

## In this issue

### Geodynamics Queries Meteorology *Rain in Central Himalaya*

After researching the orogenesis, stratigraphy and geodynamics of the Himalayas for about six decades, K. S. Valdiya, Jawaharlal Nehru Centre for Advanced Scientific Research, is puzzled. Why has the phenomenon of April showers ceased in the Central Himalaya? Why are the rains there becoming intense in pockets while leaving other areas high and dry? Why is there more rain in a narrow zone? Why is temperature in the Himalayas increasing at a faster rate than in other parts of India?

While raising such questions, he does not hesitate to question answers that do not hold water. Read more about rain in the Central Himalaya in a General Article on **page 19** in this issue for many matters to mull over in meteorology.

### Migrants from Forest Fringes *Covering for COVID-19*

In 2018, a group of researchers surveyed 5000 households in about 500 villages located in the fringes of the forests of Central India to assess patterns of migration. Seventy-five per cent of the villages reported seasonal migration to cities far and wide, within India.

In March 2020, a lockdown was announced in the country. Having no chance of sustenance in the cities, the migrants were found to return to villages in hoards. Based on the destination cities of the migrants from the study area, COVID tracker data and the epidemiological deterministic SEIR compartmental model, they examined the possible spread of COVID-19 within and between adjacent villages.

Since there is no precise data, they assumed that only one person, from a village of more than 700 people, is exposed to the virus while in the city. If there were an adjacent village similar in population size, if there were no restrictions in movements between the two villages, and if distancing norms

are lenient, about 94% of the people in the two villages will be infected, according to the model. But if there is restriction of movement between the villages, no distancing within villages, perhaps it can be brought down to about 2%. This bubble strategy would be less disruptive to village life.

Since these are forest-fringe villages without adequate health care facilities, the village bubble strategy could avoid a public health disaster, advise the researchers.

Though the accuracy of the model is limited by the availability of reliable data, perhaps it is wiser on the part of public health authorities to err on the safer side. Read the details in the Research Article on **page 52** in this issue.

### Science Teachers in India *Reconciling religious beliefs*

The Constitution of India demands that citizens develop scientific temper. Yet pseudoscience and superstition have greater foothold in the Indian psyche than science. The way science is taught and learned in school is perhaps partly to blame. Most science teachers in India engage in teaching science, but lack exposure to critical thinking and experience of doing science first hand, and, therefore, feel no need to reconcile their beliefs with science.

Researchers from the Homi Bhabha Centre for Science Education used a questionnaire and a focus group discussion to highlight the extent of this problem among practicing physics teachers. The tendency to keep science and daily life in separate compartments can, and needs to be overcome, argue the researchers. Read the details in a General Article on **page 26** in this issue.

### Leashing in Visceral Leishmaniasis

The female sand flies of the *Phlebotomous argentipes* species are responsible for transmitting *Leishmania donovani*, the protozoal parasite that

causes Leishmaniasis or kala azar. Visceral Leishmaniasis affects about 150,000 per year in India. The attempt, from the 1950s, to eradicate the vector using DDT reduced the incidence of the disease initially. But it rebounded due to the development of DDT resistance in the sandfly population. And the use of DDT was discontinued and later banned due to the environmental impact of the pesticide.

Researchers at the ICMR–Rajendra Memorial Research Institute of Medical Sciences, Patna were curious about the phenomenon of resistance development and its consequences on the reproductive fitness of the vector. By rearing the sand flies under sub-lethal concentrations of DDT, they examined the evolution of traits such as feeding patterns, fertility, fecundity and fitness along with the development of DDT resistance. Following up the experiment with sand flies for seven generations, they find that, along with DDT resistance, life expectancy among the female insect population also increased. Feeding preferences and oviposition behaviour of the insecticide-resistant population also changed. The impact of sub-lethal amounts of DDT on the male flies was quite different.

Want to know more? Flip to **page 103** in this issue to read the Research Article on the issue.

### Fall Armyworm Invasion

#### *Managing maize to minimize impact*

The fall armyworm, *Spodoptera frugiperda*, is an invasive pest that attacks all crops from the grass family. But it has a special affinity for maize and can raze crops. An invasion of the pest in India was reported in the summer of 2018 and, by now, it has spread to most parts of India. A Review Article on **page 44** in this issue provides the insights necessary to manage the pest.

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