



AGRICULTURE

HOW THE TRIBAL SETTLEMENTS IN CHINNAR WILDLIFE SANCTUARY ARE REVIVING CULTIVATION OF MILLETS AND ENDEMIC CROPS THROUGH PUNARJEEVANAM SCHEME

Punarjeevanam, launched by Kerala Forest and Wildlife Department, has revived 34 varieties of ragi, in addition to multiple kinds of beans, millets, amaranthus, maize and pumpkin



A view of the seed beds of different millet varieties at Thayyannankudy tribal settlement | Photo Credit: SPECIAL ARRANGEMENT

“Ragi dish Korangatti is had for breakfast, lunch and dinner. Accompanying it would be a curry made of vegetables that are in season or a non-vegetarian dish. Beans, pumpkin and amaranthus are some of the vegetables that we usually cook. Anchovy, crab curry and meat are also served as sides,” explains M Chandran, a member of the Muduvan tribe from Thayyannankudy settlement under Chinnar Wildlife Sanctuary, Idukki.

Read more at: <https://www.thehindu.com/sci-tech/agriculture/punarjeevanam-scheme-in-chinnar-revive-cultivation-of-millets-and-endemic-crops/article66670604.ece>

BHAVNAGAR LAB DEVELOPS TECH TO SEPARATE POTASH FERTILISERS FROM SPENT-WASH ASH

The Central Salt and Marine Chemicals Research Institute (CSMCRI) at Bhavnagar in Gujarat has developed a process to recover both sulphate of potash (SOP) and muriate of potash (MOP) from the spent wash ash generated by sugarcane molasses-based distilleries.

For a country that has hardly any mineable potash deposits and spends \$1-1.5 billion annually to import nearly 3 million tonne (mt) of this fertiliser, here’s a potentially game-changing technology. The Central Salt and Marine Chemicals Research Institute (CSMCRI) at Bhavnagar in Gujarat has developed a process to recover both sulphate of potash (SOP) and muriate of potash (MOP) from the spent wash ash generated by sugarcane molasses-based distilleries.



Spent wash is basically the wastewater or effluent that is a byproduct of alcohol production.

Read more at: <https://indianexpress.com/article/india/bhavnagar-lab-develops-tech-to-separate-potash-fertilisers-from-spent-wash-ash-8600825/>

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AGRICULTURE

CHINA APPROVES SAFETY OF FIRST GENE-EDITED CROP

The soybean has two modified genes that significantly raise the level of healthy fat oleic acid in the plant



China has approved the safety of a gene-edited soybean, its first approval of the technology in a crop, as the country increasingly looks to science to boost food production.

The soybean, developed by privately owned Shandong Shunfeng Biotechnology Co., Ltd, has two modified genes, significantly raising the level of healthy fat oleic acid in the plant.

The safety certificate has been approved for five years from April 21, according to a document published last week by the Ministry of Agriculture and Rural Affairs.

China has approved the safety of a gene-edited soybean, its first approval of the technology in a crop. | Photo Credit: Narang Kamal

Unlike genetic modification, which introduces foreign genes into a plant, gene editing alters existing genes.

Read more at: <https://www.thehindu.com/sci-tech/agriculture/china-approves-safety-of-first-gene-edited-crop/article66819427.ece>

GEMS OF ARAKU SHOWCASES THE REGION'S FINEST ARTISANAL COFFEE GROWN BY TRIBAL FARMERS

At the recent Gems of Araku, an annual harvest festival, the region's artisanal coffee, grown by over 12,000 small and marginal tribal coffee farmers, impressed an international jury with its notes of tropical fruit, round body and sweetness

Tucked away in the highlands of Eastern Ghats of Hukumpeta mandal near Araku Valley, about 130 kilometres from Visakhapatnam, is Boini Sanni Babu's four-acre field, which grows speciality coffee that travels the world.

Under the towering shade of silver oaks interspersed with guava, sapota and other 10 varieties of fruit and forest tree plantations, Sanni Babu's farm has been producing microlots (a traceable, exclusive coffee produced through outstanding effort and great care) that are consistently ranked among the best coffees in India year after year. With good crumb structure and excellent water holding capacity, his farm yielded a bumper crop of 3,300 kilograms of crimson red cherries this season.



Tribal women harvesting organic coffee from a plantation near Girliguda village in Araku. | Photo Credit: KR Deepak

Read more at: <https://www.thehindu.com/sci-tech/agriculture/gems-of-araku-showcases-the-regions-finest-artisanal-coffee-grown-by-tribal-farmers/article66834285.ece>





AGRICULTURE

HOW ARE NUTRIENTS IN MILLETS AFFECTED BY PROCESSING AND POLISHING?

The consumption of millets faces one threat that has already overtaken India's major food crops.



'Thina' or little millet cultivation in Attappady. | Photo Credit: Special arrangement

The story so far: The U.N. Food and Agriculture Organisation (FAO) has declared 2023 to be the 'International Year of Millets', giving these crops a shot in the arm even as countries worldwide are looking to them for their ability to grow in environmental conditions that the climate crisis is rendering more common. Millets are becoming more popular in India as well because of their low input requirements and high nutritional density, both of which are valuable for a country whose food security is expected to face significant challenges in the coming decades. However, the consumption of millets faces one threat that has already overtaken India's major food crops: grain-processing

What are millets?

Millets are fundamentally grasses. They are cultivated worldwide, but especially in the tropical parts of Africa and Asia, as cereal crops. Some of the more common varieties include pearl millet (*Cenchrus americanus*), barnyard millet (*Echinochloa utilis*), finger millet (*Eleusine coracana*), and foxtail millet (*Setaria italica*).

Read more at:

<https://www.thehindu.com/sci-tech/science/explained-millets-nutrient-content-affected-by-processing-polishing/article66841703.ece>

CENTRE LOOKS AT 'PARTIAL' REPLACEMENT OF WHEAT WITH MILLETS, OTHER COARSE GRAINS UNDER FOOD SECURITY ACT

At least six states have informed the Centre about their willingness to distribute coarse grains under the National Food Security Act during Kharif Marketing Season 2023-24 (Oct to Sep).



A worker sorting stock of wheat at APMC, Jetalpur in the outskirts of Ahmedabad. (Express photo by Nirmal Harindran)

The Centre is looking at "partial" replacement of wheat with coarse grains, including millets, under the National Food Security Act, 2013 (NFSA) as it expects coarse grain procurement to reach 20 lakh metric tonnes during Kharif Marketing Season (KMS) 2023-24, it is learnt. According to sources, at least six states have informed the Centre about their willingness to distribute coarse grains, including millets, under the NFSA during KMS 2023-24 (October to September). The states are Uttar Pradesh (5 lakh metric tonnes or LMT), Gujarat (3.5 LMT), Haryana (1.5 LMT), Karnataka (6 LMT), Madhya Pradesh (3 LMT) and Maharashtra (1.5 LMT).

This was informed by state officials in a meeting with Food Secretary Sanjeev Chopra on May 9. The virtual meeting was attended by the principal secretaries of these states and came after the Union Ministry of Consumer Affairs, Food and Public Distribution wrote to the states seeking information about the quantity of coarse grain planned for procurement and distribution during KMS 2023-24.

Read more at:

<https://indianexpress.com/article/cities/delhi/centre-looks-at-partial-replacement-of-wheat-with-millets-other-coarse-grains-under-food-security-act-8603696/>





ENVIRONMENT

THAWING PERMAFROST IN THE ARCTIC COULD UNLOCK TOXIC WASTE BURIED FOR DECADES: NEW STUDY HIGHLIGHTS RISKS

Contrary to common perception, the Arctic is dotted with countless industrial facilities such as oilfields and pipelines, mines and military bases. All this infrastructure is built on permafrost, which was once believed to be perennially stable.



Thawing permafrost on Herschel Island, which is located near the coast of Yukon in Canada. (Photo: Wikimedia Commons)

Read more at:

<https://indianexpress.com/article/explained/explained-climate/thawing-permafrost-cause-industrial-pollution-arctic-new-study-says-8610772/>

With rising global temperatures, thawing permafrost is likely to destabilise thousands of industrial sites and linked contaminated areas in the Arctic, which could result in the spread of toxic substances across the region, according to a new study. Nearly 2,100 industrial sites and between 5,600 and 10,000 contaminated sites are under threat of destabilisation by the end of this century.

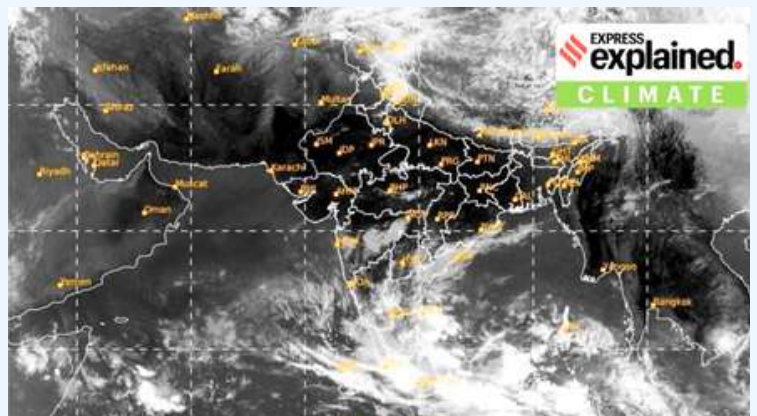
The study, 'Thawing permafrost poses environmental threat to thousands of sites with legacy industrial contamination', was published in the journal Nature Communications earlier this year. It was carried out by a team of researchers including Moritz Langer, Thomas Schneider von Deimling, Rebecca Rolph, Sofia Antonova, Volker Rachold, Alexander Oehme, and Guido Grosse – all from Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (Germany) – Sebastian Westermann from University of Oslo (Norway), Ralph Rutte, a freelance researcher based in Germany, and Michael Schultz from Heidelberg University (Germany).

CYCLONE MOCHA BUILDING OVER BAY OF BENGAL, SAYS IMD: HOW ARE CYCLONES FORMED AND NAMED?

A cyclone is a low-pressure system that forms over warm waters. Usually, high temperature equals low-pressure wind, and low temperature means high-pressure wind. Why does this happen, and what advisories has the IMD issued?

The Indian Meteorological Department (IMD) has said that a cyclonic or low-pressure area is developing in the Bay of Bengal and can lead to high rainfall in the next few days in the region, from May 8 to May 12. It also said that the weather system was likely to form a depression over the southeast Bay of Bengal around May 9, and then intensify into a cyclonic storm.

This weather system will be called Cyclone Mocha (pronounced 'Mokha'). Southern states are also expected to witness rainfall. It has been predicted that there may be moderate rainfall at most places during these days, with scattered heavy to very heavy rainfall likely over Andaman & Nicobar Islands.



The IMD has said that Cyclone Mocha is likely to make landfall by May 9. (Photo via IMD)

Read more at: <https://indianexpress.com/article/explained/explained-climate/imd-cyclone-mocha-formation-details-explained-8596533/>



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ENVIRONMENT

GLOBAL WARMING NOW MORE LIKELY TO BREACH 1.5°C THRESHOLD BY 2027, SCIENTISTS WARN

Partially responsible for boosting the chance of hitting 1.5°C is an El Nino weather pattern expected to develop in the coming months



As per research, if the planet warms by 1.5 degrees Celsius, 15% of species will be at risk of experiencing unfamiliarly hot temperatures across at least 30% of their existing geographic range in a single decade. | Representative image | Photo Credit: Reuters

For the first time ever, global temperatures are now more likely than not to breach 1.5°C (2.7°F) of warming within the next five years, the World Meteorological Organization. But that did not necessarily mean the world would cross the long-term warming threshold of 1.5°C above preindustrial levels set out in the 2015 Paris Agreement.

With a 66% chance of temporarily reaching 1.5°C by 2027, "it's the first time in history that it's more likely than not that we will exceed 1.5°C," said Adam Scaife, head of long-range prediction at Britain's Met Office Hadley Centre who worked on the WMO's latest Global Annual to Decadal Climate Update.

Read more at: <https://www.thehindu.com/sci-tech/energy-and-environment/global-warming-more-likely-to-breach-one-point-five-degrees-celsius-threshold-by-2027-scientists-warn/article66861128.ece>

STUDIES ON MIGRATION PATTERNS OF MILKWEED BUTTERFLIES AND THEIR FEEDING HABITS CAN HELP PROTECT THEM, SAY RESEARCHERS

Milkweed butterflies migrate westward from the Eastern Ghats and plains to the Western Ghats, becoming active for more than two months upon their arrival

This spectacular ecological phenomenon had been recorded more than a century ago but received little research and conservation attention until recently. However, a recent study by a team of researchers shed light on the migration patterns of Milkweed butterflies in southern India, which has the potential to contribute to the conservation of these butterflies and their migration in the face of ongoing changes in land use, habitat degradation, and climate warming. The study was published in the recent issue of the Journal of Insect Conservation. After southwest monsoon, Milkweed butterflies migrate westward from the Eastern Ghats and plains to the Western Ghats, becoming active for more than two months upon their arrival.



(From left) Striped tiger, Blue tiger and Dark blue tiger.
Photo: Special Arrangement

Read more at: <https://www.thehindu.com/sci-tech/energy-and-environment/studies-on-milkweed-migration-opens-door-for-conservation-of-butterfly-species/article66846565.ece>





ENVIRONMENT

MORE THAN HALF OF THE WORLD'S LARGE LAKES ARE DRYING UP, STUDY FINDS

About 56% of the decline in natural lakes was driven by climate warming and human consumption



More than half of the world's large lakes and reservoirs have shrunk since the early 1990s, chiefly because of climate change. | Photo Credit: AP

More than half of the world's large lakes and reservoirs have shrunk since the early 1990s, chiefly because of climate change, intensifying concerns about water for agriculture, hydropower and human consumption, a study published on Thursday found.

A team of international researchers reported that some of the world's most important freshwater sources - from the Caspian Sea between Europe and Asia to South America's Lake Titicaca - lost water at a cumulative rate of around 22 gigatonnes per year for nearly three decades. That's about 17 times the volume of Lake Mead, the United States' largest reservoir.

Fangfang Yao, a surface hydrologist at the University of Virginia who led the study in the journal Science, said 56% of the decline in natural lakes was driven by climate warming and human consumption, with warming "the larger share of that".

Read more at:

<https://www.thehindu.com/sci-tech/energy-and-environment/more-than-half-of-the-worlds-large-lakes-are-drying-up/article66869469.ece>

INDIA'S FIRST NATIONAL WATER-BODY CENSUS

The census is a welcome initiative, but if we're to get a more accurate picture of the state of India's water, we need to fix some gaps and inconsistencies first.



The Kovai Courtallam waterfall in Coimbatore district on November 20, 2022. | Photo Credit: Special arrangement

India is facing a water crisis with groundwater decline and biodiversity loss, and climate change increasing the frequency of floods and droughts. In this context, water bodies are important. They buffer against climate variability, holding flood waters for use in dry periods. They contribute to food and water security and livelihoods by recharging groundwater and providing water for irrigation and livestock. They also have cultural and ecological significance.

But water bodies are increasingly under threat from pollution, encroachment, urbanisation, and drying.

If they are to be conserved and managed effectively, we need action plans and these require baseline data. Because water bodies are managed by different agencies from state to local to private entities, the data must be uniform and easily accessible. To actually manage water bodies, we need contextual and traditional knowledge of communities to be integrated with formal data.

Read more at:

<https://www.thehindu.com/sci-tech/energy-and-environment/water-census-ministry-jal-shakti-findings-analysis/article66822865.ece>





DENGUE ON STEADY RISE, ICMR SET TO CONDUCT VACCINE TRIAL

The ICMR, the country's apex agency for formulation, coordination and promotion of biomedical research, has tied up with two biotech companies – Panacea and Serum Institute of India (SII) – to conduct phase-III trials of their dengue vaccines.



Both vaccine candidates are based on a DNA-edited dengue virus developed by the US National Institute of Health.

With a steady increase in cases of dengue across the country – from being restricted to only eight states and Union Territories in 2001 it is prevalent in all states and UTs at present – the Indian Council of Medical Research (ICMR) has raised its efforts to develop a vaccine to fight the mosquito-borne infection.

The ICMR, the country's apex agency for formulation, coordination and promotion of biomedical research, has tied up with two biotech companies – Panacea and Serum Institute of India (SII) – to conduct phase-III trials of their dengue vaccines.

Both vaccine candidates are based on a DNA-edited dengue virus developed by the US National Institute of Health. The SII is yet to conduct a phase-I/II trial in 60 adults to determine safety, after which it will conduct a large-scale study with the help of ICMR in children between 2 and 18 years.

Read more at:

<https://indianexpress.com/article/india/dengue-on-steady-rise-icmr-set-to-conduct-vaccine-trial-8615357/>

DOES EATING TOO MANY CARBS CAUSE SUGAR SPIKES, INSULIN RESISTANCE? WHY DO YOU NEED GOOD CHOLESTEROL FOOD, MILLETS TO LOWER THEM?

Other than diet, the key to reducing insulin resistance is three types of exercise FAR -- flexibility, aerobics, and resistance, says Dr V Mohan, Chairman, DrMohan's Diabetes Specialities Centre



Excess carbohydrates can lead to obesity, particularly central obesity or fat in the abdominal area. (Pic source: Pexels)

Insulin resistance is a condition where the body's cells stop responding to the glucose control hormone. It can happen due to different foods in different countries. When it comes to India and broadly South Asia, the commonest cause of insulin resistance is the consumption of excess carbohydrates.

Nowhere else in the world, and we have data, so much rice is consumed. Not even in China now, they have reduced their rice intake. Whereas South Asia – India, Pakistan, Bangladesh, Sri Lanka, Nepal, Maldives, and Bhutan – there are the places where rice is the major contributor towards insulin resistance. Of course, in north and west India the major contributor is refined wheat flour, which is no better than rice.

Read more at:

<https://indianexpress.com/article/health-wellness/carbs-cause-sugar-spikes-insulin-resistance-good-cholesterol-required-8613772/>



HEALTH

WORLD HYPERTENSION DAY: UNDERSTANDING IF HIGH BLOOD PRESSURE CAN AFFECT PERIODS

"Blood pressure is highest at the onset of menstruation and lower during the 17-26th day of the period cycle," said Dr Astha Dayal, lead consultant, obstetrics and gynecology, CK Birla Hospital, Gurugram.



High blood pressure does impact periods, experts suggest (Source: Getty Images/Thinkstock)

High blood pressure or hypertension is one of the leading causes of heart disease and also the most common cause of mortality in men and women. When the blood pressure is 140/90 mmHg or higher, and one exhibits symptoms like headaches, heart palpitations, or nosebleeds, it is termed high blood pressure or hypertension.

With increasing obesity and changing lifestyles, hypertension is now increasingly common in young women, but some studies are also showing some association with menstrual cycles, experts said. "Blood pressure of a woman changes during her periods. It is highest at the onset of menstruation and lower during the 17th-26th day of the period cycle. A 20-year-old study showed a correlation between premenstrual syndrome (PMS) and hypertension," said Dr Astha Dayal, lead consultant, obstetrics and gynecology, CK Birla Hospital, Gurugram.

Read more at:

<https://indianexpress.com/article/lifestyle/health/world-hypertension-day-high-blood-pressure-periods-8611479/>

ARE ARTIFICIAL SWEETENERS HARMFUL FOR YOUR HEALTH? HERE'S WHAT THE WHO HAS RECOMMENDED

There is a growing market, among calorie conscious people, for products containing artificial sweeteners. However, recent studies have indicated that these sweeteners are not just ineffective for weight loss in the long term, they can also be linked to a number of serious health issues.



The World Health Organisation on Monday (May 15) recommended against using artificial sweeteners to achieve weight loss and prevent lifestyle diseases such as diabetes. The report emphasised that while there was a need to cut intake of sugar, it should not be replaced by artificial sweeteners.

Artificial sweeteners provide the sweet taste with very little to no calories. Many diabetics use the sweeteners in their tea and coffee, but there is a growing market for packaged foods and beverages using these sweeteners to offer low-calorie options.

"WHO suggests that non-sugar sweeteners (NSS) not be used as a means of achieving weight control or reducing the risk of non-communicable diseases," was the highlight of 90-page report based on nearly 283 studies.

Read more at:

<https://indianexpress.com/article/explained/explained-health/artificial-sweeteners-harmful-who-recommendations-8614073/>



HEALTH

AFTER SUGAR, TIME TO WATCH OUT FOR HOW MUCH SALT IS CONSUMED

The World Health Organisation had previously cautioned that the world is off track to achieve its global target of reducing salt intake by 30% by 2025



After the COVID-19 pandemic, what seems to have caught the world's attention is salt intake and its harmful effects on the human body.

Recently, the Indian Council for Medical Research tweeted about the ways to reduce salt intake by avoiding the addition of salt while cooking rice or preparing the dough, skipping pickles and table salt and going in for salt substitutes. It rightly pointed out that children, younger than 12 years, require only 3 grams of salt per day.

The World Health Organisation had cautioned a couple of months ago that the world is off track to achieve its global target of reducing salt intake by 30% by 2025. The report shows that only 5% of the WHO member states have mandatory and comprehensive sodium-reducing policies. 73% of the WHO member states lack the full range implementation of the policies. Implementing the highly cost effective sodium reducing policies could save an estimated seven million lives globally by 2030.

Read more at:

<https://www.thehindu.com/sci-tech/health/after-sugar-time-to-watch-out-for-how-much-salt-is-consumed/article66875104.ece>

MENTAL HEALTH AWARENESS MONTH: HOW TO COPE IN STATE OF ANXIETY

All over the world, mental health needs are high but responses are still inadequate. Here we trace the work of writers and psychologists who have tried to explore the relationship between diagnosis and treatment



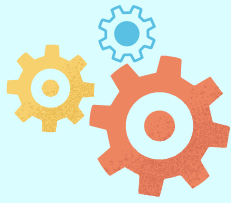
For representative purposes | Photo Credit: Olga Strelnikova

people have become increasingly conscious of their physical well-being but mental health matters remain ignored. Even though the subject is often flagged, open discussions are still a largely uncharted territory. One way to fight the taboo is to perhaps read up more because awareness and information are the key to learning, understanding and accepting the nuances of mental health management.

The good thing is that there are research-based books available on mental health that can be a useful way to process one's own experiences, learn about psychology, and find techniques that could help in day-to-day life. Besides, there are several books by authors who have faced hurdles in dealing with the issue and reading about their experiences, recollections and descriptions can be a cathartic experience.

Read more at:

<https://www.thehindu.com/books/mental-health-awareness-month-how-to-cope-in-the-age-of-anxiety/article66888638.ece>



SCIENCE & TECHNOLOGY

INDIA SET TO TRIPLE SPEED OF ITS FASTEST SUPERCOMPUTERS

Processing power to such a degree greatly eases complex mathematical calculations required, for among other things, forecasting how the weather will be over the next few days all the way up to two-three months ahead



Pratyush, one of India's most powerful, civilian supercomputers, is housed at the Indian Institute of Tropical Meteorology, Pune.
Photo: tropmet.res.in

India is set to dramatically scale up its super-computing prowess and install an 18-petaflop system over the course of this year, Ministry of Earth Sciences (MoES) Minister Kiren Rijiju said on May 24. Flops (floating point operations per second) are an indicator of computers processing speed and a petaflop refers to a 1,000 trillion flops. Processing power to such a degree greatly eases complex mathematical calculations required, for among other things, forecasting how the weather will be over the next few days all the way up to two-three months ahead.

Currently India's most powerful, civilian supercomputers – Pratyush and Mihir – with a combined capacity of 6.8 petaflops are housed at the Indian Institute of Tropical Meteorology (IITM), Pune, and the National Centre for Medium Range Weather Forecasting (NCMRWF), Noida, respectively. They were made operational in 2018 at an investment of ₹438 crore. Both these organisations are affiliated to the MoES.

Read more at:

<https://www.thehindu.com/sci-tech/technology/india-set-to-triple-speed-of-fastest-supercomputers/article66889689.ece>

IIA SCIENTISTS PROPOSE NEW METRIC WHICH CAN HELP QUANTIFY IMAGE QUALITY OF THE SUN TAKEN FROM GROUND-BASED TELESCOPES

‘Being the closest star, it can be studied in great detail, and properties of other stars may be extrapolated by the understanding of the Sun’



According to the Ministry of Science and Technology, dynamic events like flares, prominences, and coronal mass ejections taking place on the surface of the Sun have made the solar body the focus of interest of astronomers. | Photo Credit: representational image

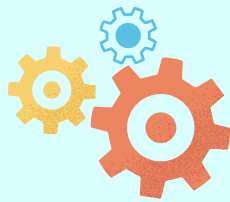
Scientists from the Indian Institute of Astrophysics (IIA) have proposed a new metric, which can help quantify image quality of the Sun taken from ground-based telescopes.

According to the Ministry of Science and Technology, dynamic events like flares, prominences, and coronal mass ejections taking place on the surface of the Sun have made the solar body the focus of interest of astronomers.

“Being the closest star, it can be studied in great detail, and properties of other stars may be extrapolated by the understanding of the Sun. To resolve even the smallest features in greater detail, large telescopes are built,” said the Ministry of Science and Technology.

Read more at:

<https://www.thehindu.com/sci-tech/science/iaa-scientists-propose-new-metric-which-can-help-quantify-image-quality-of-the-sun-taken-from-ground-based-telescopes/article66877597.ece>



LUNAR ECLIPSE 2023 HIGHLIGHTS: IMAGES OF THE 'FLOWER MOON' ECLIPSE

Chandra grahan 2023 live updates: This year's Flower Moon coincided with a penumbral lunar eclipse. Scroll below to see our highlights from the event.



The moon during a lunar eclipse, in New Delhi, Friday, May 5, 2023. (PTI Photo/Ravi Choudhary)

Chandra grahan in India, Lunar eclipse 2023 live: The penumbral lunar eclipse that happened last night (May 5) was visible to viewers in India, unlike the solar eclipse that happened on April 20. But it might have been a little difficult to spot since it is a penumbral eclipse.

All eclipses begin and end as penumbral eclipses. But during an eclipse, if the Moon passes through the dark part of the Earth's shadow (umbra), it turns into either a partial or a total eclipse, where one part of or the entire Moon will be completely obscured. But that is not the case tonight.

But during last night's lunar eclipse, the Moon only passed through the faint outer edges of the Earth's shadow (penumbra). Due to this, the only visible change was that the disc of Earth's lone satellite was almost imperceptibly dimmed.

Read more at:

<https://indianexpress.com/article/technology/science/lunar-eclipse-chandra-grahan-2023-live-updates-8593465/>

MORE INNOVATION, A SKILLED WORKFORCE: THE PROMISE IN INDIA'S NATIONAL QUANTUM MISSION

Strategic recruitment of new talent, synergistic multi-institutional collaboration and political will to ease bureaucratic norms and prevent delays – these are needed to ensure that the mission's deadlines are met



Arindam Ghosh writes: It is not difficult to imagine that material innovation in the quantum domain will invigorate the manufacturing-based entrepreneurial ecosystem. Such activities could benefit from the government's support through the Startup India initiative and other schemes. (C R Sasikumar)

India is getting serious about building her own technology base and the upcoming National Quantum Mission could be a game changer in multiple sectors, from defence, energy, and environment to healthcare and civil applications. Any technology is first devised and then thrives on material innovation, and quantum technology is no exception.

For India, investments in quantum materials and devices promise far more dividends than meets the eye. The process can generate a cadre of highly skilled workforce. As India gears to become the world's third-largest economy by 2027, a strongly networked material infrastructure in the country will be crucial. It will cater to not just quantum technologies but also other major scientific megaprojects ranging from the semiconductor mission to neutrino observatory and gravitational wave detection. The infrastructure will play a key role in building self-reliance in energy and electronics industries.

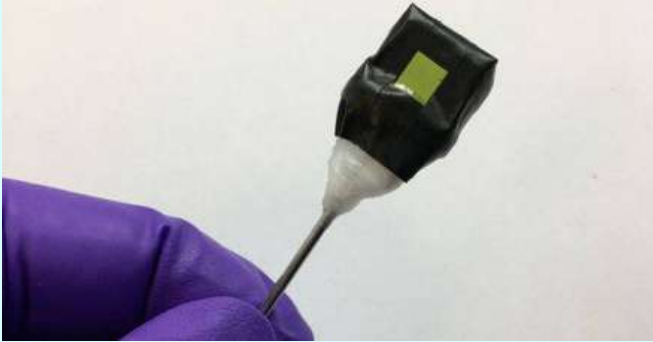
Read more at:

<https://indianexpress.com/article/opinion/columns/more-innovation-a-skilled-workforce-the-promise-in-indias-national-quantum-mission-8617168/>



FUEL FROM SUNSHINE: CAMBRIDGE SCIENTISTS MAKE LIQUID FUELS FROM SOLAR POWER

Cambridge researchers develop 'artificial leaf' that converts sunlight into liquid fuel, replicating photosynthesis to produce a clean fuel.



This "artificial leaf" produces propanol and ethanol. (Image credit: University of Cambridge)

Researchers from the University of Cambridge have developed an "artificial leaf" that can convert carbon dioxide into liquid fuels by harnessing the power of sunlight. Importantly, these can directly be used by internal combustion vehicles as drop-in fuels. In essence, the researchers replicated the process of photosynthesis by converting carbon dioxide, water and sunlight into two multicarbon fuels—ethanol and propanol. This single-step process using artificial photosynthesis was described in a research article published in the journal *Nature Energy* last week.

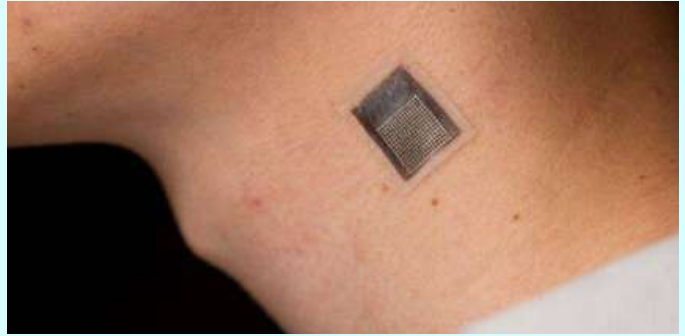
"This is the first proof-of-concept study where we are showing sunlight-driven multicarbon alcohol generation using a standalone artificial leaf. At this stage, we are forming alcohols in micromoles. Further optimizations of the device are required to improve its efficiency, which we are working on. After that, it can be used for large-scale production of such fuels," Motiar Rahaman, first author of the paper, told *indianexpress.com* in an email interview. Rahaman is a research associate at the Yusuf Hamied Department of Chemistry at Cambridge.

Read more at:

<https://indianexpress.com/article/technology/science/cambridge-scientists-clean-fuel-solar-power-8622764/>

NEW ULTRASONIC SENSOR COULD BE A BREAKTHROUGH FOR DEEP TISSUE MONITORING

The stretchable ultrasonic array developed by researchers can facilitate 3D imaging of tissues as deep as four centimetres below the surface of the skin.



The stretchable ultrasound device could have many different medical applications, including monitoring liver cirrhosis and cardiovascular diseases. (Image credit: UC San Diego)

Ultrasound deep tissue monitoring can be used to monitor a variety of diseases and injuries from liver cirrhosis and fibrosis to tennis elbow and carpal tunnel syndrome. Now, researchers at the University of California San Diego have developed a new wearable ultrasound sensor that can potentially be a non-invasive long-term alternative to current methods of ultrasound monitoring.

The stretchable ultrasonic array developed by the researchers can facilitate 3D imaging of tissues as deep as four centimetres below the surface of the skin. This could provide a non-invasive, longer-term alternative to current methods of ultrasonic tissue monitoring, according to the University of San Diego.

"The mechanism is based on a technique called compression elastography. Compression elastography based on ultrasound has been widely used in research and clinical practice. We re-engineered the conventional rigid and bulky ultrasound probe into a soft wearable format so that we can do compression elastography better," said Sheng Xu to *indianexpress.com* in an email. Xu a professor of nanoengineering at UC San Diego Jacobs School of Engineering and the corresponding author of a paper on the technology published in *Nature Biomedical Engineering*.

Read more at:

<https://indianexpress.com/article/technology/science/stretchable-ultrasonic-sensor-8618323/>



OTHERS

SPACEX SENDS SAUDI ASTRONAUTS, INCLUDING NATION'S 1ST WOMAN IN SPACE, TO INTERNATIONAL SPACE STATION

Rayyanah Barnawi, a stem cell researcher, became the first woman from the kingdom to go to space. She was joined by Ali al-Qarni, a fighter pilot with the Royal Saudi Air Force.



Saudi Arabian astronaut Rayyanah Barnawi makes a heart with her hands as she heads out to prepare for this evening's launch aboard a SpaceX Falcon 9 rocket at Kennedy Space Center in Cape Canaveral, Fla., Sunday, May 21, 2023. (AP Photo/John Raoux)

Saudi Arabia's first astronauts in decades rocketed toward the International Space Station on a chartered multimillion-dollar flight. SpaceX launched the ticket-holding crew, led by a retired NASA astronaut now working for the company that arranged the trip from Kennedy Space Center. Also on board: a U.S. businessman who now owns a sports car racing team. The four should reach the space station in their capsule Monday morning; they'll spend just over a week there before returning home with a splashdown off the Florida coast.

Sponsored by the Saudi Arabian government, Rayyanah Barnawi, a stem cell researcher, became the first woman from the kingdom to go to space. She was joined by Ali al-Qarni, a fighter pilot with the Royal Saudi Air Force. They're the first from their country to ride a rocket since a Saudi prince launched aboard shuttle Discovery in 1985.

Read more at:

<https://indianexpress.com/article/technology/science/spacex-saudi-astronauts-rayyanah-barnawi-8622151/>

HOW OLD ARE SATURN'S RINGS? FAR YOUNGER THAN ONCE THOUGHT, ACCORDING TO NEW STUDY



Saturn's rings partially in shadow as seen by NASA's Cassini spacecraft. (Credit: NASA/JPL/Space Science Institute)

The research, published May 12, 2023 in the journal Science Advances, pegs the age of Saturn's rings at no more than 400 million years old. That makes the rings much younger than Saturn itself, which is about 4.5 billion years old.

"In a way, we've gotten closure on a question that started with James Clerk Maxwell," said Kempf, associate professor in the Laboratory for Atmospheric and Space Physics (LASP) at CU Boulder. The researchers arrived at that closure by studying what might seem like an unusual subject: dust.

Kempf explained that tiny grains of rocky material wash through Earth's solar system on an almost constant basis. In some cases, this flux can leave behind a thin layer of dust on planetary bodies, including on the ice that makes up Saturn's rings. In the new study, he and his colleagues set out to put a date on Saturn's rings by studying how rapidly this layer of dust builds up—a bit like telling how old a house is by running your finger along its surfaces.

Read more at:

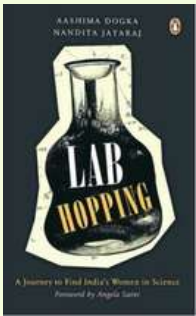
<https://www.colorado.edu/today/2023/05/12/how-old-are-saturns-rings-far-younger-once-thought-according-new-study>



OTHERS

INDIA'S WOMEN IN SCIENCE, AND THEIR STRUGGLE

Recent data from the Department of Science and Technology (DST) showed women made up 28% of participants in 2018-19 in extramural Research and Development (R&D) projects, up from 13% in 2000-01.



Lab Hopping: A Journey to Find India's Women in Science by Aashima Dogra and Nandita Jayaraj; Penguin Viking; 302 pages; Rs 499

In 2008, the Indian Academy of Sciences published Lilavati's Daughters: The Women Scientists of India, a volume capturing the journeys of nearly 100 Indian women in science.

From botanist Janaki Ammal to India's first woman physician Anandibai Joshi, from the chemist Asima Chatterjee to anthropologist Iravati Karve, from meteorologist Anna Mani to mathematician R Parimala, the essays covered the extraordinary spectrum of individual experiences of these women, and the complicated relationship between science and gender across the world, but especially in India.

Cut to 2023, to the publication of Lab Hopping: A Journey to Find India's Women in Science, and the narrative has only shifted marginally, despite an increase in women's participation in science over the past two decades.

Recent data from the Department of Science and Technology (DST) showed women made up 28% of participants in 2018-19 in extramural Research and Development (R&D) projects, up from 13% in 2000-01. The proportion of women primary investigators in R&D increased more than four times – from 232 in 2000-01 to 941 in 2016-17. The proportion of women researchers rose from 13.9% in 2015 to 18.7% in 2018.

Read more at:

<https://indianexpress.com/article/explained/indias-women-in-science-and-their-struggle-8619055/>

ARCHAEOLOGISTS FIND NEOLITHIC STONE TOOLS IN HYDERABAD

Scientists concluded that people lived at BNR Hills, adjacent to the posh Jubilee Hills, about 6,000 years ago



Archaeologists have recently found rare stone tools, belonging to the neolithic age, with the findings indicating that Hyderabad's history goes back to about 6,000 years | Photo Credit: Mitra Debosri/The Hindu

Archaeologists in Hyderabad have recently found rare stone tools, belonging to the Neolithic age, with the findings indicating that the city's history goes back to about 6,000 years.

The Neolithic age relates to the period when humans used tools and weapons made of stone and had just developed farming.

It was for the first time that neolithic tools have been found in the city, said E Sivanagi Reddy, a retired government archaeology official.

Reddy, a noted archaeologist and CEO of Pleach India Foundation, said he and S Haragopal of 'Kotha Telangana Charitra Brundam' (an organisation working on the history of Telangana) recently visited a natural rock formation at BNR Hills in the city, locally known as 'tortoise rock', to explore if there were any prehistoric rock paintings when they stumbled upon the said discovery.

He said they closely looked at a gap between two rocks and found as many neolithic stone tools.

Read more at:

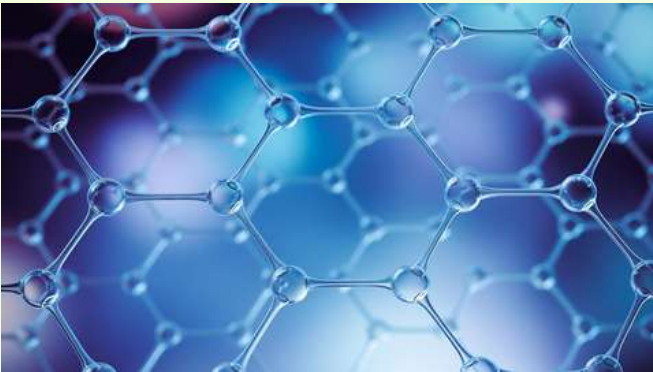
<https://www.thehindu.com/sci-tech/science/archaeologists-find-neolithic-stone-tools-in-hyderabad/article66891919.ece>



OTHERS

INDIA AS A QUAD-LED BIOMANUFACTURING HUB

India is an ideal choice because of its existing infrastructure, pharmaceutical manufacturing expertise, and workforce



'The Quad countries do not collaborate enough in biotechnology; yet, today, the need for collaboration is urgent, especially in emerging technologies' | Photo Credit: Getty Images/iStockphoto

In March 2021, the Quad (Australia, India, Japan, and the United States) set up a Critical and Emerging Technology Working Group to facilitate cooperation, monitor trends, and scout for opportunities related to developments in critical and emerging technologies, that included biotechnology. However, the potential for Quad cooperation in biotechnology remains insufficiently tapped. The establishment of a Quad-led biomanufacturing hub in India will give the necessary fillip to enhance this cooperation. (The writers have examined this proposal with researchers at the Australian National University.)

Biomanufacturing uses living systems, particularly microorganisms and cell cultures, to produce molecules and materials on a commercial scale. It has the potential to transform the global industrial system, with up to 60% of physical inputs to the global economy expected to be producible using this technology. Many countries, including the United States and China, recognise the need to optimise this ecosystem and have designed specific policies to shape their bio-economies.

Read more at:

<https://www.thehindu.com/opinion/op-ed/india-as-a-quad-led-biomanufacturing-hub/article66878203.ece>

UNDERSTANDING A HUMAN PANGENOME MAP

What is genome sequencing and why is it important? Why is the reference genome map considered one of the most important scientific breakthroughs? What is the difference between a reference map and a pangenome map? How is India hoping to benefit from the latest genome map?



For representative purposes. | Photo Credit: Getty Images

The story so far: A new study published in the May 10 issue of the Nature journal describes a pangenome reference map, built using genomes from 47 anonymous individuals (19 men and 28 women), mainly from Africa but also from the Caribbean, Americas, East Asia, and Europe.

What is a genome?

The genome is the blueprint of life, a collection of all the genes and the regions between the genes contained in our 23 pairs of chromosomes. Each chromosome is a contiguous stretch of DNA string. In other words, our genome consists of 23 different strings, each composed of millions of individual building blocks called nucleotides or bases. The four types of building blocks (A, T, G and C) are arranged and repeated millions of times in different combinations to make all of our 23 chromosomes. Genome sequencing is the method used to determine the precise order of the four letters and how they are arranged in chromosomes. Sequencing individual genomes helps us understand human diversity at the genetic level and how prone we are to certain diseases.

Read more at:

<https://www.thehindu.com/sci-tech/science/explained-understanding-a-human-pangenome-map/article66878568.ece>