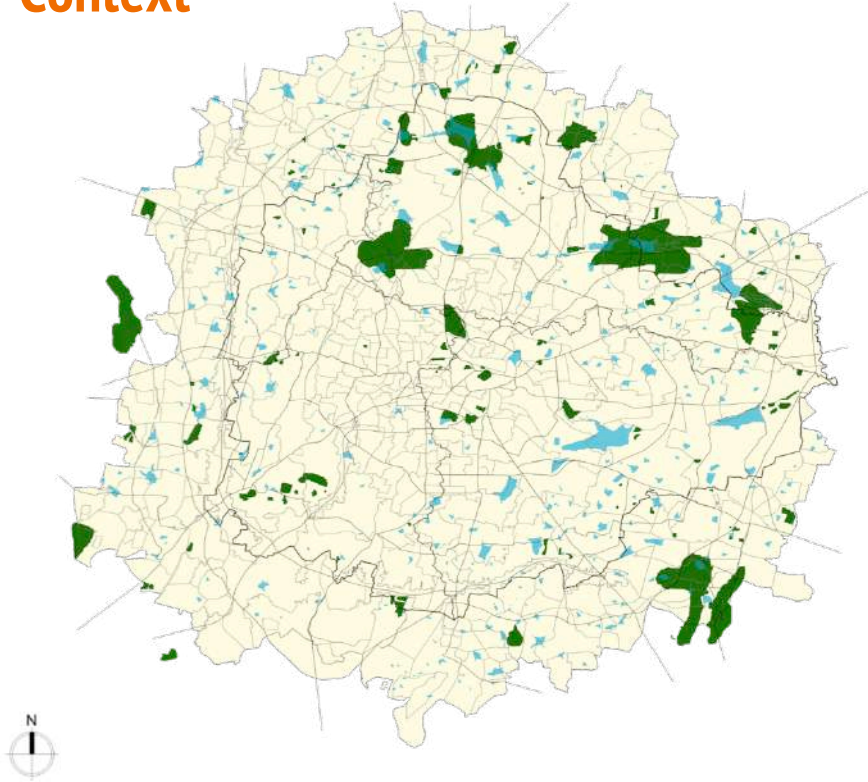

Sustainable water management in public parks

BENGALURU

Context



Bengaluru: 1294 sqkm

Public parks: 1.9 sqkm

THE GARDEN CITY OF INDIA

Total number of parks – 1288

Total area – 1.99 sqkm

Bengaluru receives 974 mm of annual rainfall

The total annual rainfall endowment of public parks is 1,938,260 million litres

Even if 25% of the endowment could be recharged, it would be 484,565 million litres per year

Nine Sustainable Water Management Practices for Public Parks

1.



Rooftop rainwater
harvesting

2.



Recharging surface
runoff

3.



Reviving open wells

4.



Ponds

5.



Reusing treated
wastewater

6.



Mulching

7.



Non water intensive
landscaping

8.



Permeable paving

9.



Bioswales

1. Rooftop Rainwater Harvesting

What is a catchment?

Any area from which the rainwater runoff can be collected for storage or recharge. E.g. rooftop of a building

How is RWH done?

The runoff from the rooftop is collected via duntake pipes, filtered, and stored in a sump. The overflow is channelled to a recharge well

What is it re-used for?



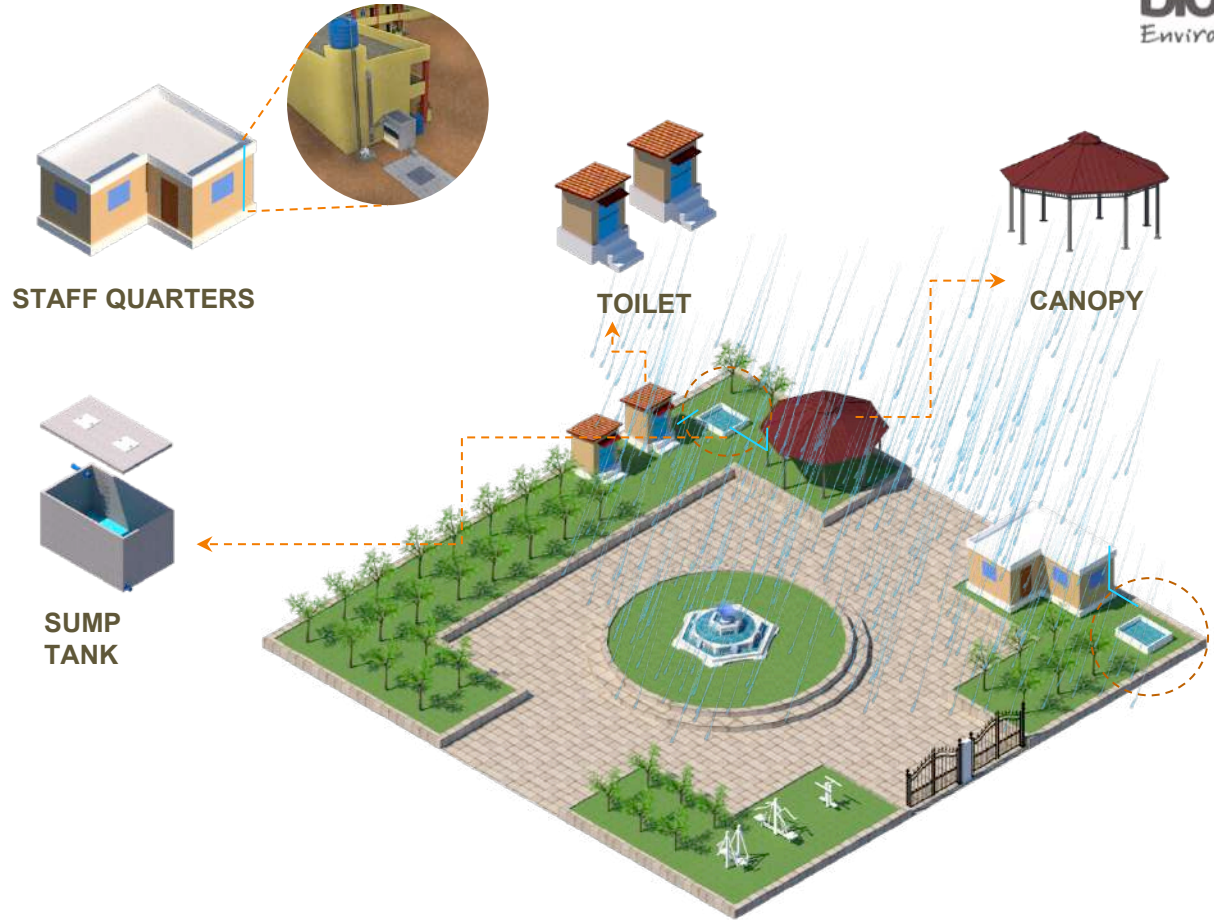
Staffs domestic use



Toilets

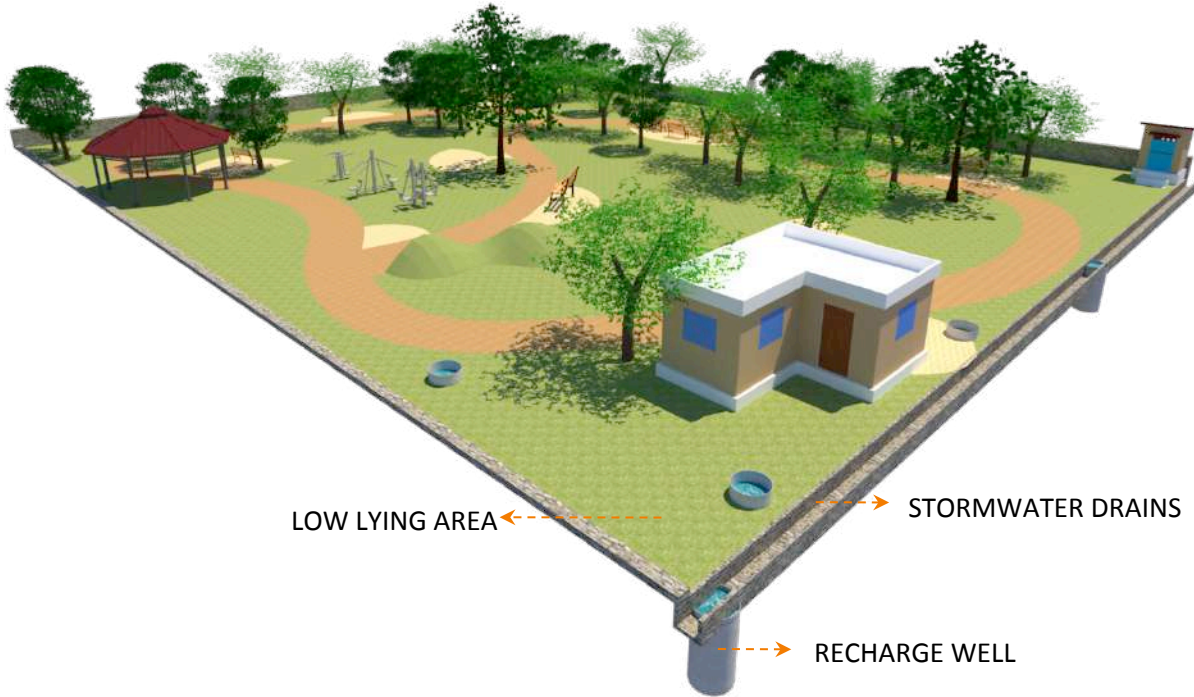


Gardening



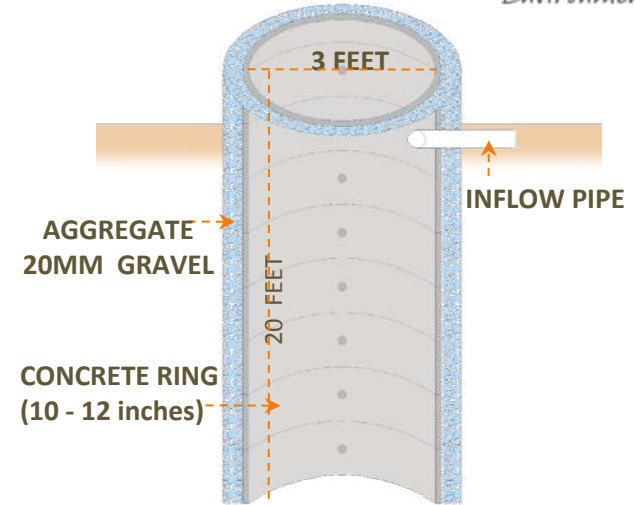
2. Recharging surface runoff

Where is the catchment?



Recharge wells in public parks can be dug in the low lying areas where there is waterlogging during rainfall

What is the size of a recharge well?



What is the cost?

Dimension	Rate (Rs)
3' x 20'	35,000/- to 55,000/-
6' x 30'	1,30,000/- to 1,50,000/-
20' x 30'	6-8 lakhs/-

What is the capacity of recharge well?

Holding capacity of a 3 ft*20 ft well - 4000 L

How many recharge wells?

Number of wells = Runoff volume / recharge capacity of each well

Chances of hitting water?

- Some areas in the city have high groundwater table
- E.g. Indiranagar, Malleswaram, Cubbon Park, Vidyananyapura
- Any area next to a lake which has water through the year

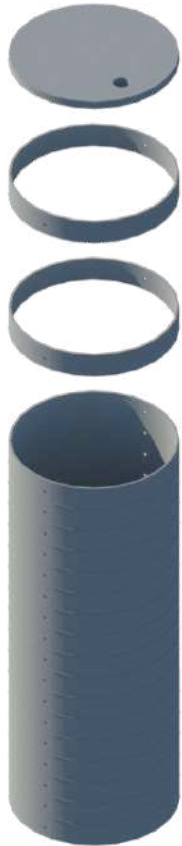
Who digs the recharge wells?

Mannu vaddars are the traditional well diggers who engage in well digging, cleaning, de-silting and deepening of wells



[Contact well diggers here](#)

What are the uses of recharge wells?



Recharges the groundwater

Mitigates flooding

Improves the yield of borewells

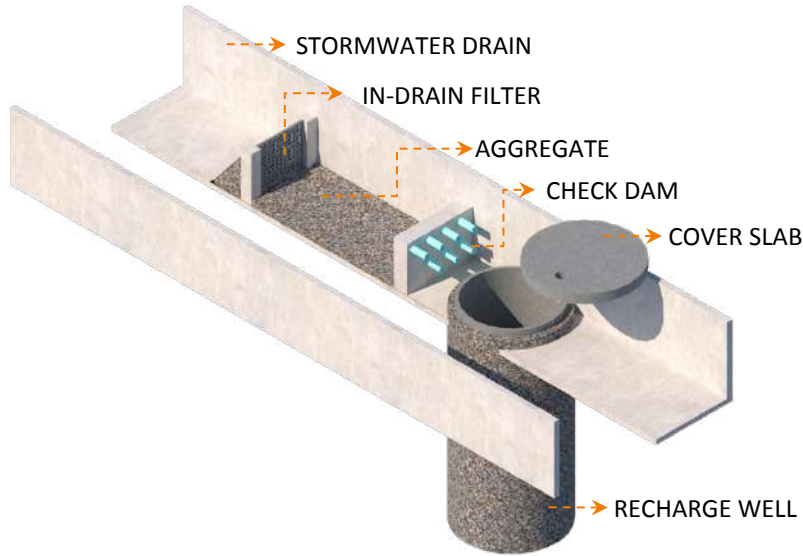
Over a period of time recharge wells may hold water and can be used as a source of water

Recharge wells may also benefit other groundwater sources in the locality

Potential to raise the city's water table

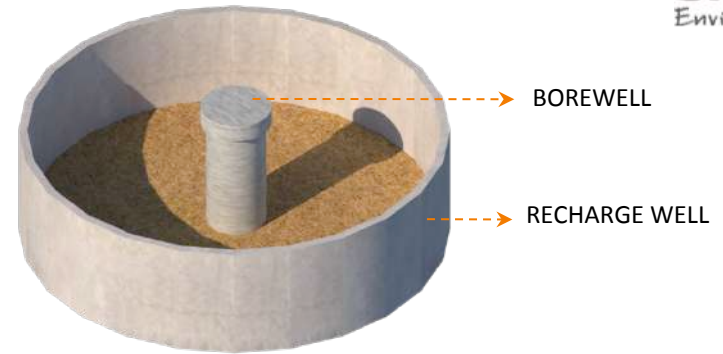
Reduce dependence on external water sources by increasing reliance on local water sources

Recharge wells in Stormwater Drains



- Recharge wells are best dug in stormwater drains as all surface runoff ends up in the SWDs
- Upstream of the recharge wells, simple in-drain filters are created to prevent solid waste / debris from entering the recharge well

Direct borewell recharge



- Recharge well is dug around the borewell casing
- Done only for functional borewells that have run dry
- Layers of graded gravel, sand and mesh, and charcoal if needed are filled in the recharge well
- Only clean rooftop rainwater should be used
- Perforations are made in the casing to allow the rainwater to enter the borewell directly
- Results of recharge can be seen after a single rain

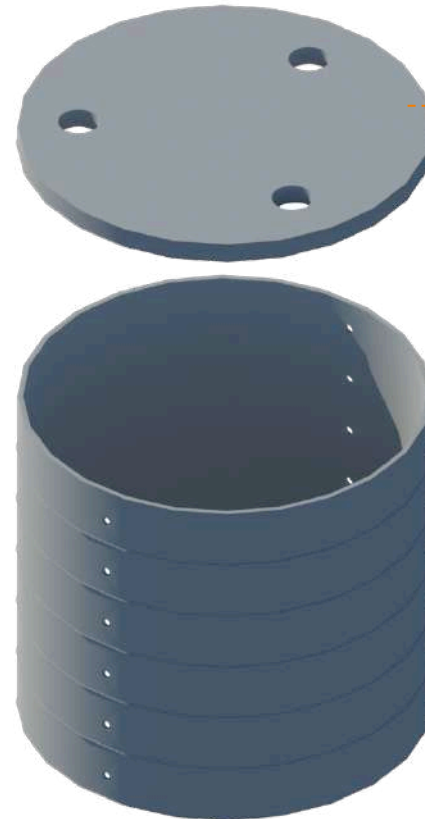
Do recharge wells require maintenance?

- Filter and SWD should be kept clean to prevent the clogging of RWs with silt, dry leaves, other debris, etc
- The recharge wells need to be checked every year and desilted at least once in 2-3 years to be able to function efficiently
- Concrete slabs should be checked - if broken or chipped they will allow debris to enter the recharge well
- Sewage should not enter the recharge wells
- Heavy items should not be kept on the covering slab of the recharge well

An Example

Cubbon Park: 73 recharge wells of 3 ft diameter and upto 15 ft depth have been dug across the park, and are recharging the surrounding open wells and borewells

What are the safety precautions?

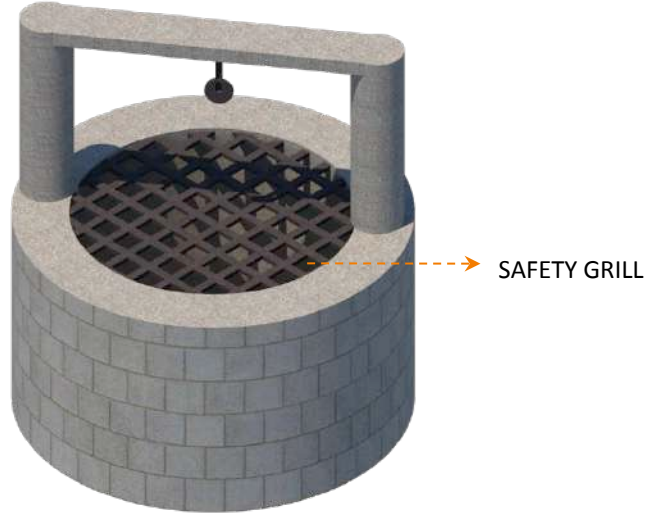


Recharge wells should be covered with a concrete slab

A grille fitted inside the recharge well provides additional safety

The recharge well should be visible and accessible for maintenance - it should not be covered with soil or paved over

3. Revival of Open wells



- Clean and desilt the open well
- If it has water use it after water quality testing, thus reducing dependence on borewell water
- Cover the well with a safety grill
- If open well does not have water, recharge it with rooftop or surface runoff
- Recharge wells help to recharge open well

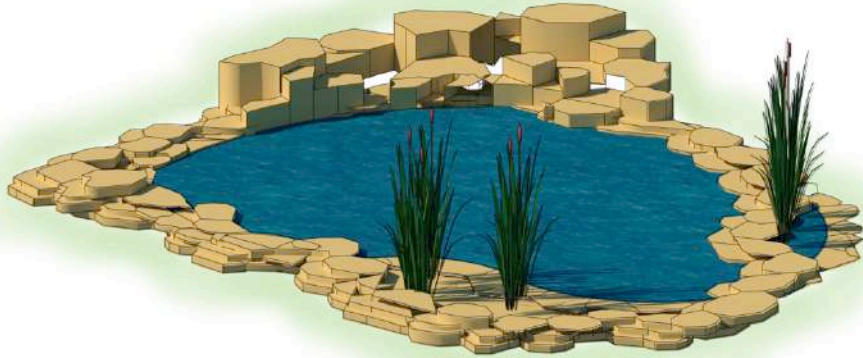
Revival of open wells in Cubbon Park

- Cubbon Park covers an area of 300 acres
- It has 7 open wells that were cleaned and desilted in 2018
- These wells were then found to yield upto 60 KL of water per day.
- The open wells water is used for watering the garden



4. Ponds

What are ponds?



- Small water body to collect rainfall runoff and allow it to percolate slowly into the ground
- Dug in low lying areas
- Overflow from the pond should be led into stormwater drain
- Can be designed creatively
- **Example:** 2 ponds were cleaned in Cubbon Park and the water is used for gardening

Recharge well within a pond

- A recharge well can be dug within a pond
- The water in the pond flows into the well, increasing the pond's percolation capacity
- Can be made aesthetically beautiful



5. Use of treated wastewater

Excess treated wastewater (TWW) from neighboring apartments can be used for watering the gardens in a park

- Reduces the park's fresh water demand
- Apartments can find a use for their excess TWW

Example

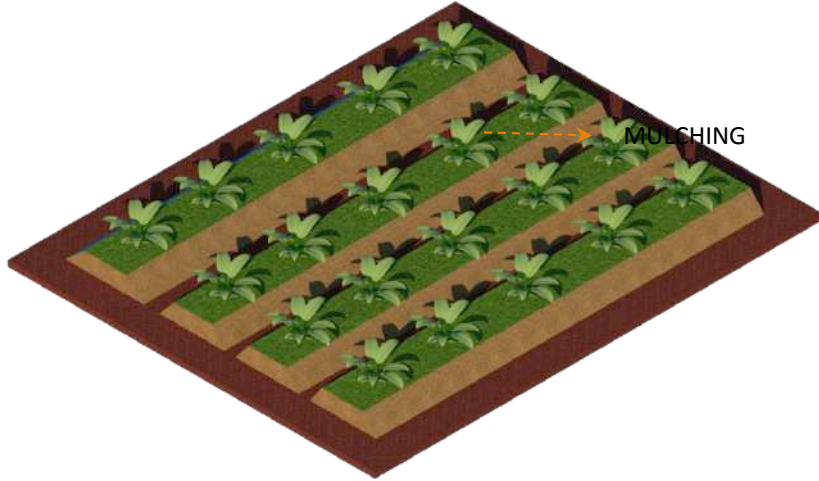
- SPARK is a community park
- Spread across 3 acres
- Located in Doddenakundi on Alpine Eco Road
- Uses treated wastewater from 2 neighbouring apartments
- 25000 + 12000 litres a day
- Plans to use TWW from a third neighbouring apartment

SPARK: Sustainable Park



6. Mulching

Mulching is the process of covering the soil with biomass like dry leaves, grass, etc in such a way that no area of soil is left exposed



Mulching is an efficient measure for soil conservation and passive irrigation

- Increases moisture retention in soil
- Plants require less irrigation
- Weed growth is reduced

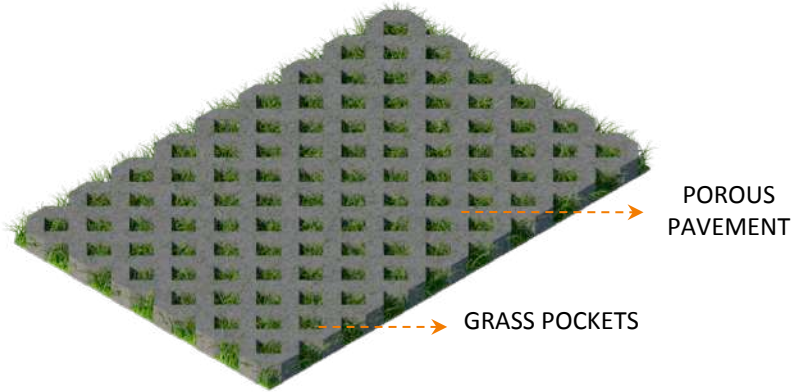
7. Appropriate Planting

Planting native species of plants

- Plants that thrive by themselves and need minimal maintenance
- Biomass plants when chopped and dropped add more nutrition to the soil
- Cover crops that keep the soil covered and also provide nitrogen



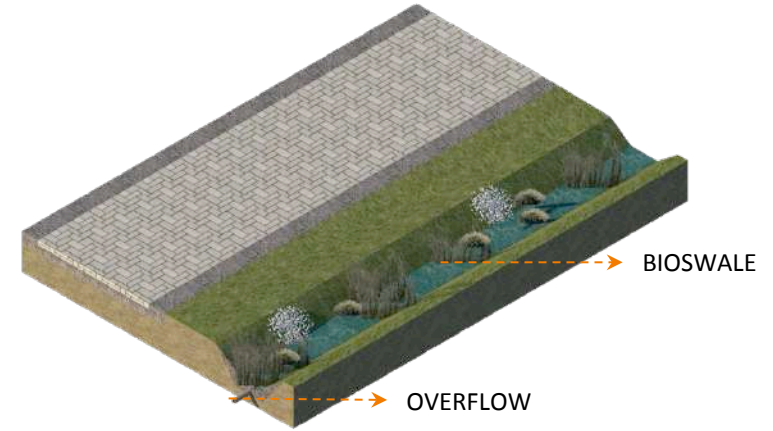
8. Permeable walkway



Permeable walkways allow the water to percolate through the openings into the soil

- Reduce surface runoff volumes
- Prevent soil erosion
- Increase soil moisture
- Prevent puddling and stagnation of water
- Can be used for pavements, parking areas

9. Bioswales



Bioswales are shallow trench like depressions created on contour to infiltrate stormwater runoff into the ground. They are planted with native vegetation

- Increase moisture retention in soil
- Recharge runoff
- Prevent soil erosion