In this issue

Mass Rapid Transit Systems
Making the right choice

Indian metropolitan cities are growing rapidly. The need to provide safe, affordable, quick, comfortable, reliable and sustainable transport for the growing number of residents in urban sprawls led to two National Urban Transport Policies in quick succession – in 2006 and 2014.

To encourage people to choose public transport instead of congesting roads with private vehicles, we need to rationalise and improve public bus transport services within a city, and, perhaps, provide buses with rapid transit lanes. We also need to choose between new transport technologies such as the light rail, the monorail and the metro rail. The choice is left to urban local bodies.

A Review Article in this issue examines existing policies and guidelines and proceeds to analyse detailed project reports on mass rapid transit systems adopted by Kochi, Jaipur, Nagpur, Ahmedabad, Surat and the twin cities of Hubli–Dharwad. The data presented shows that the policies and guidelines have failed to provide explicit criteria to select transport technologies appropriate for each type of city and that urban local bodies have not understood the spirit of the national policies and have not followed the guidelines.

Besides clarifying issues that need consideration by urban bodies and policymakers, the review article reiterates the need to set up a knowledge centre for the transfer of learning between cities to help local urban bodies, as envisioned in the Policy of 2006. Turn to **page 888** for details.

Rivers of the North-East
Clues on neotectonic activity

After the Indian continent collided with the Eurasian continent, due to resistance against its northward journey, it started turning counterclockwise. This put two different tectonic strains on North-East India, creating mountain ranges both in the north and the east.

The valleys and plains continue to change under the strain – while some parts are uplifted, others go down. This leads to transitions in landforms and changes in the courses of rivers. The anomalous drainage seen as an annular drainage pattern, compressed meanders, the folding of riverbeds, knick points in the river courses, palaeochannels and swamps provide clues about neotectonic activities in the region. Using these clues, researchers from the CSIR-NEIST, Jorhat and Dibrugarh University deduce the role of subsurface structures and faults that led to these changes. Thus they identify locations that are more prone to earthquakes in North-East India.

Decision makers and people in the region may like to turn to **page 918** in this issue for more.

Drones Spraying Pesticides
Simulations for autonomy

Spraying pesticides over large stretches of paddy fields is not only laborious, but also threatens the health of farmers. One could think of handing over the task to drones. But controlling the flight of drones is also time-consuming and boring. Researchers from Sri Lanka have come up with a solution by simulating a drone that flies over the field and, with inputs from the farmer, geolocates the boundary. The GPS data goes into a central server. The drone flies over the field, captures images and uploads them to the central server. From the images, the farmer identifies locations that should not be sprayed – water bodies and residences – and unsafe locations for the drone's flight – trees, poles, cellphone towers, etc. in the field. The central server makes a 2D grid of the area that needs to be sprayed, avoiding areas earmarked by the farmer and a path planning algorithm works out the optimum path for the drone. When the drone sprays the field, the farmer can monitor the process on mobile.

The Adigar drone simulator is ready for field testing. Agriculture startups need to read the Research Article on **page 945** in this issue.

Memory Development, Retention
To escape predators

The larvae of skipper frogs are food for the nymphs of dragonflies. The larvae being consumed release alarm signals. The other larvae associate the alarm with chemical cues from the predator and develop escape behaviour that responds to the predator's chemical cues.

But how much time does it take for this associative memory to develop? And how long is it retained?

Researchers in Pune collected four pairs of skipper frogs from a water body at Savithribai Phule Pune University and bred them to collect the larvae. Fourth-instar nymphs of the dragonfly, *Bradinopyga geminate*, were also collected from the same pond. In tanks containing sample larvae, the team placed perforated plastic containers within which dragonfly nymphs enjoyed eating a few skipper frog larvae. The researchers exposed the larvae outside the perforated plastic to the two chemical cues for different durations to find out the time required to form memory. They tested the larvae for behaviour response to chemical cues from the predator after varying lengths of time to check for memory retention.

To find the results of this ingenious experimental procedure, read the Research Article on **page 951** in this issue.

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