

In this issue

Open sesame: SAARC repositories

This issue of *Current Science* is available to any person, anywhere. Open access to scientific information is an ideal. Many scholars in the recent years have pointed out that at least the results from publicly funded research, need to be accessible in the public domain and not sold at exorbitant prices that citizens cannot afford. This viewpoint has gained support and publicly accessible institutional repositories have started growing.

But scientific enterprise often crosses the boundaries of institutions. And even of nations. Thus there is a significant number of collaborative researches undertaken between the countries in the South Asian region. It is, perhaps, time now to create discipline-wise repositories to allow open access to scientific information in such international cooperation.

But then, which disciplines should be prioritized? Besides political whims and fancy, is there a scientific way to determine the areas that need immediate attention? On **page 2077** of this issue, Chandana Patra analyses research publications, mined from the Web of Science as well as the WIPO database on patents, to come up with a list of disciplines that have historically provoked scientific collaboration.

Despite providing such data, necessary for informed decision making, despite the low cost compared to the high benefit to the region as a whole, setting up the disciplinary repositories will not be an easy task. The General article also points out the obstacles to setting up such repositories and suggests the next steps.

Glocalising climate models

Global climate models look at earth as a whole. Can they be used for predicting the immediate, medium term and long term climate variability in a local area, say the Kutch district in Gujarat, India? This is the question that is being tackled by a research article on **page 2084** of this issue.

The global models use a grid of several thousands kilometers. This had to be downscaled to a resolution that suits

the question at hand. Scientists from the Meteorological Department chose the Long Aston Research Station Weather Generator, one of the best stochastic weather generators available to downscale the model.

Good quality data from 1969 is available from three weather stations in the district. This data was fed into the generator. And they let the simulation run, using seven IPCC SRA2 scenarios, to examine the daily maximum and minimum temperature and rainfall for three 20-year periods: 2011–2030, 2046–2065 and 2080–2099. Now they present the results in this issue.

Kutch is an arid district. An understanding of variables, like the temperature and rainfall of future decades of the century, is useful in decision making – to plan and manage the water resources in the region... And the predictions made by the paper will help to validate the assumptions behind the global climate models used in IPCC SRA 2 scenarios. Two birds with one stone!

More droughts in Assam than in Gujarat

Gujarat and Rajasthan, in the Western part of India, are dry and arid regions, whereas Assam and Meghalaya are wet and humid. So it is natural to assume that the states in the West are more drought-prone than the states in the East. A Research Communication on **page 2121** of this issue, contests this assumption.

Drought, in meteorological terms, is a significant departure of actual rainfall from the climatological mean. A 19% departure from the mean is accepted as normal. If it goes further down, to 59%, it is considered deficient. More than that would be termed scanty. Now, given that Gujarat and Rajasthan get less rain anyway, the departures would create droughts. And indeed, there are more newspaper reports of droughts in Rajasthan and Gujarat than in Assam or Meghalaya. But then, it is not only rainfall that is responsible for drought. Higher soil temperatures can increase evaporation and a drought like situation can emerge because of this factor. Moreover, the impact of meteorological drought on

agriculture may vary depending on the crops. A region that expects droughts every few years is prepared with appropriate crops to reduce the impact on agricultural productivity and livelihood. The paper on page 2121 invites us to distinguish meteorological drought and agricultural drought and, to help us deal with the complexity, provides a long list of indices and techniques that have been evolved to measure and monitor drought.

Armed with meteorological data from Rajasthan, Gujarat, Assam and Meghalaya and contrasting meteorological data with agricultural production data from these states, two assistant professors in Civil Engineering show that, in the recent years, the North Eastern region of India has been more drought-prone than Western India. Turn to page 2121 for a full report.

Quantum measurements: computing to condensate

When quantum theory was taking roots in popular minds, nearly a century ago, physicists were troubled. The strength of any theory is judged on the experiments that emanate from it. But quantum theory posed a problem: when you make measurement in a quantum system, you invariably change the system by your measurement. Thus, if you measure again, you would be making the measurement in a changed system. Repetition and reproducibility of the experiments are severely curtailed because of this property of matter at the quantum level.

But after a century of struggling with the problem, scientists have come up with a repertoire of methods to circumvent the issue. In this issue we bring you a special section on quantum measurements, bringing together the work done so far in this direction.

These methods of measurements have implications in many areas – from quantum computing to research on the Bose–Einstein Condensate. Turn to special section to update yourself on the state-of-art in the field of quantum measurements.

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