In this issue

Rainwater Harvesting
Solar purification

Phaltan in the Satara District of Maharashtra is drought-prone and receives only about 500 millimetres of annual rainfall. Researchers from the Nimbkar Agricultural Research Institute made a quick calculation and found that a mere 12 square metre roof area, typical of poor households, is sufficient to meet the annual drinking water demand of a typical family of five members. They constructed a house with corrugated GI as roof material to double check. In the 2019 rainy season, the water harvesting efficiency was found to be more than 80 per cent.

Then they had to tackle the impurities in the rainwater and the impurities from the roof. A stainless steel mesh to filter out leaves, a cloth to filter small particles before the water enters a 3000-litre tank, did a part of the trick.

But the water was brownish, not yet fit to drink. The researchers tried different techniques and settled on a low-cost solution, alum, traditionally used for the purpose. Besides removing colour, some bacteria are also removed along with the sediment.

Boiling the water, to inactivate the remaining bacteria, before drinking, is a costly proposition, besides creating pollution. The team, therefore, tested their design of a solar water purifier. A system that is capable of raising the temperature of water high enough to inactivate bacteria even on days that are overcast.

In a General Article on **page 872** in this issue, the researchers suggest that, if not subsidising the cost of storage tanks for poor households under the National Rural Drinking Water Programme, the Government should use the technology in rural schools to provide safe drinking water and to protect the health of children at least.

Unprotected Built Heritage
Geospatial documentation

The Archaeological Survey of India protects more than 3600 ancient monuments of national importance; the Department of Archaeology of each state takes care of a few hundred more. But there are many thousands of heritage buildings that remain undocumented, unprotected and their existence unnoticed, bemoans Kuili Suganya, National Institute of Advanced Studies in a General Article on **page 877** in this issue.

Taking the case of her long and protracted attempts to locate the remains of Arasibidi, a western Chalukyan capital, between the 11th and 12th century, she sketches out a strategy to overcome the problem. By combining data from historical documents and modern tools such as Google Earth and geotagging, it is possible to create a digital inventory of unprotected monuments, she points out.

Any citizen scientists out there who can help out with the project?

Nitrates in Groundwater
Seeking the sources

As per the WHO, the presence of nitrates in drinking water, with a concentration of more than 10 milligrams per litre as nitrogen, makes it unsafe for drinking. But the Bureau of Indian Standards allows up to 45 milligrams per litre.

Saurabh Shukla and Abhishek Saxena from the Shri Ramswaroop Memorial University, Barabanki point out this discrepancy in this issue, before reviewing literature on the sources of nitrates in groundwater – both geogenic and anthropogenic. They present a framework to understand the leaching of nitrates in groundwater, vital for safeguarding water supplies. Turn to the Review Article on **page 883**.

Tunnel Wells in Kasaragod

Arabs who settled in the Malabar Coast at the end of the 17th century found the lateritic mounds in the area conducive for importing a technique of water supply adopted by people in south-western Asia and North Africa: tunnel wells.

The lateritic mounds here have a more or less flat top that receives rain during the monsoons. The slopes of the mounds are the recharge areas. The tunnel wells store the water and release it through an opening on the lower parts.

Researchers from the University of Kerala, NIT Calicut and the Groundwater Board of Kerala take into account 760 such tunnel wells in Kasaragod, to describe the design of tunnel wells. They also compare the performance of 26 of these structures against data collected earlier and find that the yield has reduced from 756 cubic metres in May 2001 to 23 cubic metres per day in May 2019. Read the Research Communication on **page 983** to find out why.

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