

In this issue

Post-doctoral Fellowship

Improving human capital

India has about 250 science and technology personnel per million while countries that produce innovative technologies have 3000 to 7000 science and technology personnel per million. It is not that we do not have adequate numbers of Ph.D.s. Though India produces about 15,000 Ph.D.s per year, only about one per cent is absorbed into the research and development ecosystem. The reason is simple: while countries that are serious about developing technologies spend 3% to 4% or even more of their GDP for research, India spends about 0.7%.

Till recently, to gain experience in research as a post doc, most Ph.D.s had to leave the country. Thankfully, the situation is changing. But not fast enough for an ever changing world.

So what should India do? Or, better yet, what can India do under the extant conditions?

In a General Article, A. K. Singhvi, DST-SERB Chair Professor, provides seventeen recommendations so that India can reach at least a minimum of 1000 science and technology personnel per million. Read on from **page 660** in this issue and initiate a nation-wide discussion on improving the human capital.

Snow Avalanche Prediction

Mapping hazards, reducing risks

The slow accumulation of snow on mountains creates an overburden that suddenly turns into an avalanche, a large body of snow cascading down slopes, often destroying lives and property. If there are methods to map the avalanche hazard and calculate the risks thereof, we would be better prepared for such eventualities.

Researchers in Iran examined the case of the Shemshak region, where avalanches are common. Less than 60 kilometres from Tehran, Shemshak is a popular destination for skiing enthusiasts. Avalanches have often cut off traffic to the city and pose a threat to the economy of Shemshak.

The researchers first made a database of all recorded avalanches in the region and went out of their way to add even the ones far away from habitations and not officially recorded. Field visits to the locations helped fix the GPS coordinates.

Literature so far has indicated the involvement of 18 parameters in avalanches. The researchers took all 18 into consideration in a GIS superimposed on satellite images. They evaluated the sensitivity of avalanche formation to the various factors, comparing the results with actual records. Then they created avalanche hazard maps of the area. The land use pattern in the region helped to find zones of exposure to risk and the vulnerability of people and property to the hazard.

To evaluate the risks posed by avalanches to people and property, the researchers compared the results from different models. Thus they could provide evidence for making decisions about reducing the risk of avalanches in the Shemshak region.

The methods used need to be tested for their usefulness in creating hazard and risk maps for avalanches in the Himalayas, the Alps and other mountain ranges to evaluate applicability. So, researchers elsewhere may like to flip to **page 717** to read the Research Article.

Revealing Anticancer Targets

Gankyrin, a protein encoded by the PSMD10 gene, is an oncoprotein. Cells, where the protein is overexpressed, proliferate and become cancerous. So, gankyrin is considered a target for designing anti-cancer drugs. But, since it functions mainly as a chaperone of the proteasome assembly and does not seem to have any obvious enzymatic or receptor-like sites, finding target sites on the protein is difficult.

A Research Article in this issue breaks this bottleneck. The authors provide a method to create better quality crystals of the complex protein. Using the synchrotron facility in Indore, the researchers also worked out the crystal structure at 1.7 Å resolution. Previously unnoticed

potential targets for small molecules are now laid bare.

Cancer researchers may like to flip to **page 674** to read the details.

Golden Jackals

Not so golden anymore

Golden jackal populations have been dwindling in the south west of India. In most areas between Mangaluru and Kanyakumari, the home range of the species is severely curtailed by the rise in human habitats. Based on a questionnaire survey on the sighting of the animal, camera traps were set up in all districts of Kerala. Out of 231 images captured, 172 were from mangrove regions of Kannur, reports a Research Communication in this issue.

Interestingly, the researchers note, the golden jackals here are not all golden. Many have rusty and blackish coats resembling those of dogs. Is it because of cross breeding with dogs?

Cross breeding between golden jackals and dogs (where at least some offspring are even fertile) has been detected earlier in other parts of the world. Is this what is happening to the golden jackals cordoned off by human habitations in Kannur?

The Research Communication on **page 738** opens up a challenge to geneticists.

MAGIC in Pigeon Pea

Hundreds of varieties

Multi-parent advanced generation intercrosses, or MAGIC, overcomes the limitations of breeding new varieties using only two genotypes. Researchers from ICAR now report using eight genotypes of pigeon pea with widely varying traits to create 1500 recombinant inbred lines.

Not magic this, but tedious effort of researchers over years. Plant breeders and geneticists must read the Research Communication on **page 735** in this issue.

K. P. Madhu
Science Writing Consultant
scienceandmediaworkshops@gmail.com