In this issue

Boro Rice in Meghalaya

Rice, cultivated by humans for thousands of years, has adapted to a wide range of environments and evolved into thousands of varieties. Boro rice, for example, is sown in November–December in residual water from the monsoon and harvested in March–April. It is known for high productivity and has found a place in the intensification of agriculture in the North East of India. The state of Meghalaya, not yet self sufficient in rice production, asked the North Eastern Space Applications Centre to map out areas suitable for Boro rice.

Pratihba Das and team, North Eastern Space Applications Centre, had at their disposal the FAO recommendations for soil sites for boro, existing soil maps, soil samples from more than a hundred locations and physiography maps from remote sensing. Using geographic information system software, they synthesised the available data to pinpoint more than 80,000 hectares in 20 out of 46 development blocks distributed in 8 of the 11 districts where boro rice may be cultivated.

In a General Article on **page 1865** in this issue, the team summarises a technique that will find use in identifying and matching the best areas for other varieties of rice and even other crops. And provides an example that other states can emulate.

Automated Transplanting

Vegetable cultivation

Vegetables like tomato, brinjal, chilli, cabbage, cauliflower, etc. are sown and raised in nurseries. The seedling are separated and transplanted later. The process of transplanting is laborious and is a limiting factor in upscaling the cultivation of vegetables.

Researchers from the ICAR-Central Institute of Agricultural Engineering, and the College of Technology and Engineering, Udaipur came together to examine the various options available for farmers to automate the process.

To aid farmers who use manual transplanting, the researchers start with mechanical transplanting and then progress to automated ones. They describe the different mechanisms used in semi-automatic and automatic transplanting systems so far devised and then focus on the human machine interface, the factor that weeds out even ingenious technologies from the market. Besides human comfort and ease in operations, cost is the other factor that limits the use of technology.

The Review Article on **page 1884** has important pointers for vegetable farmers, agricultural industries and researchers interested in the field.

Evolving Equations

For fluidised bed reactors

Fluidised bed reactors, where a gas is forced up a granular solid, have been used in many industries for about 100 years now. Once the gas pressure applied goes above a critical limit, the granular mass behaves like a fluid.

Though the process has been in use, there is no satisfactory theoretical formulation that adequately describes the formation and maintenance of gas bubbles in such reactors. Scientists from the CSIR-National Chemical Laboratory, Pune, the Laxminarayan Institute of Technology and the CSIR-National Environmental Engineering Research Institute at Nagpur have now evolved an equation using genetic programming.

Provide a set of dependent and independent variables. A symbolic regression analysis based on genetic programming quickly 'selects' the fittest equations from randomly selected candidate equations. In the next generation, the selected equations provide a part of their elements to one other or 'cross over', to produce a new set of equations. One can also throw in random mutations, small changes in the offspring equations and then again, a selection for the fittest is applied. Thus the equations 'evolve' in each generation to fit the niche – in this case, fluidised bed reactors.

The fitness in this case is the data from a real fluidised bed reactor. The scientists chose five parameters – density of particles, particle diameter, height of bubble in fluidised bed, input velocity, and minimum velocity needed for fluidisation. All very measurable parameters. And the genetic programming based symbolic regression had to generate an equation that predicts the bubble diameter, another measurable parameter.

In a Research Article on **page 1904** in this issue, scientists show how well evolved equations predict bubble diameter under different conditions, with a much better fit than the existing equations. Seems like the extant equations will soon become extinct.

Prevalence of Hypertension

A case study of the Mizo population

A study, from 2000, on the prevalence of hypertension, in the North East of India, showed that the Mizo population was much less prone to the problem than the Assamese who, in turn, were less affected than tea garden workers. In the last 18 years, much has changed in the lifestyle of the Mizos. How does this reflect in the public health of the state?

The Assam Medical College and the ICMR-Regional Medical Research Centre, Dibrugarh undertook to find out, this time with a much higher sample size, and after systematic random sampling of both urban and rural populations, came up with results.

How do the Mizos fare on hypertension? What might have caused the slight increase in prevalence? Why the difference, though small, between rural and urban, between male and female? And why is it more than the prevalence of hypertension among people living in Delhi's slums?

A Research Communication on **page 1947** provokes questions that call for consideration from both researchers and public health authorities.

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