Way out of Bengaluru's recurring water crisis

A city blessed with an annual average rainfall of 787 mm, struggles every summer due to water shortage

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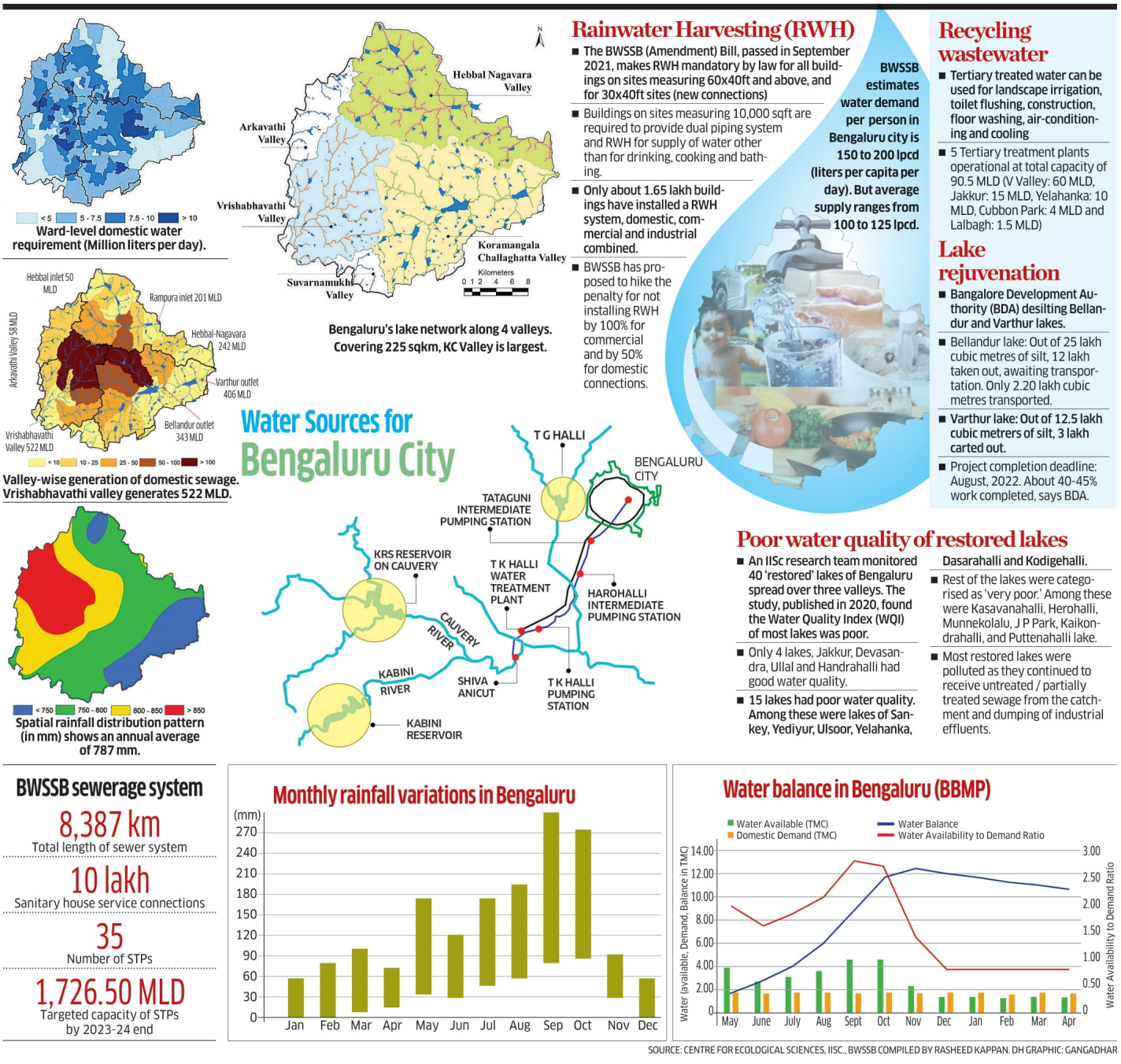
A view of Kundalahalli Lake developed and maintained by residents and BBMP in Bengaluru. Credit: DH Photo

Record rains last year had Bengaluru’s streets water-logged, houses flooded and sewers overflowing. Harvesting this would have helped the city avert any summer water crisis. A city blessed with an annual average rainfall of 787 mm even without a record year, could have avoided the perennial struggle to meet its yearly water demand of 18 TMCft.

A robust rainwater harvesting system, a foolproof wastewater treatment mechanism and a strong

by the water shortage. While citizens have been slow to warm up to rainwater harvesting, the government's response to effectively treat and manage the available water has been sluggish at best.

But there is still a way out — the city's 193 surviving lakes can serve as reservoirs for rainwater. Dr T V Ramachandra, from the Indian Institute of Science Centre for Ecological Sciences, believes that rejuvenating lakes can enable the city to retain its rainwater.



"Bengaluru's topography that allows an interconnected lake system gives us this option. In the Koramangala-Challaghatta Valley alone, we can store about 5.2 TMCft of water" Ramachandra says

the storage capacity of lakes and recharge groundwater with clean water," he says. However, desilting seems to be a half-hearted effort. A case in point is the slow pace of desilting work at the Varthur-Bellandur lakes.

In the 1800s, Bengaluru had 1,452 water bodies with a total storage capacity of 35 TMCft. Taking advantage of the city's topography, an inter-linked lake system was created in an area of 740 sqkm, the city's current spatial extent.

But the dramatic 79% decline in water bodies, aggravated by a sharp fall in green cover from 68% in 1970 to barely 3% now has left the city's once-famed green image in jeopardy. In the last five-and-a-half decades alone, the concretised area has risen by 1,055%, says Dr Ramachandra.

The potential of rain

Rainwater harvesting (RWH) offers a clear way out if the lake storage is smartly executed. Studies have established that about 73% of Bengaluru's water demand can be met by efficient harvesting. Of the city's four valleys, the Vrishabhavathi valley has an estimated catchment yield of 7.32 TMCft of water, K C Valley (5.2 TMCft) and Hebbal (4.2 TMCft). The city's total annual rainwater yield stands at about 14.80 TMCft.

Treating 18 TMCft of wastewater generated in the city could yield another 16 TMCft. "This means you end up with 31 TMCft, which is a surplus situation. You can be self-sufficient and also give the excess water to the neighbouring districts."

However, there is a problem of implementation for RWH. In a city with an estimated 35 lakh properties, the Bangalore Water Supply and Sewerage Board (BWSSB) has recorded only about 1.65 lakh buildings that have installed RWH systems, domestic, commercial and industrial combined.

Having relied entirely on harvested rainwater for over 27 years, A R Shivakumar, a water management advisor to the United Nations Development Programme (UNDP), sees in this slow progress, a public mindset problem.

By innovating a simple RWH system at his Vijaynagar home, he has demonstrated how up to 2.23 lakh litres of rainwater could be harvested. "This is adequate for a family to survive without outside water for a year," he says.

Shivakumar attributes people's reluctance to the availability of highly subsidised Cauvery water. "The BWSSB charges only about Rs 7 for 1,000 litres. There is also a fear of investment. But the

Upgrading this to 20,000 litres will help store rainwater for up to seven months. To retrofit, all that is required is a filter. The excess flow could be diverted to a recharge pit," he explains.

Wastewater treatment

Wastewater treatment is also critical to ensure sustainability. But most Sewage Treatment Plants (STPs) in the city, functioning at low efficiency, have not stemmed the inflow of untreated wastewater into the stormwater drains. On paper, the BWSSB's treatment capacity with 35 STPs stands at 1,523.5 MLD.

A way out could be to replicate the treatment model perfected in the city's Jakkur lake. A constructed wetland there was integrated with an algal pond and a secondary treatment plant. The primary treatment removes large particles from sewage, the secondary one removes the chemical ions and the tertiary treatment takes out the nutrients.

For the last 10 years, the project team led by Dr Ramachandra monitored the lake water quality. "In 2005, all the wells near the lake had nitrates which are carcinogens. Today, none of the 300 wells in the vicinity of the lake have nitrates and offer clean water," he says.

Drain remodeling

To stop the sewage inflow into lakes, a massive drain remodelling exercise has been in the process for years. "But in the name of remodelling, they are mismanaging. The drains remodelled in the last eight years have narrowed down and concretised the surface," says Ramachandra.

Concretisation completely halts groundwater recharge. This triggers more overland flow during rainfall, leading to frequent floods. "This is an unscientific method. This is at the cost of the people's water rights," he says.

For decades, self-reliance meant digging borewells. While individual wells mushroomed, both the BBMP and BWSSB adopted this as an official policy to quench the thirst of lakhs who settled in the city's newly added areas on the outskirts. BWSSB estimates that there could be around six lakh borewells in and around the city.

Currently supplying 1,470 MLD of Cauvery water daily to the city, BWSSB has proposed to complete the Cauvery Stage-V by March 2023. This, as the Board's Chief Engineer (Cauvery) S V Ramesh informs, will enhance the supply by an additional 775 MLD, catering to the 110 villages integrated to the Bruhath Bengaluru Mahanagara Palike (BBMP) in 2007. "About 35% of the work has been completed.

operators, the partnership has turned lucrative for many. Inevitably, the groundwater table has taken a massive hit. The levels have depleted to an alarming 1,000 to 1,200ft. The explosive growth of water tankers, particularly in the outlying villages, is symptomatic of a system exploited much beyond its limits.

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