

# 'WE HAVEN'T ALLOWED SUB-SOIL WATER TO RECHARGE. THIS IS INSURANCE WATER': SHASHI SHEKHAR

Relevant for: Geography | Topic: Distribution of key natural resources - Water Resources incl. Rivers & related issues in world & India

Illustration: R. Rajesh

A delayed start to the monsoon has plunged several cities and districts into a water crisis. With India nearly 37% short of its June rainfall and water levels in reservoirs in southern India lower than their 10-year average, there are swirling debates on what has caused the crisis, the role of climate change, myopic policy-making, and unregulated urbanisation. Shashi Shekhar, who was once secretary of the water resources ministry as well as a senior official in the environment ministry, has grappled with water challenges at many levels. Excerpts from an interview:

**Chennai is going through an acute water crisis. In Maharashtra, people are rappelling several hundred feet into wells for one bucket of water. When monsoon comes, the crisis mode evaporates. What is the reason for this cycle?**

The ecosystem of water is complex and many environmental factors are intricately linked. The problems we see are because we have undermined these links over decades. First, rain and snowfall are the only sources of water — about 99%. In the four months of monsoon here, there are about 30-35 downpours and the challenge is to hold this water in systems that can last us over 365 days. Thick forests make for excellent catchments. The trees slowly transfer rainwater into the sub-soil and this is critical, as it's the sub-soil that gives water to a river during the months after monsoon.

Many rivers used to be perennial. The sub-soil fills up aquifers and they are a source of long-term storage. Rains and floods recharge aquifers and the surplus is transferred basin to basin. Rivers expand into floodplains — a huge source of storage — and lower into wetlands and marshlands. When enough water empties into the sea, it's a good thing as it prevents saline seawater from ingressing into land. This is also important for creating the low pressure that draws in the monsoon winds. Aquifers are extremely deep and are recharged slowly and get water from rivers as well as from the soil. When they are full, aquifers have a permanent layer and a dynamic layer. When we go beyond the dynamic layer and extract water from the permanent layer, it becomes unsustainable.

Tamil Nadu, though in the rain-shadow region, does get water from the southwest and northeast monsoons. Over hundreds of years ago, the region had a system of tanks — nearly 29,000 — that collected this water. They were all connected and the surplus transferred basin to basin. Over time, many of these tanks fell into disuse and got silted. There was also encroachment and the connections between drains virtually disappeared. In Chennai, there used to be 68 tanks and a huge wetland — Pallikaranai — of nearly 6,000 hectares. It was a huge source of groundwater. There are only about 20 tanks left today and those too are partly encroached. The drainage lines are gone and so, when floods come, there is no system to collect water. In several places that served as natural recharge zones, forests have been depleted, and the lakes are therefore empty. This lack of underground channels is primarily responsible for inadequate storage. We haven't allowed the natural sub-soil system, which doesn't suffer from evaporation losses, to recharge and provide water. This is insurance water, which protects us from droughts. Unless this is understood, we are doomed to continually face droughts.

## **Is there a similar situation in Maharashtra?**

Maharashtra hasn't yet been declared a groundwater-critical area, but it's important to understand the State's geology. There were several volcanic eruptions in its geological past. The resulting lava has formed vesicles in the soil, and over millennia, several layers of vesicles. They have become an intricate system of trapping water. Over the years, a series of cracks developed in the soil, allowing access to these deep layers. When we extract this water all at once, the vesicles are immediately sucked out. That means when rain falls, it goes straight into the lowest layers, and there's never enough water close to the surface.

This is what sugarcane farming is doing. A 20% area in Maharashtra is drawing 80% of the groundwater. It's a similar situation in Punjab, where once there was abundant groundwater. Excessive paddy cultivation has encroached these levels. In Bundelkhand, the clay soil is unsuitable for paddy and only amenable to pulses. However, since the Green Revolution, we have ignored this traditional wisdom and not allowed natural sources to be recharged. Climate change is now an additional challenge, where water is available in bursts or not at all.

## **States like Tamil Nadu and Karnataka have insisted on rainwater harvesting in buildings and apartment complexes for some years now. Why hasn't it worked?**

Rainwater harvesting was made compulsory only in Chennai. I'm not very convinced these structures were built according to the requirements. The late Chief Minister, Jayalalithaa, gave a limited time-frame for implementation. Unless the tanks are revived and encroachment checked, measures like harvesting or desalination will remain temporary solutions. We need to go back to traditional systems and revive forests and the soil's water-holding capacity.

## **When you were secretary of the Water Resources Ministry, you championed several pieces of legislation that encumbered States to manage water responsibly. None of them were passed on the grounds that water is a State subject. The changes you propose are structural and will take generations. How does one go about this?**

When we hit a crisis, the nation becomes one. That happened in Australia. They had three-four consecutive droughts and they have only the Murray Darling, which compared to Indian rivers, is like a canal. South Australia was having a problem with ingress of seawater. There was serious freshwater shortage. The Prime Minister took the lead and put \$13 billion on the table and that's when reforms started taking place. They evolved a system where each State was given a fixed quantity of water that was to be managed using a market-based mechanism. Today, cropping patterns have changed and there is better management.

## **What is the role of dams in this reform?**

Dams can be used to supply water only up to a limited distance. The bigger the dam, the higher the evaporation losses, and often, water isn't available when required. Most dams have a dual purpose — irrigation and electricity generation. They work at cross purposes and when dam managers are supposed to release water, they hold on to it. This happened in Kerala [during the 2018 floods] Canal irrigation is the most wasteful way of supplying water. The system was bequeathed by the British and was never really suited to India, which has huge monsoonal rains concentrated over a short period.

Our storage system, through millennia, has been suited to underground storage and the expansion and contraction of river systems. Cauvery is a dead river and has no water. How will it recharge the ground? But now that we have dams, we should strive to improve their efficiency. Like China and Israel, we should be looking at reducing evaporation from canals and employing

pipelines. We should change cropping patterns to make them more amenable to sprinkler and irrigation systems.

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