In this issue

Sustainable Agriculture
Farmers to energy prosumers?

Energy consumption by agriculture has been increasing steadily from the last century. Not merely in terms of electricity and diesel, but also in terms of indirect energy inputs such as fertilisers and pesticides. But in this century, there is a growing recognition that agriculture can produce energy too. In 2003, when the National Biofuel Mission was initiated, the main target was to extract biofuel from *Jatropha* and *Pongamia* seeds. The National Biofuel Policy of 2018 identified the potential of molasses and garbage as feedstock to increase the production of biofuel. Yet the production of biofuel in India is less than 500 kilo tonnes of oil equivalent – a meagre share of half a per cent of world production.

Examining the situation in a General Article, scientists from ICAR-IARI point out the need for caution while repurposing food crops for energy production. Instead, a strategy to use waste biomass for biofuel production is more prudent in the Indian context. Straw which is now burnt by farmers, if converted to energy, can reduce environmental problems too. Read the details on **page 1833** in this issue.

Predicting Earthquakes
Radon as precursor

The Uttarkashi earthquake of 1991 and the Chamoli earthquake of 1999 were wake up calls to set up an earthquake observatory in Ghuttu, close to the Central Himalayan Thrust. Among the many instruments set up by the observatory was a radon detector at a 10-metre depth. Radon, a daughter from radioactive uranium decay, is trapped in mineral grains. The stresses on the grains due to tectonics release radon which moves through soil pores. So, anomalous emissions from soil are indicators of impending earthquakes.

But the issue is not as simple. Radon emission from soils is influenced by temperature variations, atmospheric pressure, rain and other factors. So there is a need to disentangle the confounding factors before radon gas emission can be used for predicting earthquakes. Researchers from Dehradun and Nainital used multiple regression analysis to delineate changes in radon emission due to earthquakes. Though there were no earthquakes in Garhwal after the observatory was set up, the team observed anomalous reduction in radon emission just before the Nepal and Chamoli earthquakes of 2015.

Radon is indeed a promising precursor to earthquakes. But more work is needed before we can use it routinely for predicting earthquakes, say the researchers in a Research Article on **page 1905** in this issue.

Earth Star Mushroom
Pharmaceutical potential

The earth star mushroom, *Geastrum-saccatum*,has the shape of a globe ensconced in a star. The exotic looking mushroom is found in the northern parts of the Western Ghats. Researchers from Maharashtra harvested the mushroom from the wild and analysed the pharmaceutical potential of its chloroform extract. They provide evidence of the anti-diabetic, anti-inflammatory and anti-oxidant properties of the fungus in a Research Article on **page 1917** in this issue.

Migration of Rural Youth
Stemming the tide

Unemployed rural youth migrate to urban areas to eke out a living. Villages thus lose their young to overcrowded urban areas; the manpower base for agriculture slowly gets eroded. To retain rural youth in agriculture, the ICAR initiated a socio-economic development project in 2015.

For round-the-year employment and income-generating activities in rural areas, what is needed is location-specific, profitable agricultural enterprises. The ICAR scientists chose Wokha district, Nagaland for their experiments. Nagaland has a youth unemployment rate of more than 20% while the Indian average is about 6%.

Then came protracted awareness and orientation programmes, selection and skill training of youth, exposure visits to agricultural enterprises, support for setting up enterprises... Within two years, there were more than 120 new agricultural enterprises – pig and poultry farming, mushrooms and cut flowers. The supporting enterprises for feed, spawn, etc. also came up organically. Seeing the economic success of their peers, youth from surrounding villages also emulated the examples on their own. The migration of rural youth reduced by 37%.

In a Research Account on **page 1854** in this issue, the researchers share the lessons learned and provide recommendations for such projects to be replicated elsewhere.

The Mighty Mite
To rescue agriculture

There are many species of mites that feed on plant sap and reduce agricultural productivity. But there are mightier mites that feed on these phytophagous mites. One such mite, *Neoseiulus indicus*, discovered in India in the 1960s, is a predator of smaller mites. The indigenous predator is a potential biocontrol agent for pest mites. But there was no protocol available for mass multiplication of *Neoseiulus indicus.*

Now, a Research Communication from ICAR-NBAIR, Bengaluru reports a breakthrough in rearing the predatory mite in large numbers. Trials on biocontrol of pest mites using this predatory mite can now start in earnest. Read the details on **page 1923** in this issue.

K. P. Madhu
Science Writing Consultant
scienceandmediaworkshops@gmail.com