How Serious Is India's Water Crisis?

Per-person water availability has fallen by about 75% since 1947, and experts say it could get a lot worse in the coming years with the current use and abuse patterns. TOI does a status check on World Water Day

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On Independence Day in 2019, PM Modi set the goal to provide tap water to every rural household by 2024, and the country has made tremendous progress on this since. Over 11.4 crore of India's 19.4 crore rural households (59%) have been covered already, so the promise will likely be fulfilled by next year. The big question, however, is whether all households will regularly get enough water of the right quality.

Given the precarious condition of its ground- and surface-water resources (rivers, streams, lakes, wetlands and reservoirs), India could be a water-scarce country in the next 40 years.

TIMES Special

With 1,486 cubic metres (1.5 million litres) of water available per person, per annum, India falls in the water-stressed category. A dip below 1,000 cubic metres per person, per annum, will push it into the water-scarce category.

The manner of water consumption also compounds the problem. Central Ground Water Board (CGWB) statistics show the indiscriminate use of groundwater turned 4% (260) of the total 7,089 assessed units in the country critical in 2022 while 14% (1,006 units) were assessed as over-exploited.

The situation was worse in 2017 when 17% of the units were over-exploited. Various recharge and conservation efforts have borne fruit but the number of such units remains high in states like Punjab, Rajasthan, Haryana, Delhi, Tamil Nadu and Karnataka.

Rivers And Lakes At Risk

In India, 87% of groundwater is extracted for irrigation and experts say excess withdrawal round the year may be the biggest reason for depletion, as the recharge primarily happens in the monsoon. On the other hand, encroachment of waterbodies and the discharge of untreated wastewater into rivers and streams have reduced the surface water resources.

Scan this QR code to hear about World Water Day

"Pollution compromises the water and river bed soil quality, which adversely affects the biota (life forms) in it, and developmental projects play havoc with the river as a system, changing its pattern of flow, extent of floodplains, and its propensity to freely meander and erode and deposit silt on its banks," said Manoj Misra, a retired Indian Forest Service officer who is an expert on water issues and convener of the not-for-profit 'Yamuna Jiye Abhiyaan' (Living Yamuna Campaign).

Misra added that the harm to rivers endangers the habitat conditions for aquatic and riparian biota (both plants and animals) and impacts rivers' ability to recharge groundwater "affecting the nation's water security".

Mindless development takes a toll on river beds, ponds, tanks, lakes, etc. Statistics show 1.6% (38,496) of India's 24.2 lakh waterbodies have already been encroached while 53,396 of them in rural areas are not in use as they have dried up, silted or turned saline, increasing the use of groundwater.

"Encroachment due to development projects, which alters the system in a far more fundamental manner, is often ignored or seen more as a mitigational challenge, which is a reflection of the poor understanding of rivers as an ecosystem by planners and engineers," said Misra.

Groundwater Quality Falling

The country practically depends on groundwater, which meets 62% of India's irrigation needs, 85% of rural water supply and 50% of urban water supply. So, it must be used judiciously and protected from contamination. While it is an annually replenishable resource, its availability varies from place to place and time to time with monsoon intensity.

GROUNDWATER BALANCE SHEET

*BCM: Billion cubic metres (one cubic metre contains 1,000 litres)

**Ratio of annual groundwater use and availability. If it exceeds 100%, groundwater consumption is more than the annual groundwater recharge

63% OF WASTEWATER IS NOT TREATED

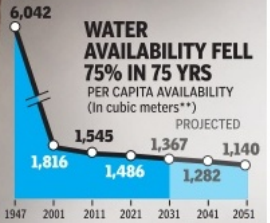
Urban sewage generation
72,368 million litres per day (MLD)
Installed treatment capacity
31,841 MLD
Operational treatment capacity
26,869 MLD

A THIRD OF GROUNDWATER UNITS NEED ATTENTION

Extracting up to 70% of the available groundwater in a year is considered 'safe'. Areas with 70-90% extraction are considered 'semi-critical', those with 90-100% extraction are 'critical', and those with more than 100% extraction are 'over-exploited'. Of the 7,089 groundwater units assessed in 2022, about a third were found to be outside the safe limits.

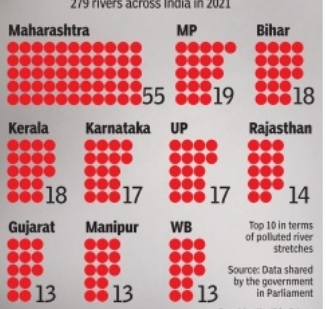
WATER AVAILABILITY FELL 75% IN 75 YRS

PER CAPITA AVAILABILITY (In cubic meters**)



RIVER POLLUTION WORSENS SHORTAGE

Central Pollution Control Board identified 311 polluted stretches on 279 rivers across India in 2021



Top 10 in terms of polluted river stretches

Source: Data shared by the government in Parliament

STATES WITH MOST OVER-EXPLOITED UNITS

Although Tamil Nadu has the maximum over-exploited units, their concentration is far higher in Punjab, Rajasthan and Haryana

STATE	NO. OF ASSESSED UNITS	OVER-EXPLOITED	
Tamil Nadu	1,166	360	31%
Rajasthan	302	219	73%
Punjab	153	117	76%
Haryana	143	88	62%

% figures are rounded off; Source: Central Ground Water Board

24,24,540 WATERBODIES COUNTED IN 33 STATES AND UTs SO FAR, WITH 7.5 LAKH IN WEST BENGAL ALONE. INDIA'S FIRST WATERBODY CENSUS IS STILL ON

Graphic: **Karthic R Iyer**

Various reports show contamination of groundwater is one of the key challenges in achieving the target of universal tap-water supply under the government's 'Jal Jeevan Mission' (JJM) by next year.

In December last year, 25,691 habitations were affected by one or more contaminants. More than half of them (13,716) had high (beyond acceptable limit) presence of iron, while 9,938 had salinity. Also, 760 habitations were affected by arsenic, 655 by fluoride, 515 by nitrate and 107 by heavy metals.

Eklavya Prasad, founder of the non-profit Megh Pyne Abhiyan that works on groundwater management issues in eastern India, said high levels of salinity, fluoride, nitrate, iron, arsenic, uranium, and some toxic metal ions had been observed over large areas, making groundwater hazardous.

Prasad said the over-exploitation of groundwater is threatening agriculture, drinking water availability, industry, and even water-based cultural practices. "The prevailing perception about groundwater largely portrays it as an infinite and safe resource, which is far from the reality," he added, blaming ignorance among users and the government. "The paucity of knowledge about the quality and quantity of water has significantly contributed towards excessive abstraction of groundwater."

To overcome this ignorance, Prasad recommended the creation of a "credible, localised, dynamic information system of groundwater across all rural and urban habitation units. Users have to be made aware about the quality of water and its quantity... to transform their perspective".

Aquifer Mapping On

That is why the CGWB is implementing the National Aquifer Mapping Programme (NAQUIM) with an aim to identify the groundwater aquifer (water-bearing stratum of permeable rock or sand) systems along with their characterisation for sustainable management. Out of India's total mappable area of nearly 25 lakh sq km, nearly 24.6 lakh sq km had been covered by December 30, 2022. The rest is expected to be covered this month. The map will help states make their respective management plans, knowing the aquifer-wise availability of water and its potential.

Rajasthan has the largest targeted area (3.3 lakh sq km) for coverage under aquifer mapping, followed by Madhya Pradesh (2.7 lakh sq km), Maharashtra (2.6 lakh sq km), Uttar Pradesh (2.4 lakh sq km) and Karnataka (1.9 lakh sq km). Targeted areas had already been mapped in Rajasthan, Bihar (90,567 sq km), Jharkhand (76,705 sq km), Haryana (44,179 sq km), Kerala (28,088 sq km), Uttarakhand (11,430 sq km), Himachal Pradesh (8,020 sq km), Goa (3,702 sq km), Jammu & Kashmir (9,506 sq km) and Delhi (1,483 sq km), among others, by December 2022.

The government has also taken up other interventions to conserve both rainwater and groundwater. One of them is Jal Shakti Abhiyan (JSA) that was launched in 2019 in the water-stressed blocks of 256 districts to harvest monsoon rainfall through artificial recharge structures, watershed management, recharge and reuse structures, intensive afforestation and awareness generation.

Atal Bhujal Yojana, implemented in certain water-stressed areas of Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh, in collaboration with the states, is another such scheme. It aims at sustainable groundwater management by involving the village communities in the targeted areas.

Besides, last April the government undertook to rejuvenate waterbodies under the Amrit Sarovar Mission that aims to develop and rejuvenate 75 waterbodies in each district as part of independent India's 75th anniversary celebrations. All these measures will, however, help only if the states stop encroachment of their existing waterbodies through judicious development.

How we raised Puducherry's water table by 7ft

Former lieutenant governor of Puducherry, **Kiran Bedi**, *recounts how her team turned the UT into a water-rich place by involving corporates in cleaning up its streams and ponds*

Making Puducherry water-rich was a journey filled with moments of agony and ecstasy. Agony at seeing canals clogged with silt, the economically weak having to buy bottled water for cooking, women complaining of hair loss due to bad water, and running out of funds to desilt 23 feeder channels, 84 tanks and 609 ponds. And then, moments of ecstasy when we got our first donor and became able to bring in ample funds to completely desilt all our canals and ponds.

While I was LG of Puducherry, having an open administration helped us to not just hear the problems the people were facing but also get to their root and solve these problems. One such complaint in an open house was about water, and it was alarming to see how Puducherry was moving towards complete drought.

So, on World Water Day in March 2018 we resolved to make Puducherry water-rich and even coined the hashtag 'WaterRichPuducherry'. Then began our weekend morning rounds towards this mission.

We formed a team that included the PWD chief engineer, other public officials and members of Team Raj Nivas. We started visiting campuses of educational institutions and industries that were guzzling water, and found most of them lacked water harvesting facilities. We instructed them to immediately work on building rainwater harvesting structures.

Bedi during an inspection at Velrampet lake during her tenure as Puducherry LG

Then started our visits to the various water channels. A visit to the Sitheri channel was an eye-opener. It was completely clogged with silt and thick grass, and needed an earth mover for cleaning up. We learnt that it would cost Rs 4-5 lakh to clean up the channel but PWD officials said they had no funds. We said we would get them Rs 6 lakh, and turned back with a resolve to raise funds.

On our way back we stopped by at the Inox gas factory, which was near the water channel, and asked them if they would adopt the channel and have it cleaned up as part of their CSR activity. They agreed.

Back in Raj Nivas I put out a tweet seeking support to clean up these water channels, promising to announce the names of the donors. Dr Mariazeena Johnson of Satyabhama University came in as our first donor. Our team led by comptroller Asha Gupta continued to work on bringing in CSR support and soon had enough funds for desilting and cleaning up all the water channels.

We made it very clear that the donor would pay the equipment operator directly. Raj Nivas was acting as a facilitator and helping connect donors to earth mover operators. We even allowed farmers to take away the silt for farming.

The channels and ponds soon started looking clean and became part of the functions and prayers the companies organised towards celebrating their efforts. We decided to give "Swachhata Hi Seva" awards to all the donors who had supported 'Mission Water Rich Puducherry'.

After the rural water channels, we took up the cleaning of the urban canals to prevent flooding in the city. They were clogged with not only silt but also pillows, mattresses and pieces of wood. The people had become callous about them.

We followed the same CSR model and got all the canals cleaned up so that when the northeast monsoon hit that year the rural water channels were brimming with water, ready to be used for irrigation, and the urban canals were able to remove the storm water and avoid flooding. When I left Puducherry two years ago, the water table was up by 7 feet and the water channels were brimming with water.