RWH at Umaid Bhawan, Jodhpur, India

Location

![Location map of Umaid Heritage in Jodhpur, Rajasthan](source: Google Map Image, 2014)

The Umaid Heritage site is a private township located in southeast of the Umaid Bhawan Palace. The site is located in the city of Jodhpur where the traditional water management system is getting gradually destroyed due to modernisation and urbanisation. The city is second largest city of Rajasthan with major physiographic units of sand dunes, alluvial plains, ridges and hillocks.

Context

Jodhpur city located close to the Thar desert, historically had devised a system of getting water through its lakes and stepwells. In 1897-98, the system was replaced by public piped water supply distribution in the city. Jodhpur stores the raw water it gets from the Rajiv Gandhi Canal in two impounding reservoirs, the Kailana and Takhatsagar. The water level in the city was 24 m below ground level (mbgl) in 1985 but the water table is 2.4 mbgl since 1998 after the waters of the Rajiv Gandhi Lift Canal started reaching Jodhpur. The residents stopped using traditional water resources after the canal began supplying water, causing rise in water table. But the city suffers from water logging on roads and open spaces in rain season due to high water table. According to the...
National Institute of Hydrology, Kailana Lake’s elevation and leakage losses could be contributing to the increase in groundwater level. The city has recorded high ground water level with brackish quality of the water. Thus it is recommended to harvest and store the rainwater than recharge as alternate source of water supply. While the walled city of Jodhpur has high water table due to external factors, the water table at Umaid heritage residential complex site is still quite low in the range of 20-40 mbgl (see Map 4: Depth of groundwater in Jodhpur District).

In the absence of adequate water supply the cost of water tanker for supplying 10,000 litres water is around Rs. 800-1000/.

Objectives

The Birkha Bawari is designed as a monumental RWH structure, in Umaid Heritage Township which is based on the concept of both ‘Kunds’ and ‘baoli’ (also referred as ‘Bawari’) which were the traditional practice of RWH in Rajasthan and Gujarat. The Bawari structure acts as a recreational space for inhabitants as well as storage of rainwater – and good example of sustainable urban development practice in a low rainfall region, demonstrating the value of water by conserving rainwater.

Timeframe

Operational since: 2008
Year of RWH system implemented 2010

Project Collaborators

It was designed by Indian architect Anu Mridul and was paid for by the Essgee Group, a real estate firm based in Jodhpur.

Strategies and Interventions

Rainwater Harvesting system

Features

- Total catchment area—110 acres (44.51 hectares)
- Green area irrigated using harvested rainwater—15 acres (6.07 hectares)
- Capacity of RWH structure (bawari storage tank)—17.5 million litres
- Volume of rainwater harvested—approx 21.1 million litres per annum
Technology

Catchment area
The entire area of the site acts as catchment area for the system to catch water. The rainwater is collected from the open areas through the natural slopes as well as from the roof top of houses which in turn are connected with natural slope of the site through drainage conduits. The nature of the catchment area is rocky with high runoff coefficient. The entry of rainwater is blocked from the inlet wall for first two flushes of rainfall to avoid debris and dust particles going to Bawari.

Conveyance system
The housing complex is designed in two phases, one with apartments called phase-II and the other with plotted housing called phase-I. The rainwater is collected from rooftops and road channels through storm water drains; open channels and slots. The runoff from phase-II is collected from the storm drains and connected to the drains in phase-I sloping towards the RWH structure – Birkha Bawari, located in Phase I of the complex.

Sedimentation and storage tanks
The Birkha Bawari consists of longitudinal open rainwater storage structures. The system consists of series of
constructed tanks making it a linear 135 meter long structure. The water enters from both the sides of underground longitudinal storage structure (Bawari), which holds 17.5 million liters of harvested rainwater annually and serve as a rich source of water for landscaping water requirements of green area in an otherwise water scarce region. Rainwater comes from either side of the structure (Bawari) and first enters into the hidden settlement tank from there, water flows to the series of tank with deepest depth of 18 meter below the ground level.

**Observations**

The RWH system captures around 21.1 million litres of rainwater reducing the dependence on municipal water supply or groundwater extraction. The average cost of water tanker (10,000 litres per tanker) in Jodhpur is Rs 800–10,000. Thus by using the rainwater as alternative source of water about Rs 2.36 million is saved annually.

**Outcomes of the Project**

The residential complex has around 15 acres of green area. The landscape is rich mix of trees, plants and gardens as an integrated part of the complex. The stored water from the Birkha Bawari is used for maintaining green area of the housing complex. The rainwater stored can meet around 8-9 months of landscaping and horticultural water requirements. The RWH project is a high visibility and high impact intervention with considerable social and economic benefits to direct users as well as its surrounding environment in terms of improvement in micro climate.

**Funding and costs**

Housing complex authority with architect Anu Mridul, Essgee Group, a real estate firm based in Jodhpur funded the project cost.

- **Cost of the system** — Rs 80 million
- **O&M**: Rs 12,000
- **Savings**: 2.36 million per annum

**Key Learnings**

The RWH structure not only provides the environmental benefits but also increased the aesthetics of the site. There are extensive landscaped area and gardens in the residential area that are used by residents for recreational activities and social gathering, thereby leading to area appreciation and building a social community around the structure.

In addition to the above the RWH structure helps in awareness creation on the overall concept of RWH. The project site is frequently visited by universities/schools students and researchers. The structure in the housing society is an absolute example of how the environmental benefits can be achieved with simple integration of historic concept to better utilise and conserve the in-situ resources.
Additional information:

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Contact Person

Anu Mridul  
Principal Architect  
71 Nehru Park, Jodhpur - 342 003  
Email: a.mridul.architect@gmail.com