

In this issue

Cold Chain for Vaccines

Powered by cellphone towers?

Vaccines against various bacterial and viral infections can save millions of lives and billions of dollars in terms of treatment costs. In recent decades, the world has seen an unprecedented growth in the capacity to design and manufacture various types of vaccines. But the distribution, administration and monitoring of vaccines are problematic: to maintain efficacy, vaccines have to be kept under cold conditions till use. The supply chain for vaccines suffers even in cities, if there are power failures. Extending the cold chain to remote villages, therefore, has been a challenge for public health.

Not anymore, argues a General Article in this issue. Cell phone towers need to be functional even when there is power failure. And there are many that operate even in areas not supplied by the electric grid, running on their own captive power generators. Thus, integrating the cold chain with cellphone towers is possible and desirable. Experiments in this direction are being attempted by many countries. India with more than six lakh villages, needs to explore this possibility.

It is not only the power supply needed to keep the vaccines cold, say the authors. Temperature sensors available in modern cold chain equipment can provide signals via cellphones for monitoring the conditions even in remote areas. Turn to **page 528** for details.

Soil Erosion in India

Process modelling

Soil erosion due to rain and wind can strip fertility from soils and reduce agricultural productivity. So there are methods that have been used to measure soil erosion. But these measurements do not give us insights into the processes involved. On the other end of the spectrum, one can model the physics of erosion. But if this is not

firmly planted in empirical data, one cannot take any evidence-based action to counter soil erosion. Thankfully, now there are conceptual models which take into account, both the underlying processes and the correlated measured values.

A Review Article in this issue examines the various process models for soil erosion used in different parts of the world. The models vary in terms of the climatic and other parameters used for determining soil erosion rate, run-off and sediment yield status. Some of these models have been used to understand soil erosion and to predict the effects of soil conservation efforts in India too.

Suitability studies of these models for use in different agroclimatic zones of India need to be undertaken now, point out the authors. Turn to **page 533** for details of process models for soil erosion.

Nahar Wildlife Sanctuary

Suitability for blackbuck

In the 19th century, the blackbuck, *Antelope cervicapra*, was reported to be present in most parts of the Indian subcontinent. But due to excessive hunting and habitat reduction, the Indian antelope became locally extinct in most areas. Though hunting the animal was prohibited from 1972, changes in land use led to further drop in blackbuck populations in the north western states of India.

The Indian antelope is the state animal of Haryana. To protect and conserve the nearly threatened species, it was reintroduced into the Nahar Wildlife Sanctuary, Rewari district. But conservation efforts in the sanctuary may not be adequate. A state highway that cuts through the sanctuary restricts the movements of the animal. *Prosopis juliflora*, a thorny shrub, has started invading the sanctuary, limiting the animal's habitat further.

How much area in the sanctuary is actually suitable for the blackbuck? Researchers from the Haryana Space Application Centre and Haryana Forest Department inquire into the problem in a Research Article on **page 609** in this issue.

Electric Buses

Pune case study

Pune with 3.5 million people has 3.6 million registered vehicles. The percentage of people who commute by bus has been steadily decreasing from the 18% estimated in 2011. If public transport improves, perhaps more people will opt to travel by bus, reducing traffic congestion in the city.

The municipal bus transport operating company in Pune is now inducting 500 electric buses into its fleet to reduce air pollution in the city. A Research Article in this issue analyses the implications.

There are more than 2000 buses operating in the city now. Diesel AC and non-AC buses, CNG buses, hybrid AC buses... The article compares the total cost of ownership over the entire life cycle of 12 years for each bus type. In spite of much higher capital investments and the need to set up facilities for charging, maintenance, etc. within a year or so the total cost of ownership will be at par with that of non-AC CNG buses, say the authors. So it is not impossible to replace the entire fleet in a phased manner by 2030.

Yet, there are many challenges. Financing procurement is, of course, the major problem, in spite of the incentives given to electric vehicles. Increase in electricity consumption and rising numbers of used batteries are also issues that need attention. Read the Research Article on **page 546** for recommendations and suggestions for overcoming these hurdles.

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