

## In this issue

### Mega Science Programmes

#### *India's preparedness*

Indian scientists have been involved in international mega science projects during the last few decades of the twentieth century. But it is only after India became an emerging economy that aspirations to initiate national mega science programmes started taking shape. In a General Article in this issue, Praveer Asthana, a Fellow in the office of the Principal Scientific Adviser to the Government of India, traces the history of that aspiration and argues why mega science programmes are feasible and desirable in today's context.

As examples of mega science projects, he cites the Large Hadron Collider, the Facility for Antiproton and Ion Research, the Thirty Meter Telescope, the Giant Magellan Telescope, the Extremely Large Telescope and the International Linear Collider. Indian researchers have participated in such international projects and matured by contributing to the construction of equipment as well in contributing to the scientific outcome of such projects. This led to the development of not only the scientific workforce, but also the engineering and industrial capabilities within the country. This, in turn, led to participation in more mega science projects, such as the LIGO.

As the capacity grew, so did national programmes. The National Large Solar Telescope, the National Large Optical Telescope, the Radioactive Ion Beam Facility, the High Brilliance Synchrotron Radiation Source, the Spallation Neutron Source, etc. are typical examples.

A section of the scientific community has raised concerns about such mega projects. Indeed, the mega science projects require huge financial outlays and cooperation and coordination between researchers and engineers from various organisations. Moreover, the scientific returns from investment take longer and are often unpredictable... But these are issues that we need to learn to tackle and the experiences

gained so far are adequate to go forward. Read the rest on **page 26**.

### Leopards in Rajasthan

Solitary. Reclusive. Adapted to life in tropical forests, grassland plains, deserts, alpine areas... Yet, *Panthera pardus*, the common leopard, has been losing out on its habitat range due to the surge in human population. And, when forced to live next to human habitations, the conflict that arises is often more detrimental to the big cats.

A General Article on **page 37** in this issue examines the reasons for the wild swings in the populations of the animal in Rajasthan and the steps needed to conserve the species which is slowly slipping into the near threatened category of the IUCN.

### Saving *Atuna indica*

#### *From going extinct*

*Atuna indica*, a medicinally important tree endemic to the evergreen forests of the Western Ghats, is now listed as endangered. What are the factors that threaten the survival and reproduction of the species? Is it reduced reproductive potential? Low fruit set due to reduced pollinators? Inbreeding depression due to self-pollination? Researchers from the Kerala Forest Research Institute set out to investigate.

The tree prefers slopes next to streams and water bodies. The team identified a population near the Kakkayam dam site in Kozhikode district, Kerala. Out of the 89 trees, only two flowered. Only the trees exposed to adequate sunshine seemed to flower.

The flowers that open around 6 am are visited by a variety of pollinators over the next few hours. The pollen to ovule ratio is high, signalling cross pollination. The flowers that were bagged did not develop fruits. So evidently, lack of pollinators or self-pollination driven inbreeding were not the cause of the problem.

During the flowering season from October to December, monkeys shak-

ing the branches led to premature falling of flowers. Moreover, the larvae of pyralid moths reduced fruit set and caused severe fruit loss.

By April, the fruits that survived fell down after ripening. Apparently, there is no seed dispersal by birds or animals.

Thus, to save the species from extinction, humans need to step in for seed dispersal to locations near streams ensuring that there is adequate sunshine when the seeds grow into trees. Conservationists should turn to the Research Article on **page 67** in this issue for more tips.

### Protecting Maize Crop

#### *From fall armyworm*

The fall armyworm appeared in India in 2018 and started destroying crops, especially maize. To counteract the invasion, pesticide use went up several folds in the next few years. A Research Article in this issue examines the reproductive and the destructive behaviour of the insect species. The article identifies the small window of opportunity for farmers to fight against the fall armyworm to protect their crops, whether maize is sown in the *kharif* or the *rabi* season. Agriculturists need to read the timely article on **page 81** and integrate the information into their pest management practices.

### Citrus in Central India

#### *Rainwater management*

Nagpur oranges are famous. But the supply will not satisfy the demand unless there is adequate water. And the groundwater there is getting depleted fast. To sustain productivity, farmers need to manage rainwater. What are the best methods to do this? A Research Communication in this issue examines three different methods. Turn to **page 100** for details.

K. P. Madhu

Science Writing Consultant

[scienceandmediaworkshops@gmail.com](mailto:scienceandmediaworkshops@gmail.com)