



Government of India
Ministry of Housing & Urban Affairs

Guidance Document on Creation of Rainwater Harvesting Parks

Central Public Health and Environmental
Engineering Organisation

<https://mohua.gov.in> || <https://cpheeo.gov.in>

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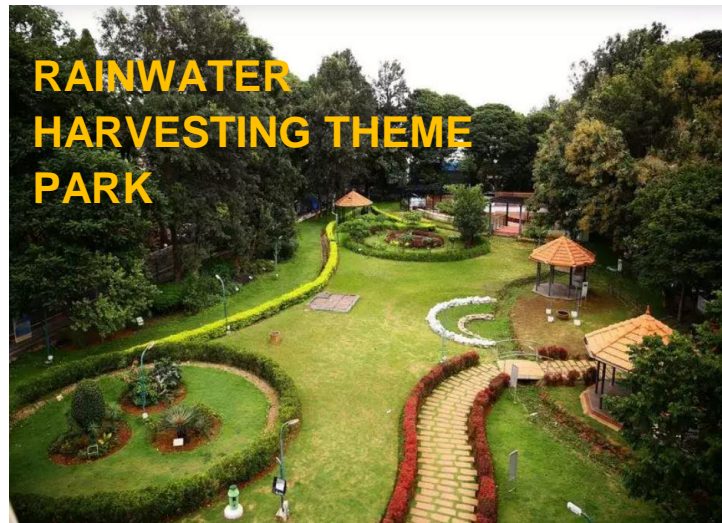
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1.0 Introduction

Rainwater harvesting is one of the prioritized projects under JJM (U) as a measure to mitigate water scarcity in the country. Different types of rainwater harvesting practices are established based on the types of land-use settings.

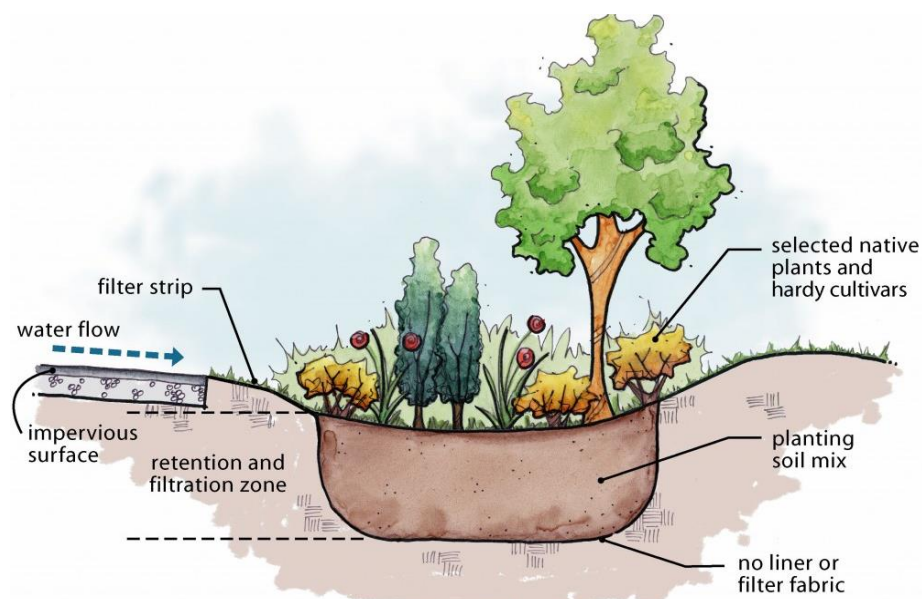
Rain water harvesting parks are one such practice that is used for conserving rainwater while also acting as recreational facilities. Rain water harvesting parks are shallow depressions in a landscape that act as a sponge to soak rainwater into ground. Rain water harvesting parks allow rainwater to creep down into the soil and replenish aquifers and improve the quality of ecosystem.



With right planning of rain water harvesting parks and cost effective simple construction techniques, rainwater can be conserved and used for recharging the ground water and rejuvenation of water bodies.

2.0 Structure of Rain Water Harvesting Parks

Rain water harvesting parks are common parks with specific features that distinguish them from ordinary parks. The four elements of rain water harvesting parks are (i) the catchment area, (ii) the transportation element, (iii) filtration and (iv) the storage.



Representation of rain water harvesting park

3.0 Construction of Rain Water Harvesting Parks

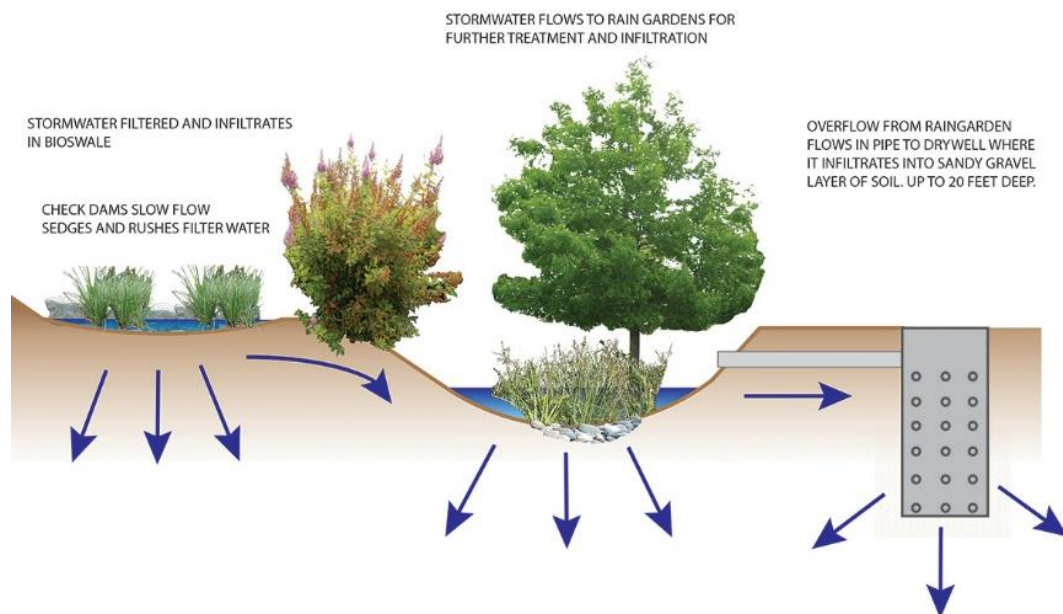
The important steps involved in construction of a rain water harvesting parks are as follows:

- Selection of a location
- Size and shape of park
- Determining type of rainwater harvesting structure
- Selection of plants to be grown and adding enhancements

4.0 Cost Effective and Sustainable Approach

4.1 Check Dams

A check dam is a small, sometimes temporary, dam constructed across a swale, drainage ditch, or waterway to counteract erosion by reducing water flow velocity. Check dams are cost effective method to help in conservation of water.



Representation of check dams

4.2 Discarded Tyre Reuse

Discarded tyres can be bound together and used as a barrier for rainwater runoff. Artificial waterbody structures can also be made out of discarded tyres to hold rainwater. Use of discarded tyres in rain water harvesting park allows percolation of rainwater into ground and rejuvenate water bodies in a cost effective and sustainable way.



Representation of tyres reuse in park

4.3 Percolation Pits/trenches

Percolation pits/trenches are suitable where a permeable stratum is available at shallow depth. The pit is filled with boulders, gravel, and sand for filtration of rainwater. Top layer of sand should be cleaned periodically for better ingress of rainwater into the subsoil.



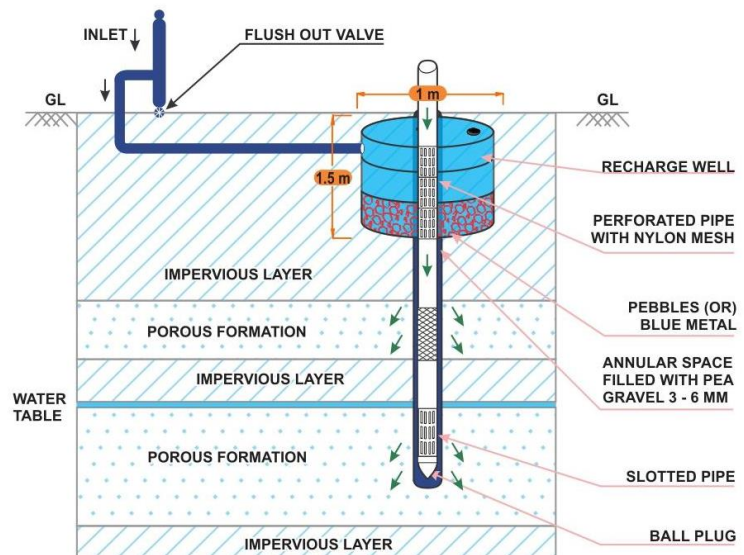
Representation of percolation pits

4.4 Abandoned Borewell/Dug well

Abandoned dugwell /borewell may be utilized as recharge structure. The rainwater is guided through a pipe to the bottom of well or below the water level. Well should be cleaned periodically and chlorinated to prevent microbial contamination.

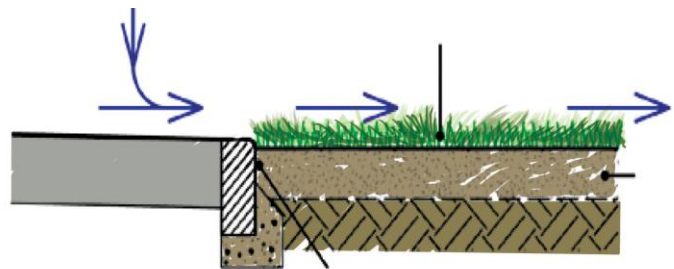


Representation of dugwell recharge structure



4.5 Filter Strips

Filter strips are designed to accept overland sheet water flow. Runoff from an adjacent impermeable area must be evenly distributed across the filter strips for infiltration into ground.



Representation of filter strip

4.6 Detention basins

Detention basins are surface storage basins that provide flow control through attenuation of rainwater. They also enable some settling of particulate pollutants. Detention basins also function as a recreational facility.



Representation of detention basins

4.7 Terrain Modeling



Terrain modeling with dry stone retention walls are a sustainable construction technique since they are built with stone, local material readily available, and easy to recycle, with natural drainage, as the joints are not filled with cement mortar.

Representation of terrain modeling with dry stone retention walls

Retention walls allow the staggering of the slopes, creating horizontal terraces for plants & bushes, where rain water is filtered into the ground avoiding both water waste and surface soil erosion.



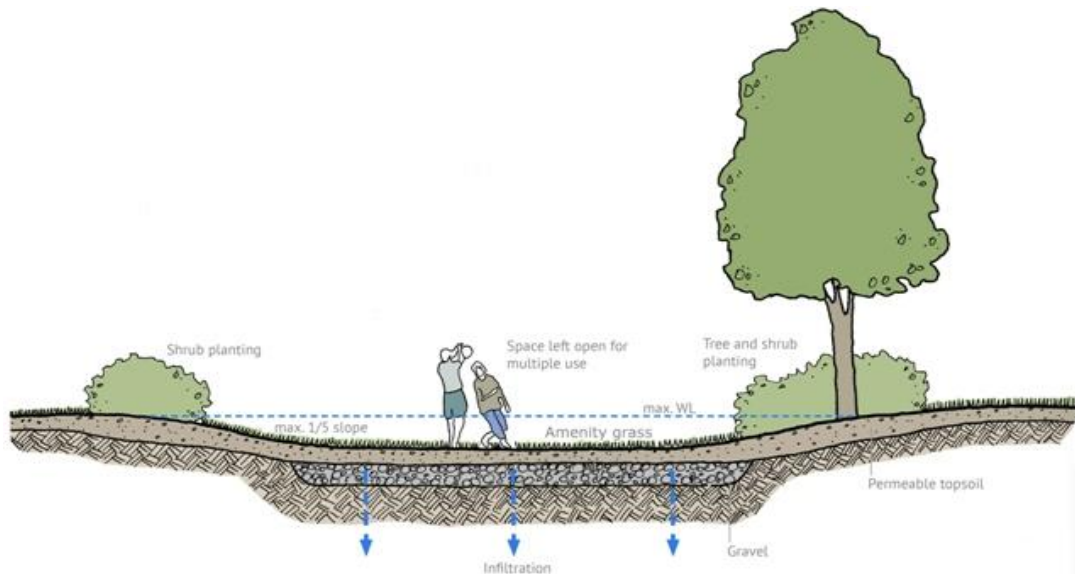
The design of open spaces involve terrain modeling in sloped sites and terraces in this case are for recreational purposes making them accessible and usable to the public.

4.8 Filtration basins

A filtration basin is filled with permeable granular material is designed to promote infiltration of surface water to the ground.



Representation of filtration basin



Representation of filtration basin in a park with space left open for multiple use

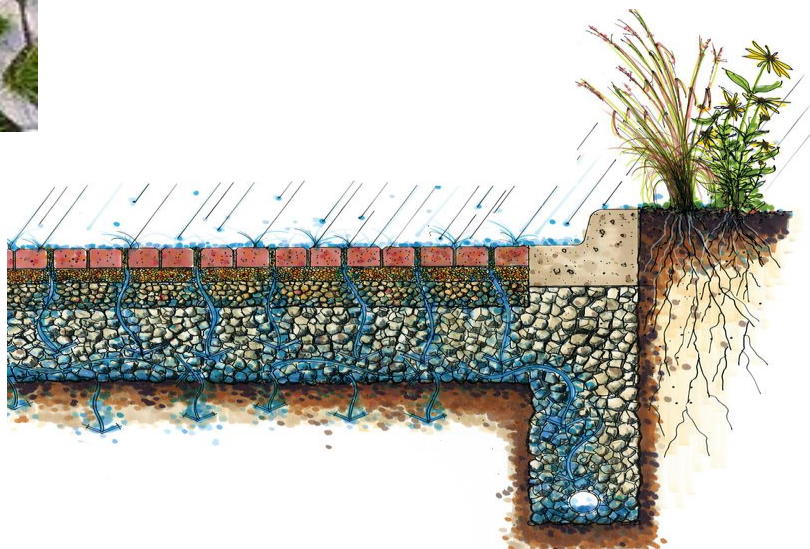
4.9 Permeable Pavers



Representation of permeable pavers

Permeable pavers or pavements are considered for areas which have hard surfaces. Preference should be given to water-friendly pavers, or porous pavement or asphalt.

Permeable pavers allow rainwater to infiltrate into underlying soils promoting groundwater recharge. These surfaces are permeable, meaning they let the water through.



Representation of permeable pavers

4.10 Infiltration Swales

Swale is a shallow channel with sloping sides used for rainwater harvesting. A swale may be either natural or human created. Artificial swales are often infiltration channels, designed to reduce rainwater runoff, filter pollutants and to increase rainwater infiltration into the ground.



Representation of swales

4.11 Sedge meadows

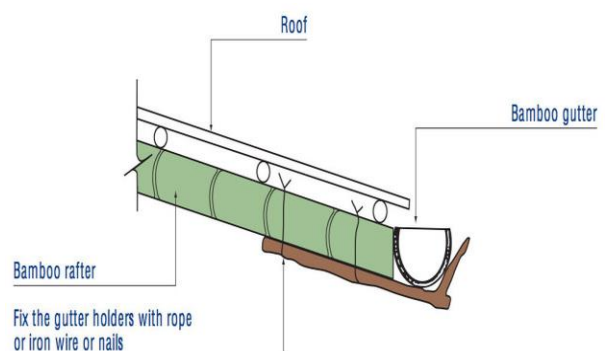
Sedge meadows are large natural or artificial wetland areas planted mostly with sedges and other native plants. Sedge meadow infiltrates water into the ground and also protects soil from erosion.



Representation of sedge meadows

5.0 Channelization and Filtration

Rainwater can be harvested via channelized gutters installed on sloping/ flat roofs on any structure available at a park. A filter system can be incorporated in the rain water channels to prevent debris, dirt and dust from entering the tank.



Representation of gutter in roof

5.1 Silt traps



Representation of silt traps

A silt trap is a structure used for preventing dirt and solid materials like grit and gravel from entering into the rainwater collection tank.

5.2 Wall Mounted filters



The Pop-Up Filter has three components such as rainwater receptor, flush valve and filter element. Rainwater filtered through pop-up filter can be stored separately. There are different types of filters available in the market based on different requirements.

Representation of pop-up filter

5.3 Sand Bed Filter

Sand bed filter is a traditional and cost effective method to filter the rainwater by using locally available materials like sand, aggregates, etc.



Representation of sand filter

5.4 Cloth filter

A piece of fine cloth is suspended over a container that functions as a sieve placed over the opening of the container. The suspended cloth would help in collecting the rainwater and filter the same into the container.



Representation of cloth filter



5.5 Leaf slide

Leaf slide is used to separate leaves from rain water in areas of high leaf litter. Relatively cleaner water passes through the filter for storing.

Representation of leaf slide

6.0 Storage

Different storage structures of various capacities such as masonry tanks, ferro-cement tanks, earthen pots, fiber storage tanks, HDPE tanks etc., can be installed. The capacity of storage device can be decided by considering parameters such as roof, catchment area/surface, water usage and space availability etc.

7.0 Selection of Plants for Rain Water Harvesting Park

Rain water harvesting parks are planted with trees, shrubs, ferns, groundcover species, ornamental/non-ornamental grass, perennial flowers and indigenous plants that are well adapted to wet/dry conditions that do not require fertilizer. Taller plants are planted in the middle or back of the park and drier species on the berm and perimeter of the park.



Representation of selection of plants for rain water harvesting park

8.0 Benefits of Rain Water Harvesting Parks

- Rain water harvesting parks reduce rainwater runoff, store water for future use, replenish groundwater recharge, local aquifer replenishment, mitigate pollution and rejuvenate water bodies, etc.
- Stores rainwater which can be used for irrigation of parks.
- Rain water harvesting parks helps in filtration and retention of pollutants, decomposition, plant uptake, etc. to improve the quality of urban runoff.
- Plantings of flowers, grasses and ornamental plants, berms adding height, contrast, and texture to level areas adds to the beauty of place and provides a pleasing park view and beautify neighborhoods and parks
- Improve water quality
- Remove standing water and mosquito breeding
- Protect communities from flooding and drainage problems
- Create habitat for birds, butterflies and beneficial insects
- Create drought tolerant green areas

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