

Planet with earth-like temperatures found

A potentially habitable Earth-like planet that is only 16 light years away has been discovered. It has a mass five times that of earth.

Alzheimer's link to brain hyperactivity

The precise molecular mechanism that may trigger elevated neuronal activity in Alzheimer's patients has been pinpointed by researchers.

SCIENCE & TECHNOLOGY

SNAPSHOTS

Test of vehicle for Mars missions successful



NASA has successfully conducted the first of three planned tests for the Low-Density Supersonic Decelerator project, developed to evaluate new landing technologies for future Mars missions.

Almonds reduce the risk of heart disease



Eating almonds reduces risk of heart disease by keeping blood vessels healthy. Research found that they increase the amount of antioxidants in the blood, reduce BP and improve blood flow.

Queen bumblebees fly far before nesting



It is well-known that bumblebee queens could fly long distances, but a new study shows that new queens disperse widely, several km away from their birthplace, before starting their own nest.

Oil palm plantations threaten water quality



Significantly eroded water quality now is a risk from oil palm cultivation. A new study warns of threats to streams that millions of people depend on for drinking water, food and livelihoods.

Novel technology alters sex of prawns



Scientists have developed a novel method for generating single-sex prawns, which may lead to higher aquaculture productivity and serve as a measure against invasive species and pests.

What makes trees more drought-resistant



It became clear in a novel study that trees with more stored carbohydrates were able to maintain the vital water content in the stem for longer than those with fewer stored carbohydrates.

Could this year's El Niño be like the 2009 one?

In 2009, from around June to almost October, the entire Pacific basin turned unusually warm

N. GOPAL RAJ

This year, the monsoon has got off to an unpropitious start, with last month's nationwide rainfall showing a deficit of 43 per cent. Since 1901, the June rainfall had a shortfall of over 40 per cent in only four previous years. The last time this occurred was in 2009 when rains were poor in the following three months as well and the monsoon ended in a drought.

Some scientists are seeing similarities between the El Niño, the exceptional warming of the tropical Pacific Ocean, that is occurring this year and one that turned up five years back.

With the classical El Niño, the tropical eastern Pacific close to the coast of South America becomes warmer than usual while the western side of the ocean, near Indonesia, cools. In recently years, scientists have drawn a distinction between this sort of El Niño and ones where the warming is principally in the central Pacific. The latter, it is argued, has a greater impact on the monsoon, reducing rains over India, than the former.

But the El Niño that manifested in 2009 was unique, according to K. Ashok of the



DÉJÀ VU? Since 1901, the June rainfall had a shortfall of over 40 per cent in only four previous years. — PHOTO: KOMMURI SRINIVAS

Indian Institute of Tropical Meteorology (IITM) in Pune. That year, from around June to almost October, the entire Pacific basin turned abnormally warm, with no cooling anywhere.

An assessment

In an assessment issued a week back, the World Meteorological Organization noted that this year's developing El Niño has a "somewhat unusual pattern" with sea surface temperatures that are above average across virtually the entire tropical Pacific, not just in the eastern

and central portions.

In a paper published in *Geophysical Research Letters* in 2012, Dr. Ashok, along with T. P. Sabin, and P. Swapna, both of them also at IITM, as well as Raghu Murtugudde, professor of atmospheric and oceanic sciences at the University of Maryland in the U.S., examined the effect that basin-wide warming in the Pacific could have. A climate model run with the Pacific sea surface temperatures of 2009 reproduced many features seen that year, including reduced rainfall over India.

"The tricky question is how

the El Niño will evolve this year, whether the basin-wide warming will persist in the coming months and the impact that will have on the monsoon," remarked Dr. Murtugudde.

Weakened winds

During the evolution of a typical El Niño, as the western side of tropical Pacific cools and eastern part warms, trade winds, which blow from east to west over that ocean, weaken considerably and sometimes even reverse direction. This shift in wind pattern aids the growth of the

El Niño.

In an El Niño with basin-wide warming, the development of such a sea-surface temperature gradient and the accompanying change in winds was disrupted. Consequently, the El Niño may not strengthen as it ordinarily would, he pointed out. However, even a weaker-than-expected El Niño might wreck the monsoon.

What matters most for the Indian monsoon are conditions over equatorial central Pacific, according to Sulochana Gadgil, a leading atmospheric scientist who was at the Indian Institute of Science in Bangalore.

Atmospheric conditions over that part of the ocean have been adverse for the monsoon this year.

Moreover, "a developing El Niño can have a major impact as seen in 2002 and 2004."

The evolving El Niño was the primary factor keeping the Indian monsoon suppressed this year, said D.R. Sikka, a distinguished meteorologist who retired as director of IITM and was the first to establish the link between El Niño and droughts over India.

Weather models indicated that rainfall in July could also be somewhat below normal. "We are hoping that some recovery will take place in the month of August."

Plastic waste costs \$13 billion worth of damages a year to marine ecosystems

DIVYA GANDHI

Every year plastic waste costs marine ecosystems \$13 billion in damages, says a report released recently by the United Nations Environment Programme (UNEP).

The estimated 10-20 million tonnes of plastic waste that finds its way into oceans, smothers coral reefs, routinely entangles marine wildlife, and more insidiously, degrades into 'microplastics' that transfer toxins into the food chain.

Microplastics (or plastic particles of 5mm diameter or less) are ingested by creatures ranging from sea birds to mussels, said marine biologist and UNEP chief scientist Jacqueline McGlade at a press conference at the United Nations Environment Assembly (UNEA) in Nairobi.

Microplastics form "plastic spheres" that harbour thriving communities of dangerous microbes and also absorb and transfer heavy metals such as mercury



APPALLING: An estimated 10-20 million tonnes of plastic waste finds its way into oceans, smothers coral reefs, entangles marine wildlife, and transfers toxins into the food chain. — PHOTO: AFP

across vast distances through the ocean.

The report titled 'Valuing Plastic' presents a "business case" for plastic-intensive companies, and recommends that companies monitor plastic use, disclose their results and increase resource efficiency and recycling.

Plastic toys, athletic goods, and household durable goods sectors use the largest amount of plastic in their products while food companies, soft drinks and the pharmaceutical industry are the biggest users of plastic in their packaging.

A growing source of microplastics is the cosmetic and personal care industry that has introduced plastic particles of 5mm diameter or less in products such as toothpastes and showergels, says the report.

Asia faces the highest environmental costs from plastic pollution because of the higher pollution intensity levels of manufacturing and a lack of adequate waste management facilities.

"Companies must consider their plastic footprint just as they do their carbon footprint," said Andrew Russell, director of Plastic Disclosure Project that was part of the research.

However, consumer goods companies have a poor track record of disclosing their plastic use, the report finds. Of 100 companies assessed, less than half reported any data relevant to plastic.

(The Correspondent participated in the United Nations Environment Assembly in Nairobi at the invitation of UNEP.)

Bangladesh: women's education cuts maternal, child mortality

Couples used to have more children; a big benefit of education is seen in reduced fertility with increased use of contraceptives

R. PRASAD

Bangladesh is a classic case of a low- and middle-income country achieving the unachievable which many others failed to. It reduced its maternal mortality by 66 per cent between 1990 and 2010; the reduction was 40 per cent between 2001 and 2010 alone.

These were achieved by lowering the maternal mortality rate (the number of maternal deaths per 100,000 live births) from 574 to 194 during the period 1990 to 2010. The reduction was substantial even in a short span of eight years (1990 to 1998) — 574 to 322 per 100,000 live births. As per the 2012 WHO estimates, the average annual rate of decrease was 5.9 per cent during the period 1990 to 2010, which is more than the Millennium Development Goal 5 target of 5.5 per cent or more.

What is more surprising is that the reduction in MMR (maternal deaths per 100,000 live births) was almost the same in both the urban and rural areas.

At the current rate of (MMR) reduction, Bangladesh is well on its way to reaching the MDG 5 target of 143 per 100,000 live births this

year — a year ahead of schedule. India too reduced maternal mortality by 65 per cent from 569 to 190 per 100,000 live births between 1990 and 2013.

Yet, with only 4.5 per cent annual reduction in MMR, India is bound to miss the MDG 5 target of 5.5 per cent or more decrease rate before 2015.

So how did Bangladesh, one of the poorest countries in the world with the highest population density and where 75 per cent of the population lives in rural areas, achieve it? "It's a difficult question to answer. Several different things happened and they were interlinked," said Prof. Shams El Arifeen, Centre for Children and Adolescent Health, ICDDR, B, Shaheed Tajuddin Ahmed Sharani, Dhaka.

"If you were to highlight the factors, the status and value of women have improved. They are more educated and have access to finance. Discrimination against women has come down... there is quite a bit of evidence of that." Education has in turn increased women's willingness and ability to seek health care. "Education for women in the 15-24 years age group is particularly important... there is a revolution happen-



DRAMATIC DROP: Between 1990 and 2011, Bangladesh witnessed a 65 per cent reduction in under-five mortality. — PHOTO: AFP

ing with 80 per cent literacy in women. It is the time when they are starting their reproductive life and having families and babies. A big factor is that the government is consistent in encouraging education regardless of which political party is in power," he explained.

"In villages can see more girls are educated compared with boys." One of the biggest benefits of education is seen

in reduced fertility. Each individual is replacing himself.

"Every couple produces no more than two children. I couldn't have imagined this 20 years ago," he pointed out. The family planning norm has changed. Couples used to have more children but that norm has changed. Most couples have 2 or less children. With increased use of contraceptives, fertility rate reduced by 0.7 child per

women.

On average, the fertility is currently 2.3. "The desired fertility is 1.6. That gap can be reduced by reducing fertility," he said. Besides reduced fertility, one third to one half of women who deliver are first time mothers. "Twenty years ago, each couple would have had five children," Prof. Arifeen said.

It is known that mothers have a greater risk of dying



INSIDIOUS: Chikungunya and dengue are among the zoonotic diseases. — PHOTO: AFP

Zoonotic diseases ignored in developing world

AARTI DHAR

Decades of neglect have allowed infectious diseases to devastate the lives of thousands of people in the developing world, a new study has revealed. Researchers say three diseases in particular — anthrax, brucellosis and bovine tuberculosis — have failed to receive the official recognition and funding needed to combat them effectively. All three impact greatly on human and animal health in developing nations, posing a major threat to safe and plentiful food supplies.

The disorders — known as zoonotic diseases — are spread between animals and humans, and are common in societies where poverty is widespread, and where people depend on animals for their livelihood. A researcher at the University of Edinburgh reviewed every meeting of the World Health Organization's decision-making body since its formation in 1948, to conclude that zoonotic diseases were almost totally ignored.

Their findings reveal that the diseases have been neglected because they mostly arise in developing countries. Scientists say the diseases have been eliminated or brought under control in more developed countries, as simple and effective controls are available.

The resolutions from all 66 World Health Assembly meetings held between 1948 and 2013 were examined to determine how many contain a specific focus on any of the following neglected zoonotic diseases as defined by the WHO — anthrax, bovine tuberculosis, Taenia solium cysticercosis, cystic echinococcosis, leishmaniasis rabies, and human African trypanosomiasis (HAT or sleeping sickness). Twenty one resolutions adopted in all the 16 assemblies between 1948 and 2013 targeted one or more of these diseases, representing 4 per cent of the total resolutions on infectious diseases passed up to now. The 2013 adoption of Resolution WHA66.12 targeting all 17 neglected tropical diseases marked a change in approach by the WHO. Earlier resolutions targeted each disease individually.

Poor healthcare infrastructure in affected countries can often mean that thousands of sufferers are left undiagnosed. This presents huge challenges to health professionals, policy makers and researchers in their efforts to combat the diseases

Findings from the study, funded by the European Commission, are published in the journal *PLoS Neglected Tropical Diseases*.

Professor Sue Welburn, Director of the University of Edinburgh's Global Health Academy, who led the study, said: "It is extraordinary that in the 21st century we are failing to manage brucellosis and the other neglected zoonotic diseases that impact so severely on rural communities in developing economies when, for many of these diseases, the tools to manage them are well developed."

Chikungunya, dengue, Avian influenza, plague, SARS and acute encephalitis syndrome (AES) are some of the zoonotic diseases that have and continue to take a heavy toll of human life in India. Japanese encephalitis and AES kills hundreds of children in the eastern parts of the country every year and results in high morbidity. Reports of deaths due to Chikungunya, dengue and highly infectious Congo Haemorrhagic Fever are also not uncommon in the country, particularly during monsoon.

Salmonella, *mycobacterium*, *E.coli* and *Brucellosis* are some commonly found bacteria in India which cause highly infectious diseases like cholera and are often transmitted through unhygienic food and impure drinking water.

(The Correspondent participated in the Partnership for Maternal, Newborn and Child Health Forum in Johannesburg at the invitation of the Global Health Strategies, New Delhi.)