

## In this issue

### **Sinkholes in Urban Roads**

#### *Saving cities from subsidence*

The natural formation of underground cavities, due to the dissolution and transport of materials with the movement of water that seeps when it rains, is seen in the lateritic regions of Kerala and Karnataka. The process is quite understandable. But what about the sinkholes that suddenly develop in Indian cities that are not built on karst materials prone to dissolution and transport?

A General Article in this issue examines 124 cases of sinkholes in cities reported by social media, documents the possible causes by *in situ* visits, reports laboratory experiments to test conjectures, suggests geophysical methods to identify potential sites before disaster strikes and comments on the repair actions being taken to fill the sink holes.

The formation of sinkholes in cities is a man-made disaster. With a little scientific understanding of the phenomenon, urban development authorities and infrastructure developers can reduce and even eliminate the problem. The article on **page 1180** in this issue provides the understanding needed for saving urban infrastructure from subsidence.

### **Agriculture Ecosystem Resilience**

#### *For sustainable development*

To meet the demands of food for growing populations, crop production needs to double by 2050, or, in other words, a growth rate of 24% per year, points out a Review Article in this issue. But,

from 1980 to 2008, global wheat yield reduced by more than 5% and maize yield by nearly 4%.

Irrigation can help increase crop yield. But irrigation increases soil salinity and decreases crop productivity in the long run. Moreover, more than 40% of irrigation is dependent on groundwater, leading to groundwater depletion.

So what can be done to improve the resilience of agricultural ecosystems, to ensure food for all and sustainable development under the threat of climate change?

Turn to **page 1190** for a review on presently available answers.

### **Information Networks of Farmers**

#### *Deciphering gender differences*

The hilly districts of Uttarakhand are not amenable to food grain production due to small and scattered agricultural lands. But the agro-climatic and soil conditions of the Himalayan state are favourable for the production of vegetables. So vegetable cultivation can be more profitable to the small and marginal farmers there. And the new information and communication technologies can help improve their agricultural practices.

Researchers from the ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora analysed the information network of farmers in four villages in two blocks of Almora and Nainital districts to understand farmer access to information sources. And they found a gender disparity in the

access and use of information. Reliable and authentic information does not reach women farmers in spite of their being a major workforce in vegetable cultivation in these districts where men folk migrate to cities in large numbers.

In a Research Article on **page 1235** in this issue, read the recommendations for agricultural extension and education in the Himalayan states.

### **Megafloods in Mars**

#### *Hydrodynamic simulations*

Though Mars has no apparent surface water bodies today, there are signs of fluid eroded troughs and channels. The paleochannels are presumed to have been formed more than 3200 million years ago.

A Research Article in this issue compares four major outflow channel systems using data from the camera on board ISRO's Mars Orbiter Mission and estimates flood discharges from the morphology and topography of the locations. The discharges of water at a rate of millions of cubic metres of water per second needed to explain the formation of the ancient lakes and channels could have happened due to volcanic action pushing water out from below the Martian surface, suggests the article.

Read the details on **page 1216** in this issue.

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