

Easy Rain Water Harvesting Easy Tomorrow



Rain Water Harvesting Guidelines



DELHI JAL BOARD



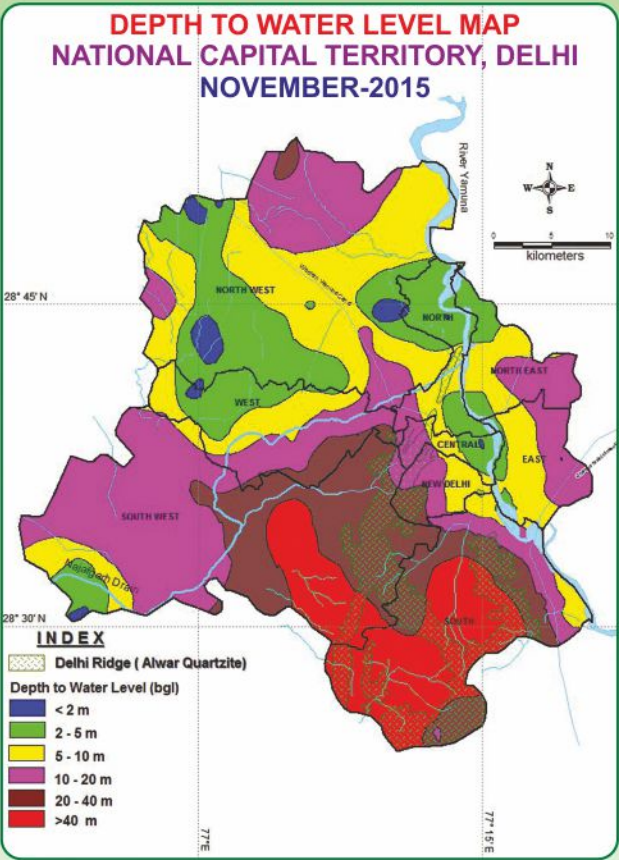
Easy Rain Water Harvesting Easy Tomorrow

WHY ?

RAIN WATER HARVESTING THE NEED OF THE HOUR

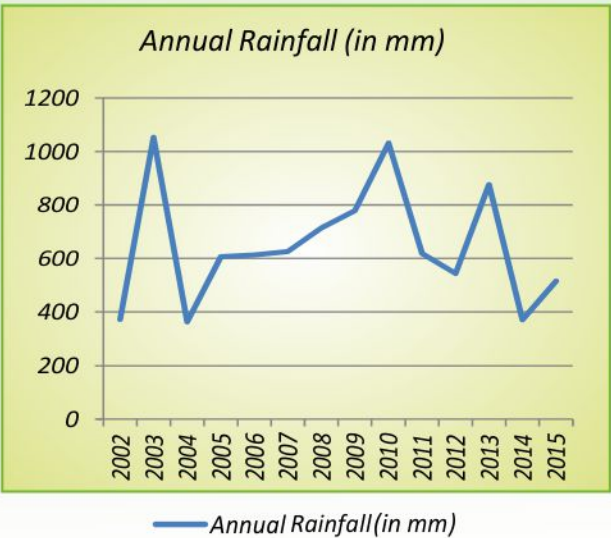
Rainwater Harvesting is critical for Delhi's Water Security. By adding to Delhi's own limited water resources it will

- Help cater to the potable water needs of the ever growing population
- Stop the rapid fall in Ground Water Level
- Increase availability of Portable Water
- Help maintain Green Cover
- Help revive Water Bodies



Annual Rainfall of Delhi NCT

Year	Annual Rainfall (in mm)
2002	372.8
2003	1052.8
2004	364
2005	607
2006	613.1
2007	626.7
2008	713.9
2009	779
2010	1031.5
2011	618.5
2012	544.3
2013	875.8
2014	370.8
2015	515.1



Source: India Meteorological Department

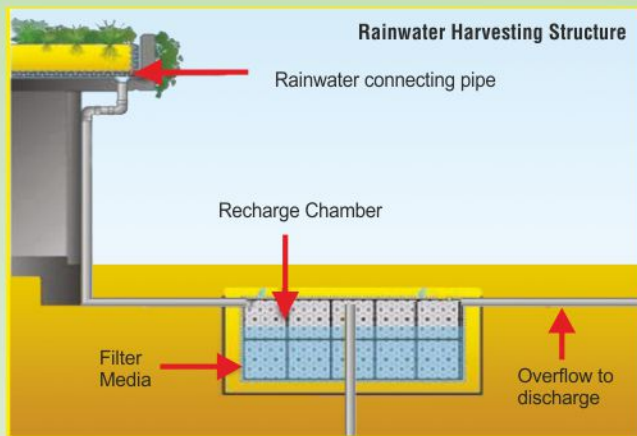


What is Rainwater Harvesting (RWH) ?

Rainwater harvesting is

- Collection and storage of rainwater
- That runs off from catchment area like roofs, roads, pavements, etc.
- This rainwater can recharge the ground water.

HOW ?

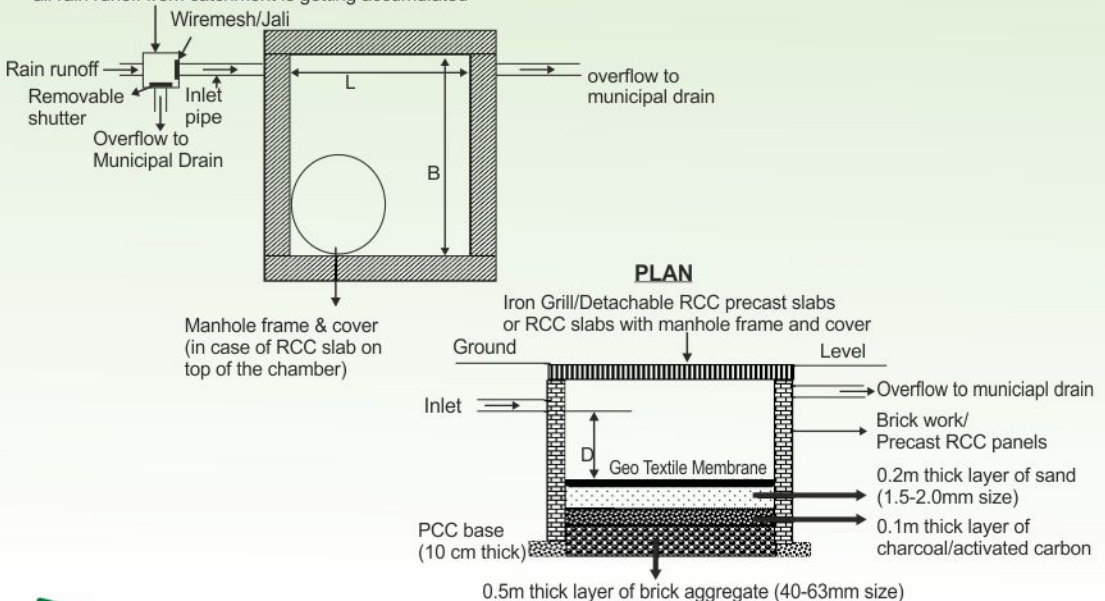


Rainwater Harvesting Structure in a building

Two Type of RWH Recharge Chambers

Fig. 1 Rectangular Recharge Chamber for RWH

Chamber on rain water conveyance system where all rain runoff from catchment is getting accumulated

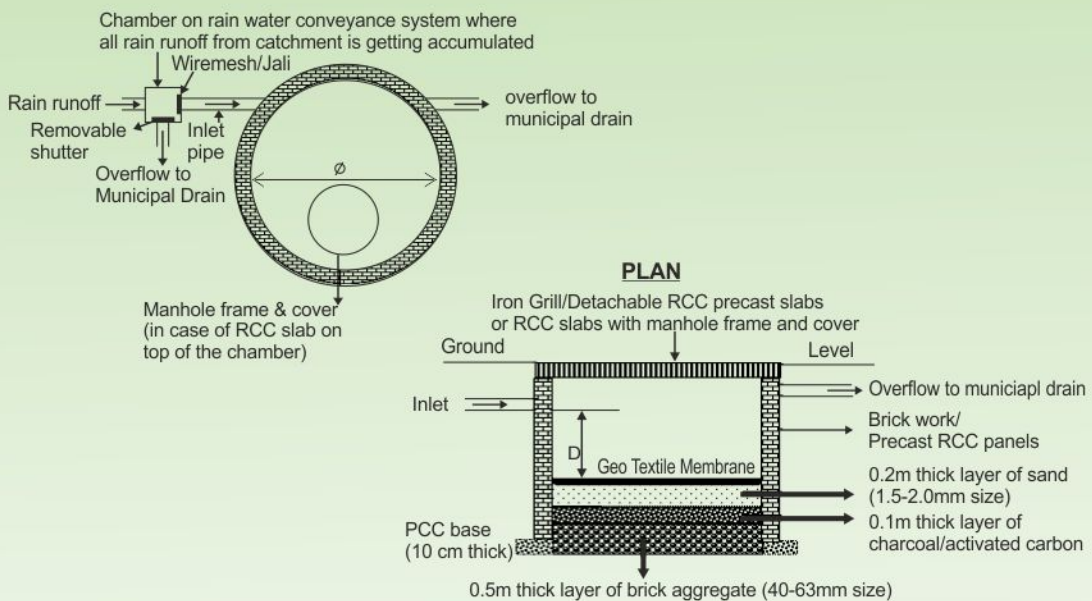




AREA REQUIREMENT

S. No	Plot Area (sq.m)	Maximum Roof-top area as per DDA MPD-2021	Required Capacity (cum)	Suggestive dimensions of Recharge Chambers/Trenches {length (L) X breadth (B) X depth (D) in meters}
1	100	90	1.8	1.2X 1.2 X 1.25
2	200	150	3	1.2 X 1.2 X 2.1
3	300	225	4.5	1.5 X 1.5 X 2.0
4	400	300	6	1.8 X 1.8 X 1.85
5	500	375	7.5	1.8 X 1.8 X 2.30

Fig. 2 : Circular Recharge Chamber for RWH



AREA REQUIREMENT

S. No	Plot Area (sq.m)	Maximum Roof-top area as per DDA MPD-2021	Required Capacity (cum)	Suggestive Diameter (Ø) (internal) of Circular Chambers (mtrs)	Depth (D) of Circular Chambers (mtrs)
1	100	90	1.8	1.2m (4 ft)	1.6
2	200	150	3	1.5m (5 ft)	1.7
3	300	225	4.5	1.5m (5 ft)	2.5
4	400	300	6	2 structures of size mentioned in S. No. 2	
5	500	375	7.5	1 structure of size mentioned in S. No. 2 & 1 structure of size mentioned in S. No. 3 (i.e. total 2 structures)	



Remember: The above calculations give the ‘effective’ capacity i.e. the space inside the pit that will actually hold water. So the depth X width X length of the pit should be equal to the figures 1 & 2. The depths should be calculated from the inlet pipe down to the top of the filter media.



How to make and maintain RWH system?

Your Rainwater Harvesting systems should be designed in such a way that:

- even if it rains with high intensity continuously for 1 hour, your system should be able to store and recharge the runoff that flows into it.
 - It is safe, easy to make and easy to maintain.
 - It complies with the DJB guidelines so that you are able to avail of the RWH rebate. Based on this, some recommendations for Implementation, Operation and Maintenance of RWH systems are:
- ✓ Calculate the water holding capacity of the pit (in cubic metres or kilolitres) that you will build by using this simple formula:

$$\begin{aligned} & \text{Rooftop area}^* \text{ (in sq.m.)} \times 0.8^{**} \text{ (runoff coefficient for roof top/concrete area)} \times \\ & 0.025^{***} \text{ (average maximum rain fall intensity in meters per hour)} \\ & = \text{roof top area} \times 0.02 \end{aligned}$$

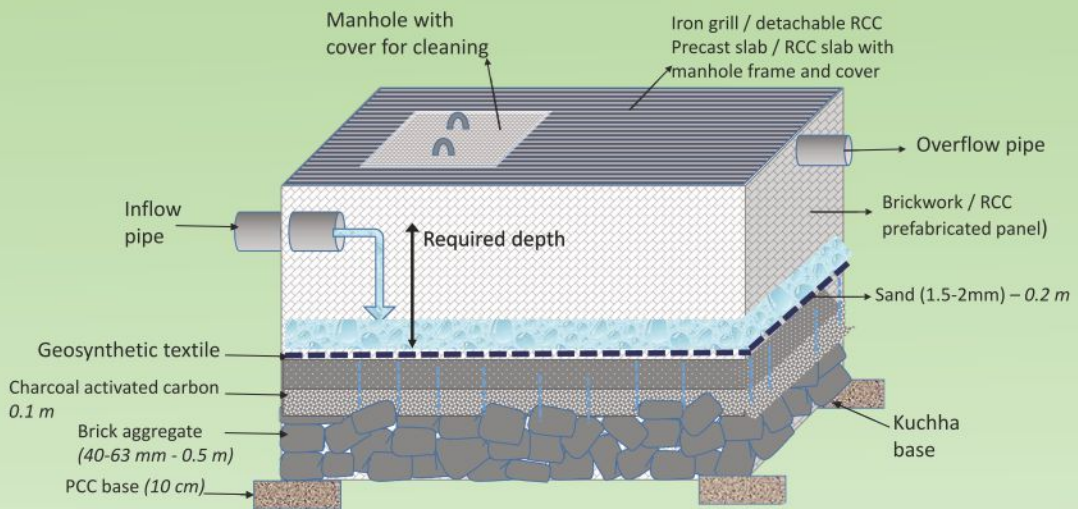
* Rooftop Area – This is the total area of the rooftop of the building for which RWH is being made.

** Approx 20% of the rainwater that falls on a rooftop evaporates or is absorbed by the concrete. The balance 80% flows as runoff. That is why 0.8 is taken as the ‘Coefficient of Recharge for rooftops’

*** 0.025metre or 25 millimeters is the average rainfall that falls in an hour over 1 metre square area in Delhi.



Rectangular Recharge Chamber for RWH



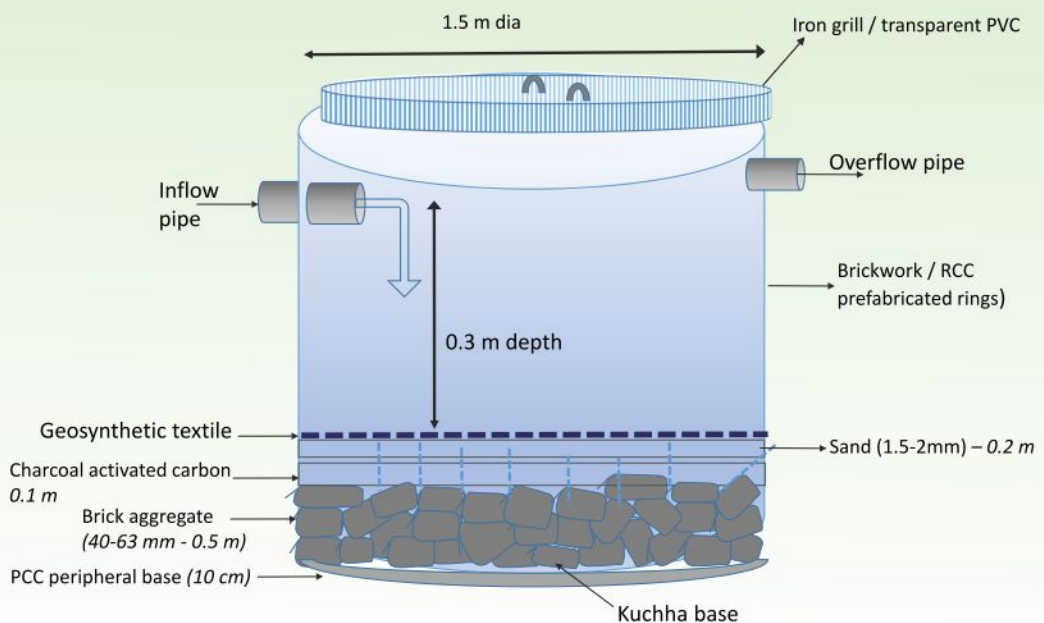
- ✓ Instead of filter media as mentioned in the drawings above, residents may also use multiple layers of jute mats in recharge chambers / modular filters in rain water pipes from rooftops. The objective is simply to arrest the silt in the rain runoff generated from the catchments before its percolation into the natural soil strata.
- ✓ It has to be ensured that no waste water enters Recharge Structures.
- ✓ Depths of recharge structures should be 1.0m - 4.0m.
- ✓ Recharge systems should be located at a safe distance away from the buildings/foundations.
- ✓ Run-off coefficient for bituminous roads/paved areas and open/green areas without steep slopes should be 0.6 and 0.1 respectively.
- ✓ Only non-polluted rain water from the catchment areas should be directed to recharge structures.





- ✓ All catchment areas should be cleaned before the onset of the monsoon to avoid any contamination.
- ✓ An overflow pipe in recharge structures should be provided leading out/ falling into municipal storm water drains / open areas. Under no circumstances should they be connected to the sewer.
- ✓ Recharge structures with requisite structural soundness must be implemented and adhered to all the construction and structural norms. The structure should not pose any danger to people and building. The design should be based on the soil type and land use. Thickness of RCC cover slabs and reinforcement shall be dependent on structural loads.
- ✓ Filter media consisting of brick aggregates (40/50/63 mm size)/charcoal and activated carbon/coarse sand (1.5-2.0mm) /geo textile membrane ought to be provided. For membrane even thick blankets can be used.
- ✓ Recharge structures are to be cleaned after every 2 rainfalls during the rainy season.
- ✓ Post monsoon cleaning and maintenance of recharge chambers shall be carried out.

Circular Recharge Chamber for RWH





- ✗ Roof should not be painted since most paints contain toxic substances and may peel off.
- ✗ Chemicals, rusting iron, manure or detergent should not be stored on the roof.
- ✗ Terraces should not be used for toilets either by human beings or by pets.
- ✗ Polluted water should not be used to recharge ground water.
- ✗ Rain water should not be harvested where post monsoon ground water levels are less than 5m.

Is Rainwater Harvesting Necessary in Delhi?

1. Regulations from Ministry of Urban Development, GOI:

By law it is mandatory for all NEW buildings or plots of 100sqm and above or discharge of 10,000 litres and above per day

2. Regulations from Delhi Jal Board

- a. Water permission to be granted to new house, only when a certificate given by the concerned Zonal Engineer, DJB, that applicant has provided the requisite systems in the building plans sanctioned by the MCD/DDA/any other land developing authority



- b. Bulk water connection is given to an applicant only when he has a certificate of installation of functional rainwater harvesting structure in his building by Executive Engineer / Superintending Engineer of the area.
- c. All plot / property of size 100sqm and above can avail the benefit
- d. Intimation needs to be given to the nearest ZRO
- e. Failing to install RWH structure will invite **penalty** of 1.5 times the water bill for all property 500 sq. mtrs and above.
- f. RWH through artificial ground water recharge structures is not recommended where post monsoon ground water levels are shallower than 5m. Penalties as per the Delhi Water & Sewer (Tariff & Metering) Regulations, 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 non-potable purposes after required treatment may be carried out as a voluntary option.

Such areas are **Sidharth Extension, Okhla Phase 3, Jahangirpuri and Civil Lines**. Areas like **East Delhi colonies along Yamuna** exempted from RWH. The above list of places are only illustrative and not exhaustive.

3. BENEFITS OF INSTALLING RWH STRUCTURE :

- i. Rebate of 10% of water bill for all plot/properties above 100 sq.m for installing functional RWH structure.
- ii. Each individual member from that society will be entitled to the 10% rebate if a society installs functional RWH structure as per the guidelines issued.



Use the water when its falls

Guidelines on Rain Water Harvesting are available at DJB

Website: www.delhijalboard.nic.in or Call on our Tollfree No. : 1916.

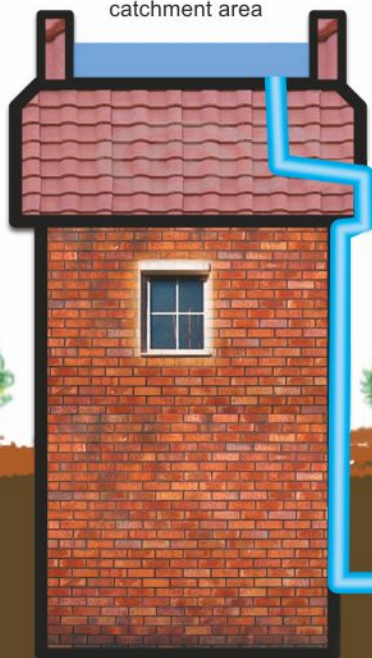
You may also visit Office of EE (RWH/GWC)

**Delhi Jal Board, Room No. 11, Varunalaya Phase-I, Karol Bagh,
New Delhi-110005, Tel. No. 011-23558264**

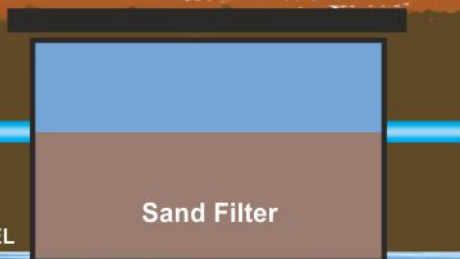
May be contacted for technical assistance on Rain Water Harvesting.



Enclosed & cemented
catchment area



Ground Surface



Sand Filter

HARVEST RAIN TO INCREASE GROUND WATER LEVEL



For more details: Visit: <http://djb.gov.in> or call our toll free no. 1916 and also visit our Facebook page.

Save on a rainy day
The Rain Water HARVESTING DRIVE



DELHI JAL BOARD

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