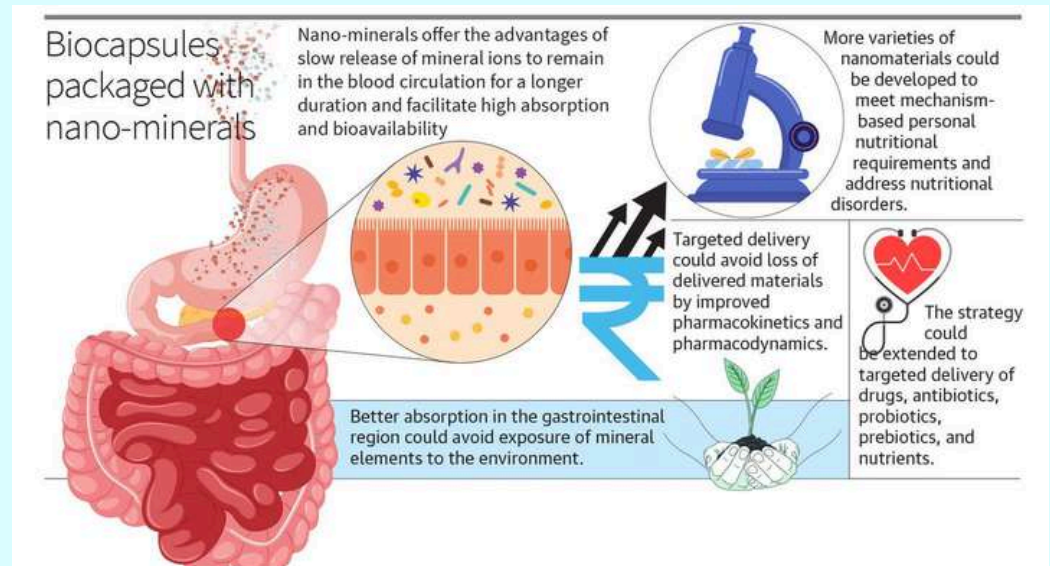


SCIENCE & TECHNOLOGY

NIAB scientists develop diagnostic kit to detect antibiotics in animal food samples

The diagnostic kits developed to detect antimicrobial resistance mark a significant leap forward for food safety. The scientists also developed nano-mineral biocapsule which allows for the precise delivery of personalized nutrient materials, drugs, antibiotics, or other bioactive molecules.



Sanjay Singh's laboratory at National Institute of Animal Biotechnology (NIAB) in Hyderabad has developed a unique delivery system for precise delivery of personalized nutrient materials, drugs, antibiotics, or other bioactive molecules.

The National Institute of Animal Biotechnology (NIAB) scientists in Hyderabad have developed innovative diagnostic tests to detect antibiotics in animal food samples, marking a significant leap forward for food safety.

With antimicrobial resistance (AMR) becoming a growing problem threatening public health worldwide, Scientist Sonu Gandhi's laboratory has developed a new tool—an Electro-Immunosensor—to monitor and control antibiotic levels in animal-based foods.

The sensor can detect very tiny amounts of these antibiotics—down to 14.8 picomolar for penicillin and 13.8 picomolar for cefalexin. For quick on-site tests, the scientists have also created a simpler device that can detect penicillin at a 10-nanomolar concentration.

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Dr. T. Ramasami - Patron
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Dr. Enna Dogra Gupta
Member

Dr. Abhishek Kumar
Member

EDITOR/COORDINATOR

Dr. Manish Mohan Gore
Dr. Enna Dogra Gupta

Executive Assistant
Suman Gulalia

ADDRESS FOR CORRESPONDENCE



Zaheer Science Foundation,
4 Udyan Marg,
New Delhi 110001

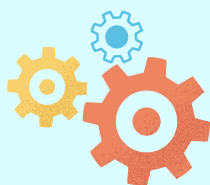
Tel: 011-23745697

EMAIL

zsfindia@gmail.com

WEBSITE

www.zaheersciencefoundation.org



cont. from page 1...

NIAB Director G. Taru Sharma told that the new tool works by using a special kind of polymer and a high-tech electrode to detect antibiotics like penicillin and cefalexin in food samples. She mentioned that the developed technologies promise to enhance the safety and quality of food samples, safeguarding public health.

Nano-Minerals

In another recent research study conducted by scientist Sanjay Singh's laboratory in the institute, which is under the aegis of the Department of Biotechnology (DBT), a unique delivery system for precise delivery of personalized nutrient materials, drugs, antibiotics, or other bioactive molecules was developed.

These salts cause oxidative stress and inflammation in the acidic environment of gastric fluid, which can be noticed in the side effects of oral iron supplements given to pregnant women. The scientist's group has developed a nanoparticle form of mineral elements (nano-minerals or NMs) of six essential micronutrients (Zn, Mn, Cu, Co, and Ce) coated with biomolecules.

Dr. Sharma said these include nanoparticles of methionine-coated zinc oxide, dextran-coated manganese oxide, ascorbic acid-coated copper oxide, dextran-coated cerium oxide, thiamine-coated cobalt oxide, and polyethene glycol-coated iron oxide.

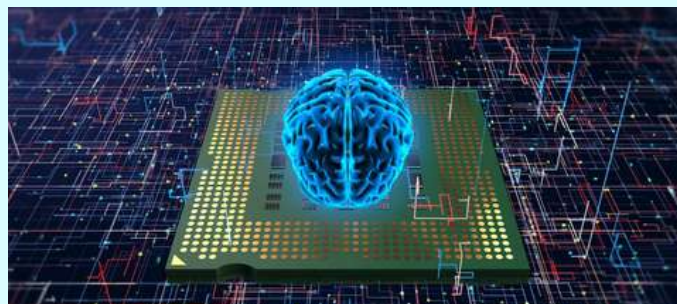
The NIAB Director explained that NMs offer the advantages of slow release of mineral ions to remain in the blood circulation for a longer duration and facilitate high absorption and bioavailability. This leads to less consumption of NMs with more benefits and better absorption as they are selectively released in the intestine due to the packaging in 'pH-responsive microcapsules' to deal with the acidic gut.

Results from the rodent model lab experiments have indicated that oral administration of microcapsules packed with these nano-minerals has led to enhanced levels of minerals, vitamin B12, haemoglobin, and total antioxidant activity in blood. The liver, kidney, and spleen show enhanced expression of antioxidant enzymes, she said.

Both the latest research leads of the institute—the first one published in the latest issue of Food Chemistry and the second in Advanced Functional Materials journals—are expected to push the livestock economy to facilitate sustainable and efficient utilization of biological resources as envisaged in the recently launched DBT's 'BioE3 policy', she added

Source: <https://www.thehindu.com/news/national/telangana/niab-scientists-develop-amr-diagnostic-kits-nano-mineral-biocapsules/article68655627.ece>

IISc scientists develop brain-inspired analog computing platform capable of storing, processing data



Researchers at the Indian Institute of Science (IISc) have developed a brain-inspired analog computing platform capable of storing and processing data in an astonishing 16,500 conductance states within a molecular film. Published on September 11 in the journal Nature, this breakthrough represents a step forward over traditional digital computers in which data storage and processing are limited to just two states, the IISc said.

In a press release, the institute said that such a platform could potentially bring complex AI tasks, like training Large Language Models (LLMs), to personal devices like laptops and smartphones, thus taking us closer to democratising the development of AI tools. These developments are currently restricted to resource-heavy data centres, due to a lack of energy-efficient hardware. With silicon electronics nearing saturation, designing brain-inspired accelerators that can work alongside silicon chips to deliver faster, more efficient AI is also becoming crucial.

"Neuromorphic computing has had its fair share of unsolved challenges for over a decade," explained Sreetosh Goswami, Assistant Professor at the Centre for Nano Science and Engineering (CeNSE), IISc, who led the research team. "With this discovery, we have almost nailed the perfect system – a rare feat," he said.

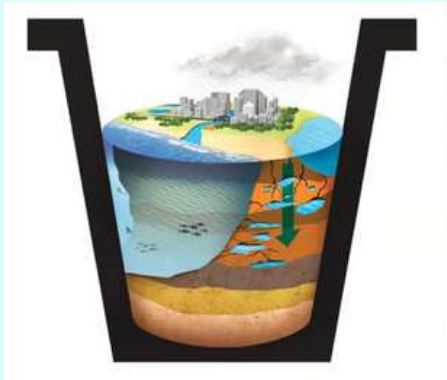
According to IISc, the fundamental operation underlying most AI algorithms is quite basic – matrix multiplication, a concept taught in high school maths. But in digital computers, these calculations hog a lot of energy. The platform developed by the IISc team drastically cuts down both the time and energy involved, making these calculations a lot faster and easier.

The molecular system at the heart of the platform was designed by Sreebrata Goswami, Visiting Professor at CeNSE. As molecules and ions wiggle and move within a material film, they create countless unique memory states, many of which have been inaccessible so far. Most digital devices are only able to access two states (high and low conductance), without being able to tap into the infinite number of intermediate states possible.

Source: <https://www.thehindu.com/sci-tech/science/iisc-scientists-develop-brain-inspired-analog-computing-platform-capable-of-storing-processing-data/article68633502.ece>



IISc Bengaluru team finds nanomaterial-based solution to treat groundwater



In a bid to address the rising concerns surrounding ground water contamination and the presence of heavy metals in water bodies, researchers from the Indian Institute of Science (IISc), Bengaluru, have developed a nanomaterial-based solution that can reduce the presence of heavy metals, like chromium, in groundwater.

Unlike conventional methods, where groundwater is pumped out and then purified using chemical precipitation, absorption, ion exchange and reverse osmosis at different locations, the IISc researchers proposed an on-site alternative which involves using iron nanoparticles that remediate the heavy metals.

“If the groundwater is contaminated, we can inject these nanoparticles into the subsurface groundwater region, where it will react with the chromium and immobilise it, resulting in clear water,” said Prathima Basavaraju, PhD student at Centre for Sustainable Technologies (CST) and lead author of the study. Researchers in the report suggested that the synthesising nanoparticles consisting of nano zero-valent iron (nZVI), along with carboxymethyl cellulose, is promising material for on-site remediation of chromium-contaminated groundwater.

“Places like Bellandur Lake have a lot of contaminated sediments, and this technique can prove quite useful in remediating contaminants such as cadmium, nickel and chromium in contaminated sediments of the water body,” said GL Sivakumar Babu, Professor at CiE and CST, and co-author of the study

The paper has also been published in the Journal of Water Process Engineering. Prathima added that chromium enters soil and groundwater through effluents from industries, such as leather tanning, electroplating, and textile manufacturing. Heavy metals enter the environment because of urbanisation and mismanagement by industries.

Source: <https://www.newindianexpress.com/states/karnataka/2024/Sep/20/iisc-bengaluru-team-finds-nanomaterial-based-solution-to-treat-groundwater>

IACS scientists discover a new target for cancer treatment

A combination of inhibitors that target different aspects of cell cycle and DNA replication makes it hard for cancer cells to survive, thereby enhancing the overall effectiveness of the treatment



Photo: iacs.res.in

Using human breast cancer cells, a team of scientists at the Kolkata-based Indian Association for the Cultivation of Science (IACS) has discovered a new target for killing cancer cells, which can potentially lead to new therapies. This target is used by cancer cells to regulate DNA repair during cell division. Results of the study were published recently in The EMBO Journal.

The work sheds light on how cancer cells respond to topoisomerase 1-targeted chemotherapy, including how cancer cells sometimes develop resistance to treatment by using their intrinsic DNA repair toolbox. These insights could pave the way for precision medicine approaches for cancer patients.

Developing novel anti-cancer therapeutics may become possible through a combinatorial targeting of two key molecules — the CDK1 protein and the TDPI enzyme. Present anti-cancer drugs — camptothecin, topotecan, and irinotecan — target a molecule (the enzyme topoisomerase 1 or Top1) involved in DNA metabolic processes like replication and transcription. The role of DNA topoisomerase 1 is critical for mitosis as it relaxes the DNA supercoil generated in the condensed chromosomes due to transcription.

“For the past decade at IACS, we have been investigating DNA repair pathways that provide resistance to camptothecin and its clinical derivatives,” says Dr. Benu Brata Das, Professor at the School of Biological Sciences at IACS and the corresponding author of the paper. “Our goal is to uncover new methods to target and eliminate these pathways through targeted or personalised chemotherapy, especially in breast and ovarian cancer. We are currently using mouse models to test the combination drug therapies using in vivo tumours.”

Source: <https://www.thehindu.com/sci-tech/science/iacs-scientists-discover-a-new-target-for-cancer-treatment/article68559161.ece>



India's second largest butterfly species found in Madurai



A Southern Birdwing, India's second largest butterfly species, found on the satellite campus of The American College near Chathirapatti in Madurai district.

India's second largest butterfly species, Southern Birdwing, has been found on the satellite campus of The American College between Chathirapatti and Kadavur on New Natham Highway in Madurai district.

The species with a wingspan of 190mm, which was known to be India's largest butterfly species from 1932 to 2020, moved to the second position after a British Brigadier William Harry Evans, a British military officer and lepidopterist, recorded a butterfly species named Golden Birdwing with a wingspan of 194mm.

M. Rajesh, Assistant Professor, Department of Zoology, The American College, said the male counterparts of these species would be smaller than the female. While the Golden Birdwing is widely found in Himalayan region, the Southern Birdwing can be seen in Western and Eastern Ghats regions.

"Until 2014, when a team from our college found the Southern Birdwing species in Azahagar hills (Eastern Ghats), the species was known to be found only in Western ghats," he said.

Though these species were of least concern and in no danger of extinction, they are very important for maintaining the balance of the ecosystem, he said. These species are found in abundance in Sirumalai hills near Dindigul.

As September is the migratory season for butterflies, the species must have travelled for the purpose of breeding, Mr. Rajesh said.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/indias-second-largest-butterfly-species-found-in-madurail/article68630985.ece>

By 2080, India could lose groundwater by 3 times the current rate: Study

Researchers found that warming temperatures, coupled with declining winter precipitation, accelerated groundwater declines at a rate far greater than that of groundwater recharge from increased monsoon precipitation.



Representational image of a bore well extracting ground water full flow while a farmer walks past in Sangrur district, Punjab

The rate of groundwater depletion could triple by 2080, if Indian farmers continued to draw groundwater at the current rate, which could threaten the country's food and water security, according to a new study.

Warming climate has compelled farmers in India to adapt by intensifying the withdrawal of groundwater used for irrigation, the study led by the University of Michigan, U.S., found.

As a result, the reduced water availability could endanger the livelihoods of more than one-third of the country's 1.4 billion residents and thus, could have global implications, the study published in the journal Science Advances said.

"This is of concern, given that India is the world's largest consumer of groundwater and is a critical resource for the regional and global food supply," said senior author Meha Jain, assistant professor at the university's School for Environment and Sustainability.

The study analysed recent changes in withdrawal rates due to warming by looking at historical data on groundwater levels, climate and crop water stress to estimate future rates of groundwater loss across India.

Further, it took into account the farmers' potential need for increased irrigation under warming conditions, which would likely enhance water demand from stressed crops, the researchers said.

Source: <https://www.thehindu.com/news/national/by-2080-india-could-lose-groundwater-by-3-times-the-current-rate-study/article67263183.ece>



ENVIRONMENT

India generates highest plastic pollution in world: what a new study found

In 2022, the UN Environmental Assembly agreed to develop such a treaty — which experts say might be the most important environmental accord since the Paris Agreement on climate change in 2015 — by the end of 2024.



The study comes as treaty negotiations for the very first legally binding international treaty on plastics pollution are ongoing.

India contributes to a fifth of global plastic pollution, a study published in the journal *Nature* last week found.

India burns roughly 5.8 million tonnes (mt) of plastic each year, and releases another 3.5 mt of plastics into the environment (land, air, water) as debris. Cumulatively, India contributes to 9.3 mt of plastic pollution in the world annually, significantly more than the countries next in this list — Nigeria (3.5 mt), Indonesia (3.4 mt) and China (2.8 mt) — and exceeding previous estimates.

Problem of 'unmanaged' waste

The study, carried out by University of Leeds researchers Joshua W Cottom, Ed Cook, and Costas A Velis, estimated that around 251 mt of plastic waste is produced every year, enough to fill up roughly 200,000 Olympic sized swimming pools. Roughly a fifth of this waste — 52.1 mt — is “emitted” into the environment, unmanaged.

The authors define “managed” waste as what is collected by municipal bodies, and either recycled or sent to a landfill. Most plastic waste meets the latter fate. “Unmanaged” waste refers to plastic which is burnt in open, uncontrolled fires producing fine particulates and toxic gases like carbon monoxide which have been linked to heart disease, respiratory disorders, cancer, and neurological problems. It also includes plastic which ends up in the environment as unburnt debris — polluting every conceivable place on Earth from the heights of Mount Everest to the bottom of the Mariana Trench in the Pacific Ocean.

Source: <https://indianexpress.com/article/explained/explained-climate/plastic-pollution-waste-management-plastic-burning-new-study-9557388/>

Scientists in Chile question if Antarctica has hit a point of no return

NASA estimates show the Antarctic ice sheet has enough ice to raise the global mean sea level by up to 58 meters.



An iceberg floats near Two Hummock Island, Antarctica, February 2, 2020. Picture taken February 2, 2020.

Nearly 1,500 academics, researchers and scientists specialising in Antarctica gathered in southern Chile for the 11th Scientific Committee on Antarctic Research conference this week to share the most cutting-edge research from the vast white continent.

Nearly every aspect of science, from geology to biology and glaciology to arts, was covered but a major undercurrent ran through the conference. Antarctica is changing, faster than expected.

Extreme weather events in the ice-covered continent were no longer hypothetical presentations, but first-hand accounts from researchers about heavy rainfall, intense heat waves and sudden Foehn (strong dry winds) events at research stations that led to mass melting, giant glacier break-offs and dangerous weather conditions with global implications.

With detailed weather station and satellite data dating back only about 40 years, scientists wondered whether these events meant Antarctica had reached a tipping point, or a point of accelerated and irreversible sea ice loss from the West Antarctic ice sheet.

"There's uncertainty about whether the current observations indicate a temporary dip or a downward plunge (of sea ice)," said Liz Keller, a paleoclimate specialist from the Victoria University of Wellington in New Zealand that led a session about predicting and detecting tipping points in Antarctica. NASA estimates show the Antarctic ice sheet has enough ice to raise the global mean sea level by up to 58 meters. Studies have shown that about a third of the world's population lives below 100 vertical meters of sea level.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/scientists-in-chile-question-if-antarctica-has-hit-a-point-of-no-return/article68580345.ece>



Spider mimicking bird excreta found in Assam

This is the first record of the *Phrynarachne decipiens* from India



Bird dung spider or Phrynarachne decipiens recorded from Assam, a first for India

Assam has added a species of spider whose web mimics a bird's excrement to India's list of arachnids.

The *Phrynarachne decipiens*, better known as the bird dung or bird-dropping crab spider, was known to be distributed in Malaysia and Indonesia's Java and Sumatra. It has been recorded for the first time in the country from Assam's Sonapur in the Kamrup (Metropolitan) district and the Chirang Reserve Forest in the Kokrajhar district.

This bird dung crab spider was recorded by a team of zoologists from Assam in the latest issue of *Acta Arachnologica*, an academic journal dedicated to arachnids and myriapods published by the Arachnological Society of Japan. The zoologists are Sangeeta Das of Guwahati's Pragjyotish College, Jatin Kalita and Nilutpal Mahanta of Gauhati University, and Dulur Brahma and Paris Basumatary of Bodoland University.

The genus *Phrynarachne* presently consists of 35 accepted species of which three – *P. ceylonica*, *P. ceeliana*, and *P. Tuberosa* – before the bird dung crab spider recorded and re-described based on female specimens collected from Assam.

The last description of *Phrynarachne decipiens*, also based on a female specimen, was made in 1921 without much detail beyond a sketch of the habitus or general physical constitution. "Of the three specimens studied, the one from the Chirang Reserve Forest was deposited at the museum of the Zoological Survey of India in Shillong," Dr. Mahanta said. The paper said the species resembles the *Phrynarachne peelina* in habitus but can be distinguished from the latter by the stout spermathecae (a sac-like organ in the female reproductive tract that stores sperm received during copulation) with posterior heads almost touching each other.

The eight-eyed bird dung crab spider was measured at 13.14 mm long. "The spider is usually seen lying motionless 1-2 ft above the ground on the upper side of broad leaves. The chalky white colour of the spider and whitish deposition (its web) on the leaves, looking like bird excreta, make it very difficult to be sighted," Dr. Mahanta said.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/spider-mimicking-bird-excreta-found-in-assam/article68593414.ece>

Earth's oldest, tiniest creatures are poised to be climate change winners

Apart from *Entomacrodus thalassinus*, the coral reef-associated faunal study conducted by the Zoological Survey of India has revealed 13 newly recorded sea slugs, 11 undocumented fish species and two new brachyuran crabs



Entomacrodus thalassinus was discovered among the intertidal rocky reefs near Visakhapatnam Fishing Harbour during a survey undertaken by Zoological Survey of India.

A four-year coral reef-associated faunal survey along the coast of Andhra Pradesh, conducted by the Zoological Survey of India (ZSI), has uncovered a treasure trove of marine life, including numerous previously undocumented species. One of the significant findings include the first-ever Indian sighting of *Entomacrodus thalassinus*, a rare reef fish.

This species was found among intertidal rocky reefs during the low tides near Visakhapatnam Fishing Harbour. "Entomacrodus Gill is represented by four species — *E. striatus*; *E. vermiculatus*; *E. epalzeocheilos* and *E. marmoratus*. This present record confirms the presence of the *Entomacrodus thalassinus* from India for the first time. Previously it has been recorded from Japan, French Polynesia, Australia, Sri Lanka, Papua New Guinea, Philippines, New Caledonia, Seychelles, Madagascar. *Entomacrodus thalassinus* is closely associated with *E. macropilus*, which is recorded from Eastern and Western Central Pacific," ZSI scientist J.S. Yogesh Kumar told The Hindu.

The extensive research, spearheaded by ZSI scientist J.S. Yogesh Kumar and his team, with support from Livein Adventures and its scuba diving instructor, has brought the spotlight on the rich biodiversity of the Indian east coast. The present study by ZSI explored the reef ecosystem from Pudimadaka Beach to Chintapalli beach, Vishakhapatnam coast, Andhra Pradesh.

The study revealed 13 newly recorded sea slugs, 11 undocumented fish species, two new brachyuran crabs, on the Andhra Pradesh coast along with the first-ever Indian sighting of *Entomacrodus thalassinus*. The findings have been published in various scientific journals.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/first-ever-indian-sighting-of-a-rare-reef-fish-reported-from-andhra-pradesh-coast/article68677968.ece>



AGRICULTURE

Centre launches new system to understand cropping patterns, impact of weather

Union Agriculture Ministry launches Krishi-DSS, a digital platform providing real-time data insights for stakeholders in Indian agriculture



Satellite-based agricultural decision support system to provide farmers with critical data for crop management and productivity enhancement

The Union Agriculture Ministry has launched a digital geo-spatial platform, Krishi-Decision Support System (DSS) in New Delhi on Friday (August 16, 2024), which will share real-time data-driven insights on weather patterns, soil conditions, crop health, crop acreage and advisories with all stakeholders — such as farmers, experts and policymakers.

The Ministry said the system was “a significant milestone” in the country’s agricultural innovation landscape.

Minister of State for Agriculture Bhagirath Choudhary and Union Agriculture Secretary Devesh Chaturvedi were present at the event. The Ministry said Krishi-DSS was a first-of-its-kind geospatial platform specifically designed for Indian agriculture. The platform provides seamless access to comprehensive data, including satellite images, weather information, reservoir storage, groundwater levels and soil health information, which can be easily accessed from anywhere at any time.

Krishi-DSS includes several advanced modules designed to support comprehensive agricultural management. “With crop mapping and monitoring, we will be able to understand cropping patterns by analysing parcel-level crop maps over the different years. This information helps in understanding crop rotation practices and promotes sustainable agriculture by encouraging the cultivation of diverse crops,” the Ministry said.

Drought monitoring

The DSS can also be helpful in drought monitoring and it will provide near real-time information on various indicators, i.e. soil moisture, water storage, crop condition, dry spells, etc., and will inform the stakeholders about how weather is impacting the crops, crop harvest status, crop residue burning, etc.

Source: <https://www.thehindu.com/sci-tech/agriculture/government-launches-satellite-based-farm-decision-support-system/article68531749.ece>

Sustainable farming key to Viksit Bharat, say scientists, industry leaders at Sustainable Agriculture Summit



Soil sustains life, and it is critical for all to come together and nurture it if we must build a sustainable agriculture ecosystem for future generations. Farmers, policymakers, scientists, industry leaders and academics echoed this sentiment at a high-level panel convened in New Delhi recently to address the urgent challenge of climate change and advance India’s net-zero goals. The Sustainable Agriculture Summit & Awards 2024 deliberated on ways to promote sustainable farming practices for a greener future and celebrated the best practices.

Addressing the Summit, Ramdas Athawale, Minister of State for Social Justice and Empowerment, Government of India emphasised the need for a sustainable culture in agriculture. He said, “This is the time to recalibrate our approach to promote sustainable farming practices to rejuvenate soil health by mixing organic manure. We should focus on integrating the use of fertilisers with organic manure to enhance production, improve soil health, and ensure agricultural sustainability.”

He highlighted how the Government of India, under Prime Minister Narendra Modi’s visionary leadership, consistently prioritises the betterment of agriculture and the well-being of farmers.

Addressing the Summit, Sanjay Kumar Jha, Member of Parliament, Rajya Sabha said, “Agriculture can be key to transformation and progress of societies and for a brighter future we must work concertedly on sustainable agriculture practices.” He cited how Bihar was leading with some of the finest initiatives towards sustainability including CM Nitish Kumar’s Jal-Jeevan-Hariyali campaign as well as Krishi Roadmap, a blueprint for sustainable agriculture in Bihar.

Source: <https://agriculturepost.com/farm-inputs/organic-farming/sustainable-farming-key-to-viksit-bharat-say-scientists-industry-leaders-at-sustainable-agriculture-summit/>



AGRICULTURE

ICAR-CIFE and VAMNICOM sign MoU to strengthen cooperative management in fisheries



The ICAR-Central Institute of Fisheries Education (ICAR-CIFE) and the Vaikunth Mehta National Institute of Cooperative Management (VAMNICOM) took a significant step towards advancing cooperative management in the fisheries sector by signing a memorandum of understanding (MoU) on Monday, August 26, 2024. The MoU aligns with the vision of establishing 200,000 Primary Agricultural Credit Societies (PACS), and dairy and fishery cooperatives in every gram panchayat.

Fisheries in India support the livelihood of 14.46 million people, and this partnership aims to integrate advanced technology and promote value addition in fishery cooperatives. ICAR-CIFE and VAMNICOM will explore new opportunities in fishery education, research, capacity building, and consultancy to strengthen the fisheries ecosystem.

The MoU was signed at the ICAR-CIFE campus in Mumbai and featured Dr. Ravishankar CN, Director and Vice Chancellor of ICAR-CIFE, and Dr. Hema Yadav, Director of VAMNICOM. Scientists, faculty members, and key team members from both institutions attended the event.

Dr. Hema Yadav shared similar sentiments, highlighting the mutual benefits of the MoU. “By joining forces with ICAR-CIFE, we are taking a monumental step towards integrating cooperative management principles into the fisheries sector. This collaboration will enable us to leverage each other’s expertise and resources to drive innovation and improve practices across the board,” she noted.

The MoU aims to enhance collaboration between ICAR-CIFE and VAMNICOM, facilitating better cooperative management practices in fisheries. Both institutions will work together on research, training, and development initiatives that promise to improve cooperative management strategies in the sector.

Source: <https://agriculturepost.com/allied-sectors/fisheries/icar-cife-and-vamnicom-sign-mou-to-strengthen-cooperative-management-in-fisheries/>

International Wheat Congress to focus on driving advancements in wheat research and production



More than 870 leading researchers, policymakers, and industry professionals from over 50 countries have gathered in Perth for the 3rd International Wheat Congress 2024 (IWC). Murdoch University is hosting this five-day event, offering a unique platform for global wheat leaders to share groundbreaking research, exchange ideas, and ignite future collaborations that will drive advancements in wheat research and production.

The event will feature over 280 poster presentations, breakout workshops, and 70 selected speakers from the world’s largest wheat-producing nations. Key themes will include achieving global food and nutrition security; driving sustainability in agriculture; breakthroughs in climate adaptability research; enhancing farmer profitability; breeding wheat varieties resilient to harsh environmental conditions; tackling diseases and pests; and the global wheat market and international trade.

The IWC kicks off on Sunday, September 22, at the Perth Exhibition and Convention Centre. The inaugural session will spotlight influential leaders in the global wheat community, who will provide insights on the Australian grain market, Western Australia’s agricultural landscape, the international wheat market, and the impact of international research collaboration on R&D.

Murdoch University Vice-Chancellor, Professor Andrew Deeks will speak at the opening session. He emphasised the significance of the IWC for Western Australian wheat farmers, the local wheat industry, and governments, as wheat accounts for 65 per cent of the state’s annual grain production, generating US\$2-5 billion annually.

“Wheat has been the world’s principal cereal crop since the 18th century,” Professor Deeks noted. “Its viability, sustainability, and protection are vital to all of humanity. Murdoch University, through the Centre for Crop and Food Innovation and the State Agricultural Biotechnology Centre—both led by Professor Rajeev Varshney—is at the forefront of wheat research and innovation in Western Australia. We are thrilled to host this major congress in Perth, bringing together the best minds to collaborate and ensure the future of the wheat industry locally and globally.”

Source: <https://agriculturepost.com/agri-research/international-wheat-congress-to-focus-on-driving-advancements-in-wheat-research-and-production/>



HEALTH

It's almost impossible to keep teens off their phones in bed - but new research shows it really does affect their sleep

Sleep guidelines recommend no screen use in the hour or two before bed. But we found screen time in the two hours before bed had little impact on young people's sleep. Instead, it was screen time once in bed that caused problems



Parents of children and teenagers have long been warned about the dangers of screen time and digital devices before bed – the worry being that screens could harm the sleep patterns of young people. But do screens really hurt the length and quality of sleep? Our new research found that using screens in bed was worse for sleep than using screens for hours before going to bed.

Sleep guidelines recommend no screen use in the hour or two before bed. But we found screen time in the two hours before bed had little impact on young people's sleep. Instead, it was screen time once in bed that caused problems. Using cameras to track device usage and sleep, we found using a device in bed could cause more harm than screen time right up to bedtime. These findings challenge long-held assumptions about screen time at night and could help parents improve the quality of their children's sleep.

Connecting sleep and screens

A number of global organisations recommend adolescents stop using devices in the hour or two before bed, and instead undertake activities like reading a book or quiet time with the family. But these recommendations are based on research with a number of limitations. The studies were designed in such a way that researchers could link sleep and screens. But they don't tell us if changes in how young people used screens had an affect on the length or quality of sleep. Most of the existing research also used questionnaires to assess both screen time and sleep. Questionnaires are unlikely to capture true screen time accurately, particularly if you are interested in knowing more than just how long an adolescent has spent on their device.

To address some of these weaknesses in the previous research, we asked 85 adolescents aged between 11 and 14 to wear a body camera on their chest for the three hours before bed, for four nights.

Source: <https://www.thehindu.com/sci-tech/health/lits-almost-impossible-to-keep-teens-off-their-phones-in-bed-but-new-research-shows-it-really-does-affect-their-sleep/article68604719.ece>

Most people in the world do not consume enough micronutrients: study

The study said over 5 billion people worldwide, which is 68% of the global population, do not consume enough iodine; more than 4 billion people do not consume enough iron



A recent article in The Lancet has estimated that the Indian population's consumption of 15 dietary micronutrients is inadequate. Except for a small segment, most people in the world did not consume enough essential micronutrients, the article had flagged.

The article, Global estimation of dietary micronutrient inadequacies: a modelling analysis, by Simone Passarelli et al estimated that over 5 billion people worldwide, which is 68% of the global population, do not consume enough iodine; 67% do not consume enough vitamin E; and 66%, calcium. More than 4 billion people (65% of the population) do not consume enough iron; 55%, riboflavin; 54%, folate; and 53%, vitamin C.

The study was funded by the National Institutes of Health and the Dutch Ministry of Foreign Affairs. The authors said that the analysis provided the first global estimates of inadequate micronutrient intakes, and public health practitioners could use the results to target populations requiring intervention.

“Within the same country and age groups, estimated inadequate intakes were higher for women than men for iodine, vitamin B12, iron, and selenium; and higher for men than women for magnesium, vitamin B6, zinc, vitamin C, vitamin A, thiamin, and niacin,” the article pointed out. It found that that globally, more than men, women consumed lower amounts of micronutrients in the same country and age group for iodine, vitamin B12, iron, and selenium. Also, the imbalance was higher for women than men in most regions for calcium, riboflavin, vitamin E, and folate. Conversely, the prevalence of inadequate intake was consistently higher for men in the same country and age group for magnesium, vitamin B6, zinc, vitamin C, vitamin A, thiamin, and niacin.

The researchers hoped that the analysis not only improved the understanding of global micronutrient inadequacy, but also that public health interventions can effectively address deficiencies.

Source: <https://www.thehindu.com/sci-tech/health/study-analyses-micronutrient-deficiency-in-global-population/article68585481.ece>



HEALTH

More children have food allergies now, say paediatricians

As we observe Nutrition Week, organised every year in the first week of September, here's a look into rising food-related allergies among children. Specialists claim this incidence is rising as a consequence of the widespread consumption of 'Westernised foods'



Children could suffer from egg, seafood, and nut allergies.

K. Archana recently went through a rather nasty ordeal after eating a takeaway dessert ordered from a restaurant. She had severe cramps for several hours. The symptoms were familiar to her. She has this reaction when she eats anything with eggs. However, this time, she specifically mentioned her allergy and asked for something that did not have eggs in it.

The 39-year-old said she has been allergic to eggs since her childhood. Her first memories are of a severe reaction after visiting a restaurant in her hometown, Coimbatore. "It was a vegetarian restaurant, and I had naan. It was the first time I was trying naan. When I returned home, I threw up, something that happens after eating anything that contains eggs." When her father confronted the restaurant later, he was told that naan was glazed with eggs.

In her teens, the reaction changed. An accidental ingestion resulted in multiple visits to the toilet and severe stomach cramps that took several hours to subside. "I have always been careful. But recently, when I ordered tiramisu after confirming with the restaurant that it had no eggs, I had an allergic reaction," she said.

Westernisation of diet

Ms. Archana's reaction to a food item is not new or rare. Paediatricians cite literature on food allergies in children. They say children could suffer from egg, seafood, and nut allergies. All the paediatricians that this correspondent spoke to believe that allergies are a result of 'westernisation'. Paediatricians say common allergies include those that manifest after consuming eggs, nuts and seafood.

Source: <https://www.thehindu.com/sci-tech/health/more-children-have-food-allergies-now-say-paediatricians/article68606755.ece>

A magic pill to control blood sugar spikes? 40-minute yoga can reduce diabetes risk, says study

Can asanas add an edge to lifestyle intervention and drugs? Study author explains



A 40-minute yoga practice every day can reduce your risk of getting diabetes by nearly 40 per cent, showing better results than lifestyle intervention or drugs alone could achieve, according to a recently published study from five centres in India.

The study looked at whether yoga could prevent progression to Type 2 diabetes among individuals who were already diagnosed with pre-diabetes, a person with higher than normal blood glucose levels but not enough to be considered to have diabetes. There are an estimated 101 million people living with diabetes in the country, with another 136 million living with pre-diabetes, most of whom are likely to progress to diabetes without substantial lifestyle changes.

Dr SV Madhu, the first author of the study and professor in the department of endocrinology at Delhi's GTB hospital, said: "We were able to demonstrate that yoga was much more effective at reducing the risk of Type 2 diabetes as compared to lifestyle changes alone. In fact, the gains are much more even when compared to lifestyle intervention and drugs shown in other studies. While determining the mechanism of action was not the purpose of the study, it is hypothesised that yoga has additional benefit as it can lower chronic psychological stress. It is also thought to be an immune modulator that can reduce the inflammation and oxidative stress, resulting in lower risk for diabetes."

What is the advice for healthy adults?

Dr Madhu says those who have a higher risk of developing diabetes — such as people with family history or those who are obese — are likely to reap the benefits of yoga. "It is suggested that they practice yoga for 40 minutes every day to keep diabetes at bay," he adds.

Will yoga help people with diabetes?

While the current study does not demonstrate the effect of yoga on those who already have diabetes, Dr Madhu says that it is likely to help them as well. "Other short-term studies on impact of yoga on diabetes have already shown reduction in blood glucose levels, so it is likely that yoga can help people with diabetes keep their sugar levels in check," he says.

Source: <https://indianexpress.com/article/health-wellness/control-blood-sugar-spikes-40-minute-yoga-reduce-diabetes-risk-9547767/>



HEALTH

Drug-resistant superbugs projected to kill 39 million by 2050

This analysis has been billed as the first research to track the global impact of superbugs over time, and to estimate what could happen next



Candida auris fungi, emerging multidrug resistant fungus, 3D illustration

Infections of drug-resistant superbugs are projected to kill nearly 40 million people over the next 25 years, a global analysis predicted on Monday, September 16, 2024, with the researchers urging action to avoid this grim scenario.

Superbugs -- strains of bacteria or pathogens that have become resistant to antibiotics, making them much harder to treat -- have been recognised as a rising threat to global health. The analysis has been billed as the first research to track the global impact of superbugs over time, and to estimate what could happen next.

More than a million people died from the superbugs -- also called antimicrobial resistance (AMR) -- per year across the world between 1990 and 2021, according to the GRAM study in *The Lancet* journal.

Deaths among children under five from superbugs actually fell by more than 50 percent over the last three decades, the study said, due to improving measures to prevent and control infections for infants. However, when children now catch superbugs, the infections are much harder to treat.

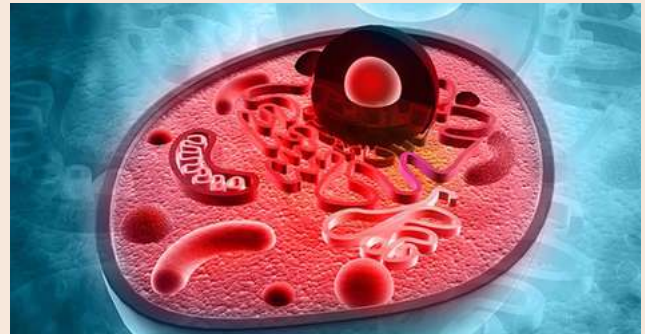
And deaths of over-70s have surged by more than 80 percent over the same period, as an ageing population became more vulnerable to infection. Deaths from infections of MRSA, a type of staph bacteria that has become resistant to many antibiotics, doubled to 130,000 in 2021 from three decades earlier, the study said.

The researchers looked at 22 pathogens, 84 combinations of drugs and pathogens, and 11 infectious syndromes such as meningitis. The study involved data from 520 million individual records across 204 countries and territories.

Source: <https://www.thehindu.com/sci-tech/health/drug-resistant-superbugs-projected-to-kill-39-million-by-2050/article68651323.ece>

Mitochondria keep your brain cells alive – helping them run smoothly may protect against Parkinson’s disease

By reducing the activity of a key protein that controls mitochondrial dynamics called Drp1, we were able to restore mitochondria to their normal activity and function; their neurons were protected from disease and able to continue functioning.



In 1817, a British physician named James Parkinson published *An Essay on the Shaking Palsy*, describing for the first time, cases of a neurodegenerative disorder now known as Parkinson’s disease. Today, Parkinson’s disease is the second most common neurodegenerative disease in the U.S. It affects about 1 million Americans and more than 10 million people worldwide.

The signature shaking in patients with the disease is the result of dying brain cells that control movement. To date, there are no treatments available that can stop or slow down the death of those cells.

We are researchers who study Parkinson’s disease. For over a decade, our lab has been investigating the role that mitochondria – the powerhouses that fuel cells – play in Parkinson’s. Our research has identified a key protein that could lead to new treatments for Parkinson’s disease and other brain conditions.

Mitochondrial dynamics and neurodegeneration

Unlike actual power plants, which are set in size and location, mitochondria are rather dynamic. They constantly shift in size, number and location, traveling between many different parts of the cells to meet different demands. These mitochondrial dynamics are vital to not only the function of mitochondria but also the health of cells overall.

A cell is like a factory. Multiple departments must seamlessly work together for smooth operations. Because many major processes interconnect, impaired mitochondrial dynamics could cause a domino effect across departments and vice versa. Collective malfunction in different parts of the cell eventually leads to cell death.

Source: https://www.thehindu.com/sci-tech/health/mitochondria-keep-your-brain-cells-alive-%E2%88%92-helping-them-run-smoothly-may-protect-against-parkinsons-disease/article68585245.ece#cxrecs_s



S&T COOPERATION FOR GLOBAL SOUTH

India-UN Fund: Leveraging South-South Cooperation for Healthcare Innovation in Trinidad and Tobago



H.E. Terrence Deyalsingh, Minister of Health of Trinidad & Tobago, interacting with the healthcare service robots during the handover ceremony.

As part of the project “Bringing High and Low Technology (HALT) to COVID-19” supported by the India-United Nations Development Partnership Fund in collaboration with Pan American Health Organization (PAHO), the PAHO-WHO Country Office in Trinidad and Tobago has handed over eight advanced mobile health service robots to the Ministry of Health. These robots, which include two specialized disinfecting units and six humanoid models, have now been integrated into the public health infrastructure of Trinidad and Tobago.

The disinfecting robots are equipped with the latest technology to effectively sanitize and disinfect high-touch surfaces in healthcare facilities, thereby reducing the risk of COVID-19 transmission within these environments. The humanoid robots, on the other hand, are designed to assist healthcare workers in various tasks, including patient interaction, data collection, and monitoring, thereby enhancing the overall efficiency and effectiveness of healthcare delivery.

At the core of this initiative is the development of a robust telemedicine system, which leverages cutting-edge digital technologies to enable healthcare workers to remotely serve individuals who may not have easy access to traditional healthcare facilities. The telemedicine system is designed to bridge the gap between patients and healthcare providers, offering a lifeline to those in remote or underserved areas, and ensuring that healthcare delivery remains uninterrupted. The system is expected to play a crucial role in reducing the burden on healthcare facilities, minimizing the risk of virus transmission, and improving patient outcomes by providing timely and accessible care.

Source: <https://unsouthsouth.org/2024/09/03/india-un-fund-leveraging-south-south-cooperation-for-healthcare-innovation-in-trinidad-and-tobago/>

Regional Dialogue Highlights South-South and Triangular Cooperation in Spurring Regional Economic Growth and Sustainable Development



Trade and integration in regional and global economies are critical to the growth of countries and, increasingly, regional South-South and triangular cooperation is seen as a mechanism for achieving this in a manner that advances the economic aspirations of countries alongside internationally agreed sustainable development goals. Trade among Latin America, Africa and the Arab countries is rising, but the view is that more could be done, particularly to enhance intra-regional trade in Latin America.

The SALMA Dialogue for Economic Cooperation and Trade 2024 focusing on “South-South and Triangular Cooperation: A Key Vector for Economic Integration and Sustainable Development” was held in Panama City, Panama from August 27 to 30 explored dynamics and potential for greater collaboration and shared growth through South-South and triangular cooperation. Participants focused on sectors and trans-border issues prioritized by the regions (agriculture, banking, health, investment and financial services, transport infrastructure, mobility and connectivity, technology and innovation, green economy, climate change, etc.).

The dialogue was hosted at the Ministry of Foreign Affairs of Panama, with Foreign Affairs Minister Javier Eduardo Martiner-Acha welcoming participants and opening the forum with a message that underlined the crucial importance of building balanced economic exchanges, strengthening scientific and cultural ties, and anchoring trade targets in the goals of sustainable development that elevate human rights and protect the environment.

The dialogue was co-convened by the Konrad Adenauer Foundation in Latin America (KAS Adela) and Tunisia-based SALMA Dialogue, with support from the Ministry of Foreign Affairs of Germany (H.E. Joachim Schmillen, Ambassador of Germany to Panama, delivering message of solidarity).

Source: <https://unsouthsouth.org/2024/09/03/regional-dialogue-highlights-south-south-and-triangular-cooperation-in-spurring-regional-economic-growth-and-sustainable-development/>



S&T COOPERATION FOR GLOBAL SOUTH

Global Partners, Local Actions: Strengthening Nutrition and Food Security Through Trilateral South-South Cooperation



Over 100 participants (both in-person and virtual) from 15 member States in Asia-Pacific and beyond, along with representatives from development partners, academia, civil society and the private sector, converged at the United Nations Conference Center in Bangkok to commemorate the UN Day for South-South Cooperation in Asia-Pacific.

A multistakeholder panel discussion on the theme ‘Multilateral Solutions for a Better Tomorrow’, including member States representatives, civil society, academia, the private sector and development partners, discussed new developments in the South-South cooperation landscape and encouraging examples of cooperation in action across the region, to more effectively address common development challenges. South-South cooperation champions and practitioners aspired to shape a better tomorrow, with cooperation and solidarity serving as a catalyst for change.

“In 1955, the Asia-Africa Conference was held in my hometown of Bandung. That pioneering meeting laid the foundation for South-South cooperation... The “Spirit of Bandung” lives on in Asia-Pacific today, with inspiring examples showcasing the power and vital importance of multilateral and bilateral cooperation among countries of the South,” noted Ms. Armida Salsiah Alisjahbana, Under-Secretary-General of the United Nations and Executive Secretary of ESCAP in her welcome remarks.

“With climate change, the advent of the digital revolution, unprecedented demographic transitions, unsustainable national debt levels and increasing cost of living, our region faces emerging and persistent, multi-dimensional crises and challenges. At the same time, Asia and the Pacific is witnessing an important transformation in the development assistance landscape, with the emergence of new development partners in the countries of the South”, the Executive Secretary stated. “As 2025 will mark 70 years since the Bandung Conference, renewing commitments and redoubling efforts for effective South-South and triangular cooperation are more relevant than ever”.

Source: <https://unsouthsouth.org/2024/09/25/escap-south-south-cooperation-underscored-as-vital-to-boost-the-asia-pacific-regions-progress-and-steer-it-towards-a-better-tomorrow/>

Rome-based Agencies (RBAs) celebrate UN Day for South-South Cooperation in Brazil



The UN Day for South-South Cooperation, celebrated annually on September 12, highlights the importance of partnerships developed among countries in the Global South. The Rome-based Agencies (RBAs) of the United Nations—the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP)—have met this week in Brazil, under the aegis of the Brazilian Cooperation Agency (ABC), to reflect on this agenda.

Trilateral South-South Cooperation (TSSC), promoted by the RBAs together with developing countries, is based on the sharing of knowledge, experiences, technologies, and resources. Respecting the principles of national sovereignty, equality, and non-conditionality, the agencies act as catalysts to unite the synergies, solutions, and skills of Global South countries. This collaborative effort contributes to advancing the Sustainable Development Goals (SDGs), especially SDG 1 (No Poverty), SDG 2 (Zero Hunger) and SDG 17 (Partnerships).

To celebrate the evolution of these partnerships, Brazil, which is a global reference in South-South Cooperation, hosted the celebration on September 10 in the capital, Brasília. The event, organized under the theme “Global partners, local actions: Strengthening nutrition and food security through Trilateral South-South Cooperation,” reaffirmed the collaboration between the United Nations agencies and the Brazilian Government.

Mario Lubetkin, Assistant Director-General and Regional Representative of FAO for Latin America and the Caribbean, who opened the event, highlighted Brazil role in South-South and Triangular Cooperation, that plays a pivotal role in global agricultural development, driving the transformation of agrifood systems and responding to the need for sustainable solutions.

“Collaboration between Rome-based agencies is essential to support countries in reducing global hunger and poverty. Brazil has been a key force in promoting regional cooperation in Latin America and the Caribbean, strengthening ties and fostering a unified bloc representing the Global South.

Source: <https://unsouthsouth.org/2024/09/25/rome-based-agencies-rbas-celebrate-un-day-for-south-south-cooperation-in-brazil/>



S&T COOPERATION FOR GLOBAL SOUTH

HLPF: Exchanges of Innovative Solutions for Debt Relief – Country Experiences and the Role of South-South and Triangular Cooperation



The United Nations Office for South-South Cooperation (UNOSSC) in partnership with the Government of Sri Lanka, serving as the President of the High-Level Committee on South-South Cooperation, organized an High-Level Political Forum on Sustainable Development side-event entitled “Exchanges of Innovative Solutions for Debt Relief: Country Experiences and the Role of South-South and Triangular Cooperation” on 11 July 2024.

The event harnessed the potential of South-South and triangular cooperation in addressing debt distress through knowledge exchanges, underscoring the importance of collaborative efforts in finding sustainable solutions. The event is a direct response to the UN General Assembly resolution on South-South Cooperation its 78th session which urged the UN development system to facilitate knowledge exchanges on debts.

“The implications of debt distress on sustainable development in the Global South are profound,” said UNOSSC Director Ms. Dima Al-Khatib in her welcoming remarks, noting the alarming rise in external debt and its detrimental effects on sustainable development. She emphasized the need for innovative solutions and reforms in international financial architecture to better support developing countries. She highlighted that debt distress is a pressing challenge that affects numerous countries across Africa, Latin America, and Asia.

The external debt stocks of developing countries have surged to an alarming \$11.4 trillion in 2023, more than double what it was a decade ago. This growing burden, exacerbated by economic shocks and the current international financial architecture, significantly hinders sustainable development.

Source: <https://unsouthsouth.org/2024/07/11/hlpf-exchanges-of-innovative-solutions-for-debt-relief-country-experiences-and-the-role-of-south-south-and-triangular-cooperation/>

2024 High-Level Political Forum Highlights the Importance of South-South and Triangular Cooperation in Achieving the SDGs



The 2024 High-Level Political Forum (HLPF) on Sustainable Development spotlighted the pivotal role of South-South and triangular cooperation in advancing the global development agenda. During the HLPF numerous successful initiatives were highlighted where countries of the Global South have driven progress in areas such as poverty reduction, healthcare, and climate resilience, among others. These partnerships not only foster mutual growth and innovation but also serve as vital mechanisms for achieving the Sustainable Development Goals and all other internationally agreed development goals.

The HLPF emphasized the need to strengthen and expand South-South and triangular cooperation to enhance development impact.

Speaking at the HLPF plenary meeting on Small Island Developing States: Implementing the outcomes of the fourth SIDS Conference, UNOSSC Director Dima Al-Khatib, emphasized that transfer of knowledge, experiences and solutions is the backbone of UNOSSC’s SIDS support toward coherent implementation of the new Antigua and Barbuda Programme of Action for SIDS (ABAS).

“UNOSSC stands ready to work closely with all partners to achieve their aspirations through SDG-anchored development,” said the Director. “For example, our Global Thinkers Network offers ready intellectual capital, while our newly revamped South-South Galaxy knowledge-sharing platform offers over 950 solutions specific to Global South priorities.” She also encouraged participants to read and utilize the new Guidelines for the Integration of South-South and Triangular Cooperation into the Country- and Regional-level Work of the United Nations Development System.

Source: <https://unsouthsouth.org/2024/07/25/2024-high-level-political-forum-highlights-the-importance-of-south-south-and-triangular-cooperation-in-achieving-the-sdgs/>



OTHERS

Do earthquakes help quartz crystals collect gold?

Researchers have been wondering why most gold nuggets mined in human history were found in orogenic quartz veins



A nugget of gold on public display at the Carnegie Museum of Natural History, Pittsburgh, U.S., November 17, 2012.

Sometimes a scientific study comes along that reminds us not all the natural mysteries of this world demand highly specialised knowledge or million-dollar experiments to solve. Instead, they reveal something new by using ideas we were familiar with by high school. Doing this science in this day and age is still limited by access to specific instruments and locations and of course time. Not everyone can do it — but that shouldn't stop us from being wowed by it.

One such study was published in Nature Geoscience on September 2 offering to explain why gold nuggets accumulate in quartz veins found in mountainous areas – a mystery for which scientists currently lack a single, convincing explanation.

It opens thus: “Ore deposits represent natural enrichments of elements compared with their normal distribution in Earth's crust. Gold deposits stand out by having the highest degree of enrichment, by factors of 1,000 to 10,000 required to make economic deposits compared with base metals, such as copper, that require ~200x enrichment. Gold nuggets represent the most extreme examples of this gold enrichment. Most nuggets originate from the quartz veins formed in orogenic gold systems found around the world. These systems have had exceptional economic importance throughout human history, representing up to 75% of all gold ever mined.”

(‘Orogenic’ means a large-scale geological process that creates mountains, such as the interaction of the Indian tectonic plate with the Eurasian plate to create the Himalaya.)

Source: <https://www.thehindu.com/sci-tech/science/could-quakes-explain-why-gold-nuggets-are-found-in-quartz-veins/article68599453.ece>

Octopuses, fish hunt together using surprisingly complex decision-making

Animals of the same species often cooperate – work together to reach some kind of goal. But it's rare to find cooperation between individuals from different species.



A new study lifts the veil on what happens when octopuses and fish hunt together. As it turns out, this cross-species relationship is more complex than anyone expected.

A new study published in Nature Ecology & Evolution lifts the veil on what happens when octopuses and fish hunt together. As it turns out, this cross-species relationship is more complex than anyone expected.

Animals of the same species often cooperate – work together to reach some kind of goal. But it's relatively rare to find cooperation between individuals from different species.

A classic example you'll be familiar with is the close relationship between dogs and humans, whether in the context of herding sheep or hunting. In these situations, the dog and the human work together to achieve a goal.

That's mammals. But underwater species also sometimes cooperate. A nice example is the joint hunting behaviour of moray eels and grouper. The grouper approaches the moray and signals that it wishes to hunt. The eel responds in kind, and off they go.

During these hunting forays, the grouper uses signals to indicate where prey may be hidden in the coral matrix. It's a synergy made in heaven: the eel can scare the prey fish from hiding places among the coral, while the grouper patrols over the top. There is literally no place for prey to hide. For the eels and grouper, the chances of catching their dinner are greatly improved when hunting together compared to hunting on their own.

Who's in charge here?

While researchers have described these behaviours before, one question remains unanswered. Who, exactly, is in charge of these cross-species interactions? Who decides what they are going to do, where and when? Are the different players “democratic”, in that they come to some form of compromise, or does one species take the lead and the other simply follows (that is, they are “despotic”)?

Source: <https://www.thehindu.com/sci-tech/science/octopuses-fish-hunt-together-using-surprisingly-complex-decision-making/article68685221.ece>