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Less rain, more dengue?

TAMIL NADU has always been vulnerable to dengue. In 1780, the first clinically recorded case in India was reported in Tamil Nadu. In 2001, a serious dengue outbreak swept through densely populated swathes of Tamil Nadu. And during the five years between 2008 and 2012, even after counter measures promulgated by the government to rein in dengue, more and more people fell prey to the malady with each passing year. In 2012, for example the number of dengue cases reported was three times more than the number reported in 2011. The writing on the wall cannot be more explicit: *Dengue is becoming more aggressive in its intent.*

Such a fierce rise in the number of dengue cases in Tamil Nadu could be ascribed to several factors: its tropical climate; poor sanitation; suffocating population densities; and lack of educational initiatives to spread the word about the disease. The local people of Tamil Nadu, however, themselves are of the belief that this sudden rise in dengue cases is primarily because of two other – *seemingly spurious* – factors: poor rainfall and insufficient power supply.

It is of course within sound reason to correlate rainfall deficit with a decrease in electrical power production: A deficit in rainfall implies lower than usual water in hydroelectric dams. But correlating rainfall deficit and a decrease in power production with the surge of dengue appears to be far-fetched, and even counter intuitive. Common sense dictates that greater the rainfall, the more widespread the disease (because, quite obviously, there is more water for the mosquito to breed). And what do power outages have to do with dengue? A Research Communication, **page 171**, endeavours to find out.

This study considers five years, from 2008 to 2012, a period during which 23,000 dengue cases were reported in Tamil Nadu, in its analysis and discovers an intriguing result: There indeed exists a positive correlation between both – (i) poor rainfall and insufficient power supply, and (ii) a rise in dengue cases. According to the study, poor rainfall results in long power cuts that force the common man to store water, the electric motor rendered redundant without electricity, in open containers. This results in the accelerated proliferation of *Aedes aegypti*, the vector of the dengue virus. Furthermore, the study also develops a model that can predict the number of dengue cases in a season. Although the model struggles with its accuracy, it could nevertheless serve as a prototype for more accurate prediction models. These would most assuredly prove to be invaluable tools for stemming the surge of dengue – a global phenomenon that afflicts more than 300 million people every year.

Policing science research in India

THE scientific research sphere is fiercely competitive. And like any other competitive profession, in science research, the incentive of awards, fame, money, and respect is often so sweet a lure for some that they compromise their morals, and indulge in misconduct to forward their ambitions.

In 2011, for instance, Joachim Boldt, allegedly forged data in as many as 90 research studies. In 2012, found guilty of fabricating figures in his papers, Japanese anaesthesiologist Yoshitaka Fujii was forced to retract as many as 172 publications. And of course, still fresh – like an open wound – in the minds of the scientific community, are the sensational but fraudulent findings of the biologist Haruko Obakata who had claimed to have developed an ingenuously simple method of inducing pluripotency in cells. This is only the tip of the iceberg.

Misconduct not only undermines the credibility of the perpetrators and the organizations they work in, but more importantly, it causes significant losses of both time and money that were expended ostensibly in the name of science. Not surprisingly therefore, to curb misconduct, several countries have established specialized ombudsman bodies. These ombudsman bodies have two primary objectives. First, to ensure that the research studies being published from their country is *clean*, and bereft of any fraudulent practices. And second, to mete out punishments to those found guilty of misconduct. Surprisingly, however, no ombudsman body has been established in India – a developing country whose scientific endeavour already suffers from paltry budget allocations, and a severe paucity of scientists. A General Article, **page 31**, delves deep into various forms of misconduct prevalent in science research today, thereby underscoring the importance of establishing an ombudsman institution in India.

Troubled waters

IN 1992, to address the water woes of the parched people of Jodhpur, the Kaylana lake was connected to the Rajiv Gandhi Lift Canal by the Indian government. Little did anyone know, however, that the same lake water would be detrimental to the buildings of the city in the long run. Indeed, over the years the lake water has been seeping through cracks at the bottom of the lake, mixing with the groundwater, percolating through the soil, and oozing through the cement foundations of buildings, thus undermining their structural integrity. What makes matters worse is that, owing to this continuous trickle of lake water into the underground, the groundwater level has risen significantly, and is now only a few perilous centimetres below the surface. Fear grips all. Jodhpur floats precariously on water, something not blessed with the fortitude of hard ground. Even a whisper of a tremor will be calamitous.

Of course, to alleviate the problem of water-logging, one could continually pump out the water, as is already being done. But there is simply too much water, and every time water is pumped out, owing to the suction pressure, even bits of cement from nearby building foundations come loose and dissolve in the water, further exacerbating building damage. It is therefore imperative that other more efficacious remedial measures be formulated to stem the tide.

Before one can set forth in doing so, however, one needs to address a serious problem: How does one demarcate the passage of groundwater as it insidiously slithers from Kaylana lake to building foundations? The passage of groundwater, after all, is many feet deep beneath the surface, and beyond the scope of the human eye. A Research Article, **page 148**, successfully addresses this question by using something known as landscape entropy...

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