In this issue

Open access publishing
Indian scenario

The results of research done using public funds must be made accessible to the public. This increasingly voiced demand has changed the international scientific publishing ecosystem in the recent decades. The DST, DBT, UGC and other agencies that fund research have responded to this demand and have made it mandatory for funded research to be published such that it is openly accessible.

What are the options available in open access publishing? What is the percentage of papers from India published as open access? What type of open access do Indian researchers opt for? How do Indian open publications fare compared with publications from other countries? Which disciplines have more open access publications?

Researchers from the South Asian University and the BHU analysed the data of Indian research publications from 2014 to 2018 to present the answers to such questions in a General Article on **page 1435** in this issue.

Predicting Water Table
To manage withdrawals

It is difficult to predict groundwater levels. The recharge depends on unpredictable rainfall parameters and not so easily investigated soil and rock parameters. Moreover, withdrawals cannot be easily monitored. Yet, to manage groundwater resources, we need a method to forecast water table depth.

Researchers from the College of Agricultural Engineering, Raichur and the National Institute of Hydrology have reduced the uncertainty to a great extent by putting artificial intelligence to use to overcome what seemed to be an insurmountable problem.

For the input to their model, they used the hydrometeorological data from the station at Roorkee. To overcome the lack of information about the processes, they employed an artificial neural network, useful to capture the input–output relationship.

But the artificial neural network is not good enough to deal with the changes that happen in time scales that vary from days, to seasons to decades. So they used wavelet transform to pre-process the input signals into their artificial neural network model.

They trained the model using data of 35 months and, after some trial and error for tweaking the weights of different parameters of the model, they succeeded in validating the results using data of 26 months. In spite of not knowing the details of recharge and withdrawal, this data-driven method can now provide reasonable monthly estimates of groundwater levels near the hydrometeorological station in Roorkee.

Want to test the method in your area? Read on from **page 1475** in this issue for the details.

Urinary tract infections
Treating with plant products

The conventional attitude to infections is to hit pathogens with antibiotics, interfering with their cell wall synthesis, protein synthesis or RNA synthesis. But within the last few decades, bacterial species have evolved to resist most antibiotics. The race towards one-upmanship between bacteria and humans has started. And humans seem to be lagging behind in coming up with newer types of antibiotics.

Perhaps we need to change our strategies. Perhaps if we take a live and let live policy, we may be able to curb this molecular arms race between humans and bacteria. Instead of attacking them directly, why not create situations where they cannot hurt us?

There are many secondary metabolites from plants that are known to interfere with bacterial adherence and invasion of epithelial cells, biofilm formation, quorum sensing and the production and release of cytotoxins – processes that make bacteria pathogenic. Many of them can be used to improve the human immune system. These phytochemicals can perhaps help us live a peaceful coexistence with bacteria.

In a Review Article on **page 1459** in this issue, Poonam G. Daswani, from the Foundation for Medical Research, Mumbai presents the wide range of plant products that are useful in treating infections of the urinary tract.

Fungal endophytes
Repositioning the repository

T. S. Suryanarayanan from the Vivekananda Institute of Tropical Mycology and his students have been collecting fungal endophytes from all types of sources – from mangroves, trees in the Western Ghats, from sea grasses, sea weeds, lichens... After decades of exploration, he came to the conclusion that no plant is ever free of fungal endophytes. In the meantime, he had accumulated more than 1700 species of fungal endophyte cultures and developed methods to store and preserve them.

He has a reason. Fungal endophytes take up traits from their host plants and can be used in the production of many secondary metabolites such as antibiotics, anti-fungal and anti-cancer agents, weedicides, pesticides and many industrially useful enzymes.

Suryanarayanan knows that the huge repository of fungal endophytes that he has built up will not be lost if he shares it with others who are interested in research on fungal endophytes. And that is what he does in a Research Account. Read about the repository on **page 1469** in this issue.

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