

Farm operations for Vanakalam to take off on uncertain note

Hyderabad: The skies have started opening up with the southwest monsoons making an early advent bringing cheer to the farmers in the State. But the preparatory operations for Vanakalam (Kharif) are set to get underway on an uncertain note on different counts. Farmers have been complaining about short supply in seed, especially the sought after varieties of cotton seed. The delay in disbursal of the crop investment support has become another major concern. Even as the crop insurance coverage has been promised from Kharif this year, the State is yet to finalise the modalities for implementing it from the Vanakalam crops.

The State had embarked on a ambitious Vanakalam programme this year targeting 1.51 crore acres, some eight per cent more than the 1.4 crore acres covered last year. The monsoon has already entered southern districts of the State covering parts of Nalgonda, Mahabubnagar, Nagarkurnool and Jogulamba – Gadwal districts and many places started receiving rainfall. The Vanakalam operations which usually take off towards the last week of June or first week of July, are expected to make a headway at least a week in advance this year. Farmers gearing up for season, are expected to go for cotton in a big way as early monsoon is expected to favour the crop. The government had targeted cotton in over 55 lakh acres this year. The cotton growers are facing a big scarcity of the sought-after cotton seed varieties. They are not evincing much interest in the brands that are available in the supply outlets in the market.

The area under paddy this season, which is the most preferred crop in the com-



mand area of almost all the major and medium irrigation projects, is expected to cover over 66 lakh acres this year as against 65.9 lakh acres last year. Maize crop is targeted in over 6,00,000 acres as against 5.32 lakh acres during the same season last year. Similarly, the area under jowar, which was raised in 5.32 lakh acres last year, was expected to increase in a big

way. The area under the Chilli crop is expected to go up from 3.64 lakh acres to 3.7 lakh acres this time. So far as crop investment support is concerned, the government had promised to scale it up from Rs 10,000 per acres to Rs 15000 per acre. The government is planning to restrict the direct benefit transfer (DBT) to small and marginal farmers. The farmers received the crop

investment assistance of Rs 10,000 per acre under Rythu Bandhu with unflinching regularity for the past eleven trenches. The implementation of last phase of Rythu Bandhu was marred by inordinate delays. Even as the government had assured to disburse the Rythu Bharosha assistance by next month, the eligibility for the benefit is yet to be finalised.

Hyderabad welcomes monsoon showers, more rainfall expected

Hyderabad: The city witnessed its first monsoon showers of the year on Wednesday. The evening saw heavy rains accompanied by thunderstorms and strong winds, impacting daily life and causing water logging in various areas. In the afternoon, scattered rain showers were observed in areas such as Kapra, Uppal, Nacharam, Mallapur, and Dammaiguda. By evening, the sky grew darker, and within a short span of time, heavy rainfall engulfed most areas of the city. According to Telangana State Development Planning Society (TSDPS), as of 6 pm, the highest rainfalls recorded were at 72.5 mm in Nampally, followed by 62.5 mm in Khairatabad, 50.8 mm in Bandlaguda

and Asifnagar, and 44.8 mm in Shaikpet. Other parts of the city that received rains including Ramanthapur, Bachupally, LB Nagar, Kukatpally, Hitec City, Madhapur, Gachibowli, Banjara Hills, Dilsukhnagar, Vanasthalipuram, Miyapur, Yusufguda, Jubilee Hills, Nanakramguda, and others. According to the India Meteorological Department (IMD) Hyderabad, the city recorded a maximum temperature at 36.1 degree Celsius and a relative humidity of 60 per cent which marked the lowest temperature recorded compared to all other districts on Wednesday.

More rains are expected overnight at various areas, with a mostly cloudy sky and scattered rain anticipated on Thursday.



Explained | Abaucin, the potential new antibiotic found with machine-learning

Researchers have used machine-learning to identify a potential new antibiotic against a challenging species of disease-causing bacteria, they reported in a paper published in *Nature Chemical Biology* on May 25. The finding is important because of the rise of antimicrobial resistance and the struggle to identify new classes of antibiotics. It also clarifies how machines can help speed up the identification, discovery, and testing of new antibiotics that the world desperately needs – and potentially reduce the cost of this laborious process.

What is antimicrobial resistance?

Antimicrobial resistance is one of the great crises of the 21st century that, like climate change, was brought on by human activities and affects the whole world, regardless of borders or points of origin. It refers to the ability of microbes to evolve to resist the compounds humans have developed to beat them. As a result, many drugs, but especially antibiotics, have become less effective or ineffective against disease-causing bacteria, allowing the diseases to become more prevalent again. The global cost of antimicrobial resistance is expected to be \$300 billion to more than \$1 trillion every year. India is a 'hotspot' of antimicrobial resistance thanks to the overuse of antibiotics, among people and animals, and the improper disposal of pharmaceutical waste. Efforts to develop new antibiotics have been hampered by the fact that many existing compounds have been derived from a smaller group. This implies a higher cost and longer timelines to identify new drugs that can push back the tide of resistance. One promising pathway here is to use machine-learning models that can be 'taught' to look for molecules with properties considered desirable to fight specific species of bacteria. Such models can also sift through large datasets in a short duration.

What is *Acinetobacter baumannii*?

In their study, the MIT researchers looked for a molecule to fight *Acinetobacter baumannii* bacteria. *A. baumannii* is a Gram-negative bacteria, which means it has a protective outer membrane that allows it to resist antibiotics. It has been associated with hospital-acquired infections in India. *A. baumannii* was acknowledged even a decade ago to be a "red alert" pathogen "primarily because of its exceptional ability to develop resistance to all currently available antibiotics". This remains the case today. Recently, a Department of Biotechnology initiative launched a programme to find compounds that could fight *A. baumannii*, among five other pathogens. In 2019, researchers from the Jawaharlal Nehru Centre for Advanced Scientific Research reported finding a new molecule that seemed to be potent against *A. baumannii* but left human cells alone. "Based on the *in vitro* studies, we feel this molecule has immense potential for being developed as a future therapeutic agent," the lead author of the study, Jayanta Haldar, had told *The Hindu* at the time.

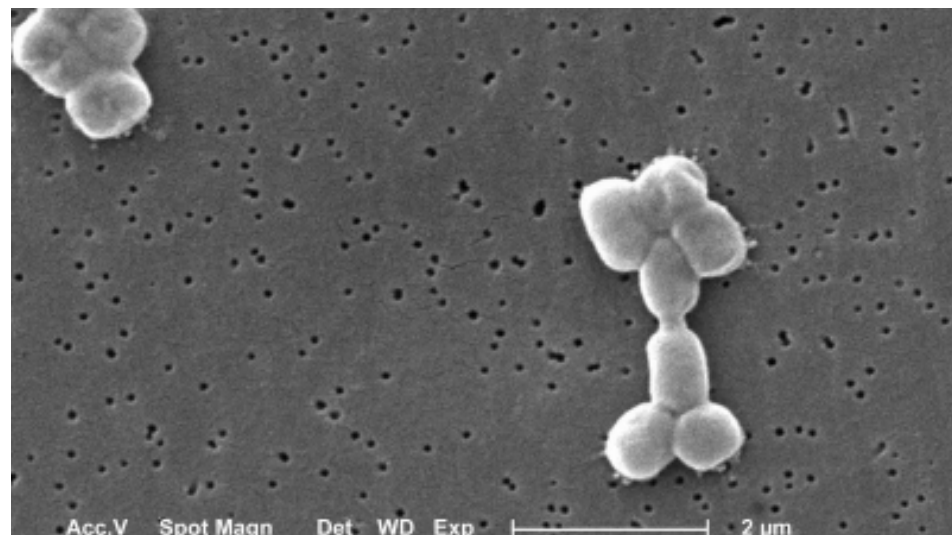
How did the MIT group find the compound?

First, the MIT group compiled a list of

7,684 molecules already known to inhibit the growth of *A. baumannii* in biomolecular studies in the lab. They used these molecules to train a machine-learning model. Specifically, the model 'learnt' the various relevant properties of each molecule and combined them into a single, complicated vector. This vector was fed into a neural network – a system that learns information in a way inspired by the human brain – that optimised for each molecule's antibacterial properties. Finally, they applied this system to a database of 6,680 molecules to look for those that could fight *A. baumannii*. This step yielded a shortlist of 240 molecules after just a few hours. The researchers tested them for activity against *A. baumannii* and found that nine of them inhibited bacterial growth by 80% or more. They further pared the list down to remove molecules that had structures that the bacteria might be 'familiar' with. They were left with abaucin. "When we run wet-lab experiments based on model predictions, the model will inevitably make both correct predictions and incorrect predictions. We then take this wet-lab data and retrain the model," Jon Stokes, an assistant professor of biochemistry at McMaster University, Ontario, and one of the people behind the study, told *The Hindu*. "Through this iterative retraining process, the model can improve its predictive performance."

What is abaucin?

Abaucin is known to compromise the normal function of a protein called CCR2. One of the authors of the study told CNN it may have originally been developed to treat diabetes. The researchers wrote in their paper that abaucin had "modest bactericidal activity against *A. baumannii*" in a



medium containing other compounds that the bacteria resisted. They also observed that when they removed abaucin from the medium "after [six hours] of treatment", the *A. baumannii* regrew. "This experiment was conducted to verify that abaucin did not sterilise bacterial cultures *in vitro*," Dr. Stokes said. "It was simply another method – in addition to the conventional bacterial cell-viability experiments – to determine the efficacy of abaucin at reducing the viability of bacterial cells." Abaucin appears to work by disrupting lipoprotein trafficking in *A. baumannii*. A lipoprotein is a molecular framework required to transport fat inside cells. Based on genetic studies, the researchers believe that abaucin could be preventing lipoprotein produced inside the bacteria from moving to the outer membrane. Abaucin is also "species-selective": it only disrupts the growth of *A.*

baumannii, not other Gram-negative bacteria. The authors write that this could "at least in part" be because *A. baumannii* uses a slightly different lipoprotein transport system.

What next?

The team plans to improve the model. "There are always gaps in chemical training datasets since you can only explore a finite region of chemical space," Dr. Stokes said. "We therefore have to focus on continually gathering more robust training data with which to train our models, as well as designing new types of models that can make robust predictions using less training data." The team members are also "designing and testing" compounds that are chemically similar to abaucin, to see if they could be more potent against *A. baumannii* and to "improve its medicinal properties".

Chinese man behind 'world's largest ever' cybercrime botnet arrested

Washington: An international law enforcement team has arrested a Chinese national and disrupted a major botnet that officials said he ran for nearly a decade, amassing at least \$99 million in profits by reselling access to criminals who used it for identity theft, child exploitation, and financial fraud, including pandemic relief scams. T

The US Department of Justice quoted FBI Director Christopher Wray as saying on Wednesday that the "911 S5" botnet – a network of malware-infected computers in nearly 200 countries – was likely the world's largest. Justice said in a news release that Yunhe Wang, 35, was arrested on May 24. Wang was arrested in Singapore, and search warrants were executed there and in Thailand, the FBI's deputy assistant director for cyber operations, Brett Leatherman, said in a LinkedIn post. Authorities also seized \$29 million in cryptocurrency, Leatherman said. Cybercriminals used Wang's network of zombie residential computers to steal "billions of dollars from financial institu-



tions, credit card issuers and account holders, and federal lending programs since 2014", according to an indictment filed in Texas' eastern district. The administrator, Wang, sold access to the 19 million Windows computers he hijacked –

more than 6,13,000 in the United States – to criminals who "used that access to commit a staggering array of crimes that victimised children, threatened people's safety and defrauded financial institutions and federal lending programmes."

15 Students of Aakash Educational Services Limited (AESL) from Hyderabad become top scorers in NEET UG 2024

Aakash Educational Services Limited (AESL), the national leader in test preparatory services, proudly announces the outstanding achievement of 15 of its students from Hyderabad who scored 679 and above in the prestigious NEET UG 2024 examination. This remarkable feat is a testament to their hard work, dedication, and the high-quality coaching provided by AESL. The results were announced by the National Testing Agency (NTA). Anuran Ghosh secured AIR 77 by scoring 716, Sai Pranav Lakinapally AIR 306 by scoring 711, Rizwan Sheikh AIR 549 by scoring 710, Jayanth AIR 755 by scoring 706, Aroosh Dadheech AIR 1391 by scoring 705, and K Sarvagna AIR 856 by scoring 705 amongst others. The students enrolled in AESL's classroom program to prepare for NEET, widely regarded as one of the toughest entrance exams globally. They attribute their remarkable success to their rigorous understanding of concepts and strict adherence to a disciplined study schedule. "We are grateful that Aakash has helped us with both. But for the content and coaching from AESL, we would not have grasped many concepts in different subjects in a short period of time," the students expressed. Congratulating the students on the extraordinary achievement, Mr. Dheeraj Kumar Misra, Chief Academic and Business Head, Aakash Educational Services Limited (AESL), said, "We congratulate the students for their exemplary feat. Over 20 lakh students appeared for NEET 2024 from across the country. Their achievement speaks volumes of their hard work and dedication as well as the support of their parents. We wish our students all the best

in their future endeavors." NEET is conducted annually by National Testing Agency as a qualifying test for students who wish to pursue undergraduate medical (MBBS), dental (BDS) and AYUSH (BAMS, BUMS, BHMS, etc.) courses in government and private institutions in India and also, for those intending to pursue primary medical qualification abroad. About Aakash Educational Services Limited (AESL)

Aakash Educational Services Limited (AESL) is India's leading test preparatory company that specializes in providing comprehensive and effective preparation services for students preparing for high stakes Medical (NEET) and Engineering entrance examinations (JEE), School/Board exams and competitive exams such as NTSE and Olympiads. AESL has a pan India network of over 315 centres with over 400,000+ currently enrolled students and has established an unassailable market position and brand value over the last 35 years. It is committed to providing the highest quality test preparation services to unlock students' true potential and achieve success in their academic endeavours. AESL takes a student-centric approach to test preparation, recognizing that every student is unique and has individual needs.

It has a team of highly qualified and experienced instructors who are passionate about helping students achieve their dreams. The company's programmes are designed to be flexible and its teaching methodologies are backed by the latest technologies to ensure that students are well-prepared for their exams. AESL is a subsidiary of Think and Learn Pvt Ltd. www.aakash.ac.in



MG India achieves significant milestone with Sustainable Repainting on Environment Day

MG (Morris Garages), a British automobile brand with a 100-year-old legacy, also known for its innovative and sustainable initiatives, announced a significant milestone in India for environmental protection on World Environment Day. Through the thoughtful use of water-based paints in the repainting processes of over 1.72 lakh MG vehicles over the past five years across its service centres in India, the company has successfully saved over 30,000 kilograms of Volatile Organic Compounds (VOCs) from being released into the atmosphere. The water-based paints process emits only 10gm of VOCs per litre of water compared to the 400gm released by solvent-based paints, thereby significantly reducing 390gm of harmful VOCs on each vehicle during repainting. MG India has been using water-based paint since the start of its India operations in 2019. By embracing this sustainable approach, MG India has demonstrated its responsibility towards the environment and ensured the well-being of its customers and the communities it operates in.

Commenting on this achievement,

Satinder Singh Bajwa, Chief Commercial Officer, MG India, said, "At MG, we believe and work in a manner that echoes the fact that sustainability is an integral part of our business. We are delighted to have saved 30,000 kg of VOCs through the mindful adoption of water-based paints at all our service centres in the country. This milestone highlights our dedication to reducing our environmental impact and showcases our commitment to achieve our net-zero target and create a greener future for generations to come. I hope that the aftersales market increasingly adopts the use of water-based paints for painting work, ensuring a more effective way to care for the sensitive state of our environment."

Volatile Organic Compounds (VOCs) are chemical compounds that easily vaporize at room temperature. While they are commonly found in various products such as paints and cleaning agents, their release into the atmosphere can have detrimental effects on human health and the environment. VOCs contribute to the formation of ground-level ozone, a major component of smog, which can lead to res-

piratory issues and exacerbate respiratory conditions such as asthma. Additionally, VOCs can react with other pollutants in the atmosphere, leading to the formation of harmful air pollutants and contributing to climate change. Furthermore, the MG Dry Wash (Enviro Wash) initiative promotes dry car washing, encouraging people to save up to 14 lakh litres of water per month. These initiatives and the adoption of water-based paints highlight MG Motor India's commitment to environmental sustainability, aligning with the global celebration of World Environment Day and underscoring the company's dedication to a greener future. About MG India

Founded in the UK in 1924, Morris Garages vehicles were world-famous for their sports cars, roadsters, and cabriolet series. MG vehicles were much sought after by celebrities, including British Prime Ministers and even the British Royal Family, for their styling, elegance, and spirited performance. The MG Car Club, set up in 1930 at Abingdon in the UK, has thousands of loyal fans, making it one of the world's largest clubs for a car brand. MG has evolved into a modern, futuristic, and inno-

vative brand over the last 100 years. MG Motor India's state-of-the-art manufacturing facility in Halol, Gujarat, has an annual production capacity of 1,00,000 plus vehicles and 6,000 direct and indirect employees. Driven by its vision of CASE (Connected, Autonomous, Shared, and Electric) mobility, the innovative automaker has augmented across-the-board 'experiences' within the automobile segment today. It has introduced several 'firsts' in India, including India's first Internet SUV – MG Hector, India's first Pure Electric Internet SUV – MG ZS EV, India's first Autonomous (Level 1) Premium SUV – MG Gloster, the Astor- India's first SUV with personal AI assistant and Autonomous (Level 2) technology, and MG Comet – The Smart Electric Vehicle.

Website: www.mgmotor.co.in

Facebook: <https://www.facebook.com/MGMotorIN>

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YDI Events yash Joshi presents, Box Cricket Premier League (BCPL 2024 Season 3) - A Social Cause Event

Held at Straight Drive Attapur, the event was graced by esteemed guests and powered by Parampara and MPL Steel Pipes



YDI Events, led by Yash Joshi, proudly presents the third season of the Box Cricket Premier League (BCPL 2024), a thrilling event held at Straight Drive Attapur for a social cause. The event was inaugurated by the esteemed Chief Guest, Dr. Ajai Kumar Agarwal, and graced by the presence of Sri Amrat Kumar Jain, Sri Arun Kumar Dakotiya, Sri Ved Prakash Joshi, Sri SriKishan Sharma, Sri

Purushottam Lala, Srinivas Rinwa, Sri Keshav Rinwa, Sri Govind Lal ji Nawal, Sri R.P. Sharma, Sri Sangesh Agarwal, Smt. Megharani Agarwal, Smt. Renu Soni, Sri Pavan Mishra, Sri Bharat Chanda, Sri Mukesh Joshi, Sri Suresh Mali, and Sri Dinesh Sharma.

The event was powered by Parampara (multi-cuisine restaurant) and MPL Steel Pipes, and associated with Luft

(Bar & Kitchen) and Khandelwal Ceramics Private Limited. The event was sponsored by Khandal Vipra Samaj, Needz Security Solution, Himalaya Crockery and Gifts, Store 24, IRIS Eye Hospital, Ramdev Baba Online Media Services, Brothers Ayurvedic and General Store, and BHN Namkeen. The matches were held between 20 teams, each consisting of 8 players, for 7 overs. The final match was played between the Power Hitters and the Poor Boys

teams, with the Power Hitters emerging victorious. Shankar Singh Rajput was awarded the Man of the Match for his superb bowling performance, while Suraj from the Poor Boys team received the Best Batsman and Most Valuable Player awards, and Sahil from the Power Hitters team was recognized as the Best Bowler. The event was organized by Yash Joshi, the Founder and Director of Ydi Events, and was supported by the Khandal Vipra Samaj.

OPPO committed to making AI available in smartphones

OPPO is committed to making AI available on smartphones across all price points by the end of 2024. The brand has set up an AI R&D Centre to develop proprietary technologies and is collaborating with Google, Microsoft and chipset manufacturers such as MediaTek and Qualcomm to deliver more AI features for everyday life. In February this year, OPPO announced the establishment of the OPPO AI Centre in Shenzhen to centralise resources and support the systematic development of AI capabilities in areas such as image processing, computer vision, speech technology, natural language processing, and machine learning. OPPO has pledged not to employ user data for training models and established a robust data security and privacy protection system backed by third-party certifications, end-to-end encryption, and confidential computing technology to ensure user data remains private. IDC's latest research report "Time to Democratise the Impact of AI Tech"

reinforces the significant potential of this market. According to IDC, shipments for AI phones in the sub-US\$1000 segment are expected to grow by 250% in 2024 to reach 35 million units. Generative AI will increasingly enter everyday life via phones to enhance experiences across entertainment, mobile officing, and more. Since 2020, OPPO has pioneered the development of its own Large Language Models (LLMs) and has been active in large vision models and multimodal technology. More importantly, OPPO is the first smartphone brand to deploy an LLM with 7 billion parameters directly on the device. With its advanced AI technologies, OPPO has rolled out over 100 generative AI capabilities to its phones this year and has filed over 5,399 AI patents worldwide, including 3,796 patents for AI imaging. OPPO has consistently invested in technology research and development, delving into key technological fields such as flash charging with SuperVOOC, imaging algorithms that can

recognise age, sex, and skin tones, as well as smart charging with its Battery Health Engine that prolongs battery life over the span of the device. OPPO's new centre aims to strengthen its AI capabilities and explore a broad range of user-centric AI products and features that will enable it to bring users the latest experiences at the forefront of AI. To strengthen the AI ecosystem for its smartphones, OPPO has formed strategic partnerships with Google, Microsoft, and MediaTek. "With our relentless efforts and commitment, OPPO aims to make AI phones accessible to everyone," said Billy Zhang, President of Overseas MKT, Sales, and Service at OPPO. "For the first time in the industry, OPPO is bringing generative AI to all product lines. By the end of this year, we expect to bring generative AI features to about 50 million users." "Next-gen AI Smartphones will represent a major transformative stage in the mobile phone industry", said Pete Lau, Chief Product Officer of OPPO. "

Time to Democratize the Impact of AI Tech

AI smartphone, driven by users' authentic needs in real-life scenarios, is widening its user base from the high premium to the mass market.



The bacteria that write new genes to cope with infections

Amid the unprecedented challenges presented by the COVID-19 pandemic, a once obscure enzyme found itself in the spotlight: reverse transcriptase. As laboratories worldwide rushed to develop reliable diagnostic tests, techniques using the enzyme became the gold standard to detect the SARS-2 virus, and a cornerstone of molecular diagnostics. This remarkable enzyme didn't only facilitate rapid and accurate testing; along with another powerful approach — genome-sequencing — it also helped track the virus's spread, paving the way for surveillance, better public healthcare, and vaccine development.

The discovery of reverse transcriptase is a story unto itself. Researchers in the labs of Howard Temin and David Baltimore independently discovered it and published their findings in back-to-back articles in the journal *Nature* in 1970. In his paper, Dr. Baltimore suggested that in the vesicular stomatitis virus, a protein called RNA polymerase was involved in reverse-translating RNA to DNA. The discovery was transformative. The prevailing belief at the time was that in all living beings, hereditary information flowed only from DNA to RNA and from RNA to protein (a.k.a. the 'Central Dogma'). The discoveries of Drs. Temin and Baltimore et al. showed information could flow the other way, too, with RNA giving 'rise' to DNA. The name "reverse transcriptase" was however coined by the editor of *Nature*, in an article discussing the significant advance in an accompanying column.

The discovery's impact was also immediate. The ability of cells to create DNA copies from RNA revolutionised research methods in molecular biology, where researchers could reverse-transcribe messenger RNAs to pieces of DNA, clone that DNA into bacterial vectors, and study the function of the corresponding genes. In diagnostics, clinicians used reverse transcriptase to convert RNA to DNA and thus estimate the amount of viral material in a given sample. This technique quickly found wide application and use in the study of RNA viruses, including hepatitis B and the human immunodeficiency virus (HIV). Indeed, the discovery of reverse transcriptase had a significant effect on the management and treatment of HIV infections, including Acquired Immunodeficiency Syndrome (AIDS), in the 1980s. A generation of antiviral agents that specifically targeted the reverse transcriptase enzyme helped convert an otherwise deadly disease to one that could be managed, translating to improving the long-term outcomes and survival of people living with AIDS. Subsequent studies of the reverse transcriptase enzyme since the 1970s led to mechanistic insights into how viruses use this enzyme to replicate, as well. Retroelements in the human genome Reverse transcriptases also had a significant role in shaping the human genome. The human genome is interspersed in many places with sequences, called elements, that appear to have originated from retroviruses. Thus researchers call them retroelements. Evolutionary bi-

ologists believe these retroelements to have been transferred horizontally during the course of millions of years of evolution. (Horizontal gene transfer refers to genes 'jumping' between organisms rather than from parent to offspring.) And until recently, researchers also considered them to be "junk" elements: they were repeated through the genome and they seemingly did not confer any function to the human organism. However, recent evidence has suggested that these retroelements could really have had a profound impact on human biology and evolution, and that they play important roles in a variety of physiological processes.

In a recent paper in the journal *Nature Communications*, researchers extensively studied the expression of genes in different parts of the human brain from post-mortem brain samples. They reported that the expression of more than a thousand human endogenous retroviruses — a major class of retroelements in the human genome — could be associated with a risk of neuropsychiatric diseases in humans. Retroelements in the human genome and bacterial reverse transcriptases have a common evolutionary history as well as share functional mechanisms. Bacterial reverse transcriptases — believed to be the precursors of their eukaryotic counterparts — exhibit analogous mechanisms. The discovery of reverse transcriptase activity across the different domains of life underscores the enzyme's fundamental role in both prokaryotic and eukaryotic systems as well as a remarkable evolutionary continuity and functional versatility. Writing genes using reverse transcriptase

Researchers widely believed that bacterial reverse transcriptases were the precursors of their eukaryotic counterparts. They discovered the first reverse transcriptase in bacteria in 1989, with papers published back to back in the journals *Science* and *Cell*. In bacteria, as in the case of humans, retroelements are categorised as belonging to three broad groups: the Group II introns, the retrons, and the diversity-generating retroelements. In a preprint paper uploaded to the bioRxiv preprint server on May 8, researchers at Columbia University in New York, led by Stephen Tang and Samuel Sternberg, suggested that when the bacteria *Klebsiella pneumoniae* is infected by bacteriophages — viruses that infect bacteria — they use a non-coding RNA with specific motifs (or structures) that could bind to reverse transcriptase and instruct cells to create DNA. This DNA copy has multiple copies of a gene that can create a specific protein. The researchers dubbed this protein 'Neo' for "never-ending open-reading frame". It could place the bacterial cell in a state of suspended animation, blocking its replication, and thus stalling the replication of the invading bacteriophage as well. Thus, the infection is stopped in its tracks. Recent discoveries — including the role of reverse transcriptase in bacterial defence against bacteriophages — hint at the potential of innovative applications in biotechnology and medi-



cine, especially in the context of emerging antimicrobial resistance, the ability of disease-causing microbes to resist the effects of substances designed to incapacitate or kill them. Further exploring reverse transcriptases could also reveal novel mechanisms of genetic evolution and viral resis-

ance, potentially leading to new therapeutic strategies and biotechnological tools. The authors are senior consultants at Vishwanath Cancer Care Foundation and adjunct professors at IIT Kanpur and Dr. D.Y. Patil Medical College, Hospital & Research Centre, Pune.

Ex-OpenAI employees demand greater protection for whistleblowers



A group of current and former company employees have signed an open letter demanding that "frontier AI companies commit" to principles in order to better safeguard whistleblowers in the industry, or those raising valid concerns about the safety of AI technology. The letter titled 'A Right to Warn about Advanced Artificial Intelligence' was signed by former Google DeepMind employee Ramana Kumar and current employee Neel Nanda, as well as former OpenAI employees Jacob Hilton, Daniel Kokotajlo, William Saunders, Carroll Wainwright, and Daniel Ziegler, while other current and former OpenAI employees remained anonymous. In the letter, the signees called on AI companies to encourage a culture of open criticism and non-retaliation at their workplaces, so that safety risks could be responsibly called out. The

letter's signees also criticised a lack of support and adequate safeguards for AI whistleblowers due to relatively less regulation in the emerging space. "Ordinary whistleblower protections are insufficient because they focus on illegal activity, whereas many of the risks we are concerned about are not yet regulated. Some of us reasonably fear various forms of retaliation, given the history of such cases across the industry. We are not the first to encounter or speak about these issues," stated the open letter. The letter highlighted a need for companies to remove contract clauses that penalised "disparagement" of the company and the hindering of vested economic benefit due to employees' concerns, in what was a clear reference to OpenAI's former practice.

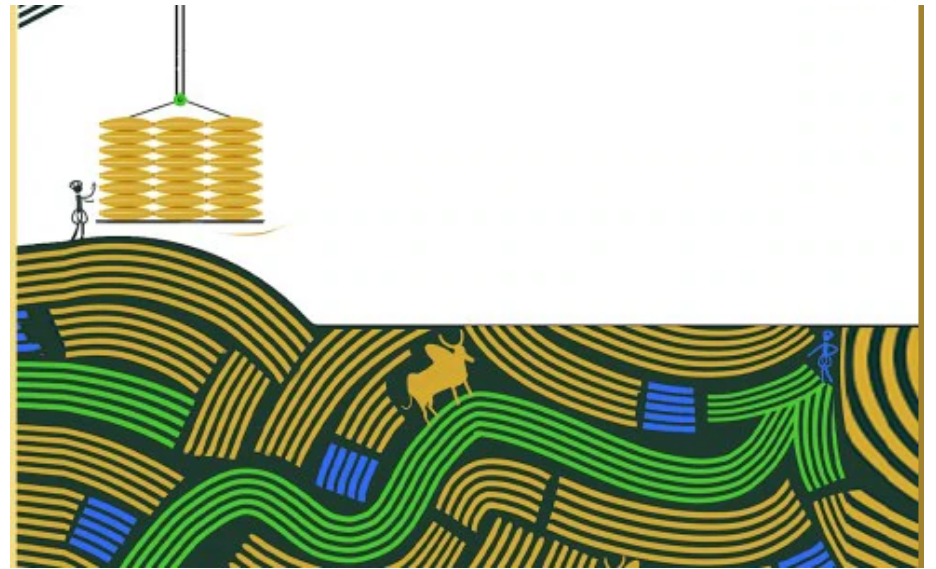
Viksit Bharat must also be inclusive Bharat

The temperatures are rising not only politically, but also atmospherically. It is now confirmed that 2023 was the warmest year on record since 1850 as per the National Oceanic and Atmospheric Administration (NOAA) in the US. The 2023 temperatures were 1.18 degrees Celsius higher than pre-industrial levels, and many scientists are predicting that 2024 could be even worse. Against this backdrop of rising temperatures, the moot question for us in India is: Will Indian agriculture be able to feed our growing population in the medium to long run, and whether our farmers will also be prosperous in Viksit Bharat@2047 — an aspirational slogan given by Prime Minister Narendra Modi.

Although 2047 is still 23 years away, and it is very difficult to arrive at such long-term projections, a rough idea can be obtained by looking at what happened since reforms began in 1991 and continued, in one way or the other, under various governments. But more interesting would be to see the growth story in the last 10 years under the Narendra Modi government since 2014 and compare it with the 10 years of the Manmohan Singh government. Given that the incumbent government feels very confident of coming back to office with a thumping majority, it is likely to continue its policies of the last 10 years, or may even accelerate to realise its aspiration of a Viksit Bharat by 2047. The infographic gives average annual growth rates (AAGR) of overall GDP and agri-GDP (2011-12 base, revised series). While the long-term growth rate from 1991-92 to 2023-24 (second advance estimate) of overall GDP is 6.1 per cent, for agri-GDP it is 3.3 per cent. However, during the last 10 years of the Modi government, overall GDP has grown only by 5.9 per cent (compared to 6.8 per cent during Manmohan Singh's period) and agriculture growth has been 3.6 per cent (compared to 3.5 per cent during the Manmohan Singh period). There is not much of a difference between the two governments with respect to agri-GDP growth. Agriculture is critical for India's development as it still engages about 45 per cent of the working population (2022-23, PLFS data). So, if Viksit Bharat has to be an inclusive Bharat, it must develop its agriculture to its full potential. Productivity needs to rise, water consumption needs to be reduced, groundwater needs to be recharged, soil degradation needs to be arrested, and greenhouse gas (GHG) emissions from agriculture need to be curtailed. Business as usual, with the current set of policies, is not likely to deliver this dream of inclusive Viksit Bharat by 2047.

What we know today is that agriculture contributes roughly 18 per cent to the overall GDP but engages 45 per cent of the workforce — as pointed out earlier. If our growth rates of overall GDP and agri-GDP keep growing as they have during the last 20 years, or even last 10 years, the likely chances are that by 2047,

agriculture's share in overall GDP may drop to just 7-8 per cent but it may still be saddled with more than 30 per cent of the country's workforce. More people need to move out of agriculture to higher productivity jobs with better skills. Therefore, the skill formation of rural people for rapidly growing and urbanising India has to be a top priority. Else I am afraid, Viksit Bharat will be Viksit only for the top 25 per cent population, while the remaining may remain stuck in the low-medium income category. The expected overall GDP growth of 7.6 per cent in 2023-24 is a good foundation to build on. The Ministry of Finance and RBI both feel upbeat and expect the final numbers of this year may even be higher. It is good news and many in the tribe of economists feel that this can be maintained for the long run. But how many of us have noted that the agri-GDP growth rate of 2023-24 is a pitifully low 0.7 per cent (second advance estimate)? Do we want a situation where the economic conditions of the masses improve at less than one per cent while overall GDP grows at 7.6 per cent? The answer is obviously "no". Remember that agriculture growth dropped to this low level (0.7 per cent) primarily because of unseasonal rains during the last kharif season. And there are no positive signals that the situation will improve. If there are any signals, the risks of extreme weather events are going to increase, as humanity is falling far behind in arresting global warming. Is India in general, and agriculture in particular, ready for that? Not really. Indian agriculture in Viksit Bharat cannot be on a weak and risky wicket. Two years of suc-



cessive droughts can spoil the party of Viksit Bharat. Even without a drought, RBI has been fighting almost this entire year to control food inflation. Govt has put export controls, stocking limits on traders, suspended futures trading in many agri-commodities, and unloaded wheat and rice at prices below their economic costs. These are all signs of panic, and policy tools of the 1960s, when India was living from "ship to mouth". This policy toolbox cannot be carried on in Viksit Bharat. So, what should be the agenda for agriculture in Viksit Bharat? Rationalise food and fertiliser subsidies, and put the savings to augment agri-R&D, agri-innovations, agri-extension, soil and water recharge through check dams and watersheds, promoting water saving

techniques in agriculture (drip and sprinklers, fertigation, protected cultivation, etc). More importantly, Indian agriculture has to move to high-value agriculture (poultry, fishery, dairy, fruits and vegetables) with a value chain approach, from plate to plough, that is, a demand-driven system. For that, we need to think of policies and institutions through which our farmers can access pan-India markets, and even export markets on a regular basis. Be it through cooperatives or farmer producer organisations (FPOs) on digital commerce (E-NAM, ONDC type) or through contract farming with large processors, retailers, and exporters. And, don't forget to step off from the brakes on futures trading. The price messenger can't be shot down in Viksit Bharat.

Sweet Baby Inc controversy: A return of Gamergate?

Alan Wake II, Spiderman 2, God of War Ragnarök, and Sable are some of the notable projects that the narrative and consultation studio Sweet Baby Inc has worked on since its founding in 2018. A cursory look at the list tells you that for an organisation that is around six years old, that is a commendable roster of projects/titles to be a part of.

While their expertise lies in aspects such as narrative development, character design trajectories and arcs, and elements of diversity and representation, it is surprising that the organisation is being targeted by players who seem to have uncovered their hidden agenda of making games political/woke. As game-makers from around the world have dubbed this moment 'Gamergate 2.0,' I can't understand what the organisation has done wrong. In a time where global gaming organisations are shedding employees by the cartloads, here

is an organisation championing diversity and plurality in a bid to make the medium more global and representative, yet the community is willing to conduct a witch hunt? A cursory search for Sweet Baby Inc. on Google yields in its top five results, a Steam curation page whose only supposed function is to identify games the company has consulted on and flag them as "not recommended." This list includes games such as Assassins Creed Valhalla, The Crew Motorfest, and Gotham Knights and I can't help but wonder: what purpose does boycotting a game that is supposed to offer players moments of joy and pleasure serve? Who does this form of cancel culture benefit when it undermines game makers, players, and the industry at large? How are video games to be considered a democratic and globally accessible form if we threaten people among us who champion diversity and inclusion? One of the largest pursuits of the video game industry has

been to shed the popular stereotype of video games being a medium of refuge for 'young white teenagers of privilege, playing video games in their basements, secluded from the rest of the world.' Here, in not taking a stand against the backers of the witch hunt against Sweet Baby Inc., we are undoing years of progress in one swift motion. We did the same when we refused to take a stand when misogynists questioned the accuracy of Abby's body in The Last of Us II. In monetary terms, because that is where the crux of the attack against Sweet Bay Inc lies, Spider-man II is a much better game due to the African American and Puerto Rican heritage of Miles Morales. The game shines when it highlights jazz and African American music cultures and, in the process, becomes much more than an action game. It represents modern-day New York and serves both as a site of learning and being.

Sutlej on three sides, border fence on the other, why this flood-hit Punjab village is refusing to vote this election

“Harraan ton baad kuch ni bacheya saada, hun taan bas tibbey hi hai poore pind vich... reta hi reta hor kuch nahi vikhda. Pehlan taapu si tey hun registaraan vi ban gaya hai... (After floods, nothing is left in our village. Huge craters and sand is all we can see. Earlier it was just an island, now it's also nearly a desert),” says Malkeet Singh, 22, whose house was washed away in the floods last year. Heaps of sand and silt spread across the vast landscape as far as one can see; parched, barren fields with a few wild shrubs, some partly damaged houses standing like a skeleton here and there while many others completely washed away and reduced to rubble, impoverished cattle tied outside a few homes, and two rickety boats – is all that has been left at Kaluwala after the floods last year. As one alights from the berhi (wooden boat) to reach the entrance of the village, there are no roads but just vast stretches with thick layers of sand. Surrounded by waters of Sutlej river on three sides and Indo-Pak border fence on the fourth, the small village of just around 300 people, in Ferozepur district of Punjab, is approachable via boat on most days, barring the days when army sets up temporary pontoon bridge on the other end. As Punjab votes for 2024 Lok Sabha elections on June 1 in the last phase, the residents here say they might not even vote this time. It doesn't feel like an election in Kaluwala, where neither any party's flag nor poster is placed on any wall or house, as villagers say they are yet to overcome the flood trauma. During the floods, as Kaluwala was drowned in waist-deep waters, and was completely cut-off from the outside world, the villagers were forced to spend more than a month on the rooftop of the village's government primary school, the only building which survived the raging flood waters. Such was the state of affairs that despite repeated letters and requests, even a new boat wasn't sanctioned in time to help villagers evacuate and they had to borrow one, say the villagers. After surviving the floods, largely with their own grit and determination, the villagers had even demanded that their village should be merged with neighboring Pakistan, as no government from the Indian side of Punjab considered them humans. kaluwala floods Sand all around after floods in the village Kalluwala in Ferozepur. (Express Photo by Gurmeet Singh)

“Why should we vote? What has the vote given to us till now? Edhar koi nahi pucha saanu, pher assi keha ki saanu Pakistan naal hi mila do (No other bothers here if we are dead or alive. That's why we had said that it's better if we are merged with Pakistan). Maybe someone will listen there. Only we know how we survived floods here. We lived on the rooftop of the school for more than a month. My 4 acres of agricultural land has been reduced to sand. Even the animal fodder is being grown with great difficulty. When no government or any political party is bothered if we are dead or alive, then why to live here? We are in no mood to vote this time,

neither has anyone come till now to ask for them,” says Lakhwinder Singh. Malkeet Singh says that of around 45 families, almost 20 have already moved out. “The village has just 157 registered voters. After class V, children have to travel to high school on a boat in the nearby village Gatti Rajoke. Many parents, unwilling to send kids on boats, prefer to discontinue their education. Even a few who are pursuing graduation have no future here,” he adds. “Even to vote, we have to go to nearby Nihale Wala village via boat only.” The floods came as last nail in the coffin for the “island village”, where a hand pump throwing stinking, contaminated water is the only source of drinking water, riding a boat in the middle of the night the only option in case of medical emergencies and the government primary school that came up in 2021 doesn't have a regular teacher. What's more? None of the villagers here have the ownership of the land they cultivate. Indo-Pak wars, floods or “surgical strikes”- the people here say that they have only struggled for their whole life, trying to rebuild their village after every blow, but 2023 floods have almost put the village's existence at stake. “As soon as these few families left behind also leave, Kaluwala will cease to exist,” says Satnam Singh, 37. Not a penny of compensation received, say villagers

“It was only the NGOs and gurdwaras which sent us some groceries during floods. No politician came. Our animals died as there was nothing to feed them. So when no one came then, they should also not come now to ask for votes,” adds Satnam Singh. kaluwala floods Floods have left behind trail of destruction, and there's only sand as far as one can see. (Express Photo by Gurmeet Singh) Malkeet Singh further says, “Those who were in actual need of compensation after losing their houses were never given a penny, while the rich in other villages, who were close to officials, were even given twice. If such would be the system, why would we vote?,” he asks. “Even the new boat came after the floods were over. We had to borrow one to shift people when the waters raged.” In Ferozepur parliamentary constituency, consisting of border districts Ferozepur and Fazilka, Shiromani Akali Dal (SAD) has been the six-time consecutive winner since 1998.

In 2019, SAD president and former deputy CM Sukhbir Singh Badal won from here. This time the party has fielded Nardev Singh Bobby Mann, son of Akali stalwart late Zora Singh Mann, three-time former MP. The Congress has fielded Sher Singh Ghubaya, a Rai Sikh and a two-time former SAD MP from Ferozepur, who had shifted to Congress. He was defeated by Sukhbir Badal in 2019 by over 1.98 lakh votes. The AAP has fielded Muktsar MLA Jagdeep Singh Kaka Brar, while BJP has fielded four-time Congress MLA (from Guru Har Sahai) Rana Gurmit Singh Sodhi. Most villagers in Kaluwala are from Rai Sikh community, which holds considerable sway during elections. The Ferozepur Lok Sabha



seat consists of nine assembly segments: Ferozepur rural, Ferozepur city, Guru Har Sahai, Abohar, Fazilka, Balluana, Jalalabad, Muktsar and Malout. All except Abohar were won by the Aam Aadmi Party (AAP) in 2022 Punjab assembly elections. Kaluwala village is a part of Ferozepur city segment, from where AAP's Ranbir Singh Bhullar is the current MLA. In 2002 and 2007, BJP's Sukhpal Singh Nannu and in 2012 and 2017, Congress's Parminder Singh Pinki, had won from here. Nannu recently joined AAP. kaluwala floods The government primary school in the village doesn't have a regular teacher. (Express Photo by Gurmeet Singh) “AAP's Bhullar never visited here after winning the election in 2022, nor did SAD's Sukhbir Singh Badal. Pinki had still come once during Covid and Nannu visited once after the floods. But no one has got us the compensation for flood damage yet,” says Nishan Singh, 28. “Every few years, either due to tension at the border or due to natural calamities, our village has been bearing the brunt since Partition. Mere 157 votes hardly matter to anyone,” says Malkeet,

adding that demand for a bridge to help villagers commute has continued to remain pending for decades.

Harbans Singh, sarpanch of the village who lives in nearby Nihale Ke village, says, “No one is interested in the election this time from both villages. Neither candidates are coming to us, nor we are going to their meetings because they know that they failed us during floods. Kisi ne saadi baan ni fadi si (no one had supported us during the crisis).. Not a single penny of compensation reached us for flood damage. Where is AAP now? No one came to us then so why should we vote for them now? In case AAP and SAD candidates step here to ask for votes, they will have to answer several questions.” What is further angered Kaluwala residents is that despite being at the receiving end for over 70 years now, they are still not the “owners” of the land on which they live. The land, being next to the border, is still owned by the government. “Saadi huney vi kachhi paili hai... (We are cultivating the land which doesn't belong to us). Are we aliens?,” says Malkeet.

Aparna Constructions and Estates launches its first mall in Hyderabad

Hyderabad: Aparna Constructions and Estates Private Limited has announced its foray into the retail-commercial and entertainment segments with the launch of Aparna Neo Mall and Aparna Cinemas in Located in the Nallagandla region, Aparna Neo is spread across 3.67 acres with an expanse of 3.5 Lakh square feet and is the only mall within the 8 km radius. Aparna Constructions has made a strategic investment of Rs 252 crore in Aparna Neo and an additional investment of Rs 32 crore in Aparna Cinemas. “Hyderabad is poised to emerge as the 4th fastest growing city. This rapid urbanization is fuelling growing demand across the residential, commercial, and retail real estate categories,” said Rakesh Reddy, Director, Aparna Constructions and Estates. The mall which is set to open on May 31 boasts an array of over 80 stores,



offering a wide range of luxury cosmetics, high-end apparel, travel necessities, technology, dining, and premium quality entertainment options. Furthermore, Aparna Cinema features state-of-the-art facilities, including the latest Dolby sound systems and 4K projection screens, the 1200-plus seater cinema ensures an unparalleled audio-visual experience providing people with a top-tier cinematic experience.”

Electric heavy-duty vehicles unlock pathway for significant reduction of GHGs in India, study finds

A recent study, conducted by an independent non-profit group, the International Council on Clean Transportation (ICCT), evaluated the life-cycle greenhouse gas (GHG) emissions of various HDV technologies and fuel pathways in India and found that electric HDVs offer the highest potential for reducing GHG emissions among current vehicle technologies. GHG emissions are directly connected to fuel types as different fuels produce varying amounts of carbon dioxide (CO₂) and other greenhouse gases when burned, with fossil fuels such as diesel and petrol, emitting more compared to alternative fuels such as natural gas, electricity, or hydrogen. Lifecycle emissions are the total GHG emissions produced throughout the entire lifespan of a product. Focusing on three such vehicles — a 12-tonne rigid truck, a 55-tonne tractor-trailer, and an urban bus — the study revealed that battery-electric HDVs significantly outperform diesel and natural gas vehicles in terms of GHG reduction. This holds even with India's current coal-heavy electricity grid supported by ongoing grid decarbonisation policies.

This is primarily due to the inherent efficiency of electric powertrains (the system in a vehicle that delivers power to the wheels). Electric powertrains convert a larger proportion of the energy from the grid into movement, resulting in lower energy consumption and GHG emissions per kilometre driven, explained Aviral Yadav, one of the authors of the ICCT study. "Additionally, as India's grid moves towards decarbonisation, and transitions away from coal to renewable energy, the emissions advantage of battery EVs will only increase. Our study shows that the future grid decarbonisation will significantly enhance the benefits of battery EVs, making them a crucial solution for GHG emissions reduction," said Yadav. RE-powered HDVs can achieve 80% lower lifetime GHG emissions compared to diesel-driven vehicles by the growing demand for mobility and the reliance on fossil fuels, the transport sector is one of the fastest-growing contributors to climate change. According to the Intergovernmental Panel on Climate Change (IPCC), the sector accounted for nearly 23% of global energy-related CO₂ emissions in 2019, with emissions continuing to rise. The findings of the ICCT study further highlight that with renewable energy, these vehicles can achieve up to 83% lower lifetime GHG emissions compared to diesel HDVs, underscoring the potential of electric HDVs in reducing the transport sector's carbon footprint.

"Our analysis shows that accelerating the transition to renewables could unlock even bigger emissions cuts from electric trucks and buses. The good news is that India is already making strides in this direction, with ambitious renewable energy targets and new policies to drive EV adoption," said Amit Bhatt, India managing director, ICCT. The majority of HDVs in India are diesel-powered, at 6,552,729 vehicles, reflecting the dominance of diesel in the sector. Compressed natural gas (CNG)

vehicles account for 88,209 units, while dual diesel/CNG vehicles are limited to 51, and diesel hybrid vehicles are 267, as per April 2024 data by the ministry of road transport and highways (MoRTH) Vahan dashboard.

The EV segment is emerging, with 8,422 battery-operated vehicles and 20 pure EVs. Ethanol-powered vehicles are at 26, and there are 12 fuel cell hydrogen vehicles, the Vahan data showed. "Battery EVs produced in India in 2023 exhibit up to 29% lower life-cycle emissions than their diesel counterparts, even with the current grid mix. These results make a powerful case that battery electric technology should be at the centre of India's strategy to decarbonise its HDV sector," said Bhatt. Meanwhile, petrol vehicles, numbering 19,536 (petrol is not preferred in heavy-duty vehicles), with additional combinations of petrol-CNG (397), petrol-hybrid (2), and petrol-LPG (417). This diverse mix indicates a growing shift towards cleaner fuels, albeit in the nascent stages. GHG emissions reduction scenario for HDVs by 2030

The ICCT study modelled future changes in India's electricity grid using projections from the International Energy Agency (IEA) scenarios. Under the Stated Policies Scenario (STEPS), the coal share in the grid decreases from 70% in 2021 to 55% by 2030. It also considered IEA's more ambitious scenario, the Sustainable Development Scenario (SDS), which projects a reduction in coal share to 30% by 2030 and just 5% by 2040. In addition to these grid projections, a third scenario was considered where battery EVs are powered entirely by renewable electricity. "By calculating annual electricity consumption based on vehicle efficiency and distance travelled, we estimated the total upstream GHG emissions from charging, reflecting the impact of different electricity grid compositions on battery-EV emissions over their lifetime," said Yadav. Of the three vehicle types, an example compares the life-cycle GHG emissions of a 55-tonne tractor-trailer entering the fleet in India in 2023 versus 2030, across the different scenarios of electricity grid composition and categorised by powertrain and fuel type.

In the 2023 scenario for electricity grid composition, a battery EV powered by the grid mix under STEPS results in approximately 1,200 grams of CO₂ equivalent (gCO₂e) per kilometre. Under the SDS scenario, emissions are reduced to around 900 gCO₂e per kilometre. However, with renewable energy, they drop significantly to roughly 200 gCO₂e per kilometre. "By 2030, advancements in vehicle technologies are expected to improve fuel efficiency, leading to about 5% lower GHG emissions for diesel HDVs compared to 2023 models. Battery EVs will also benefit from improvements in battery energy density, resulting in lighter batteries and reduced lifecycle emissions," said Yadav. Meanwhile, for the categorisation under powertrain and fuel type, in the 2023 scenario, diesel vehicles combined with biofuels produce the highest GHG emis-



sions, nearing 1,600 gCO₂e per kilometre, while LNG and biogas vehicles reach approximately 1,800 gCO₂e per kilometre. Battery EVs using the 2023-2037 grid mix show significant reductions at around 1,200 gCO₂e per kilometre, with further reductions to 200 gCO₂e per kilometre when powered entirely by renewables. In the 2030 scenario, diesel vehicles with biofuels drop to around 1,200 gCO₂e per kilometre, LNG and biogas vehicles fall to about 1,400 gCO₂e per kilometre, and battery EVs using the 2030-2040 grid mix drop to around 900 gCO₂e per kilometre. With renewable energy, emissions for these EVs again reach the lowest level, around 200 gCO₂e per kilometre. Yadav added that the decarbonisation of India's electricity grid will significantly reduce the GHG emissions of battery EVs. "By 2030, decreased coal usage and increased renewable energy are projected to lower emissions, making battery EVs entering service in 2030 estimated to have 32% lower life-cycle GHG emissions than in 2023," he said. Electrifying HDVs: A pathway to India's climate goals. Electrification of the HDV sector plays a crucial role in helping India achieve its climate commitments.

According to ICCT, heavy-duty vehicles currently contribute to about 58% of the on-road emissions of India's transport sector. "As demand for HDVs continues to rise, GHG emissions from HDVs are pro-

jected to nearly double by 2050," said Yadav. This trajectory, however, poses a significant challenge to India's climate goals. "Such trajectories are incompatible with India's commitment to a 45% emission reduction by 2030 and net-zero emissions by 2070," Yadav said. Previous ICCT studies have demonstrated that diesel powertrains are insufficient to meet these ambitious targets. "With the current study, we find that electrification provides a clear pathway to net-zero as well as towards energy independence by 2047," Yadav added. "We find that by 100% electrifying HDVs by 2045, India can meet the sub-2-degree commitment under the Paris Agreement," he added. Earlier this month, the ministry of heavy industries (MHI) announced the development of an inclusive EV roadmap. As a part of this, the MHI established an EV task force, with the ICCT leading efforts, along with industry bodies related to electric trucks and supporting infrastructure in India. "With the knowledge and expertise of industry bodies, our goal is to engage stakeholders through workshops and meetings, ensuring that the adoption of electric trucks and the necessary infrastructure development are strategically aligned with the nation's sustainability goals, and in line with the Indian government's vision of Viksit Bharat," said a senior official from the MHI, requesting anonymity.

University of Hyderabad ranked among the top 12 percent universities in the world

Hyderabad: The University of Hyderabad (UoH) has been ranked among the top 12% universities in the world for international students. It is among the best ranked university from India in the World Best Value University Rankings 2024 for International Students. The University Database Lead at Study Abroad Aide is the world's most comprehensive database of universities, encompassing over 8,000 institutions — including 3,349 institutions in Asia. After evaluating 3,349 higher educational institutions in 20 Asian countries,

Study Abroad Aide has placed the University of Hyderabad in the top 12% of universities in Asia. (<https://studyabroadaide.com/institutions/university-of-hyderabad>). The Study Abroad Aide (SAA) World Rankings for Best Value Universities for International Students features universities across 69 countries and ranked based on two metrics — affordability and academic reputation. UoH Vice-Chancellor, Prof. B J Rao, said affordability and quality of education has been the positive outcomes for the university.