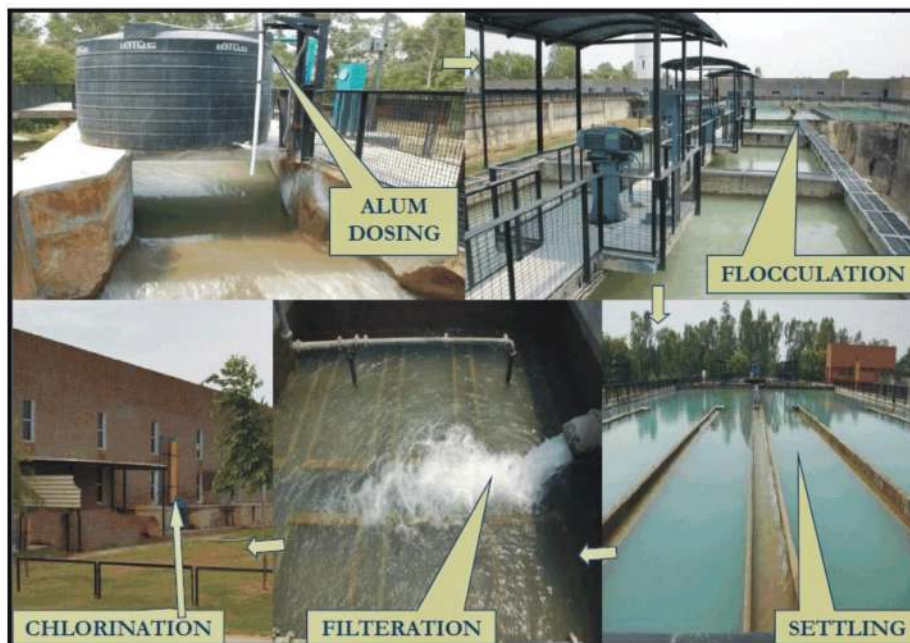
Chandigarh State of Environment



WATER AVAILABILITY, USAGE AND CONSERVATION IN CHANDIGARH

EDITORIAL

The present water supply service area of Municipal Corporations Chandigarh (MCC) is 114 km², which includes MCC area 79.34 km² and rural area of 34.69 km². The urban area falls in jurisdiction of Municipal Corporation and the water supply system is entrusted to Public Health wing of MCC. The rural area comprises of 13 villages overseen by the Engineering Department. The water supply to the villages is provided with tube wells in and around the villages. Other urban/rural areas have water source of 67 MGD from Bhakra Main Canal which is 27 km away from Chandigarh and 20 MGD from 239 tube wells located in the city. The transmission mains carry raw water from Kajuali to the water treatment plants located at Sector 39. At sector 39, the water is treated, disinfected and transmitted to 7 No. subsidiary water works located in Sectors 12, 26, 32, 37, 52 and Manimajra.



Water Treatment Plant, Sector 39, Chandigarh (Supply of drinking water)

The average availability of water in Chandigarh is reasonably high at 332 Litres per Capita per Day (LPCD), stands second in the country after Goa (343 LPCD). Chandigarh gets 14.5 million gallons per day (MGD) water as its share from each phase of Kajuali water supply scheme. Chandimandir cantonment and Haryana is in process of installing its infrastructure for treatment and transmission of water. The net available water will be only 78.0 MGD, if Haryana and Chandimandir Cantonment starts drawing their share of raw water from Chandigarh.

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Index

1. EDITORIAL
2. Status of Ground Water
3. Ground Water in Deep Aquifers
4. Monsoonal Rainfall in Chandigarh
5. Status of Drinking Water in Chandigarh
6. Total Water Availability and The Possible Projection of Its Demand in Near Future

P a r y a v a r a n
P a t r a

7. Water Quality of the City
8. Water Quality Analysis of Drains/ STP
9. Action Plan for Water Conservation



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Status of Ground Water

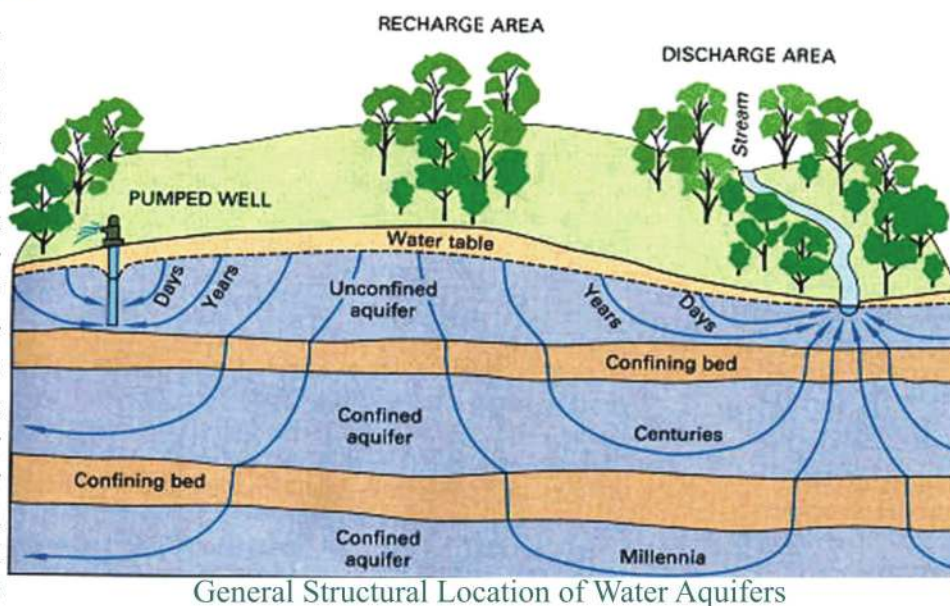
Ground water level of Chandigarh has declined at a fast speed in the last decade. The data collected by the CGWB, Chandigarh shows a gradual decrease in the total replenishable Ground Water Resources (3.636%) and the available ground water resources (3.645%).

Status of Ground Water	2004	2009	2014
Annual Replenishable Ground Water Resources (MCM)	2255 ham	2173 ham	2156 ham
Available Ground Water Resource	2030 ham	1956 ham	1940 ham
Balance Ground Water	2030 ham	1956 ham	1940 ham
Provision for Industrial/Domestic and other uses & Natural Discharge etc.	225 ham	217 ham	216 ham

Source: Scientist' D' & TS For Regional Director, Suprintending Hydrogeologist For Reg. Dir.GroundWaterB.Chandigarh

Ground Water in Deep Aquifers

Chandigarh is a rapidly growing city and in the last decade (2001-2011), its population growth rate was observed to be about 28%. Being one of the densely populated city (9252/sq km), its demand for water is estimated to grow steeply. It is estimated that by 2026, the water demand will be 523.41 MLD (138.27 MGD) that is about 22.72% higher over the 2011 demand of 426.50 MLD (112.67 MGD). Due to excessive withdrawing and comparatively lesser annual replenishment, the ground water level of deep aquifers in Chandigarh (except southern sectors) has been suppressed on an average of 4m in 6 years at different locations throughout



Monsoonal Rainfall in Chandigarh

Chandigarh experiences heavy rainfall during monsoon season i.e. July to late September, with an average rainfall of 1059.3 mm, which is calculated to be 60380.1million liters or 13241gallons or 36.28 MGD per annum. As per the study conducted by Ground Water Board Chandigarh, this heavy amount of water seeps down to the aquifers and helps to recharge them remarkably.

Year	Pre-Monsoon Water Level Range	Post Monsoon Water Level Range	Units
2009	2.84-18.60	2.30-19.96	m bgl
2010	0.58-22.12	1.89-21.97	m bgl
2011	2.27-21.67	2.38-21.68	m bgl
2012	3.12-23.67	2.03-24.15	m bgl
2013	4.62-22.49	2.98-20.50	m bgl
2014	2.05-21.48	2.55-20.50	m bgl

Source: Scientist' D' & TS For Regional Director, Suprintending Hydrogeologist For Reg. Dir.GroundWaterB.Chandigarh

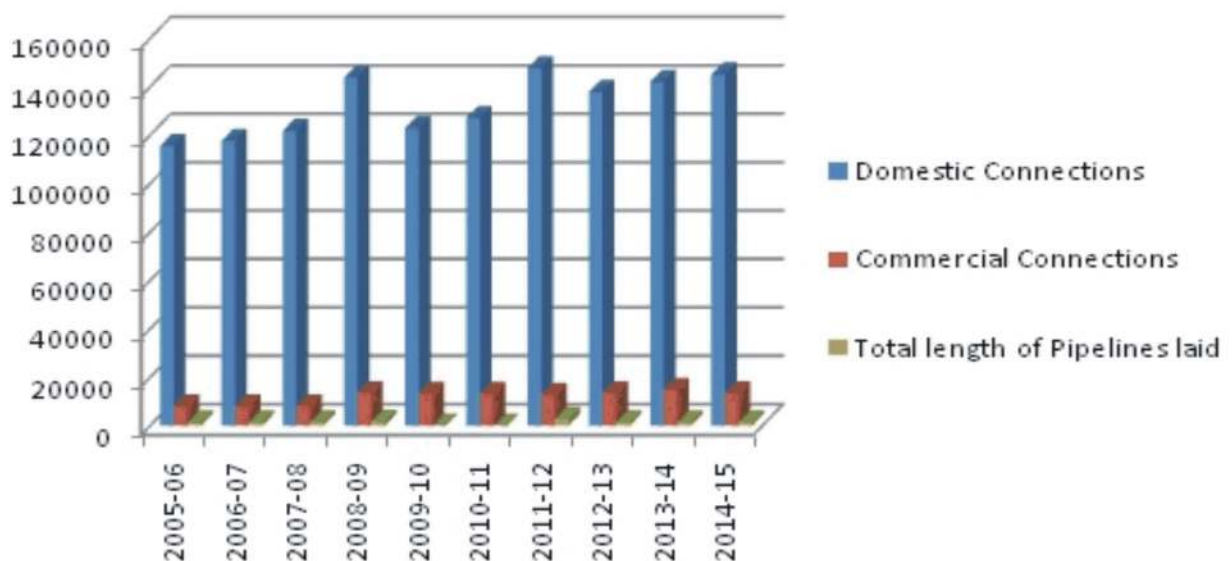
Status of Drinking Water in Chandigarh



The City has been divided into 7 zones for the purpose of distribution of drinking water, including town of Manimajra. The total installed capacity of drinking water from the four phases of surface source is about 67 MGD. Apart from the piped supply, about 20 MGD is also abstracted through deep bore wells with power pumps. Out of the total 156730 water connections, more than 94% connections are metered and flat rate connections are given to rehabilitated colonies. Besides there are 800 stand posts in the city 332 LPCD water is 10-12 hours.

Water Connections

The steep growth in the population had also increase the demand of water for the daily purposes. Water supply in Chandigarh is regulated by the municipal corporation of the city and it was calculated that the total water connections have been increased from 1,36,094 in 2009-10 to 1,58,363 in the year 2014-15. Regularization of the unmetered connections is also moving at a faster rate in the city. The graph below represents the total domestic and commercial connections along with the total length of water supply pipeline laid in the city till 2015.



Source: Executive Engg., MCPH, Div 2, Chandigarh. Superintending Engineer, MCPH Circle, Chandigarh. (M.C-17)

Water Supply and demand Scenario

Year	Populat on in Lacs	Domestic Require ment @150 LPCD In MLD	Industrial Commerc ial @ 4000 gallon/Da y Area in Acres	Industrial Commercia l Requirem ent in MLD	Communi ty Institutio nal @ 4000 gallon/Ac res/Day Area in Acres	Communi ty Institutio nal Requirem ent in MLD	Requireme nt For Stand Post Lav Blocks MLD	Wastage Water Leakage %	Total Leakage MLD	Total Requireme nt	Horticult ure Requirem ent @ 5400 Gallon /Acres /Day Area in Acres	Horticult ure Requirem ent in MLD	Gross Requirement MLD
2011	10.55	158.25	1921.63	29.09	3048.5	46.15	20.07	15	38.04	291.60	6600	134.90	426.50
2016	12.79	191.85	1998.50	30.26	3170.44	48.00	24.43	8	44.18	338.72	6600	134.90	473.62
2021	13.71	205.65	2078.44	31.47	3297.25	49.92	29.77	8	47.52	364.33	6600	134.90	499.23
2026	14.46	216.90	2161.60	32.73	3429.15	51.92	36.29	8	50.68	388.51	6600	134.90	523.41
2031	15.59	233.85	2248	34.03	3566.32	53.99	44.19	8	54.91	420.98	6600	134.90	555.88
2036	16.95	254.25	2338	35.40	3709	56.15	53.86	8	59.95	459.61	6600	134.90	594.51

Source: Climate Action Plan, U.T., Chandigarh

Total Water Availability and The Possible Projection of Its Demand in Near Future:

According to Bureau of Indian Standards (BIS) code 1172-1993 the per capita water requirement for the cities with habitations more than 100,000 with full flushing systems require 150-200 Liters per day. This may come down to 135 Liters per capita for Economically Weaker section of the society. In this context, Chandigarh is providing more water per capita than required. Water demand based on the current population (census 2011) is around 426.50 MLD. This includes 158.25 MLD for domestic consumption, 29.09 MLD for commercials/ industrial demand, 46.15 MLD for community/ institutional demand, 20.07 MLD for standpost lavatory blocks and a wastage of water nearly 15% stands at 38.04 MLD. In addition horticultural water demand is 134.90 MLD.

Water Conservation Practices in Chandigarh

Water conservation means protecting our water resources from pollution and being wasted. It is important because plants, humans and animals all need water to survive. Without water, the earth would have no life. Due to consistent water resources, but increasing population and demand of water; the city beautiful has also been practicing water conservation by following different conservation strategies.

1. Artificial Recharge and Rain Water Harvesting

With the exponentially increasing demand of water resources due to escalating population, the city beautiful "Chandigarh", has also implicated the scheme at the remarkable speed in a very short span of time. The rainwater harvesting potential of Chandigarh, with an area of 114 sq km and the average annual rainfall of 1059.3, is calculated to be 60380.1million liters or 13241gallons or 36.28 MGD. Thus, the potential is more than the water pumped out of aquifers and therefore, efficient harvesting of rain water and proper recharging of ground water will go a long way in contributing towards sustainability of water supply.

One interesting feature is that the aquifers in the southern parts of the city are restricted in aerial extent due to lithological boundaries as studied by CGWB. Therefore, this part of the city has very high water level and does not require any water recharge facility.

 Details about the installed capacity of artificial recharge schemes implemented in Chandigarh:

No. Of Units	Type of scheme	Total annual Capacity (Lakh Cubic meter)
6	Roof Top Rain Water Harvesting	0.144-0.13
1	Roof Top & Pavement catchments Rain Water Harvesting	34.50
1	Recharge Trenches	9.50

Source: Executive Engineering Project Public Health Division No. 1 & 7, Chandigarh


Construction of storm water harvesting and ground water recharge structures is also at full swing throughout the city to cover the **roads (15.89 sq. km), rooftops of residential areas, (30.19 sq.km) shopping areas (3.97 sq. km), public and institutional buildings (7.94 sq. km).**

 Area wise Rain Water availability:

Chandigarh has a total rain water harvesting capacity of more than 70% of the total land area. The total capacity of water that would be available for recharge annually is:

58 sq km (area) x 1059.3 (rainfall) x 0.5 (rainfall coefficient) = 30,720 million litre

From Roads	15.89 sq. km
From the Rooftop of Residential area	30.19 sq. km
From Public and Institutional Buildings	7.94 sq. km
From Shopping area	3.97 sq. km

 To reduce dependence on ground water a short term legal frame work has been laid by the Administration to make provisions for rain water harvesting mandatory while granting the additional covered area to all plots above 500 m² (1 Kanal) area (**Order/Notification dated 16.10.2008**).

2. Recycle and Reuse of treated waste water Water:

Chandigarh is fully covered with sewerage facility and provided with the 100% sewerage treatment facility. Out of 87 MGD water being supplied to the residents of the city, 57 MGD sewage effluent is being generated per day. Out of which, average 53.85 MGD waste water is treated everyday.

Municipal Population	10.54 Lacs
Volume of Domestic & Industrial Waste Water Generated	57 MGD (Approx.)
Treated waste water	53.85 MGD
No. of STPs	5
Capacity of Each STP	16 MGD – 3 BRD
	5 MGD – Raipur Kalan
	30 MGD – Diggian
	1.25 MGD – Raipur Khurd
	1.6 MGD – Dhanas
	Total : 53.85 MGD
Proposed STPs	1.7 MGD at Khuda-ali-sheer.
	15 MGD is under renovation at
	Diggian, Mohali.
	Total: 16.7 MGD
Mode of Disposal	Natural Choe for all except Diggian. Diggian STP effluent goes to Irrigation Channel

Source: CPCC, Chandigarh

Recognizing the importance of water, Chandigarh had, earlier in 1991, initiated tertiary treatment of waste water at Diggian STP (10 MGD) and later supplied it for the non-potable uses such as irrigation of gardens, green belts & lawns, washing cars etc, to different sectors. Presently, the installed capacity for tertiary treatment is 20 MGD at Diggian STP which is treating 10 MGD water (avg.), however, the present demand of tertiary treated water is 6 MGD. As per new bylaws the use of tertiary treated water has been made mandatory for all houses having area of 1 kanal or more. At present, tertiary treated water is available for use in sector 1, 4, 5, 6, 7, 9, 12, 15, 16, 18, 19, 20, 21 & 61; whereas sectors 2, 3, 8, 10, 11, 14, 17, 23, 25, 33, 34, 37, 41 and 42 are provided with the partial availability of the same.

Water Quality of the City:

CGW Toxic Elements in Ground Water							
Year	Field	Pb	Cd	Mn	Fe	Cr	As
2014	Water Samples of Tap Water	0.009-0.015 mg/l	0.006-0.007 mg/l	0.000-0.030 mg/l	0.130-1.390 mg/l	-	-
2014	Water Samples of Hand Pump	0.000-0.110 mg/l	0.004-0.006 mg/l	0.001-0.800 mg/l	0.100-3.430 mg/l	-	-
2014	Water Samples of Tube well	0.000-0.022 mg/l	0.004-0.007 mg/l	0.003-0.360 mg/l	0.000-2.89 mg/l	-	<0.01

Source:- Central Ground Water Board, North Western Region, Chandigarh.

Every house of the city has access to the clean drinking water supplied by the municipal corporation during the regular periods of time every day. Due to small agricultural fields, the use of harmful chemicals such as pesticides is also very controlled in the city. Thus the water quality of the Chandigarh lies within the limits as prescribed by the BIS standards of drinking water. Water analysis conducted by the Central Ground Board of the shallow and deep aquifers of the city shows the absence of any impurity including heavy metals.

Water Quality Analysis of Drains/ STP:

Parameters	Sukhna Lake	Attawa	Sukhna Choe/Drain	PKR	Baltana	Lake-42	Dhanas Lake (D1)	Diggian Tertiary Treatment	Diggian	3 BRD	Raipur Khurd	Raipur Kalan
pH	7.9	7.5	7.8	7.6	7.3	8.6	7.5	7.5	7.7	7.3	7.9	7.4
DO (mg/l)	<1	1.8	<1	<1	<1	5.2	<1	<1	1.1	<1	<1	<1
COD (mg/l)	40	96	101	400	61	20	32	44	105	263	97	307
BOD (mg/l)	8	40	28	141	22	4	13	13	28	71	31	92
TSS (mg/l)	14	90	55	270	45	15	40	30	50	120	28	25
NH ₃ -N (mg/l)	1.20	5.60	3.50	18.20	2.60	BDL	1.60	1.80	3.20	8.50	3.60	12.40
NO ₃ -N (mg/l)	2.10	1.90	2.60	1.80	3.10	BDL	2.10	1.30	1.50	2.10	2.10	1.70

Source: Chandigarh Pollution Control Committee (Dec 2015)

Water quality analysis of all the drains and sewage treatment plants established in the U.T. region are carried out regularly (monthly basis) to keep a sharp eye on the quality of water flowing through the city. Except the open drains (Sukhna Choe, Patiala Ki Rao, North Choe) passing through the city, the treated water of STP's lies near the permissible limits. As per the new guidelines upgradation of all STP's is proposed to take the BOD of treated water below the figure of 10 mg/L.

Like the adjoining states of the city, no ground water from shallow tube wells in Chandigarh is prescribed as drinkable. MC discourages use of handpumps for drinking water. Hand pumps in markets serve other purposes of the use of water. These Handpumps are painted red to indicate the same. MC has given potable water supply to various sections of market/commercial places which is for hours in a day.

Response Centre Feedback Form



YES ! I WANT TO KNOW
ABOUT ENVIS CHANDIGARH
Chandigarhenvi

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Dear Information Seeker,

ENVIS CENTRE, Chandigarh furnishes you with the services to collect and disseminate information related to environment of Chandigarh. To share information with us you are requested to fill up the form given below.

Your feedback is valuable to us and will be highly appreciated



- Name _____
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- Department _____
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_____ City _____
- State _____ Country _____ Pin _____
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Your views on scope of improvement :

▪ Interest Area _____

I would like to have information on following :



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