



QUEENSLAND: An undated handout photo taken by Bette Willis and released ARC Centre of Excellence for Coral Reef Studies shows a bleaching on a coral reef in Great Barrier Reef. —AFP

## GREAT BARRIER REEF DAMAGE COULD COST AUSTRALIA A MILLION TOURISTS

SYDNEY: Mass coral bleaching on Australia's Great Barrier Reef could cost the region more than a million tourists a year and up to Aus\$1.0 billion (US\$760 million) in lost revenue, a study warned yesterday. Scientists said this week that coral bleached for two consecutive years at the World Heritage-listed site had "zero prospect" of recovery after researchers detected another round of mass bleaching due to warming sea temperatures.

In a new study, Australia's independent Climate Council said that further damage to the 2,300-kilometre long reef could severely affect tourism prospects and cost around 10,000 jobs. "This isn't just an environmental issue. The Great Barrier Reef is one of Australia's greatest economic assets," said the council's Lesley Hughes. "It's responsible for bringing in more than Aus\$7.0 billion each year to our economy, while also supporting the livelihoods of around 70,000 people."

Even if parts of the reef hurt by bleaching bounce back, scientists say it could take up to a decade for even the fastest growing corals to recover. "If coral bleaching persists, tourism areas adjacent to the Great Barrier Reef risk declines... from 2.8 million visitors (2015 figures) to around 1.7 million per year," the study said, citing analysis by the

Australia Institute think-tank. "This is the equivalent of more than Aus\$1 billion in tourism expenditure, which supports around 10,000 tourism jobs in regional Queensland."

The reef is experiencing its fourth mass bleaching where stressed corals expel the algae that live in their tissue and provide them with food after previous events in 1998, 2002 and 2016. It is also under pressure from farming run-off, development and the crown-of-thorns starfish. And last month the site was hammered by Cyclone Debbie, mostly affecting southern areas around the Whitsunday islands which largely escaped the bleaching.

In another setback, scientist Andrew Brooks of Griffith University yesterday said aerial assessments showed flood plumes from two rivers swelled by the cyclone were now pushing sediment and nitrogen pollution into reef waters. "We know sediment can harm coral and sea grass by restricting light," he said. "Now we're learning that sediment from this area also carries large loads of harmful nitrogen because it sticks to the sediment sourced from these same soils." WWF-Australia's Sean Hoobin said: "We need greater investment in catchment repair so that the next cyclone or flood does less harm to the reef." —AFP

## HUNDREDS OF MILLIONS OF POOR MENACED BY 'SILENT KILLER': HEAT

BHUBANESWAR, India: On a hot, humid afternoon on the outskirts of Bhubaneswar in eastern India, construction worker Sabitri Mahanand frets about increasingly "dangerous" summers. Carrying over a dozen bricks on her head, she fears getting sunstroke while at work, but home offers no respite either. "When the day's work is over, I'm so exhausted that I often don't want to cook food but I have no choice," said Mahanand, 35, wiping the sweat from her face with a cloth wrapped around her waist. "I have to feed myself, my husband and my son."

The ancient city of Bhubaneswar is the capital of Odisha state - one of the few parts of South Asia that has a heat emergency plan. Odisha's government departments have been asked to put in place measures in anticipation of heat waves this summer. The world has already experienced three record-breaking hot years in a row, and the rising global temperature could have profound effects for health, work and staple food supplies for hundreds of

millions of people, climate scientists said. The poor in urban slums in developing nations are particularly at risk, they said, while solutions to cool homes and bodies that do not hike climate-changing emissions remain elusive. Even if the world is able to limit global temperature rise to 1.5 degrees Celsius above pre-industrial levels - a goal set by governments in Paris in 2015 - by 2050, around 350 million people in megacities such as Lagos in Nigeria and Shanghai in China could still be exposed to deadly heat each year, according to a recent study by British researchers.

Estimates from the Institute for Social and Environmental Transition-International (ISET-International) and the National Center for Atmospheric Research (NCAR), both based in Colorado, are even higher. By mid-century, some 300 million Indians and Bangladeshis in the lower Ganges Valley alone will lack sufficient power to run electric fans or air conditioning to combat rising temperatures, they predict. —Reuters

# KENYA LEARNS TO COOK WITH SOLAR POWER, AFTER SUNSET

BUSIA, Kenya: In this sunny part of Kenya, solar cookers - which trap sunlight to heat food - have surged in popularity in recent years. But a big problem remains: How to cook when the sun doesn't shine? Communities are now starting to sort out solutions, from insulated baskets that hold onto heat after the sun disappears to use of back-up fuel-efficient charcoal and firewood stoves. "Fluctuations in sunshine can hinder cooking using the solar (system) but with the basket we nowadays prepare tea during the day and can drink it after sunset," said Peter Wanga, whose family has been using a solar cooking system since last year.

The insulated basket "conserves enough heat to cook food even when there is no sunshine" - and is affordable and easy to use, he said. In Busia County, in western Kenya, as many as 1,500 households have turned to solar cooking, mostly over the last four years, according to county Ministry of Energy figures. Other families have adopted more efficient charcoal or firewood stoves. The changes in large part have been driven by Farmers with a Vision (FWA), a local community organization based in Bumala Township.

Over the last four years, "we have sold thousands of solar cookers and energy saving charcoal and wood stoves, and also found a platform to promote use of solar energy appliances such as lighting equipment" said Didacus Odhiambo, the organization's chief executive officer. He said the clean energy effort has faced significant challenges, including as many as 60 percent of buyers defaulting on loans for equipment - a problem the organization is still trying to sort out. Many households struggle

to find the upfront money to buy the more efficient cooking technology, he said.

### Faster cooking, more trees

The switch to more efficient cooking aims to cut deforestation in Kenya, and health problems related to cooking over smoky fires. Those who have bought the new systems say another attraction is that they require only about a third of the usual time to cook food or heat water - a big savings of women's time. Julius Magero, an official in the Ministry of Energy and Petroleum in Busia County, said that besides protecting increasingly scarce forests, the stoves also are helping women spend less time searching for fuel wood.

Lilian Nyapola, a member of Farmers with a Vision, said the new technologies - most of which cost on average \$25 to \$60 - have led to a decline in use of firewood and paraffin, which are costly and emit smoke. "The uptake of solar cookers and energy saving wood stoves and thermos baskets is high," she said. She sells around 14 clean cooking devices a month, she said - enough that now virtually all of the homes in her neighborhood now use them.

Nyapola said her 32-member organization has worked in schools, churches and homes to train community members on the new technologies, and that men have backed women switching to new cooking technology, not least because food can be cooked faster and rarely burns, and children aren't injured in fires.

### Battling cloudy days

To afford the equipment buyers can access credit from Farmers with a Vision, or local

microcredit agencies, Nyapola said, with loans often paid back over half a year or more. Odhiambo said the group is in talks with M-Kopa, a money lending scheme owned by Kenya's leading mobile telephone company, Safaricom, to allow buyers to make payments for equipment via their mobile phones.

Originally the group focused only on selling solar cookers, Odhiambo said, but after complaints about problems using them on rainy or cloudy days, or at night, members broadened their approach. Now the group offers a range of different solar cooking boxes, parabolic reflector cookers, solar thermos systems and other devices, including clean cook stoves.

Box cookers - designed with help from the Free University of Amsterdam - trap sunlight that shines through the box's glass top, using it to heat food placed inside. The device "can cook when the sunshine is low and when not much light is available. It retains heat and can cook for additional three hours," Odhiambo said. He said his organization also has partnered with EcoZoom, a company that builds cast iron improved wood and charcoal stoves.

Daniel Maneno, an official with the national Ministry of Energy and Petroleum in Busia County, called the initiative useful, particularly as training on renewable energy technology is provided free of charge. He said the ministry is also promoting tree planting efforts in collaboration with the Kenya Forestry Research Institute as part of a broader effort to protect trees and reduce deforestation. —Reuters

# CATASTROPHIC FAILURE: WHY SHOELACES COME UNDONE

PARIS: A mystery as old as laced shoes was unraveled yesterday by experiments that reveal how shoestrings come undone when we are on the move. "The failure of the knot happens in a matter of seconds, often without warning, and is catastrophic," scientists reported in the journal Proceedings of the Royal Society A. The researchers meant "catastrophic" in a technical sense of complete, or total collapse-once the loosening begins, there's no stopping it.

But while the cost of a straggling shoelace is rarely higher than a scraped knee or the time it takes to bend down and retie a bow, sometimes the consequences can be devastating. Lacerated accidents dot local media around the world: the van driver who killed a motorcyclist when his shoestring-wound tight around the accelerator prevented him from lifting his foot off the gas; the boy whose leg got pulled into the gears of an escalator; the cyclist who went head-over-handlebars into traffic.

Millions of shoelaces surely come unfurled every day, and yet the mechanics of that process had never been thoroughly examined. To tackle the enigma, a trio of mechanical engineers at the University of California at Berkeley filmed a knot-on the shoe of a researcher running on a treadmill-coming undone in extreme slow motion. The images suggested a two-pronged attack on the knot's integrity.

### A double whammy

"When running, your foot strikes the ground at seven times the force of gravity," stretching and relaxing the knot, said co-author Christine Gregg, a graduate student. And then-as the knot relaxes-the legs swings into motion, applying additional force. "A double whammy of stomping and whipping forces acts like an invisible hand, loosening the knot and then



MANILA: This file photo shows a member of the Smokey Mountain baseball team tying his shoelace during practice at the former dumpsite in Manila. —AFP

tugging on the free ends of your laces until the whole thing unravels," the researchers explained in a statement.

Follow-up tests with a mechanical foot-and-leg showed that some laces were better than others, but none were impervious to failure. Of the two most commonly used knots to tie shoes, one is "weak" and the other "strong," the study found. The strong version is based on a square knot, which is more symmetrical, while the so-

called "false" knot twists when tightened rather than lying flat. Both fail in the same way, but one takes longer than the other.

"We were able to show that the weak knot will always fail and the strong knot will fail at a certain time scale," said Professor Oliver O'Reilly, whose lab conducted the experiments. "But we still do not understand why there's a fundamental mechanical difference," he added, leaving another knotty mystery to be solved. —AFP

# CLINIC PAGE



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