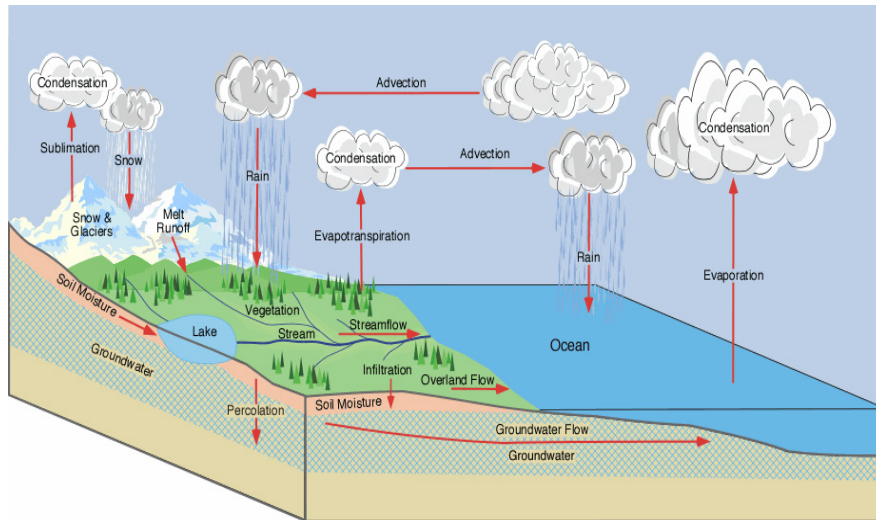


RAIN / ROOF TOP WATER HARVESTING:

Water is essential for life and plays a major role in earth's climate. By modifying land use, the proportion of the different pathways, evaporation, percolation and run off change. The never ending exchange of water from the atmosphere to the oceans and back again is known Hydrological Cycle.



In the present day world, rapid urbanization coupled with industrialization has become the order of the day. Added to urbanization, scanty and erratic rainfall is often resulting in reduction in water levels indicating depletion in storage in the surface reservoirs. Dependence on ground water is increasing rapidly over the past two decades. The demand is so high that indiscriminate use of groundwater resulting in steep fall of the ground water levels and there is also reduction in yields.

Apart from this, sealing of permeable soil zone is gradually increasing due to construction activities thereby resulting in reduced percolation of rainwater into the sub-surface and increased surface run-off.

Therefore an urgent need to take up rain / roof water harvesting / conservation methods in urban and rural areas on a large scale, which subsequently help to recharge and maintain ground water balance, in order to make it on a sustainable source.

RAIN WATER HARVESTING:

Concept of rainwater harvesting lies in:

- Tapping the rainwater from where it falls
- Techniques of rainwater harvesting involve

Catch the rainwater from localized catchment surfaces such as roof of a house, plain and sloping ground surfaces etc. It is easy process to collect Rainwater and diverted into ponds, vessels or underground tanks to store for longer periods and to recharge by construction of RWH Structures in a suitable sites.

Rainwater harvesting is in two ways --

1. **Direct Use:** The process of collecting and storing the rainwater by construction of sump through filters for future productive use and

2. **Artificial recharge to groundwater:** Recharge the rainwater in a scientifically planned way by construction of rain / roof top water harvesting structures to augment the groundwater.

Direct Use:

Rainwater can be used directly in water scarce period by construction of sump and collect the roof top rainwater through filter media.





RWH for rural homes



Purest form of WATER



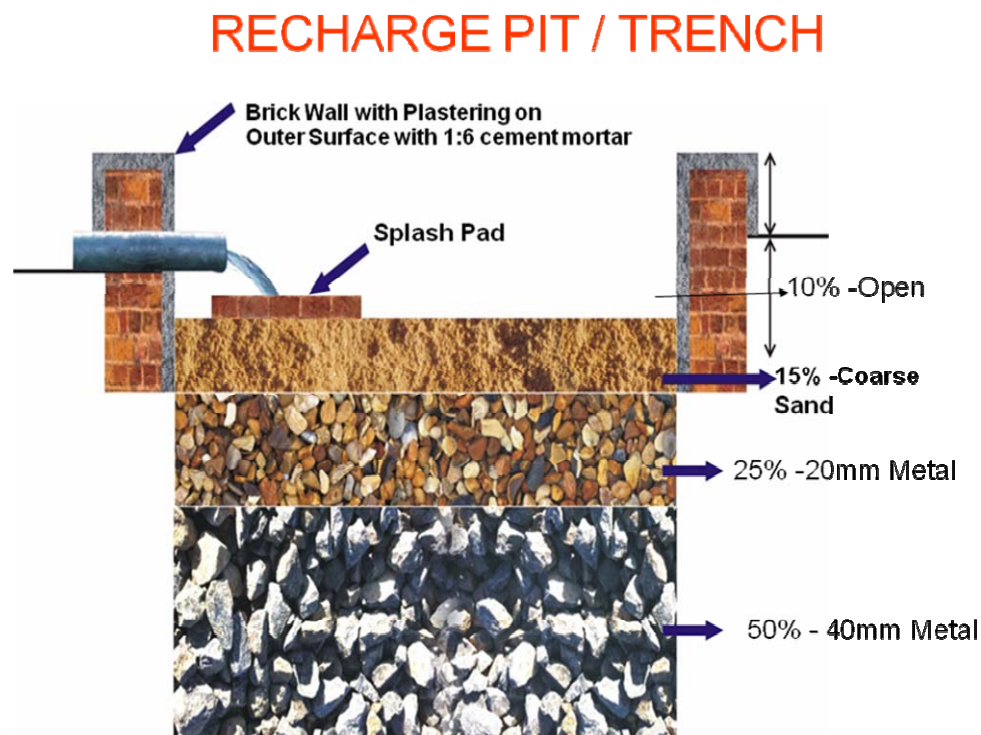
Guidelines for construction of Rain / Roof top water harvesting Structures:

1. Recharge structures should be designed and constructed in favourable geological conditions i.e. permeable soils followed by murrum etc. The structures should not be taken up in impervious clayey soils, rock and steep sloped areas.
2. Recharge structures should be preferred for recharging to depleted aquifers with deep water table. They should not be taken up in the shallow water table areas. The depth to water level should be not less than 5 to 6 meters in post-monsoon period.
3. Recharge structures should be taken up with unpolluted surface water only. Adequate precautions should be taken to prevent entry of polluted urban surface runoff water, sewerage water into recharge structures.
4. Recharge structures should be planned and taken up in over exploited and critical areas experiencing intensive ground water development for various uses.
5. All existing kuntas and tanks in and around the urban agglomeration areas are to be protected against encroachments and should be converted as percolation ponds and tanks. The polluted drainage and other industrial pollutants should not be allowed to let into these tanks.
6. Ground water recharge through shafts is preferable in steep slope areas.

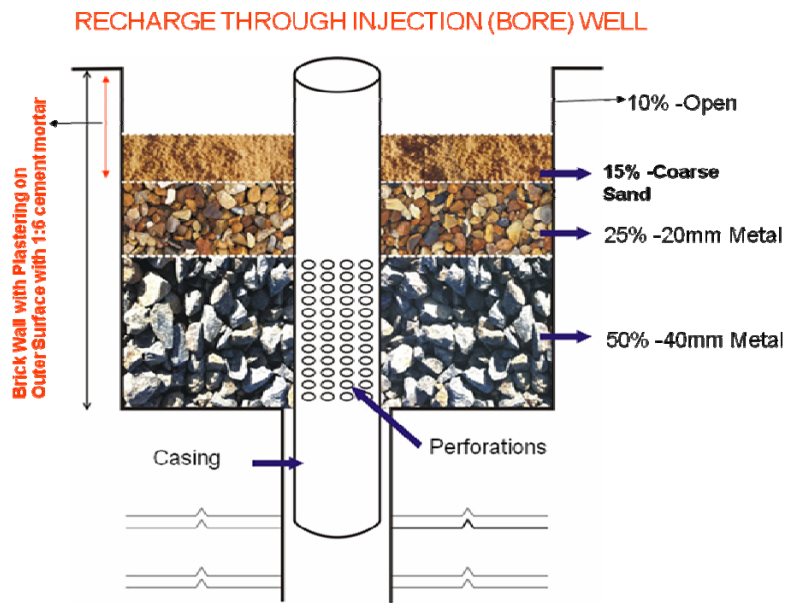
Type of RWH Structures to recharge the rainwater:

The rainwater harvesting structures are scientifically designed along with filter media that, a 6cum of trench or pit for the roof area of about 100Sq.m.

1. Recharge of rainwater through pits or trenches in the areas of top permeable aquifers

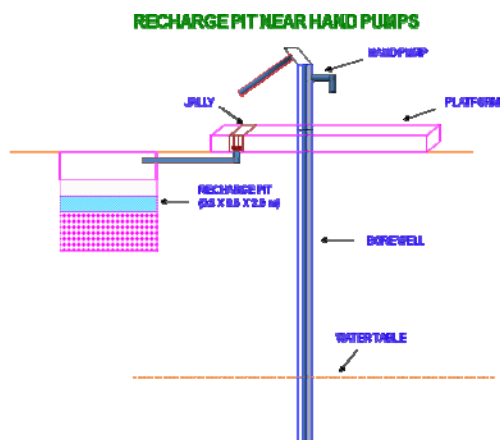


2. Recharge of rainwater through injection wells along with pit or trench in the areas of top impermeable aquifers



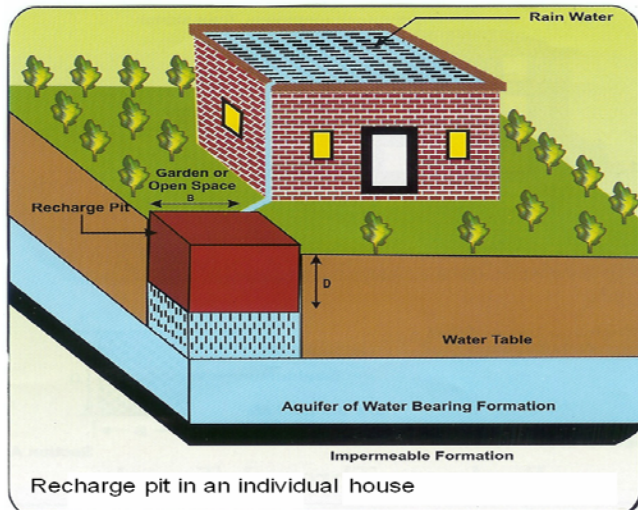
Some models are as below:

Recharge structure at public storage tank near Scheme bore well

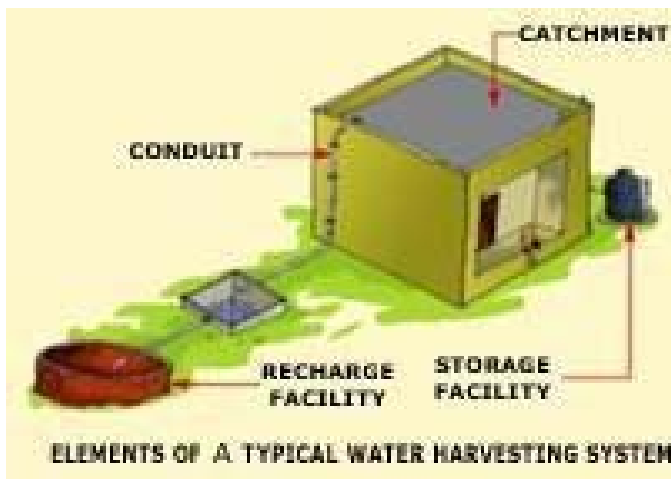




Rainwater Collection in Multistoried Roofs

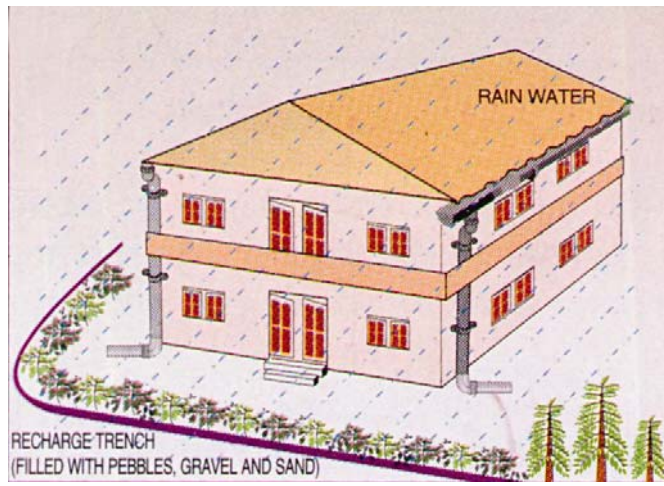
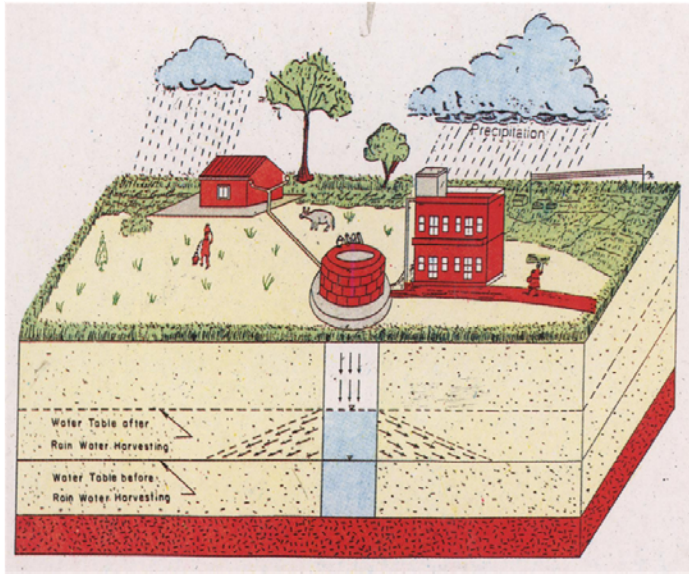


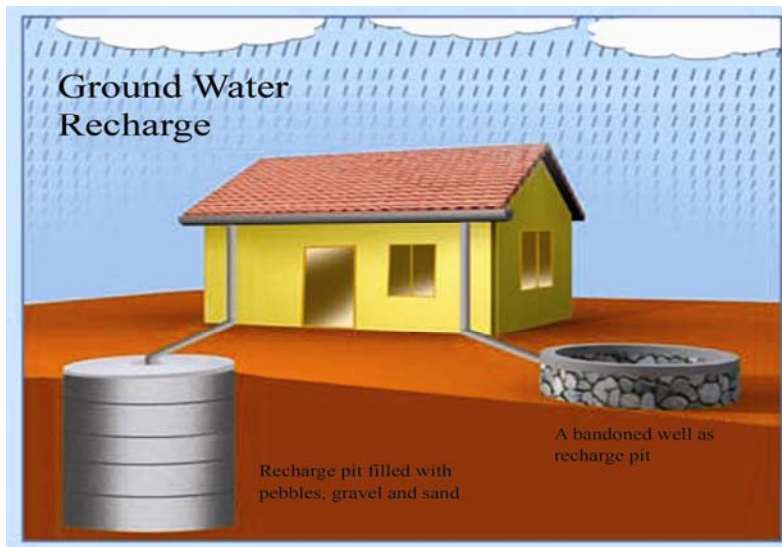
Recharge pit in an individual house



ELEMENTS OF A TYPICAL WATER HARVESTING SYSTEM

ROOFTOP RAIN WATER HARVESTING





In large open areas:

EARTHEN BUND IN LARGE OPEN AREAS TO RECHARGE THE RAINWATER





Live Check Dams in large open areas



Check Dams in large open areas and on first or second order streams

COMPUTATION OF ADDITIONAL RECHARGE TO GROUND WATER

Roof top collection and diversion to recharge pit factors considered for 100 sq.m individual house and 500 sq.m. apartments.

1. Roof top area.
2. Rainfall 20 mm in single event.
3. Total annual rainfall about 780 mm.

Percent rainfall considered for harvesting is 70% of annual rainfall., 550 mm.(780/20*2000=78000; 78000*70/100=54600 or say 55000)

Sl.No	Description	Individual Houses	Apartments
1	Roof top area	100 Sq.m.	500 Sq.m.
2	Available rooftop water for 20 mm rainfall	2.0 Cum.	10.0 Cum.
3	Available rooftop water for additional recharge per annum @ 70% of total annual rainfall	55 Cum.	275 Cum.
4	Available rooftop water for additional recharge from 2000 houses of 100 Sq.M each	1,10,000 Cum.	

Thus the rainwater harvested from each house of 100 Sq.m. of roof area (55 cum) can meet the requirement of a five member for 100 days @ 110 liters / day / person.

SUGGESTED VOLUMES OF RECHARGE PITS:

	Individual Houses	Multi Storied buildings
1. Roof top area	100 sq.m.	500 sq.m
2. Volume of Pit / Trench	6 Cum	30 Cum
2. Total quantity available for recharge per annum.	55 cum	275 cum
3. Water available for 5 member family @ 110 litres/head	100 days One family	50 days For 10 families

ADVANTAGES OF RAINWATER HARVESTING:

1. Recharge to groundwater and built up in ground water levels.
2. Rejuvenation of dried up wells.
3. Improvement in the yields of wells.
4. Improvement in the quality of ground water through dilution.
5. Helps in reducing inundation of roads and flood hazards.
6. Save future generations from water scarcity problem.
7. Reduce power Consumption.
8. Collection of roof top water in to a sump and recharge pit facilitates direct use of rainwater apart from recharge to ground water. This helps in reducing the water bill and huge investments on purchase of water through tankers in scarcity areas.
9. The structures recommended for rainwater harvesting area simple, economical and eco-friendly.

NEED FOR ROOF TOP RAINWATER HARVESTING:

- ❖ To meet the ever increasing demand for water
- ❖ To reduce the runoff which chokes storm water drains
- ❖ To avoid flooding of roads
- ❖ To augment ground water storage
- ❖ To reduce the soil erosion
- ❖ To supplement domestic water requirement during crisis
- ❖ To improve the quality of ground water

Contact Sri. J. Satyanarayana, Assistant Director, Rain Water Harvesting Cell, Single Window Cell, HMWSSB, Khairatabad, Hyderabad for technical guidance for construction of Roof top / Rain Water Harvesting structures.