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Greenery in the City

Urbanisation and tree diversity

Cities generally have low green cover compared to adjacent towns and other non-urban areas. Many studies support the notion that urbanisation causes loss of tree diversity. But, some reports show the opposite: that population density is not necessarily related to the variety of vegetation cover.

For instance, a study in Raleigh, New Carolina reported a positive influence of population density on the range of vegetation. The idea builds upon the observation that, as people from different areas settle in a new place, they prefer to plant trees and shrubs native to their homelands in their vicinity. This adds to diversity.

Another part of heterogeneity comes from the city architecture itself. Parks, roadways and offices support vastly different types of plants, herbs and shrubs. In a General Article in this issue, Ashutosh Singh *et al.* from the Banaras Hindu University discuss the green cover in cities.

They also touch upon the benefits of tree cover in cities and how it may be an easy way to tackle heat build-up that turns cities into urban heat islands. At the same time, they also chart possible ecosystem disservices by trees. Read on from **page 428**.

Deforestation Over Time

Geospatial mapping in north-east

Mapping forest cover can be a tedious exercise. But when monitored remotely, through satellites, the feat becomes easier, systematic and more organized. NASA launched satellites specifically for geospatial mapping in the seventies. The Landsats, as they are commonly known, carried multispectral scanners that produced a 186 km × 186 km images. Over the years, the scanners have been improved to collect even more detailed data.

These images now serve as an important resource for mapping geographic changes. Many scientists use them to study land use patterns, retreating glaciers and to identify fishery areas. Now, on the same lines, S. P. S. Kushwaha *et al.* from the Indian Space Research Organisation, Dehradun, used geospatial technology to document the diminishing forest cover in Assam and Arunachal Pradesh.

North East India is rich in natural resources. Its lush forests are an abode for wildlife, especially elephants. However, with industrial development, urbanization and population growth, the forests seem to be shrinking. The scientists monitored the effects on forest cover in this region from 1924 to 2009. The earliest information was sourced from US topography maps. Thereafter, images were procured from Landsat archives and Indian remote sensing satellite (IRS LISS III).

They present their findings in a Research Communication on **page 510**.

A Sweeping Act

Phyto-stabilizing mined lands

A major concern in reversing soil pollution is the difficulty of removing contaminants from soil. Whatever falls on the bare ground is usually absorbed and is extremely difficult to retrieve. On **page 529**, A. K. Singh from ICAR-Kolkata discusses a cost-efficient strategy of rehabilitating polluted soil next to a coal mined site in Jaintia hills of Meghalaya.

Soil pollution is a serious problem in areas with coal mines. The discharge from mines contains toxic materials that get absorbed in the soil and alter its chemical nature, making it unfit for farming. Most plants do not grow in such soils. But, there are a few which can withstand a high amount of toxicants and also accumulate them in their bodies. When planted on polluted land, with proper soil amendment practices, these can, over time, remediate soil pollution.

However, the success of this method depends on choosing plants and soil amendment materials that work best with the target contaminant and are acclimated to the region of interest. The researchers used plants commonly grown in the region to reclaim an area overrun with toxic iron and sulphur discharge**.** To know what worked best, head over to the Research Communication in this issue.

Electrochemical Energy Storage

Super capacitor electrodes

Capacitors are devices that store electrical energy. In that sense, they are similar to a battery. But there are vital differences. For instance, capacitors have rapid charge and discharge capabilities. This comes in handy for constructing fast portable power devices. However, they lag far behind batteries in terms of the amount of power they can store.

Now, scientists are working towards creating supercapacitors with improved power density. One way to boost efficiency is to experiment with new materials for constructing supercapacitor electrodes. Carbon, in its various forms, like graphene, has high electrical conductivity. It is also electrochemically stable and is, therefore, used for making electrodes. Metal oxides are also utilized for this purpose.

But maintaining the economy of the process remains a challenge. In a Review Article on **page 436**, Sunetra Dhere of the S. H. Kelkar College of Arts, Commerce and Science, Devgad provides a comprehensive review of how the sol–gel process can be used to synthesize carbon and metal oxide based supercapacitor electrode materials.

The sol–gel process, as the name suggests, involves gelation of a colloidal solution. It is a simple scheme to produce high purity products in the form of thin films, aerogels and particles.

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