

## DAILY CURRENT AFFAIRS (DCA)

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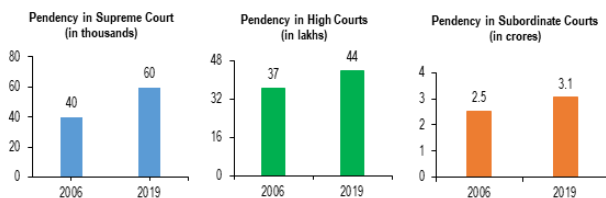
## ISSUE OF PENDENCY OF CASES IN INDIAN JUDICIARY

### Context

- The Supreme Court permitted **High Courts to appoint retired judges on an ad-hoc basis** to address the mounting backlog of cases.

### About

- The Supreme Court first endorsed the appointment of ad-hoc judges in its **2021 ruling in Lok Prahari v. Union of India**.
  - These judges were authorised to hear only criminal appeals as part of a bench led by a sitting judge.
- Backlog:** As of January 2025, High Courts were burdened with a staggering backlog of 62 lakh cases.



- In 2021, the SC noted there have only been **three recorded instances** of ad hoc judges being appointed under Article 224A, calling it a "dormant provision".

### Related Constitutional Provisions

- Article 224A** of the Indian Constitution allows the Chief Justice of a High Court to request retired HC judges to perform the duties of a judge again, with the permission of the **President of India**.
  - Such appointees are entitled to allowances as determined by the President's order and have all the jurisdiction, powers and privileges of a Judge of that High Court.
- Lok Prahari v Union of India (2021):** SC held that ad hoc judges can only be appointed when recommendations have not been made for less than 20% of the vacancies, after considering both the number of active judges and pending proposals for judge appointments.

### Reasons for the Backlog of Cases in Indian Judiciary

- Insufficient Judges:** India has one of the lowest judge-to-population ratios globally.
- Increased Litigation:** The growing number of litigants and cases, coupled with the increasing population and socio-economic complexities, contributes to the rise in the number of cases.
- Delays in the Justice System:** There are delays due to procedural inefficiencies, adjournments,

and delays in filing of evidence, which further prolong case resolutions.

- Lack of Infrastructure:** Many courts, especially in rural areas, are under-equipped and understaffed, making it difficult to handle the growing number of cases efficiently.
- Bureaucratic and Administrative Challenges:** The judicial process can sometimes be slowed down by inefficiencies in the system, including paperwork, administrative delays, and a lack of modernization in court processes.

### How does it impact?

- Delay in Justice:** The backlog results in long delays in cases, and justice is often delayed for years.
- Increased No. of Undertrials:** The number of undertrials (accused awaiting trial) in prisons has increased, prisons are running at an over-capacity of 114%.
- Increased Costs:** The delay in cases causes financial strain on the litigants and the government. It can also result in the erosion of public confidence in the judicial system.
- Overburdened Judges:** Judges are often overburdened with cases, leading to burnout and further delays.

### Efforts to Address the Issue

- Judicial Reforms:** It includes increasing the number of judges, modernizing court infrastructure, and implementing e-courts and technology to speed up hearings.
- Alternate Dispute Resolution (ADR):** ADR mechanisms like arbitration, mediation, and conciliation are being promoted to resolve disputes outside of the traditional court system.
- E-Courts and Technology:** The E-Courts Project has been an important initiative to digitize court proceedings and allow online hearings. This helps in streamlining case management and reducing physical backlogs.
- Fast Track Courts:** Special courts or fast-track courts have been set up to handle specific types of cases like corruption, crimes against women, and long-pending cases to expedite the process.

Source: TH

## CONCERNS RELATED TO CHINA'S DAM PROJECT

### Context

- China's plan to construct the **world's largest** hydropower dam **on the Brahmaputra River**, known as the **Yarlung Tsangpo in Tibet**, has

raised significant concerns among downstream countries, **particularly India and Bangladesh.**

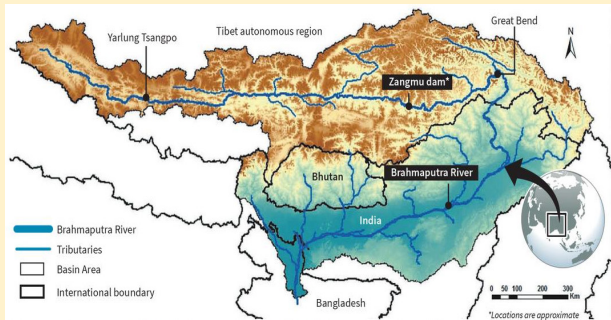
### China's Mega-Dam Project

- **Capacity:** 60 GW (14th Five-Year Plan, for 2021–2025); Three times the capacity of China's current Three Gorges Dam;

**China aims to reduce its reliance on fossil fuels and achieve carbon neutrality by 2060.**

- **Cost:** About \$137 Bn.
- **Location:** At the **Great Bend**, where the **Brahmaputra** river takes a U-turn, in the **Medog county of the Tibetan Autonomous Region.**

China has previously constructed significant dams like the Three Gorges Dam (Yangtze) and Zangmu Dam (Yarlung Zangbo).



### Yarlung Tsangpo (Zangbo) River

- It originates in **Tibet**, and enters Arunachal Pradesh, where it is known as the **Siang**.
- In Assam, it is joined by **tributaries such as Dibang and Lohit**, and is called the **Brahmaputra**.
- The river then enters Bangladesh, and makes its way to the Bay of Bengal.

The main river does not flow through Bhutan, but 96% of the country's area is within the basin.

### Implications of China's Mega-Dam Project

#### Environmental and Ecological Concerns:

- **Altered Water Flow and Sediment Reduction:** River Brahmaputra carries vast amounts of sediment that fertilize downstream agricultural lands.
  - ♦ Chinese dams trap these sediments, **reducing soil fertility and affecting farming communities** in India and Bangladesh.
- **Increased Risk of Flash Floods:** Sudden releases of water from Chinese reservoirs could lead to **devastating floods in Assam and Arunachal Pradesh.**

- ♦ There have been instances in the past where unannounced water discharges led to loss of lives and property.

- **Biodiversity Loss and Habitat Destruction:** River ecosystems, including aquatic species such as the Gangetic dolphin, are under threat due to fluctuating water levels and disrupted breeding cycles.
- **Glacial Melt and Climate Change Effects:** The Tibetan Plateau, often referred to as the **"Third Pole"**, is home to the largest volume of ice outside the Arctic and Antarctic. It plays a critical role in the Earth's cryosphere and influences global climate patterns.
- **Seismic Risks:** The **dam's location in a seismically active and ecologically fragile Himalayan region** raises concerns about potential earthquakes and environmental degradation.
  - ♦ Such a massive infrastructure project could increase the risk of landslides and other geological disasters.

### Geopolitical Ramifications:

- **India's Vulnerability:** India, which relies on the Brahmaputra for agriculture and drinking water, fears that China could use its control over the **river as a strategic weapon**, either by **restricting water flow or causing artificial floods.**
- **Legal and Diplomatic Challenges:** International laws governing transboundary rivers, such as the **UN Convention on the Law of the Non-navigational Uses of International Watercourses (1997)**, emphasize equitable and reasonable utilization of shared water resources.
  - ♦ However, **China is not a signatory to this convention**, allowing it to exercise unchecked control over these rivers.
  - ♦ **China and India** have the **Expert Level Mechanism (ELM) since 2006** for hydrological data sharing, but lack a comprehensive treaty.
- **Conflict with Southeast Asian Nations:** Countries like Vietnam, Cambodia, and Thailand, which depend on the Mekong River, have raised similar concerns over reduced water availability due to China's upstream damming.
- **Economic and Social Impact:** Large dam projects often lead to forced relocation of local communities.
  - ♦ Altered river flows can disrupt irrigation patterns and reduce fish stocks, threatening food security in India and Bangladesh.



### India's Response and Possible Strategies

- **Developing Its Own Water Infrastructure:** India has been **ramping up dam and hydropower projects in Arunachal Pradesh**, like the proposed **Siang Upper Multipurpose Project (SUMP)** to ensure water security and energy generation.
- **Strengthening Diplomacy:** India has been engaging with Bangladesh and other regional stakeholders to form a united front on transboundary water management.
- **Enhancing Satellite Monitoring and Early Warning Systems:** Improved satellite surveillance of Chinese dam activities and better flood prediction models can help mitigate risks.
- **Exploring Legal Avenues:** India could push for regional agreements on water-sharing and seek international arbitration in cases of water disputes.

Source: TH

## DRAFT ADVOCATES (AMENDMENT) BILL, 2025

### In News

- The Government of India is proposing changes to the **Advocates Act, 1961**, to strengthen the legal framework.

### About the Bill

- The original Act, introduced in 1961, regulates the legal profession, ensures client protection, and maintains the discipline of lawyers through the Bar Council of India and State Bar Councils.
  - ♦ Law firms are already regulated as corporate entities, but foreign lawyers have previously not been recognized under the Advocates Act.
- The **Department of Legal Affairs** has prepared the **Advocates (Amendment) Bill, 2025**, along with a tabular statement comparing existing provisions with proposed amendments.
- It would allow foreign law firms and foreign lawyers to enter India.

### Features

- **BCI:** The BCI would be responsible for regulating law firms, including those operating in multiple states.
  - ♦ The central government can override the BCI's regulations if they don't align with the government's rules.

- **Framework for foreign law firms:** The proposed changes could **pave the way for foreign law firms** to operate in India.
  - ♦ This is seen as an effort to create a regulatory framework for them.
- **Nomination of Members:** The central government is proposed to have the power to nominate up to three members to the Bar Council of India, in addition to existing members like the Attorney General and Solicitor General.
- **Section 49B proposes** that the central government can issue directions to the Bar Council of India for carrying out provisions of the Act and its rules.
- **Strikes and Boycotts: It introduces Section 35A which** prohibits lawyers from striking or boycotting work if it disrupts court operations.
  - ♦ Advocates may participate in symbolic or one-day strikes, as long as clients' rights are not affected.
- **Transfer of Bar Council Registration:** Advocates will need to pay a fee to transfer their registration from one state bar council to another, with approval from the BCI.
- **Removal of Advocates for Serious Convictions:** Any advocate convicted of an offense punishable by three or more years of imprisonment will be removed from the state roll, provided the conviction is confirmed by the High Court or Supreme Court.
- **Expanded Definitions:** The definition of a law graduate is expanded to include those who obtain a law degree (Bachelor's in law) from recognized legal education centers or universities approved by the Bar Council of India.
  - ♦ The definition of "legal practitioner" is expanded to include corporate lawyers and those working with foreign law firms.
- **Punishment:** The punishment for practicing law illegally (i.e., by someone not an advocate) is increased from six months to one year of imprisonment and/or a fine of up to 2 lakh.

### Importance and Need

- The government continues to reform the legal profession to make it fair, transparent, and accessible to all.
- The amendments are part of the government's ongoing reform agenda aimed at aligning the legal profession and legal education with global

best practices, improving professional standards, and contributing to a just and equitable society.

Source :IE

## FREEZE ON USAID BY UNITED STATES

### Context

- US President Donald Trump has taken steps to close the United States Agency for International Development (USAID).

### What is USAID?

- The United States Agency for International Development (USAID) is an independent agency of the U.S. government, established in **1961 by President John F. Kennedy**.
- It was created to consolidate various foreign assistance programs under one agency to administer civilian foreign aid and development assistance.
  - USAID receives funding allocated in the U.S. federal budget.
- The top recipient** countries of USAID include: Ukraine, Ethiopia, Jordan, Somalia etc.

### Objectives and Areas of Work

- It operates in over 100 countries**, providing financial aid and technical assistance in key sectors such as:
  - Economic development, Health and education, Food security and humanitarian assistance, Climate change mitigation and Democracy and governance.
- USAID collaborates with governments, NGOs, businesses, and international organizations, offering grants and assistance for development projects. Some notable initiatives include:
  - President's Emergency Plan for AIDS Relief (PEPFAR)**, addressing HIV/AIDS treatment and prevention.
  - Feed the Future**, tackling hunger and food security issues.
  - Power Africa**, expanding electricity access across Africa.
  - Water for the World Act**, improving water, sanitation, and hygiene services.

### Implications of freeze on USAID

- Impact on U.S. Global Influence:** Foreign aid has been instrumental in Washington's efforts to build alliances and counter geopolitical rivals like China and Russia in developing nations.

- The freeze may reduce U.S. influence in strategic regions.

- Rise of Alternative Development Partners:** Countries such as China, through initiatives like the Belt and Road Initiative (BRI), could step in to fill the aid vacuum, increasing their strategic leverage.
- Humanitarian Setbacks:** Several vulnerable nations will struggle to meet development goals due to funding cuts, affecting education, healthcare, and infrastructure programs.

### USAID's Role in India

- USAID's engagement with India began in **1951** under the India Emergency Food Aid Act signed by President Harry Truman.
- The funding freeze is unlikely to have a major impact on India, given its reduced dependence on USAID assistance.
  - However, it may affect select ongoing projects in health and sanitation. In **2024**, USAID allocated **\$79.3 million** for India's healthcare sector.

### Concluding remarks

- The freeze on USAID funding by the U.S. government has wide-ranging implications for global development efforts.
- While India is relatively insulated from its effects, many developing nations reliant on U.S. aid may face significant challenges.
- The move underscores the need for nations to explore alternative strategies for ensuring sustained development assistance and economic stability.

Source: TH

## THE INCOME-TAX BILL, 2025

### Context

- The government has proposed a new bill to repeal and replace the **60-year-old Income-tax Act, 1961**, with a simpler and more efficient tax framework.

### About

- Income Tax Bill 2025 aims to simplify Income Tax Act 1961. The new bill reduces chapters and words for enhanced clarity.
- It aims to reduce litigation and enhance compliance. Once passed, the proposed legislation will be called the Income Tax Act, 2025, and is expected to take effect in April 2026.

## Key Features

## INSIDE BILL INTRODUCED IN PARLIAMENT

| Particulars | Income-tax Act, 1961 | Bill tabled in LS |
|-------------|----------------------|-------------------|
| Chapters    | 47                   | 23                |
| Sections    | 819*                 | 536               |
| Words       | 5.12 lakh            | 2.60 lakh         |

\* Effective sections. About 1200 provisos and 900 sections have been removed in the new Bill.

**SCHEDULE II (16 ROWS)** Incomes exempt, such as agricultural income

**SCHEDULE III (39 ROWS)** Certain persons eligible for exemption on certain income such as partners of firms and HUF, etc.

**SCHEDULE IV (14 ROWS)** Exemptions to non-residents

**SCHEDULE V (8 ROWS)** Exemption to business trusts, Sovereign Wealth Funds, etc.

**SCHEDULE VI (12 ROWS)** Exemptions to IFSC units

**SCHEDULE VII (48 ROWS)** Persons exempt from tax

### Qualitative Improvements

- ◆ Simplified language, making the law more accessible.
- ◆ Consolidation of amendments, reducing fragmentation.
- ◆ Removal of obsolete and redundant provisions for greater clarity.
- ◆ Structural rationalization through tables and formulae for improved readability.
- ◆ Preservation of existing taxation principles, ensuring continuity while enhancing usability.

- **Crypto as Property:** Virtual digital assets such as cryptocurrencies have been included in the definition of property to be counted as a capital asset.
- **Dispute Resolution:** It provides the points of determination, decision, and the reasons behind it, marking a shift from the earlier section, which lacked clarity on the manner of issuing DRP directions.
- **Capital Gain Exemptions:** Section 54E of the Act, which details exemptions for capital gains on transfer of capital assets prior to April 1992 has been removed.
- **Tax Year:** The Bill introduces the concept of "tax year", which has been defined as the 12-month period beginning April 1.

### Conclusion

- Once the Bill is passed in the Parliament, it will be sent to a Parliamentary Standing Committee on Finance for reviewing.
- After a call is taken on including any proposed amendments, the government will decide the date for rolling out the new income tax law.

Source: PIB

## NEWS IN SHORT

## SAGAR ISLAND

### Context

- The West Bengal government has announced comprehensive preparations for the **Gangasagar Mela 2025**.

### About

- Sagar Island is situated at the mouth of the Bay of Bengal about 120 km from the State capital Kolkata.
- It is the **largest island in the Sundarbans archipelago**.
- Lakhs of pilgrims visit the island every year to participate in the religious fair and take a dip at the confluence of the Ganga and the sea on the occasion of Makar Sankranti.
- The site is considered sacred and is home to the **Kapil Muni temple**.

Source: TH

## MANIPUR PLACED UNDER PRESIDENT'S RULE

### Context

- The Ministry of Home Affairs (MHA) has announced the **imposition of President's Rule in Manipur**, with the state assembly placed under suspended animation.

### Constitutional Provisions of Imposition of President's Rule

- **Article 356** empowers the President of India to impose **President's Rule** in a state when governance cannot be carried out as per constitutional provisions.
- **Grounds:** If the President receives a report from the state's Governor or otherwise is convinced or satisfied that the state's situation is such that the state government cannot carry on the governance according to the provisions of the Constitution.
- Under the President's rule, the elected **state government is dismissed** and its powers are suspended.
  - ◆ The Governor becomes the executive head of the state and runs the administration on behalf of the President.
- The proclamation remains **valid for up to two months** but must be **approved by both Houses of Parliament** to extend further.

- ♦ If approved, the **Rule can last for six months** and be extended in increments of six months, up to a maximum of **three years**.

## Repeating history

Manipur is among States with highest instances of President's Rule

■ This marks the **11th time** President's Rule has been imposed

■ The first was for **66 days** from January 12 to March 19, 1967

■ The longest was for **2 years and 157 days** from October 17, 1969, to March 22, 1972



MANIPUR

■ The latest instance was **277 days** from June 2, 2001, to March 6, 2002

■ **Rishang Keishing** of the Congress became the first Chief Minister to complete his full term. **Okram Ibobi Singh** of Congress was the first Chief Minister to finish not one but three terms

Source: TH

## HEATWAVES

### Context

- India is experiencing more frequent, prolonged and severe heatwaves.
  - ♦ These extreme temperatures pose significant risk to public health, infrastructure, and livelihoods, especially in vulnerable regions.

### About

- The World Bank estimates that India could account for **34 million job losses due to heat-stress-related productivity declines by 2030**.
- **54% of India's land** is experiencing high-to-extreme-high water stress, according to the World Resources Institute (WRI).

### Heatwaves and Its Impacts:

- A heatwave is defined as a **prolonged period** of unusually and excessively hot weather, accompanied by **high humidity**.
- **The India Meteorological Department (IMD)** has specified the following criteria:
  - ♦ a heatwave need not be considered till the **maximum temperature** of a station reaches at least **40°C for plains and at least 30°C for hilly regions**.
- **Impacts:**
- **Health Risks:** Increased heat can cause heatstroke, dehydration, and exacerbate pre-existing conditions like heart disease.
- **Agriculture:** High temperatures can lead to crop failures, reduce yields, and damage livestock, threatening food security.
- **Water scarcity:** Heatwaves can worsen droughts, leading to water shortages and affecting drinking water supplies.

- **Wildfires:** Prolonged heat can increase the likelihood of wildfires, damaging ecosystems and property.
- **Energy demand:** High temperatures often lead to higher energy consumption for cooling, which can strain power grids.

Source: IE

## REMOVAL OF JUDGES IN INDIA

### In News

- Rajya Sabha Chairman emphasized that **only Parliament has the constitutional authority to remove a High Court judge**

### About Removal of judges

- A judge can be removed on the grounds of **'proved misbehaviour' or 'incapacity'** as per **Articles 124 and 217 of the Constitution**.
  - ♦ The Constitution does not define 'proved misbehaviour' or 'incapacity.'
  - ♦ Supreme Court rulings clarify that wilful misconduct, corruption, lack of integrity, or offenses involving moral turpitude are grounds for misbehaviour.
    - Incapacity refers to a medical condition, either physical or mental.

### Procedure for Removal

- **Procedure for Removal:** A judge can be removed only by an order of the President, based on a motion passed by both Houses of Parliament.
  - ♦ The Judges Inquiry Act, 1968, outlines the removal procedure.
    - A motion may be introduced in either House of Parliament.
    - In the Lok Sabha, at least 100 members must sign the notice.
    - In the Rajya Sabha, at least 50 members must sign the notice.
    - The Speaker (Lok Sabha) or Chairman (Rajya Sabha) may consult relevant individuals and decide whether to admit the motion.
- **Motion Admission:** The Speaker (Lok Sabha) or Chairman (Rajya Sabha) decides whether to admit the motion after due consideration and consultation.
- **Three-Member Committee:** If the motion is admitted, a three-member committee is formed:
  - ♦ A Supreme Court/High Court judge, A distinguished jurist, and A member of the judiciary.



- **Investigation and Report:** The committee investigates the case.
  - ♦ If the judge is cleared of misbehaviour or incapacity, the motion is dropped.
  - ♦ If guilty, the committee report is presented in Parliament for further action.
- **Parliament's Role:** If the committee finds misbehaviour or incapacity, the motion is debated in Parliament.
  - ♦ A motion for removal must be passed by both Houses of Parliament.
  - ♦ The motion requires:
    - A majority of the total membership of each House.
    - A special majority of at least two-thirds of members present and voting in the same session.
- **Sending the Motion to the President:** Once adopted by both Houses, the motion is sent to the President.
  - ♦ The President will issue an order for the judge's removal.

Source:TH

## FREE MOVEMENT REGIME (FMR)

### In News

- 22 crossing points along the Myanmar border are now operational under the revised **Free Movement Regime (FMR) agreement**.

### About Free Movement Regime (FMR)

- It allows border residents to visit relatives without a visa or passport.
- It was introduced in 1968 due to ethnic and familial relations between people on either side of the largely unfenced north-eastern border.
- **The territorial limit** of free movement : Initially it was 40 km, which was reduced to 16 km in 2004 and in 2016 additional regulations were enforced. It has now been reduced to 10 km.
- **Monitoring :** Border passes are issued with biometrics recorded and checked against a centralised portal.
  - ♦ Assam Rifles is responsible for issuing border passes and conducting the first layer of security checks, while state police conduct further checks at the place of stay.
- **Status of FMR:** Although the Home Minister announced the scrapping of FMR, no formal orders have been issued by the Ministry of External Affairs (MEA) to suspend the agreement.

### Do you know ?

- The India-Myanmar border passes through the States of Arunachal Pradesh (520 km), Nagaland (215 km), Manipur (398 km), and Mizoram (510 km).

Source :TH

## INDIA'S FIRST AUTOMATED BIOMEDICAL WASTE TREATMENT PLANT

### Context

- The Union Minister inaugurated India's first indigenous Automated Biomedical Waste Treatment Plant at AIIMS New Delhi.

### About

- The plant, named "**Srjanam**," was developed by the Council of Scientific and Industrial Research – National Institute for Interdisciplinary Science and Technology (**CSIR-NIIST**).
- **The plant disinfects pathogenic waste** such as blood, urine, sputum, and laboratory disposables without using incinerators.
  - ♦ The **system also neutralizes odors** from waste.
- With a daily capacity of **400 kg**, the equipment is capable of handling **10 kg** of degradable medical waste per day in the initial phase.

### Significance

- According to a **2023 report of the Central Pollution Control Board (CPCB)**, India generates **743 tonnes** of biomedical waste daily.
- The new technology offers an **alternative to traditional incineration**, reducing risks associated with exposure and environmental contamination.

Source: AIR

## ESG FRAMEWORK

### In News

- The Securities and Exchange Board of India (SEBI) has proposed new measures to regulate ESG Rating Providers (ERPs), ensuring greater transparency, accountability, and consistency in ESG assessments.

### What is the ESG Framework?

- It is a set of standards that assess how a company operates responsibly concerning the planet and people. It includes:



- ♦ **Environmental:** How well a company manages its environmental impact.
- ♦ **Social:** How it treats employees, customers, suppliers & communities.
- ♦ **Governance:** Its leadership, ethics, and corporate accountability.

#### SEBI's Key Proposals

- **Withdrawal of ESG Ratings:** ERPs can withdraw ratings if there are no subscribers, but ratings part of index-linked packages (e.g., Nifty 50) cannot be withdrawn selectively.
- **Issuer-pays model:** Ratings can be withdrawn after at least three years or 50% of the security's tenure (whichever is higher), with approval from 75% of bondholders.
- **Disclosure of Rating Rationale:** ERPs following a subscriber-pays model must provide detailed rating rationales only to subscribers, but ESG ratings themselves should be disclosed publicly.
  - ♦ Stock exchanges will be required to display ESG ratings prominently on their websites.
- **Governance and Oversight:** Category-II ERPs will have to conduct internal audits and form a Nomination & Remuneration Committee (NRC) within two years of the new rules being implemented.

#### Implications for Stakeholders

- **Investors & Issuers:** Greater clarity and standardization in ESG ratings will help investors make more informed decisions.
- **ESG Rating Providers:** Increased compliance and governance requirements may add operational overhead but will enhance credibility.
- **Listed Companies:** Public display of ESG ratings on stock exchanges will add transparency, possibly influencing investor perception.

Source: BS

## INDIRECT PROMPT INJECTION (IPI)

#### In News

- The rise of indirect prompt injection as a major security threat to AI chatbots is a wake-up call for both developers and users.

#### What is Indirect Prompt Injection?

- Unlike direct attacks, indirect prompt injection embeds harmful instructions within benign-looking text (e.g., documents, emails, or web content). When processed by an AI LLM, these hidden prompts can lead to unauthorized actions, data breaches, and misinformation.

#### Why Does This Matter?

- AI models are trained to interpret and execute instructions—making them susceptible to hidden manipulations.
- Recent research demonstrated how Google's Gemini chatbot could be tricked into storing false information permanently.
- Attackers can bypass security safeguards, making traditional defenses ineffective.

Source: TH

## NEUTRINO DETECTED UNDER THE MEDITERRANEAN SEA

#### In News

- Scientists detected a record-breaking ultra-high energy neutrino using an observatory under construction in the **Mediterranean Sea near Sicily**, part of the KM3NeT (Cubic Kilometre Neutrino Telescope) Collaboration

#### About Neutrinos

- They are tiny elementary particles with very little mass, no charge, and a spin of half.
- They interact weakly with other matter particles and pass through our bodies unnoticed.
- **Sources of Neutrinos:** Neutrinos come from the Sun (solar neutrinos), other stars, cosmic rays from beyond the solar system, and the Big Bang.
  - ♦ They can also be produced in labs.
- **Types of Neutrinos:** There are three types of neutrinos, known as "**flavours**": **electron neutrino, tau neutrino, and muon neutrino**.
- **Findings of Recent Study :** The detected neutrino's energy is 10,000 times more than that of particles from the Large Hadron Collider and quadrillion times more than photons (light particles)
  - ♦ The neutrino is believed to have originated from beyond the Milky Way galaxy.
  - ♦ Possible sources include 12 supermassive black holes at the centers of distant galaxies.
  - ♦ Neutrinos are produced in various astrophysical events, such as **nuclear fusion in stars (low-energy)** and violent processes like **black hole activity or gamma-ray bursts (high-energy)**.
- **Significance:** Neutrinos are electrically neutral and rarely interact with matter, making them ideal "cosmic messengers" to study the universe.
- They can travel through matter, including the Earth, unimpeded.

- The study of neutrinos aims to understand the universe better, offering insights into astrophysical processes and the cosmos.

Source :IE

## FOETUS IN FOETU

### Context

- In January 2025, doctors in Maharashtra detected a rare case of “foetus in foetu” in a pregnant woman.

### About

- ‘Foetus in foetu’ is a **foetus-like mass developed within the body of the other foetus** in a monozygotic twin pregnancy.
- Basically, one twin is very underdeveloped and enwrapped inside the body of the other twin,

so much so that the pregnancy is considered a singleton pregnancy.

- Also known as **cryptodidymus**, this rare congenital disorder affects about one in 500,000 births.
  - ♦ Less than 200 cases have been reported worldwide, with about 10 to 15 cases in India.
- **Cause:** About 10 to 15 days after the conception of monozygotic twins, the cell mass of the embryo may be split unevenly, due to which one twin is smaller and incompletely formed with the other twin fully developed.
  - ♦ The smaller twin gets trapped within the larger twin. The trapped twin is considered “parasitic,” as it draws its blood supply and nutrients from the other “host” twin.

Source: TH

■■■■

