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**MK Yadav Sir**

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# Supreme Court upholds NFRA's retrospective investigative powers

The apex court's dismissal of appeals by auditors affirms NFRA's jurisdiction over pre-2018 business audits

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**T**he question of the National Financial Reporting Authority's (NFRA's) investigative powers over statutory audits of businesses done prior to the watchdog's creation in 2018 is finally getting settled.

The Supreme Court in March and then in May dismissed two appeals against a tribunal order that upheld the audit watchdog's retrospective powers over audits, shored court orders seen by Mint.

According to an assessment by the NFRA, this development has reinforced the watchdog's jurisdiction including for the period before its creation in October 2018, a person with knowledge of the regulator's view said.

This assessment is based on a fundamental principle of law called the 'doctrine of merger', which implies that only one operative order can govern a particular subject matter at any given time.

This doctrine also seeks to preserve the hierarchical structure of courts and tribunals.



The SC in March and then in May dismissed two appeals against a tribunal order that upheld the audit watchdog's retrospective powers over audits.

The National Company Law Appellate Tribunal had on 1 December 2023 held that the NFRA has "clear and required retrospective jurisdiction over alleged offences by delinquent Chartered Accountants

the disciplinary orders issued by the NFRA for alleged lapses, leading to the tribunal order upholding the regulator's retrospective powers. Two of the branch auditors then appealed against the tribunal order,

## BOOST FOR NFRA

**THIS** move has reinforced NFRA's jurisdiction including for the period before its creation.

**THE** assessment is based on a key principle of law called the 'doctrine of merger', which implies that only one operative order can govern a particular subject matter at any given time.

**CLARITY** on retrospective jurisdiction of the NFRA comes as a big boost to its authority.

**EXPERTS** said that as per the 'doctrine of merger', when a higher court reviews a case and issues a decision, the order of the lower court merges into the higher court's judgment.

**THIS** principle ensures that the final decision from the higher court takes precedence, and the lower court's decision no longer stands independently.

**ESSENTIALLY**, it affirms the authority of the higher court's ruling as the definitive judgment on the matter.

**SOMAN CHANDWANI**, managing partner at law firm RS Legal & Associates, said, without referring to this specific case.

**THIS** doctrine prevents conflicting rulings and upholds the higher court's interpretation and application of the law as the ultimate resolution, said Chandwani.

**IN** practical terms, when a higher court, such as the Supreme Court, either decides on a case or chooses not to intervene in a lower court's decision, it effectively endorses that decision. This endorsement solidifies the lower court's ruling as the final legal outcome, preventing further legal disputes on the same issue within the lower courts, said Chandwani.

**ONE** of the branch auditors who had contested the NFRA's disciplinary order said in response to an emailed query from Mint that the decision of the Supreme Court not to interfere with the order of the NCLAT, as things stand now, brings finality to the proceedings initiated by NFRA against five branch auditors of DHFL.

**HOWEVER**, this has no meaning that the law on NFRA has been settled, said the auditor, who spoke on condition of not being named. He said that the NCLAT's power is restricted to deciding on issues raised in an appeal, testing whether law was applied correctly or not, with the assumption that the law is correct.

October 2018. It also ensures that there is no regulatory vacuum in the country's oversight of the corporate and the financial sectors.

"When an appeal or revision is lodged against a decision by a lower court, tribunal, or authority, and the higher forum modifies, reverses, or affirms the decision under scrutiny, the decision of the lower forum becomes absorbed into the decision of the higher forum. As a result, the decision of the higher forum becomes the operative and enforceable one in the eyes of the law," said the person.

The apex court's orders on 22 March and 17 May saying there is no reason to interfere with the NCLAT order, "underscores NFRA's authority, including retrospective jurisdiction, in matters of financial reporting standards and norms," the first person quoted above said.

It also applies to the tribunal's order on other issues in the same order—for example, clarifying that the standards of audits notified by government are mandatory and not advisory or a guidance note to auditors, the person said.

Experts said that as per the 'doctrine of merger', when a higher court reviews a case and issues a decision, the order of the lower court merges into the higher court's judgment.

This principle ensures that the final decision from the higher court takes precedence, and the lower court's decision no longer stands

independently. Essentially, it affirms the authority of the higher court's ruling as the definitive judgment on the matter," Sonam Chandwani, managing partner at law firm RS Legal & Associates, said, without referring to this specific case.

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## NATIONAL FINANCIAL REPORTING AUTHORITY (Syllabus: GS Paper 3 – Economy)

**Context:** The Supreme Court has dismissed two appeals challenging the National Financial Reporting Authority's (NFRA's) retrospective investigative powers over statutory audits conducted before its establishment in 2018, settling the question of the watchdog's jurisdiction.

### National Financial Reporting Authority (NFRA)

- **About:** NFRA has actively collaborated with the Corporate Data Management (CDM) division of the Ministry of Corporate Affairs (MCA) and three recognized stock exchanges in India.
- **Headquarters:** New Delhi
- **Constitution:** NFRA was established in 2018 by the Government of India under section 132(1) of the Companies Act, 2013, serving as an audit regulator.
- **Objective:** To continuously improve the quality of all corporate financial reporting in India.
- **Background and Establishment:** The decision to form NFRA was prompted by concerns over the role of auditors and the Institute of Chartered Accountants of India in various corporate scandals, including the one at Punjab National Bank.
- **Composition:** NFRA comprises a chairperson, appointed by the Central Government, who must be a person of eminence and possess expertise in accountancy, auditing, finance, or law. Additionally, it includes up to 15 other members.
- **Powers of NFRA**
  - **Investigation Scope:** NFRA can investigate Public Interest Entities, including listed companies, large unlisted public companies, insurance companies, banking companies, and those engaged in electricity generation or supply.
  - **Penalty Imposition:** In cases of professional misconduct, NFRA has the power to impose penalties ranging from one lakh rupees to five times the fees received for individuals and ten lakh rupees to ten times the fees received for firms.

# An overview of Europe's AI convention

What is the scope of the Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law? What is the difference between a framework convention and a protocol? How does the convention address national security concerns?

## EXPLAINER

Krishna Ravi Srinivas

**The story so far**  
The global governance of Artificial Intelligence (AI) is becoming more complex even as countries try to govern AI within their borders in various ways, ranging from acts of law to executive orders. Many experts have articulated a global treaty to this effect, but the obstacles in its path are daunting.

**What is Europe's AI convention?**  
Although there are many ethical guidelines, 'soft law' tools, and governance principles enshrined in many documents, none of them are binding or are likely to result in a global treaty. There is also no ongoing negotiation for an AI treaty at the global level anywhere. Against this background, the Council of Europe (CoE) took a big step by adopting the Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law, also known as the 'AI convention', on May 17. The CoE is an intergovernmental organisation formed in 1948, with currently 46 members. The agreement is a comprehensive convention covering AI governance and links to human rights, democracy, and the responsible use of AI. The framework convention will be opened for signature on September 5.

**What is a framework convention?**  
A 'framework convention' is a legally binding treaty that specifies the broader commitments and objectives under the convention, and sets mechanisms to achieve them. The task of setting specific targets is left to subsequent agreements. Those agreements that are negotiated at AI governance in the U.S. as well, which matters because the country is currently a hotbed of AI innovation.



ISTOCKPHOTO

protocol under it that deals with living modified organisms.

The framework convention approach is useful because it allows flexibility even as it encodes the core principles and processes by which the objectives are to be realised. Parties to the convention have the discretion to decide the ways in which to achieve the objectives, depending on their capacities and priorities. The AI convention can catalyse the negotiation of similar conventions at the regional level in other places. Then again, as the U.S. is also a member of the CoE, the convention can indirectly affect AI governance in the U.S. as well, which matters because the country is currently a hotbed of AI innovation.

**What is the scope of the convention?**  
Article 1 of the convention states: "The provisions of this Convention aim to ensure that activities within the lifecycle of artificial intelligence systems are fully consistent with human rights, democracy and the rule of law".

Article 3 states: "The scope of this Convention covers the activities within the lifecycle of artificial intelligence systems that have the potential to interfere with human rights, democracy, and the rule of law as follows: a. Each Party shall apply this Convention to activities within the lifecycle of artificial intelligence systems undertaken by public authorities or private actors acting on their behalf; b. Each Party shall address risks and challenges arising from activities within the lifecycle of artificial intelligence systems by private actors... in a manner conforming with the object and purpose of this Convention."

**Does it address national security?**  
The exemptions in Articles 3.2, 3.3, and 3.4 are broad and pertain to the protection of national security interests, research, development and testing, and national defence, respectively. As a result, military applications of AI are not covered by the AI convention. While this is a matter of concern, it's a pragmatic move given the lack of consensus on regulating such applications. In fact, the exemptions by Articles 3.2 and 3.3 – while broad – don't completely rule out the convention's applicability vis-à-vis national security and testing, respectively.

Finally, the 'General Obligations' in the convention pertain to the protection of human rights (Article 4), the integrity of democratic processes, and respect for the rule of law (Article 5). While disinformation and deep fakes haven't been addressed specifically, parties to the convention are expected to take steps against them under Article 5. In fact, the convention indicates (in Article 22) that parties can go beyond the commitments and obligations specified.

**Why do we need the AI convention?**  
The AI convention doesn't create new and/or substantive human rights specific to AI. Instead, it asserts that existing human and fundamental rights that are protected by international and national laws will need to stay protected during the application of AI systems as well. The obligations are primarily directed towards governments, which are expected to install effective remedies (Article 14) and procedural safeguards (Article 16). In all, the convention takes a comprehensive approach to mitigating risks from the use of AI systems for human rights and democracy. There are bound to be challenges to implementing it, particularly at a time when AI regulation regimes are yet to be fully established and the technology continues to outpace policy.

Krishna Ravi Srinivas is Adjunct Professor of Law, NALSAR University of Law, Hyderabad, and Associate Faculty, Fellow, CeRIA, IIT Madras.

## THE GIST

▼ The Council of Europe (CoE) took a big step by adopting the Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law, also known as the 'AI convention', on May 17.

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## EUROPE'S AI CONVENTION (Syllabus GS Paper 3 – Sci and Tech)

**Context:** Recently, the complexity of global AI governance has intensified, with countries implementing diverse approaches within their borders, from legislative acts to executive directives, despite calls from experts, including the Pope, for a global treaty, hindered by formidable obstacles.

## Europe's AI Convention

- **About:** It is a significant step towards regulating artificial intelligence within the framework of human rights, democracy, and the rule of law.
- **Lack of Binding Agreements:** Despite various ethical guidelines and soft law tools, there's a notable absence of binding agreements or global treaties concerning AI governance.
- **Role of the Council of Europe:** It is an intergovernmental organization with 46 member states, including the Holy See, Japan, the U.S., and EU countries, played a pivotal role in adopting the Framework Convention on Artificial Intelligence and Human Rights, Democracy, and the Rule of Law.
- **Nature of the Agreement:** The AI convention is a comprehensive framework covering various aspects of AI governance, with a strong emphasis on respecting human rights, fostering democracy, and promoting the responsible use of AI.
- **Significance of the Agreement:** The adoption of the AI convention marks a significant milestone in the global efforts to regulate AI technologies, providing a model for other regions to follow in addressing ethical concerns and governance principles.

# WIPO Meeting 2024: New treaty on genetic resources and associated traditional knowledge in place

**Context:** The Treaty on Intellectual Property, Genetic Resources, and Traditional Knowledge was recently adopted at the Diplomatic Conference under the World Intellectual Property Organization (WIPO) in Geneva.

## WIPO Treaty on Intellectual Property, Genetic Resources, and Traditional Knowledge

- **About:** Under the treaty, it will be mandatory for patent applicants to disclose country of origin or source of genetic resources if the claimed invention is based on those materials or associated traditional knowledge.
  - The treaty will provide additional protection for Indian genetic resources and traditional knowledge. Although these are currently protected within India, they are prone to misappropriation in countries, which do not have disclosure obligations.
- **Significance:** It is a win for countries of the global South and for India, which is a mega biodiversity hotspot with abundance of traditional knowledge, and wisdom.
  - This is the 27th treaty under WIPO and the first in the last 10 years.
- **Importance to India:** The treaty is important to India as the country holds 7-8 percent of global biodiversity and a rich repertoire of knowledge based on these genetic resources.
  - The treaty marks a big win for India and the global south, which has long been proponents of this instrument.
- **Protection for Indian Resources:** This will offer added protection to Indian genetic resources and traditional knowledge, which, while currently protected in India, are prone to misappropriation in countries that do not have disclosure obligations.
- **Current State of Disclosure Obligations:** At present, only 35 countries have some form of disclosure obligations, most of which are not mandatory and lack appropriate sanctions or remedies for effective implementation.

## World Intellectual Property Organization (WIPO)

- **About:** It is the global forum for intellectual property (IP) services, policy, information, and cooperation.
- **Formation:** 1967.
- **Funding:** It is a self-funding agency of the United Nations. It is one of the 15 specialized agencies of the United Nations (UN).
- **Members:** 193 members.
- **Headquarters:** Geneva, Switzerland.
- **Mission:** To lead the development of a balanced and effective international IP system that enables innovation and creativity for the benefit of all.

# What is the current status with respect to spice exports?

Why is Ethylene Oxide used for sterilisation of Indian spices? What is the method that the EU prefers?

**M. Soundariya Preetha**

**The story so far:**

Last month, Hong Kong and Singapore recalled certain spice mix products of the MDH and Everest Group allegedly over the presence of a higher than prescribed level of the sterilising agent Ethylene Oxide (ETO). The Indian authorities have now initiated several measures to ensure that Indian spices comply with food safety standards of the importing countries.

**Where does contamination occur?**

Ganeshan Varadarajan, promoter of Lifespace, says that India does not use ETO as a pesticide but only as a sterilising agent to reduce microbial load in finished (spice) goods. Most of the agro products, including spices, are heaped in *mandies* (auction yards for farmers) where they are contaminated by human, bird, reptile and insect contact. Many of the large factories receive material from the *mandies*, which is then fed on automated lines. It leaves

them with high microbial levels and forces them to opt for ETO sterilisation. However, the contamination levels can be reduced early through the processes adopted for value addition. Consumers should start looking at the quality of products and not just the price, he says.

**How big are Indian spice exports?**

A quick export estimate data available with the Spices Board India shows that India enjoys a significant share in the global market for spices and spice products. In 2023-2024, India exported spices worth \$4.4 billion (nearly 14 lakh tonnes), which is 12.3% higher than the financial year 2022-2023. Data shared by the United Planters Association of Southern India reveals that chilli, spice oils and oleoresins, curry powder and paste, cumin, mint products, cardamom and pepper are some of the largest exported spices and spice products in the financial year 2022-2023. In terms of production, garlic, ginger and chilli were the top three spices produced in FY23.

China, Bangladesh, west Asian countries and the U.S. are important markets for Indian spices.

**What has been impact of the recall?**

An office bearer of the Federation of Indian Spice Stakeholders pointed out that Singapore and Hong Kong had not banned the Indian products, but only recalled them. Exports have resumed to these countries and hence there may not be much impact in the coming months because of this issue. India's share in total spice production globally is about 70%.

Countries have different standards for ETO and maximum (pesticide) residue levels (MRL). The European Union has stringent norms for both ETO and MRLs while Japan largely sources only organic products. The industry has been talking to the Indian government demanding discussions with the EU to relax the norms in order to boost Indian spice exports to the EU market.

A section of chilli growers in Telangana said the issue is not likely to affect farmers

**Context:** Hong Kong and Singapore have recalled spice mix products from the MDH and Everest Group due to elevated levels of Ethylene Oxide (ETO). Indian authorities are taking steps to align Indian spice exports with international food safety regulations.

## Spice Sector in India

### Government Initiatives to Promote Spices

- **Export Development and Promotion of Spices:** The initiative aims to assist exporters in adopting advanced processing technologies to meet evolving food safety standards of importing countries.
- **Spices Board of India:** It is dedicated to the global promotion and development of Indian spices, serving as a vital link between exporters and importers.
- **Spices Parks:** Eight crop-specific Spices Parks have been launched to aid farmers in achieving better price realizations and broader market access.
- **Codex Committee on Spices and Culinary Herbs (CCSCH):** It operates as a subsidiary body of the Codex Alimentarius Commission, ensuring international food standards under the joint initiative of FAO and WHO.

- **Global Spice Market:** India's spice exports in 2023-2024 amounted to \$4.4 billion, representing nearly 14 lakh tonnes, a 12.3% increase from the previous financial year.
- **Leading Exported Spices:** Chilli, spice oils and oleoresins, curry powder and paste, cumin, mint products, cardamom, and pepper were among the top exported spices and spice products in 2022-2023.
- **Top Spice Producers:** Garlic, ginger, and chilli were the top three spices produced in India in the financial year 2022-2023.
  - India holds the title of the world's largest spice producer, consumer, and exporter.
- **Spice-Producing States:** Madhya Pradesh, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Maharashtra, Assam, Orissa, Uttar Pradesh, West Bengal, Tamil Nadu, and Kerala are among the largest spice-producing states in India.
- **Important Export Markets:** China, Bangladesh, West Asian countries, and the United States serve as significant markets for Indian spices.

## LVM3 commercialisation a big step at right time: Experts

ANONNA DUTT  
New Delhi, May 26

ISRO'S RECENT INVITATION to private firms to build India's heaviest rocket is a long-awaited step to ensure greater participation of the private sector in the country's space programme. And it will help India emerge stronger in the international space market amid a rapidly increasing demand for satellite launches, according to experts.

Earlier this month, Isro's commercial arm, New Space India (NSI), invited applications from private firms for "end-to-end" manufacturing of Launch Vehicle Mark-III or LVM3, the rocket that was used in the Chandrayaan-2 and Chandrayaan-3 lunar missions.

Previously called GSLV-MkIII, the LVM3 is Isro's most powerful rocket so far. It can carry up to 4-tonne satellites into the geostationary orbit

and up to 8-tonne satellites into the lower earth orbits.

According to the offer, Isro's plan is to have a 14-year collaboration with the selected private entity. The first two years would be the "development phase" for transfer of technology and know-how and then, over the next 12 years, it is envisaged that the private partner would be able to build four to six LVM3 rockets each year.

"With the commercialisation of LVM3, Indian compa-



nies will now have a wider array of launch vehicles to offer in the global market. It will

increase the country's share in the global market," Lieutenant General Anil Kumar Bhat

(ret), director general, Indian Space Association, said. And Lt Gen Bhat added, it will allow Isro to focus on the NGV (Next Generation Launch Vehicle), a much bigger launch vehicle being developed as part of India's vision to set up its own space station and send an Indian to the Moon.

Since 2014 when Isro validated the LVM3 technology, only seven flights have taken place, including the ones that took the Chandrayaan mis-

sions. The rocket made two flights in a year for the first time in 2023.

NSI's invitation notes that the global launch service market assessments indicate "substantial demand" for launching communication satellites in the geostationary orbits and satellites for mega constellations in the lower orbits.

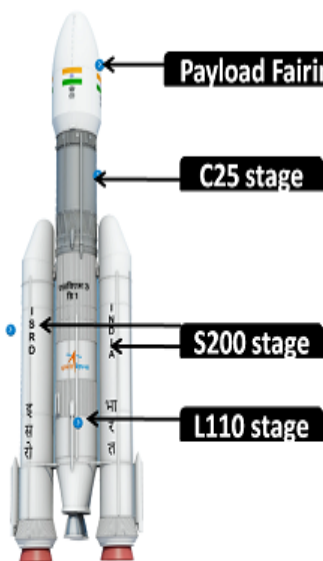
Also at Isro, assistant general manager of IIFCL, a government-owned project advisory company which has

assisted NSI in finalising the commercialisation procedures, said the decision to allow private manufacturing of LVM3 has come at a "very opportune moment".

"As of now, Falcon 9 of SpaceX is the only significant launch vehicle taking heavy payloads to space... This is a very opportune moment for India to grab some space for LVM3. There is a growing market for satellites in the lower earth orbits as well," Isro said.

**Context:** Experts assert that the commercialisation of LVM3 marks a significant advancement for India, arriving at an opportune moment.

## LVM3(Launch Vehicle Mk III)



Introduction

GSLV Mk III or LVM Objectives

Vehicle Specifications for the LVM Mk III

Technical Specification for LVM Mk III

Launch of LVM Mk III

## Launch Vehicle Mark-III

- **About:** It is ISRO's most powerful rocket so far. It can carry up to 4-tonne satellites into the geostationary orbit and up to 8-tonne satellites into the lower earth orbits.
  - It was used in the Chandrayaan-2 and Chandrayaan-3 lunar missions.
- **Previously called:** GSLV-MkIII
- **Stages:** LVM3 is configured as a three stage vehicle with two solid strap-on motors (S200), one liquid core stage (L110) and a high thrust cryogenic upper stage (C25).
- **Height:** 43.5 m
- **Lift Off Mass:** 640 tonnes
- **Payload to GTO:** LVM3 will be capable of placing the 4 tonne class satellites of the GSAT series into Geosynchronous Transfer Orbits.
- **Payload to LEO (Low Earth Orbit) :** 8,000 kg
  - The powerful cryogenic stage of LVM3 enables it to place heavy payloads into Low Earth Orbits of 600 km altitude.
- **Some of the LVM 3 Missions**
  - GSAT-29 Mission
  - GSAT-19 Mission
  - CARE Mission
  - OneWeb India-2 Mission
  - OneWeb India-1 Mission
  - Chandrayaan-2 Mission & Chandrayaan-3 Mission

## SEBI's green reporting mechanism vital but needs to be more consistent, rigorous: CSE suggests steps to enhance system

**Context:** Delhi-based think tank Centre for Science and Environment (CSE) welcomed the Business Responsibility and Sustainability Reporting (BRSR) initiative to increase corporate transparency but identified significant gaps in the current reporting practices.

### Business Responsibility and Sustainability Reporting (BRSR) Initiative

- **About:** BRSR mandates the top 1000 listed companies to disclose their performance on Environmental, social, and corporate governance (ESG) parameters, showcasing their dedication to responsible business practices.
- **Developed by:** Securities and Exchange Board in India (SEBI)
- **Objective:** To mandate Indian companies to provide quantifiable metrics on sustainability-related factors, such as respect for human rights or environmental protection.
- **Evolution to BRSR:** The new BRSR, in effect since 2023, is more closely aligned with globally accepted reporting frameworks like the GRI and TCFD.
- **Core Categories:**
  - **Environmental Protection:** Key performance indicators cover electricity consumption, water usage, and air emissions.
  - **Human Rights:** Focus on human rights violations and minimum and fair wages.
  - **Integrity:** Performance indicators include anti-corruption, anti-bribery, and conflicts of interest policies.
  - **Employee Well-being:** Metrics focused on parental benefits, employee accessibility, and the percentage of unionized workers.
  - **Inclusive Growth:** Policies favoring vulnerable and marginalized groups.
  - **Sustainable Goods and Services:** Information on investments in social and environmental impacts.
  - **Responsible Consumer Engagement:** KPIs encompass handling consumer complaints and feedback, product recall procedures, and cybersecurity and data privacy policies.
  - **Stakeholder Responsiveness:** Describing engagement with vulnerable and marginalized groups.
  - **Responsible Public Policy Engagement:** Listing trade and industry affiliations and detailing issues relating to anticompetitive conduct.

### Landslide buries 150+ homes in PNG, 670+ feared dead: UN

**Sydney:** More than 670 people are assumed to have died in Papua New Guinea's massive landslide, the UN migration agency estimated on Sunday as rescue efforts continued.

Media in the South Pacific nation north of Australia had previously estimated Friday's landslide had buried more than 300 people. But more than 48 hours later the International Organization for Migration (IOM) said the death toll may be more than double that, as the full extent of the destruction is still unclear and continuing dangerous conditions on the ground are hampering aid and rescue efforts. Only five bodies had been retrieved from the rubble so far.

The agency based its death toll estimates on information provided by officials at Yambali Village in the Enga province, who say more than 150 houses were buried in Friday's landslide. Serhan Aktoprak, the chief of the agency's mission in Papua New Guinea said in an email statement.

"Land is still sliding, rocks are falling, ground soil is cracking due to constant increased pressure and ground water is running thus the area is posing an extreme risk for everyone," Aktoprak said. More than 250 houses nearby have been abandoned by the inhabitants, who had taken temporary shelter with their relatives and friends, and some 1,250 people have been displaced, the agency said. "People are using



People digging at the landslide site of Yambali Village in Papua New Guinea's Enga Province

ties would be children of 15 years or younger.

Social media footage posted by villagers and local media teams show people clambering over rocks, uprooted trees and mounds of dirt searching for survivors. Women could be heard weeping in the background.

The landslide hit a section of highway near the Porgera gold mine, operated by Barrick Gold through Barrick Niugini Ltd, its joint venture with China's Zijin Mining. The Porgera Highway remains blocked, IOM said, and the only way to reach the Porgera Gold Mine and other localities cut off from the rest of Enga Province is via helicopter. The geographic remoteness and the tough, hilly terrain is slowing rescue and aid efforts. REUTERS

digging sticks, spades, large agricultural forks to remove the bodies buried under the soil," Aktoprak said.

The IOM said an elementary school, small businesses and stalls, a guesthouse, and a petrol station were also buried. The UN's Papua New Guinea office said five bodies were retrieved from an area where 50 to 60 homes had been destroyed, and a number of injured reported, including at least 20 women and children. IOM said the community in this village was relatively young and it's feared that the most fatali-

### Papua New Guinea

- **Located:** Situated in the southwestern Pacific and encompasses the eastern half of New Guinea, the **world's second-largest island**, along with numerous smaller offshore islands.
- **Boundaries:** It shares its borders with Indonesia to the west, Australia to the south, and the Solomon Islands to the southeast.

**Context:** As rescue efforts persist, the UN migration agency recently estimated that over 670 people may have perished in Papua New Guinea's extensive landslide.

### Landslide

- **Meaning:** Landslides are natural disasters occurring mainly in mountainous terrains where there are conducive conditions of soil, rock, geology and slope.
  - A sudden movement of rock, boulders, earth or debris down a slope is termed as a landslide.
- **Factors behind landslide:**
  - **Natural factors:** Heavy rainfall, earthquakes, snow melting and undercutting of slopes due to flooding.
  - **Anthropogenic factors:** Excavation, cutting of hills and trees, excessive infrastructure development, and overgrazing by cattle.
  - **Other factors:** Lithology, geological structures like faults, hill slopes, drainage, geomorphology, land use and land cover, soil texture and depth, and weathering of rocks.
- **Classification:** Landslides are broadly classified based on:
  - **Type of materials involved:** Rock, debris, soil, loose mud),
  - **Type of movement of the material:** Fall, topple, slide, rotational slide or translational slide, and
  - **Type of flow** of the material.
  - Another category is of landslides **that spread laterally**.
- **Impacts:** Threat to human and animal lives, damaging property, roads and bridges, disrupting communication lines and snapping power lines etc.

# India in talks with Sri Lanka to acquire graphite mine block

**Context:** India is in talks with Sri Lanka to acquire a **graphite mine block in the island nation**, pushing ahead with its plan to forge global alliances to secure critical mineral supplies.

## Graphite

- **About:** It is an opaque, non-metallic carbon polymorph that appears blackish silver in color and varies from metallic to dull in sheen. It's colloquially known as black lead or plumbago due to its resemblance to metal lead.
- **Formation:** Graphite forms through the metamorphosis of sediments containing carbonaceous material.
- **Molecular Structure:** Graphite consists of a ring of six carbon atoms closely bonded together hexagonally in widely spaced layers.
- **Properties:** Naturally occurring and stable form of crystalline carbon.
- **Texture and Density:** Extremely soft, cleaving with light pressure, and with a very low specific gravity.
- **Thermal and Chemical Resistance:** Highly resistant to heat and nearly inert when in contact with most other materials.
- **Global Presence:** Graphite is extensively mined globally, with significant operations in China, India, Brazil, North Korea, and Canada.
- **In India:** Arunachal Pradesh accounts for 36% of the total resources which is followed by Jammu & Kashmir (29%), Jharkhand (9%) Madhya Pradesh (5%) Odisha (9%), and Tamil Nadu (4%).
- **Applications:**
  - **Utility:** Graphite finds application in various industries, including metallurgy and manufacturing.
  - **Specific Uses:** Widely used in pencils, lubricants, crucibles, foundry facings, polishes, arc lamps, batteries, brushes for electric motors, and in cores of nuclear reactors.

# Nasa launches sat to better climate change prediction

**Context:** NASA successfully launched the first of a pair of small climate satellites PREFIRE from the **Rocket Lab's Launch Complex 1** in Mahia, New Zealand.

## **PREFIRE Mission**

- **About:** PREFIRE (Polar Radiant Energy in the Far-InfraRed Experiment) is a mission aimed at studying heat emissions at the Earth's poles to understand their role in global climate change.
  - It will fill the gaps in knowledge of two of the most remote regions on Earth — the Arctic and Antarctic — and how it is shedding heat upward into space.
  - The PREFIRE CubeSats are expected to significantly enhance our understanding of Earth's energy budget and its implications for climate change.
- **Objectives:** To reveal the full spectrum of heat loss from Earth's polar regions for the first time, making climate models more accurate.
- **CubeSat Configuration:** It comprises two shoebox-sized CubeSats, each equipped with a sophisticated thermal infrared spectrometer.
- **Measurement Capabilities:** These CubeSats are capable of measuring far-infrared radiation emitted by the Earth's coldest and most remote regions.
- **Goals:** Scientists aim to collect crucial data to better predict the impact of climate change on sea ice loss, ice sheet melt, and sea-level rise.
- **NASA's Perspective:** According to NASA, PREFIRE will provide a detailed understanding of how Earth's polar regions influence the planet's energy absorption and release.

## Why multiple chatbots are better than one

BY SHELLEY SINGH

Now that users are getting comfortable with AI models and chatbots, the next step is to improve user experience. But how? The answer lies in using many specialist bots, rather than getting one to do all the jobs — from banking to customer care to teaching. *Mint* explains.



**1 What are multiple virtual agents?**  
Systems that rely on more than one chatbot or use multiple Large Language Models (LLMs) are called multi-agent systems (MAS). A chatbot on the website of a bank, auto, insurance, edtech or any other company has improved over the years, thanks to advances in AI and natural language processing. But it still falls short of answering questions that might require more 'human-like' capabilities or pulling data from different domains. The solution lies in using multiple bots or more than one AI (artificial intelligence) model — each with a different, specialised capability, and complementing each other to deliver a better response.

**2 How are they better than a single AI model?**  
Companies and users are getting better at deploying and interacting with virtual agents. Open AI's release of an upgraded GPT-4 offers improved handling of text, vision and audio, boosts AI capabilities, and opens up new possibilities. Just as teams of humans are better in tackling complex problems, more than one chatbot will improve customer interactions. So, a Hindi language chatbot could combine with a math teaching bot and deliver math lessons in Hindi. Each is a separate LLM (which helps chatbots understand human input and offer answers) and is better at executing specialist tasks.

**3 What will be the impact of having multiple bots?**  
If a chatbot gets stuck, the query is usually escalated to a human agent. Merging capabilities of multiple bots or making different bots work together is the way out. Microsoft, Meta, Google, Tokyo-based Sakura and others are trying multiple bots. A single bot can break down the task and give an answer but it may lag in response time and lack accuracy.

**4 So, will we have teams of bots?**  
That's the future. As machines get better with more computational power and ability to comprehend context and emotions, there will be many specialised bots. Some will take care of FAQs; others will offer deeper insights on, say, a holiday destination; another could plan the itinerary. But if you can't go on the holiday, and need someone to reschedule plans, it is beyond the capability of a current bot. But in future, even this will be managed by a virtual agent. It could be more than one bot managing such processes.

**5 What are the risks of many chatbots?**  
Trust will be a big issue. The biggest risk is the virtual team messing up the outcome. You may not know your entire mutual fund portfolio and money management to a bunch of bots. Single bots are getting better at customer care: type of responses, like are you service or issuing cheque books. But in other use cases like content generation, there are doubts on accuracy and copyright issues. Even if teams of bots get it right, user acceptance will take longer. After all, it took over a decade to get comfortable with a single bot.

**Context:** As users become more comfortable with AI models and chatbots, the focus shifts to enhancing user experience. Improved functionality and interaction are the next steps in AI development.

### Chatbot

- **About:** Chatbots are computer programs designed to simulate conversation with human users, usually through text-based interfaces like messaging apps or websites.
- **Technology:** They use natural language processing (NLP) and machine learning algorithms to understand and respond to user input in a way that mimics human conversation.
- **Evolution of Chatbots:** A chatbot on the website of a bank, auto, insurance, edtech, or any other company has improved over the years, thanks to advances in AI and natural language processing.
- **Limitations of Single Chatbots:** Despite improvements, a single chatbot still falls short of answering questions that might require more 'human-like' capabilities or pulling data from different domains.
- **Applications:** They are used in a variety of industries, including retail, healthcare, finance, and entertainment, to improve customer service and automate repetitive tasks.
- **Multiple Virtual Agents:** Systems that rely on more than one chatbot or use multiple Large Language Models (LLMs) are called multi-agent systems (MAS).
- **Multi-Agent Systems:** The solution lies in using multiple bots or more than one AI (artificial intelligence) model each with a different, specialized capability, and complementing each other to deliver a better response.

### How are they better than a single AI model?

- **Improved Deployment and Interaction:** Companies and users are becoming more proficient at deploying and engaging with virtual agents.
- **Enhanced AI Capabilities with GPT-4:** OpenAI's release of GPT-4 introduces advancements in text, vision, and audio processing, enhancing AI capabilities.
- **Specialized Task Execution:** Combining chatbots, such as a Hindi language bot with a math teaching bot, enables specialized task execution, like delivering math lessons in Hindi.
- **Specialized Language Models (LLMs):** Each chatbot operates as a distinct Language Model (LLM), aiding in understanding human input and providing tailored responses, thus excelling in executing specialist tasks.

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