Conserve™ The Energy

It's Tomorrow™

June - 2019 | Climate Special | Issue : 32

Nanotechnology

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Why ???

We the people on the earth are gifted with wonderful energy sources by the nature, which has made our routine much more smother & easier... However, this gift of the nature is ' limited '. What we have done is, with the growth of science & technology, we have started using it extremely, because of which the energy resources are going to finish in near future. Hence, let us take the pledge to conserve the energy - save the energy!!!

Tip of the Month

Article - 1 : Virus-infected bacteria could provide help in the fight against climate change

Viruses don't always kill their microbial hosts. In many cases, they develop a mutually beneficial relationship: the virus establishes itself inside the microbe and, in return, grants its host with immunity against attack by similar viruses. Understanding this relationship is beneficial not only for medical research and practical applications but also in marine biology, says Alison Buchan, Carolyn W. Fite Professor of Microbiology at the University of Tennessee, Knoxville. Marine microbes are uniquely responsible for carrying out processes that are essential for all of earth's biogeochemical cycles, including many that play a role in climate change.

Within the community, bacteria compete with one another for resources. In the course of this fight, some bacteria produce antibiotics and use them against other types of bacteria. This kind of interaction has been known for some time. But there is another fight strategy that scientists like Buchan are just now considering: bacteria might use the viruses that infect them as weapons against other types of microbes. We have recently discovered that while they are in the process of dying, microbes can produce new viruses that then go to attack their original invader. We have recently discovered that while they are in the process of dying, microbes can produce new viruses that then go to attack their original invader.

**Source: https://www.sciencedaily.com/releases/2019/02/190217115830.htm*

**Image Source: https://phys.org/news/2019-02-virus-infected-bacteria-climate.html*

Article - 2 : Understanding carbon cycle feedbacks to predict climate change at large scale

Thomas Crowther identifies long-disappeared forests available for restoration across the world. There is room for an additional 1.2 trillion new trees around the world that could absorb more carbon than human emissions each year. Crowther also describes data from thousands of soil samples collected by local scientists that reveal the world's Arctic and sub-Arctic regions store most of the world's carbon. But the warming of these ecosystems is causing the release of this soil carbon, a process that could accelerate climate change by 17%. This research is revealing that the restoration of vegetation and soil carbon is by far our best weapon in the fight against climate change. The living parts of the planet make it unique from all other parts of the solar system, and they drive every aspect of biogeochemical cycling. It is essential that we represent these living processes into our understanding of current and future biogeochemical cycles in order to understand and predict climate change.

In their research, the Crowther Lab uses the largest global dataset of forest inventory data (the Global Forest Biodiversity Initiative), measured by people on the ground in over 1.2 million locations around the world combined with satellite observations, to get a mechanistic understanding of the global forest system. The lab also uses an equivalent database for below-ground ecology -- the Global Soil Biodiversity Initiative. This initiative, with tens of thousands of soil samples that describe the global patterns in the biomass and the diversity of the global soil microbiome, paired with satellite data generates a first glimpse at the billions of below-ground species that determine soil fertility, atmospheric composition and the climate. Using this combination of above ground and below ground data the research team can identify regions of high priority for biodiversity conservation.

Additionally, they can finally start to understand the feedbacks that determine atmospheric carbon concentrations over the rest of the century. They now understand that, as the soil warms, carbon emissions from the soil will increase, particularly in the high-latitude arctic and sub-arctic regions. Under a business-as-usual climate scenario the Crowther lab model suggests that warming would drive the loss of ~55 gigatons of carbon from the upper soil horizons by 2050. This value is around 12-17 per cent of the expected anthropogenic emissions over this period.

**Source: https://www.sciencedaily.com/releases/2019/02/190217115827.htm*

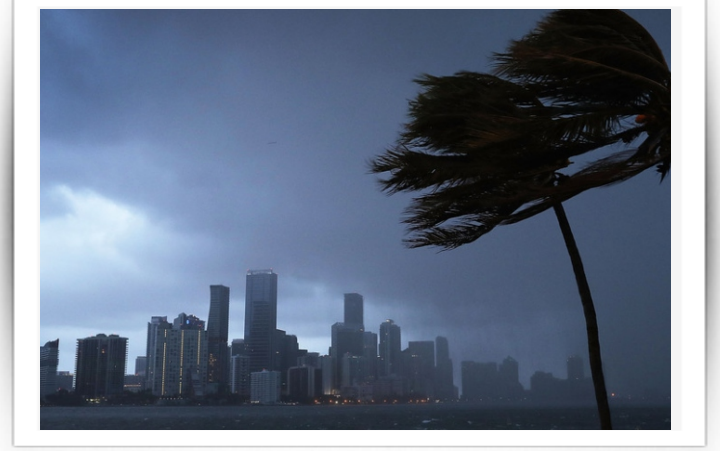

**Image Source: https://www.marketwatch.com/story/florida-and-texas-are-expected-to-take-the-biggest-economic-hit-from-climate-change-2018-04-24*

Article - 3 : How to feed the world by 2050? Recent breakthrough boosts plant growth by 40 percent

One of the most significant challenges of the 21st Century is how to sustainably feed a growing and more affluent global population with less water and fertilizers on shrinking acreage, despite stagnating yields, threats of pests and disease, and a changing climate. Plants have to do three key things to produce the food we eat: capture sunlight, use that energy to manufacture plant biomass, and divert as much of the biomass as possible into yields like corn kernels or starchy potatoes," Ort said. "In the last century, crop breeders maximized the first and third of these, leaving us with the challenge to improve the process where sunlight and carbon dioxide are fixed -- called photosynthesis -- to boost crop growth to meet the demands of the 21st Century." Land plants evolved with a biochemical glitch whereby a photosynthetic enzyme frequently captures oxygen instead of carbon dioxide, necessitating a convoluted and energy-expensive process called photorespiration to mitigate this glitch.

Crops like soybean and wheat waste more than 30 percent of the energy they generate from photosynthesis dealing with this glitch, but modeling suggested that photo respiratory shortcuts could be engineered to help the plant conserve its energy and reinvest it into growth. Borrowing genes from algae and pumpkins, the team engineered three alternate routes to replace the circuitous native photorespiration pathway in tobacco, a model plant used to show proof of concept before scientists move technologies to food crops that are much more difficult and time-consuming to engineer and test. Now, the team is translating this work to boost the yields of other crops including soybean, cowpea, rice, potato, tomato, and eggplant. It is incredible to imagine the calories lost to photorespiration each year around the globe," Ort said. "To reclaim even a portion of these calories would be a huge success in our race to feed 9.7 billion people by 2050. It is incredible to imagine the calories lost to photorespiration each year around the globe," Ort said. "To reclaim even a portion of these calories would be a huge success in our race to feed 9.7 billion people by 2050.

** Source: https://www.sciencedaily.com/releases/2019/02/190216094518.htm*

**Image Source: https://www.eurasiareview.com/18022019-how-to-feed-the-world-by-2050-recent-breakthrough-boosts-plant-growth-by-40-percent/*

Article - 4 : Undersea gases could superheat the planet

The world's oceans could harbor an unpleasant surprise for global warming, based on new research that shows how naturally occurring carbon gases trapped in reservoirs atop the seafloor escaped to superheat the planet in prehistory. Scientists say events that began on the ocean bottom thousands of years ago so disrupted the Earth's atmosphere that it melted away the ice age. Those new findings challenge a long-standing paradigm that ocean water alone regulated carbon dioxide in the atmosphere during glacial cycles. Instead, the study shows geologic processes can dramatically upset the carbon cycle and cause global change. For today's world, the findings could portend an ominous development. The undersea carbon reservoirs released greenhouse gas to the atmosphere as oceans warmed, the study shows, and today the ocean is heating up again due to human made global warming. If undersea carbon reservoirs are upset again, they would emit a huge new source of greenhouse gases, exacerbating climate change. Temperature increases in the ocean are on pace to reach that tipping point by the end of the century. For example, a big carbon reservoir beneath the western Pacific near Taiwan is already within a few degrees Celsius of destabilizing.

Moreover, the phenomenon is a threat unaccounted for in climate model projections. Undersea carbon dioxide reservoirs are relatively recent discoveries and their characteristics and history are only beginning to be understood. These undersea carbon reservoirs largely stay put unless perturbed, but the new study shows the natural reservoirs are vulnerable in a warming ocean and provides proof the Earth's climate has been affected by rapid release of geologic carbon.

The scientists say it occurred in the distant past when the Earth was much warmer, and it's happened more recently -- about 17,000 years ago at the end of the Pleistocene epoch when glaciers advanced and receded, which is the focus on the new study. Warming was evident due to changes in atmospheric greenhouse gas concentrations, based on ice cores, marine and continental records. They soon realized that processes that regulate carbon to the ocean operated too slowly to account for the surge in atmospheric greenhouse gases that led to warming that ended the ice age. So, scientists around the world began examining the role of Earth's hydrothermal systems and their impact on deep-ocean carbon to see how it affected the atmosphere.

**Source: https://www.sciencedaily.com/releases/2019/02/190213090812.htm*

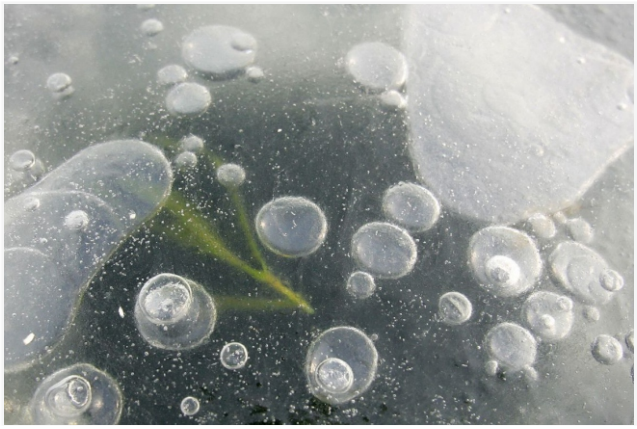

**Image Source: https://news.sky.com/story/release-of-undersea-gases-could-superheat-the-planet-11637062*

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Save our Climate!

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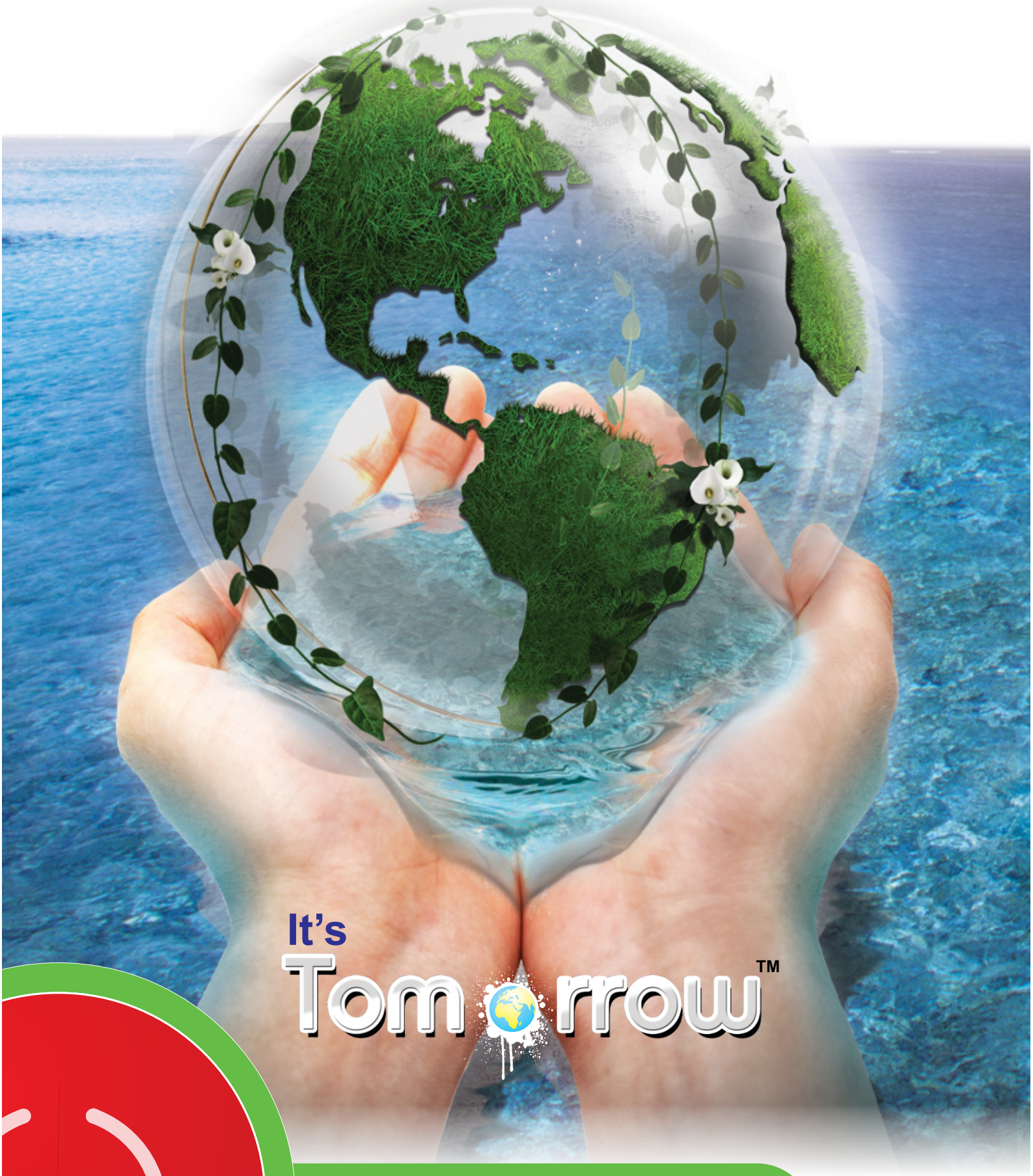
The Energy



It's
Tomorrow™

Nanoland Ltd.
Mezzanine Floor, N. R. House, Nr. Popular House, Ashram Road, Ahmedabad - 380 009. INDIA
Tel : +91 79 27545254/5255/5256 Fax : +91 79 27545257/4167
Email : info@conservetheenergy.com
Web : www.conservetheenergy.com

/cnsrv_enrgy
/energyconserve