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PREFACE

Current Affairs UPSC CSE Prelims 2025

This high-quality monthly compilation of Current Affairs for Civil Services Exam Prelims 2025 is designed to help Civil Services Exam aspirants by:

1. **Saving preparation time:** Consolidates key current affairs from multiple sources for CSE Prelims.
2. **Reinforcing static concepts:** Links static concepts with current affairs
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Details of our Current Affairs Test Series are on the back cover and inside this magazine.

Our team of content developers have worked rigorously to create this high-quality compilation, and we hope that all Civil Services and other competitive exam aspirants will make the best use of it. All the Best!

R. C. Reddy IAS Study Circle
Hyderabad



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POLITY

1. CAG Toolkit

Context: The Comptroller and Auditor General of India (CAG) has introduced a revolutionary toolkit using the Open Data Kit (ODK) platform to ensure transparency in public spending and evaluate the effectiveness of government schemes.

About the CAG Toolkit:

- It is a digital platform based on Open Data Kit (ODK) technology for designing, collecting, and managing audit-related data.
- It is launched by Comptroller and Auditor General (CAG) of India.
- **Objectives:**
 - Enhance transparency in public spending.
 - Improve accountability in the delivery of government schemes.
 - Collect real-time beneficiary feedback for informed audit planning.
- **Key Features:**
 - **Integrated with CAG's own Operating System (OIOS).**
 - **End-to-end encryption for secure data management.**
 - Multi-language support for beneficiary surveys.
 - User-friendly interface for designing and managing data collection processes.
- **Working:**
 - **Surveys are designed on the ODK platform and deployed to beneficiaries.**
 - **Data is collected in real-time, analyzed using the OIOS system, and used as audit evidence.**
 - **Beneficiary feedback** helps identify problem areas and improve scheme delivery.

2. CBI and INTERPOL

Context: Union Home Minister and Minister of Cooperation, Shri Amit Shah will launch BHARATPOL portal developed by central Bureau of Investigation (CBI) in New Delhi on 07th January, 2025 in Bharat Mandapam in Delhi.

CBI and INTERPOL:

- **CBI, as the National Central Bureau (NCB-New Delhi) for INTERPOL** in India, facilitates international cooperation in criminal matters in collaboration with various agencies across the country, including law enforcement agencies.
- **At the Central, State, and Union Territory levels, this coordination is executed through INTERPOL Liaison Officers (ILOs), who are further linked to Unit Officers (UO's) at the level of Superintendents of Police, Commissioners of Police and Branch Heads,** within their respective organizations. Presently, communications among the CBI, ILOs, and UOs primarily relies on letters, emails and faxes.

NEED for BHARATPOL:

- The growing footprint of transnational crimes including cyber-crime, financial crimes, online radicalization, organized crimes, drug trafficking, human trafficking etc, necessitates rapid and real-time international assistance in criminal investigations.
- To address this challenge, CBI has developed BHARATPOL Portal, accessible through its official website, which will bring all the stakeholders on a common platform.
- **The BHARATPOL portal will streamline the processing of all requests for international assistance through INTERPOL, including the issuance of Red Notices and other colour-coded INTERPOL notices.**
- The BHARATPOL portal will become a transformative tool for field-level police officers, enhancing their efficiency in dealing with crimes and security challenges.

By facilitating easier and faster access to international assistance, it will strengthen India's efforts in combating transnational crimes.

3. Section 152 of BNS

Context: The Rajasthan High Court, in *Tejender Pal Singh v. State of Rajasthan (2024)*, cautioned against using Section 152 of the Bharatiya Nyaya Sanhita (BNS) as a tool to stifle legitimate dissent.

About section 152 of BNS:

- In 2022, before the BNS was enacted, the Supreme Court had suspended pending criminal trials and court proceedings under Section 124A (sedition) of the Indian Penal Code (IPC) until the government reconsidered the law.
- This was followed by a verbal proclamation by the union home minister that 'sedition' would be repealed as an offence.
- Section 152 of the BNS criminalises any act exciting secession, armed rebellion, and subversive activities.
- It also criminalises acts encouraging feelings of separatism or endangering the sovereignty, unity, and integrity of India.
- While the BNS does not formally use the term 'sedition', the Rajasthan High Court's recent decision hints that the spectre of sedition still looms large in the BNS.

Problems with Section 152 BNS

- **Vagueness:**
 - The statute lacks a clear definition of "acts endangering the sovereignty, unity, and integrity of India."
 - This vagueness allows for broad interpretation by authorities, potentially criminalizing speech critical of government or political figures.
- **Low Threshold for Prosecution:**
 - The term "knowingly" lowers the bar for prosecution.
 - Sharing content that could potentially incite prohibited activities, even without malicious intent, can be sufficient for arrest.
 - Lack of a requirement to prove a direct causal link between speech and its consequences increases the risk of abuse.

• Potential for Chilling Effect on Free Speech:

- The vague and easily applicable nature of Section 152 can stifle dissent and criticism, leading to self-censorship.
- The experience with Section 124A of the IPC, which had a high arrest rate and low conviction rate, demonstrates the potential for abuse of such provisions.

4. Oligarchy

Context: Outgoing US President Joe Biden warned of the dangers of an oligarchy gaining power as he delivered his farewell address and brought a decades-long career in politics to an end.

Definition:

- Oligarchy is a form of governance where power resides with a small, privileged group of people. These individuals might wield power due to their wealth, social status, military influence, or familial ties.

Key Characteristics:

- **Limited Participation:** Political and decision-making power is restricted to a select few, excluding the majority.
- **Elitism:** Often, the ruling group is an elite class that prioritizes its own interests over those of the general population.
- **Concentration of Resources:** Wealth and resources are typically concentrated among the ruling group, reinforcing their control.

Historical Examples:

- Ancient Sparta: Governed by a small group of elites.
- Venetian Republic: Controlled by wealthy merchant families.
- Modern Instances: In some cases, countries with dominant business or military elites exhibit characteristics of oligarchies.

Distinction from Other Systems:

- Unlike a **democracy**, where power is distributed broadly, or an **autocracy**, where one person rules, oligarchy specifically involves a small group wielding authority.

5. Whip

Context: Indian Vice President recently questioned the relevance of party whips in parliamentary proceedings, stating that they curtail legislators' freedom and restrict their independent decision-making.

About Whip:

- A whip in parliamentary parlance is a written order that party members be present for an important vote, or that they vote only in a particular way.
- The term is derived from the old British practice of "whipping in" lawmakers to follow the party line.
- The importance of a whip can be inferred from the number of times an order is underlined.

Appointment:

- **In India all parties can issue a whip to their members.**
- Parties appoint a senior member from among their House contingents to issue whips — this member is called a Chief Whip, and he/she is assisted by additional Whips.
- **Constitutional Status: The Constitution of India does not explicitly mention whips.**

Types of whips:

- **One-line whip:** A one-line whip, underlined once, is usually issued to inform party members of a vote, and allows them to abstain in case they decide not to follow the party line.
- **Two-line whip:** A two-line whip directs them to be present during the vote.
- **Three-line whip:** A three-line whip is the strongest, employed on important occasions such as the second reading of a Bill or a no-confidence motion, and places an obligation on members to toe the party line.

Defiance of whip

- In India, rebelling against a three-line whip can put a lawmaker's membership of the House at risk.
- The anti-defection law allows the Speaker/Chairperson to disqualify such a member; the only exception is when more than a third of legislators vote against a directive, effectively splitting the party.

6. Essential Religious Practice Doctrine

Context: Use of loudspeakers is not an essential part of any religion, the Bombay High Court said on Thursday, directing the law enforcement agencies to take prompt action against loudspeakers that violate the noise pollution norms and rules.

Essential Religious Practice Doctrine:

The "essential religious practice doctrine" in India under Article 25 of the Constitution is a legal principle that aims to define the scope of religious freedom. It essentially states that:

- **Protection is limited to core religious practices:** Article 25 guarantees the freedom of conscience and the right to freely profess, practice, and propagate religion. However, this right is not absolute. The "essential religious practice" doctrine states that only those religious practices that are integral and essential to a particular religion are protected from state interference.
- **Determining essentiality:** Determining what constitutes an "essential religious practice" is a complex task. The courts generally consider factors such as:
 - **Religious texts and scriptures:** Practices explicitly or implicitly mentioned in religious texts are often considered essential.
 - **Historical and traditional practices:** Practices that have been followed by a religious community for a long time are given significant weight.
 - **Impact on religious identity:** Practices that are fundamental to the identity and beliefs of a religious group are more likely to be considered essential.

- **Balancing religious freedom with other rights:** The "essential religious practice" doctrine seeks to balance the right to religious freedom with other constitutional values, such as public order, morality, and health. The state can regulate or restrict religious practices if they pose a threat to these values.

Case laws associated with essential religious practice doctrine:

- **Shirur Mutt Case (1954):** This case established the "essential religious practice doctrine," under which courts determine what constitutes essential religious practices deserving protection under Article 25 and 26 of the Indian Constitution.
- **Anand Margi Case (1983):** This case dealt with whether the Tandava dance is an essential religious practice of the Anand Marg sect, thus directly invoking the essential religious practice doctrine.
- **Triple Talaq Case (2017):** The case deliberated on whether the practice of triple talaq (instant divorce) was an essential practice of Islam, falling under the essential religious practice doctrine.

However:

- **Azeez Basha v Union of India (1968):** This case was about whether Aligarh Muslim University was established by Muslims and whether it had minority status. It did not deal with the "essential religious practice doctrine."



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ECONOMY

1. Wholesale Price Index

Context: The Indian government has formed an 18-member expert panel, led by NITI Aayog member Ramesh Chand, to revise the Wholesale Price Index (WPI) and explore a transition to a Producers' Price Index (PPI).

About Wholesale Price Index (WPI):

- **WPI measures changes in the prices of goods sold and traded in bulk at the wholesale level. It is a key indicator of inflationary trends in the economy.**
- The Office of Economic Advisor, Department of Industrial Policy and Promotion, Ministry of Commerce and Industry releases WPI.
- **Aim:**
 - Track supply and demand dynamics in industries.
 - Provide a measure of wholesale inflation in the economy.
 - Align with other economic indicators like GDP.
- **Key Features:**
 - **Base Year:** Updated to 2011-12 in the current series, under revision to 2022-23.
 - **Number of Items:** Tracks prices of 697 items, including 117 primary items, 16 fuel and power items, and 564 manufactured products.
 - **Excludes:** Services sector (unlike CPI, which includes both goods and services).

About Producer Price Index (PPI):

- **The Producer Price Index (PPI) measures the average change in prices received by producers for goods and services, either sold domestically or exported.**
- Two Types of PPI:
 - **Output PPI:** Tracks prices of goods and services as they leave production sites.
 - **Input PPI:** Monitors prices of goods and services entering production processes.

2. Front-running

Context: Market regulator Securities and Exchange Board of India (SEBI) has banned former stock broker Ketan Parekh from buying and selling securities again. This time, it is for allegedly front-running trades of a US-based fund, Bloomberg reported.

Front-running:

- **Front-running is an unethical and illegal practice in financial markets where an individual or entity benefits by trading on the basis of non-public, advance information about an upcoming transaction or activity that is likely to affect the price of a security. This typically involves brokers, analysts, or other insiders exploiting their privileged access to confidential information.**

Key Characteristics of Front-Running:

1. **Non-Public Information:** The individual or entity engages in trades based on material information that has not yet been made available to the public or clients.
2. **Manipulative Intent:** The primary motive is to profit from price movements that are anticipated due to the pending transaction.
3. **Conflict of Interest:** The perpetrator usually violates their fiduciary duty or responsibility to their clients.
4. **Price Impact:** The perpetrator's trades can sometimes affect the market price before the client's trade is executed.

Common Examples of Front-Running:

1. **Broker Front-Running:** A stockbroker receives a large buy or sell order from a client and, before executing it, trades the stock for their own account to benefit from the expected price movement.
2. **Mutual Fund Front-Running:** Employees of mutual funds trade ahead of large fund orders, which are likely to cause significant price movements.

3. **Algorithmic Front-Running:** In high-frequency trading, algorithms detect large orders being placed and place trades ahead of them to profit from the subsequent price movement.

Legal and Regulatory Aspects:

1. **Prohibited Practice:** Front-running violates securities laws and regulations in most countries, including India, the US, and Europe.
2. **Role of Regulators:** Agencies like SEBI in India and the SEC in the US actively monitor and penalize individuals and entities involved in front-running.
3. **Penalties:** Offenders may face financial penalties, trading bans, revocation of licenses, or even imprisonment.

Prevention and Ethical Practices:

1. **Chinese Walls:** Firms should implement barriers to prevent the flow of sensitive information between departments.
2. **Surveillance Systems:** Regulators and firms use technology to detect suspicious trading patterns.
3. **Stringent Compliance:** Employees and brokers are required to adhere to strict ethical and legal standards.

Why It Matters:

Front-running undermines the integrity and fairness of financial markets, eroding trust among investors and creating an uneven playing field. Its prevention is crucial for maintaining market efficiency and investor confidence.



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3. Currency Depreciation

Context: In the last week of December, 2024, the rupee breached the 85 mark against the U.S. dollar, touching an all-time low of 85.81. The currency depreciated about 3% in 2024, continuing its long-term trend of gradually but consistently losing value against the dollar.

What causes a currency to depreciate?

- The price of any currency in the foreign exchange market is determined by the demand for the currency vis-a-vis its supply.
- This is similar to how the price of any other product is determined in the marketplace.
- When the demand for a product rises while its supply remains constant, this causes the price of the product to rise in order to ration the available supply.
- On the other hand, when the demand for a product drops while its supply remains constant, this causes sellers to drop the price of the product in order to attract sufficient buyers.
- There are various factors that determine the demand for and the supply of any currency in the foreign exchange market.
- One of the most important determinants of the supply of a currency in the market is the monetary policy of a country's central bank.
- A central bank adopting looser monetary policy compared with other central banks will cause the supply of its currency in the market (for both goods trade and investment purposes) to rise relative to other currencies, causing the currency's value to drop.
- Central banks adopting relatively tighter monetary policy, on the other hand, are likely to see their currencies appreciate in value.
- A crucial factor that determines the demand for any currency, on the other hand, is the demand among foreigners for the goods and assets of the country.

- Since foreigners will first have to purchase the local currency before they can purchase a country's goods and assets, high demand for a country's goods and assets translates to high demand for its currency and which in turn leads to a rise in the value of the currency.
- A fall in demand for a country's goods or assets, on the other hand, will cause the value of its currency to fall.

What is behind the rupee's fall?

- The current bout of rupee depreciation is seen as driven primarily by the exit of foreign investors from India, which has put pressure on the rupee.
- Meanwhile, the longer-term trend of the rupee's depreciation against the dollar is attributed to higher inflation in India than in the U.S. due to the Reserve Bank of India's looser monetary policy compared to the U.S. Federal Reserve. India's traditional demand for high-value imports such as crude oil and gold (which boosts demand for the dollar and weakens the rupee) to keep its economy going and its inability to boost exports (which can help boost demand for the rupee) have also contributed to the lacklustre performance of the rupee.
- The RBI has been using its dollar reserves to prop up the value of the rupee by artificially increasing the supply of dollars in the foreign exchange market, and thus the dollar demand for rupees.
- As a result, the value of India's foreign exchange reserves dropped to an eight-month low of \$640 billion as of the last week of December from over \$700 billion in September.

4. Future of Jobs Report, 2025

Context: The World Economic Forum (WEF) has released the fifth edition of the Future of Jobs Report, 2025, which analyzes global labor market trends for the period 2025-2030.

More about the report:

- Technological change, geoeconomic fragmentation, economic uncertainty, demographic shifts and the green transition – individually and in combination are among the major drivers expected to shape and transform the global labour market by 2030.
- The Future of Jobs Report 2025 brings together the perspective of over 1,000 leading global employers—collectively representing more than 14 million workers across 22 industry clusters and 55 economies from around the world—to examine how these macrorends impact jobs and skills, and the workforce transformation strategies employers plan to embark on in response, across the 2025 to 2030 timeframe.

5. Community Notes

Context: Meta recently announced the adoption of Community Notes, a crowdsourced content moderation system similar to Twitter's (now X) approach, as a replacement for its fact-checking program in the US.

How Community Notes work

- Community Notes was first piloted as a programme called 'Birdwatch' by Twitter in 2021 i.e. before Elon Musk purchased the platform for \$44 billion and rebranded it to X.
- The crowdsourced fact-checking model allows users to add facts and context below a specific post.
- A Community Note shows up below a post only if enough contributors vote that the context it provides is helpful.
- As a result, the model is said to become better as more users participate.
- Currently, anyone on X can become a contributor and add Community Notes as long as they meet certain criteria such as having a six-month-old account, verified phone number, and zero violations of X's rules.

- Initially, contributors are only allowed to rate Community Notes as helpful or not.
- Over time, they are allowed to write and attach their own Community Notes that will be rated by other contributors.
- All Community Notes contributions on X are publicly available.
- Anyone can download the data to analyse the trends and flag issues.
- Meta's Community Notes model is likely to be similar to that of X. "It will require agreement between people with a range of perspectives to help prevent biased ratings," the company said.
- Users in the US were able to sign up to be a contributor via Facebook, Instagram, and Threads starting January 7.

6. National Turmeric Board

Context: The National Turmeric Board was launched by Union Minister of Commerce & Industry to enhance the production, research, and global trade of turmeric.

About the National Turmeric Board:

- It will be** a dedicated body established to promote turmeric cultivation, research, and exports.
- It will be headquartered at Nizamabad, Telangana.
- It will be** operated under the Ministry of Commerce and Industry.
- It will aim to enhance turmeric production, support farmers, and boost global exports.
- Shri Palle Ganga Reddy will be its first Chairperson.
- Functions:**
 - Promote research and development for high-yield and value-added turmeric products.
 - Enhance awareness of turmeric's medicinal and essential properties.
 - Support farmers across 20 turmeric-growing states.
 - Focus on logistics, quality assurance, and boosting exports.
 - Collaborate with ministries like AYUSH, Agriculture, and Commerce for policy alignment.

	Name of boards	Headquarters
1	National Spice Board	Kochi, Kerala
2	National Tea Board	Kolkata, West Bengal
3	National Rubber Board	Kottayam, Kerala
4	National Turmeric Board	Nizamabad, Telangana

7. Pay Commission

Context: The Union Cabinet approved the 8th Pay Commission on January 16 to revise the salaries of central government employees and pensioners. Union Minister Ashwini Vaishnaw announced the decision and said that the commission will likely be established soon.

What is Pay Commission?

- The Pay Commission is a body set up by the Central Government that reviews and recommends changes to the salary structure of employees.
- The composition of the Pay Commission comes under the Department of Expenditure (Ministry of Finance).
- Pay commissions are usually constituted every 10 years and the first pay commission was set up in 1946. Since Independence, a total of seven pay commissions have been formed. (it is not mandatory to constitute pay commission for every 10 years).
- The latest pay commission was set up in 2014 and its recommendations came into effect in 2016. Currently, central government employees and pensioners get salaries based on the recommendations of the 7th pay commission.

It is **not mandatory** for the government to accept the recommendations of the pay commission. The government may choose to accept or reject the recommendations.

8. Inflation

Context: Reserve Bank of India officials moot monitoring of sticky food inflation and its 'second order effects', pin hopes on rekindling private capex through improved disposable incomes for people amid an 'anything but ordinary' global economy.

Inflation and Its First-Order Effects:

- The first-order effect of inflation refers to the **immediate rise in prices** of goods and services, reducing the purchasing power of money. This is the direct impact felt by consumers and producers.

Second-Order Effects of Inflation:

- Second-order effects refer to the **indirect, long-term consequences** of inflation that ripple through the economy:
 - **Wage-Price Spiral:**
 - Workers demand higher wages to keep up with rising prices.
 - Higher wages increase production costs, leading businesses to raise prices further.
 - This creates a **self-reinforcing cycle** of inflation.
 - **Inflation Expectations:**
 - Businesses and households begin to **expect higher inflation** in the future.
 - This expectation influences behavior, such as businesses preemptively raising prices and workers negotiating higher wages in anticipation.
 - **Increased Interest Rates:**
 - To counter second-order effects, central banks may tighten monetary policy by increasing interest rates, which can slow down economic growth.



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9. Entity Locker

Context: The Ministry of Electronics and Information Technology (MeitY) has launched Entity Locker, a digital platform aimed at streamlining document management for businesses and organizations in India.

About Entity Locker:

- **Entity Locker is a secure, cloud-based platform developed by the National eGovernance Division (NeGD) under MeitY to simplify the storage, sharing, and verification of business documents for organizations, MSMEs, startups, trusts, and societies.**
- Ministry of Electronics and Information Technology (MeitY) will be the nodal ministry to manage it.
- **It aims to create a streamlined and efficient business document management system, reduce administrative overhead, and promote ease of doing business.**
- **It covers large Organizations, Micro, Small, and Medium Enterprises (MSMEs), Startups, Trusts and Societies and Other Entities.**
- **Features:**
 - **Real-Time Document Access:** Integration with government databases for instant verification.
 - **Secure Cloud Storage:** Provides **10 GB of encrypted storage** for document management.
 - **Consent-Based Sharing:** Ensures secure sharing of sensitive data with partners and stakeholders.
 - **Digital Signature Authentication:** Enables legally valid authentication for documents.
 - **Role-Based Access Management:** Aadhaar-authenticated access ensures accountability.
 - **Government Integration:** Seamlessly linked with systems like Goods and Services Tax Network (GSTN), Ministry of Corporate Affairs (MCA), and Directorate General of Foreign Trade (DGFT) for compliance processes.

10. Coffee

Context: India has emerged as the world's seventh-largest coffee producer, with exports reaching \$1.29 billion in FY 2023-24, almost double the \$719.42 million recorded in 2020-21, according to a press release from the Commerce Ministry.

About Coffee:

- **Origin:** Coffee was introduced to India in the 1600s when **Baba Budan**, a Sufi saint, planted **seven Mocha coffee beans** from Yemen in Karnataka's **Baba Budan Giri** region. This marked the beginning of India's coffee cultivation.
- **Types of Coffee:**
 - **Arabica:** Known for its mild, aromatic flavor and higher market value.
 - **Robusta:** Hardier, with a strong taste, often used in instant coffee production.
- **Climatic Conditions for Coffee Cultivation:**
 - **Temperature:** Ideal range is **15°C to 28°C**.
 - **Rainfall:** Requires **150-250 cm** of annual rainfall.
 - **Soil:** Grows best in **well-drained, loamy soil** rich in humus and minerals like iron and calcium.
 - **Climate:** Thrives in a **hot, humid climate** with shaded plantations.
 - **Elevation:** Typically cultivated at altitudes of **600–1,600 meters** above sea level.

11. Sachetisation of Mutual Fund Investments

Context: The Securities and Exchange Board of India (SEBI) is introducing a sachetisation plan to enable small-ticket systematic investment plans (SIPs) starting at ₹250 per month.

About Sachetisation of Mutual Fund Investments:

What is Sachetisation?

- **Sachetisation** refers to offering financial products, such as mutual funds, in smaller, more affordable amounts to cater to low-income or retail investors.
- This concept is inspired by the success of sachet marketing in consumer goods, where products are sold in small, affordable packets to reach a wider audience.

Need for Sachetisation:

- **Financial Inclusion:** Targets underserved, low-income groups to enable investment in mutual funds.
- **Addressing Barriers:** Overcomes the high entry costs of traditional mutual fund SIPs.
- **Market Deepening:** Expands the retail investor base in equity markets, stabilizing market flows against foreign investor volatility.

How it works:

- **Minimum SIP Amount:** ₹250/month (targeted at new mutual fund investors).

Eligibility Criteria:

- Available for new investors only.
- Maximum of three ₹250 SIPs per investor across asset management companies (AMCs).
- **Schemes Excluded:** Debt schemes, sectoral, thematic, small-cap, and mid-cap equity funds due to their volatility.
- **Commitment Period:** Investors encouraged to commit to 5 years (60 instalments), but premature withdrawal is allowed.
- **Technology-Driven Process:** Investments through UPI auto pay or NACH to minimize costs.

12. Unified Pension Scheme

Context: Five months after the Centre announced a new Unified Pension Scheme (UPS) with assured benefits for government employees, the Finance Ministry late on Friday notified the scheme as an option for workers covered by the National Pension System (NPS) to be effective from April 1, 2025.

About Unified Pension Scheme (UPS)

- UPS shall apply to **Central Government employees** who are **covered under the National Pension System (NPS)** and who choose this option under the NPS.
- Both current and future Central Government employees covered under the NPS have the option to choose between the UPS or continue with the existing NPS plan.
- **Once a decision is made to switch to the UPS, it is considered final and binding.**

- **Pension Fund Regulatory and Development Authority (PFRDA)** may issue regulations for operationalizing the UPS.
- The effective date for operationalization of the Unified Pension Scheme shall be April 1, 2025.

Key Features of UPS

- UPS provides a **guaranteed payout** to employees upon superannuation.
- **UPS will offer 50% of the average basic pay drawn by a Central government employee during the 12 months prior to retirement, provided they complete 25 years of service.**
- **Employees with less than 25 years of service but more than 10 years will receive a pension on a proportionate basis.**
- **A minimum payout of Rs 10,000 per month is assured for employees with 10 or more years of qualifying service.**
- For those who choose to retire voluntarily after 25 years of service, the payout will begin from the date they would have reached superannuation if they had continued working.
- In the event of the **payout holder's death** after superannuation, a **family payout at 60% of the payout** admissible to the holder will be given to the **legally wedded spouse**.
- Additionally, **dearness relief** will be available on the **assured payout and family payout**, calculated in the same manner. Dearness Relief will be worked out in the same manner as Dearness Allowance applicable to serving employees.
- **UPS or assured payout would not be available in case of removal or dismissal from service or resignation of the employee.**

Contributions under the UPS

- **Unlike the old pension scheme, UPS is contributory in nature, wherein employees will be required to contribute 10 percent of their basic salary and dearness allowance while the employer's contribution (the central government) will be 18.5 percent.**
- However, the eventual **payout depends on the market returns** on that corpus, mostly invested in government debt.

13. Strategic Disinvestment

Context: Prime Minister Narendra Modi is pouring billions into ailing state-run firms after slowing ambitious divestment plans that were intended to reduce the role of the state in business, according to government sources and a document reviewed by Reuters.

More on the news:

- **Less than a month into 2025, New Delhi has plans to invest about \$1.5 billion in financial rescue packages for two state-owned firms after failing to sell them to private firms.**
- It has also decided to put in "abeyance" privatisation of at least nine state-owned units after opposition from relevant ministries, as per a document that detailed recommendations of a government panel set up to identify privatisation candidates.
- The document, reviewed by Reuters, did not cite reasons for its decision.

About Strategic Disinvestment

- **Strategic disinvestment would imply the sale of a substantial portion of the Government shareholding of a central public sector enterprise (CPSE) of upto 50%, or such higher percentage as the competent authority may determine, along with transfer of management control.**
- **It involves the transfer of ownership and control of a public sector entity to some other entity, either private or public.**
- **What is the difference between strategic disinvestment/sale and disinvestment?**
 - **Selling minority shares of Public Enterprises to another entity, be it public or private, is disinvestment.** In this, the **government retains ownership** of the enterprise.
 - On the other hand, **when the government sells majority shares in an enterprise, that is strategic disinvestment/sale.** Here, the **government gives up the ownership** of the entity as well.

- **Objectives:**

- **Reduce Government Ownership;**
- **Raise Capital;**
- **Improve Efficiency;**
- **Promote Competition;**
- **Attract Private Investment;**
- **Focus on Core Functions;**
- **Reduce Fiscal Burden;**

14. When-listed platform

Context: The Securities and Exchange Board of India (Sebi) is planning to introduce a “when-listed” platform, which will allow trading companies’ shares in a period between allotment of shares post the closure of the initial public offering (IPO) bidding process and the official listing on stock exchanges. According to Sebi Chairperson Madhabi Puri Buch, it will facilitate the trading of such unlisted shares in a regulated manner.

What is the new platform?

- The platform aims to reduce ‘grey market activity’ in companies’ stocks. Simply put, the grey market refers to the unofficial trading of securities even before being listed on stock exchanges.
- This is an unregulated market and works on demand and supply, with investors purchasing or selling shares notionally in the grey market even before they get listed.
- The grey market is a cash market and there is no delivery of shares.
- Many retail investors also look at the premium offered in the grey market on shares of a company which has launched an IPO, before considering investing in the offer.

What is the current timeline for listing of shares?

- At present, once the bidding process for an IPO close, shares have to be listed on bourses in trading plus three (T+3) working days.
- The allotment of shares has to be done on T+1 day. In the period between the allotment of shares and listing day, investors trade in the grey market.
- It is this pre-listing grey market trading activity which the Sebi wants to reduce.

How does grey market trading in an IPO happen?

- Since the probability of getting shares allotted in an IPO is thin, most investors who are keen to buy shares of a company enter the grey market.
- The day a company announces its plan to launch an IPO, grey market activity for such a company’s shares begins with a different set of brokers dealing only in the grey market.
- After arriving at a price band for an IPO, these operators then fix a premium over and above the price band.

15. MSME Trade Enablement and Marketing (TEAM) initiative

Context: The Ministry of Micro, Small, and Medium Enterprises (MSME) has introduced the MSME Trade Enablement and Marketing (TEAM) initiative to help small businesses embrace digital commerce.

More on the news:

- With a budget allocation of Rs 277.35 crore over three years, the initiative aims to bring 5 lakh MSMEs onto the Open Network for Digital Commerce (ONDC), enhancing their digital presence and market reach.

Goal and benefits of the TEAM initiative:

- A key goal of the Team initiative is promoting inclusivity, with plans to ensure that 50 per cent of the participating businesses are women-led.
- The initiative will provide MSMEs with access to digital storefronts, payment solutions, and logistics support through the ONDC network, which is designed to reduce operational barriers and expand business opportunities.
- In addition to technical support, the initiative will focus on education and awareness.
- Over 150 workshops will be conducted in tier 2 and 3 cities, targeting MSME clusters, with special emphasis on women-led and SC/ST-led businesses.

- The workshops will guide participants on how to join the ONDC network, develop digital catalogues, and optimize their use of the platform.
- The initiative also includes a dedicated portal for businesses to register for workshops and access essential resources such as financing options, grievance support, and tools for catalogue creation and account management.
- The Team initiative complements existing government schemes like PM Vishwakarma and the Digital MSME scheme, working towards a comprehensive strategy for the digital transformation of India's MSME sector.

- Users can benefit from a dashboard feature for **easy access to 'Spend Analytics' and various 'Management Information System (MIS) Reports'** at the click of a button.

Additionally, a **dedicated helpdesk and call centre facility** with a callback request option ensures customer support.

16. Baanknet Portal

Context: Financial Services Secretary M. Nagaraju on Friday unveiled the revamped 'Baanknet' portal for e-auction of properties, including commercial properties, industrial land, shops, vehicles, and agricultural and non-agricultural land. This platform consolidates information on e-auction of properties from all public sector banks (PSBs) and offers a one-stop destination for buyers and investors to discover a wide range of assets, the Finance Ministry said in a statement.

About Baanknet Portal:

- It is an e-auction portal that consolidates information on all properties that are put up for e-auction by public sector banks (PSBs).
- The portal is a one-stop destination for buyers and investors offering a wide range of properties.
- The listings on the new platform include **residential properties** such as flats, independent houses, and open plots, as well as **commercial properties**, industrial land and buildings, shops, vehicles, plant and machinery, and **agricultural and non-agricultural land**.

Features:

- The new portal is equipped with improved and enhanced features, including frictionless user journeys where the portal will have the entire pre-auction, auction, and post-auction journeys in a single application.
- It includes an **automated and integrated payment gateway** alongside KYC tools, all built on a microservices-based architecture that allows for third-party integration through open application programming interface (API).



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GEOGRAPHY

1. Location of Croatia

Context: Croatia's incumbent President Zoran Milanovic won most of the votes in the first round of a presidential election on Sunday, but must face a runoff against a ruling party candidate to secure another five-year term.

Croatia shares borders with the following countries:

- Slovenia
- Hungary
- Serbia
- Bosnia and Herzegovina
- Montenegro



2. Location of Montenegro

Context: An armed man killed at least four people and wounded four others on January 1 in the western Montenegrin city of Cetinje, police and local media said. The shooter was on the run.

Montenegro shares borders with five (four as per Gol) countries:

- Croatia to the southwest
- Bosnia and Herzegovina to the northwest
- Serbia to the northeast
- Kosovo (not recognised by India as a country) to the east
- Albania to the southeast



3. Important Deserts and location

Context: The Kubuqi Desert in Inner Mongolia is undergoing a massive transformation with the installation of a "solar great wall," which is set to power Beijing upon completion in 2030.

	Deserts	Locations
1	Gibson Desert	Australia
2	Kubuqi Desert	China
3	Dasht-e Lut	Iran
4	Rub' al Khali	Saudi Arabia, UAE, Oman, and Yemen

4. Auroras

Context: Scientists have made groundbreaking progress in understanding the dazzling auroras that light up the night sky.

More about news:

- Using NASA's KINET-X experiment, researchers simulated auroral conditions by releasing barium into the ionosphere, creating plasma clouds and Alfvén waves.
- These waves transferred energy to electrons, mimicking the conditions behind Earth's auroras.
- Although no visible aurora was generated, the experiment provided critical data about electron acceleration and plasma dynamics, offering clues to the processes that create these breathtaking phenomena.

The experiment aimed to replicate, on a minute scale, an environment in which the low energy of the solar wind becomes the high energy that creates the rapidly moving and shimmering curtains known as the discrete aurora.



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5. West African Economic and Monetary Union

Context: Ivory Coast announced on December 31 that French troops will leave the country after a decadeslong military presence, the latest African nation to downscale military ties with its former colonial power.

West African Economic and Monetary Union (UEMOA):

- The **West African Economic and Monetary Union (UEMOA)**, also known as **WAEMU**, is an organization of eight West African states that share a common currency, the **CFA franc**, which is pegged to the euro. The member countries are:

1. Benin
2. Burkina Faso
3. Ivory Coast (Côte d'Ivoire)
4. Mali
5. Niger
6. Senegal
7. Togo
8. Guinea-Bissau



6. Location of Mediterranean Sea

Context: At least 27 people including women and children have died and 83 others were rescued after two boats capsized off Tunisia, the country's National Guard has said. The boats sank in waters off the city of Sfax, a departure point often used by irregular migrants and refugees seeking to travel to Europe.

The North African countries bordering the Mediterranean Sea, in descending order of coastline length, are:

1. **Libya:** Approximately 1,770 km (1,100 miles)
2. **Egypt:** Approximately 1,001 km (622 miles)
3. **Algeria:** Approximately 998 km (620 miles)
4. **Tunisia:** Approximately 1,300 km (808 miles)
5. **Morocco:** Approximately 1,835 km (1,140 miles)



7. Zavaritskii volcano

Context: Nearly 200 years after a powerful volcanic eruption cooled Earth's climate, scientists have identified the source of the mystery: Zavaritskii volcano, located in the remote Kuril Islands. The findings were published in the Proceedings of the National Academy of Sciences of the United States of America.

How the 1831 eruption affected the world

- The eruption's impact was catastrophic, with widespread famine and hardship reported across Northern Hemisphere regions like India, Japan and Europe.
- Crop failures exacerbated by cooler and drier conditions left millions struggling to survive.
- The eruption led to a 1-degree Celsius drop in temperatures across the Northern Hemisphere, causing cooler and drier conditions.

Using advanced tools to trace the volcano

- Advanced techniques like geochemical analysis, radioactive dating, and computer modelling helped scientists trace the volcanic material to the Zavaritskii volcano in the Kuril Islands.

Ice cores help solve the mystery

- Scientists studied ice cores from Greenland, which contained ash and sulphur from the eruption.
- They found that sulphur levels in Greenland were much higher than in Antarctica, proving the eruption took place in the Northern Hemisphere.

One of the strongest eruptions of the 19th century

- Zavaritskii's eruption is now recognised as one of the most powerful volcanic events of the 19th century, alongside Mount Tambora in Indonesia (1815) and Cosegüina in Nicaragua (1835).
- These eruptions marked the end of the Little Ice Age, a time of cooler global temperatures.
- The 1831 eruption had a huge impact on the planet. It caused food shortages, famine, and suffering in many regions.
- The eruption showed how volcanic activity, even from remote places, can affect the whole world's climate.

8. Perihelion

Context: As Earth journeys through its elliptical orbit around the sun, there comes a point each year when it reaches its closest proximity to our star. This event, known as perihelion, occurs in early January. In 2025, perihelion will happen on January 4 at 13:00 UTC (7:00 a.m. CST). At this moment, Earth will be approximately 91,405,993 miles (147,103,686 km) away from the sun.

Perihelion: Why Does It Happen?

- Earth's orbit around the sun is not a perfect circle. Instead, it is slightly elliptical, resembling a flattened circle or oval.
- This elliptical shape means that Earth has a closest point, called perihelion, and a farthest point, known as aphelion, in its orbit each year.
- At perihelion, Earth is about 3% closer to the sun than at aphelion, which occurs in early July. This translates to a difference of roughly 1.5 million miles (2.5 million km).
- On average, Earth is about 93 million miles (150 million km) from the sun.
- **While this variation in distance is fascinating, it's not enough to impact the seasons or temperatures significantly.**



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Why Earth's Distance from the Sun Doesn't Cause Seasons?

- It's a common misconception that Earth's proximity to the sun determines the seasons.
- In reality, the seasons are caused by the tilt of Earth's axis, not the distance from the sun.
- When it's winter in the Northern Hemisphere, that part of Earth is tilted away from the sun, resulting in shorter days and less direct sunlight.
- Conversely, during summer, the Northern Hemisphere is tilted toward the sun, receiving more direct sunlight and longer days.
- The same principle applies to the Southern Hemisphere, where the seasons are opposite.

The Role of Earth's Orbit in Seasonal Lengths

- While Earth's distance from the sun doesn't cause the seasons, it does influence their duration. Earth moves fastest in its orbit when it is closest to the sun, due to the gravitational pull being stronger.
- This increased speed shortens the length of winter in the Northern Hemisphere and summer in the Southern Hemisphere.
- For example, Northern Hemisphere winter lasts nearly five days shorter than summer. The Southern Hemisphere experiences the opposite, with winter being longer than summer. This phenomenon aligns with Kepler's second law of planetary motion, which states that a planet moves faster when it is closer to the sun and slower when it is farther away.

How Perihelion Affects the Sun's Appearance?

- At perihelion, the sun appears slightly larger in the sky than at aphelion due to its closer proximity. However, this size difference is subtle and not noticeable to the naked eye.
- It's important to remember that one should never look directly at the sun without proper eye protection.

Perihelion 2025: Astronomical Significance

- Perihelion provides a unique opportunity to observe and appreciate the mechanics of Earth's orbit and its interaction with the sun.
- It serves as a reminder of the delicate balance and precision of celestial movements that govern life on our planet.

- As Earth races through its orbit at a speed of nearly 19 miles per second (30.3 km/s) during perihelion, we gain a greater understanding of our place in the cosmos.
- This event is a testament to the principles of physics and astronomy that continue to shape our understanding of the universe.
- Perihelion Day on January 4, 2025, marks an astronomical milestone that highlights Earth's dynamic relationship with the sun.
- While it may not have a direct impact on our daily lives, it underscores the intricate workings of the solar system.
- Whether you're an astronomy enthusiast or simply curious about the natural world, Perihelion Day offers a chance to marvel at the wonders of our celestial neighbourhood.

9. Planetary Parade

Context: Planetary Parade 2025: The New Year has set in, and the universe seems to be joining in the festive spirit with humans, with a 'planetary parade' likely to occur in the first month of 2025.

What is Planetary Parade?

- A 'planetary parade' is a rare celestial event where all the planets appear to align in a single line, resembling a parade. While it's tricky to catch all nine planets together, previous sightings have shown Saturn, Jupiter, Mars, and Venus aligned.

Planetary Parade 2025: When to watch

- In 2025, the planetary parade will happen two times, once in January and once in March.

Planetary Parade: January 2025

- Six planets, including Venus, Mars, Jupiter, Saturn, Neptune, and Uranus, will be visible from January 21, 2025, and for about four weeks afterwards.
- While the naked eye can see Venus, Mars, Jupiter, and Saturn, a telescope is needed to see Neptune and Uranus, according to reports by NASA (The National Aeronautics and Space Administration).

Planetary Parade: When to watch in India

January 21 is a general date when the planetary parade will be visible in all countries across the world, including India. According to reports, the best time to view this planetary alignment in India will be after sunset, around 8:30 p.m.

10. Oder River

Context: Poland decided not to invite Hungary's ambassador to an event on Friday launching Warsaw's EU presidency after Budapest gave asylum to a former deputy minister who is under investigation over alleged misuse of public funds, a senior official said.

Oder River:

- **The Oder River forms a boundary between Germany and Poland.** It is a significant river in Central Europe, flowing through both countries and serving as part of the border defined after World War II by the Potsdam Agreement.



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11. Islands of Andaman and Nicobar

Context: The Union Shipping Ministry is making ambitious plans for high-end tourism along with a shipbuilding and repair yard on Great Nicobar Island, according to a series of letters written to the Andaman and Nicobar administration and the Union Home Ministry over the last eight months.

Some popular islands of Andaman and Nicobar Island groups:

- **Swaraj Dweep:** Formerly known as Havelock Island, it is part of the Andaman group.
- **Shaheed Dweep:** Formerly known as Neil Island, it is part of the Andaman group.
- **Camorta Island:** Part of the Nicobar group.
- **Kondul Island:** Part of the Nicobar group.
- **Netaji Subhas Chandra Bose Island:** Formerly known as Ross Island, it is part of the Andaman group.

12. Location of Greece

Context: Costas Simitis, former prime minister of Greece and the architect of the country's joining the common European currency, the euro, has died at age 88, state TV ERT reported.

Greece shares land borders with four countries:

- Albania
- North Macedonia
- Bulgaria
- Turkey



13. Main Islands of Japan

Context: Shigemi Fukahori, a survivor of the 1945 Nagasaki atomic bombing, who devoted his life to advocating for peace and campaigning against nuclear weapons, has died. He was 93.

Main Islands of Japan:

- **Hokkaido:** The northernmost and second-largest island.
- **Honshu:** The largest and most populous island.
- **Shikoku:** The fourth-largest island.
- **Kyushu:** The third-largest island.

Japanese islands from North to South: **Hokkaido** → **Honshu** → **Shikoku** → **Kyushu**



14. Jaisalmer Unique Phenomenon

Context: Residents of Taranagar village in Rajasthan's Jaisalmer district witnessed a unique phenomenon last month when large amounts of water began gushing out from underground on December 27. The water stopped flowing without any external intervention on the night of December 29. Some on social media claimed it was related to the Saraswati River, mentioned in ancient texts like the Rig Veda and believed to have once flowed through the region.

What happened in Jaisalmer?

- A farmer in the Mohangarh area of Jaisalmer hired a firm to dig a tube well to tap groundwater.

- On the morning of December 27, after digging up to 850 feet, water began sprouting from the ground.
- In about an hour, it began flowing at high pressure, so much so that a truck and a drilling machine also got stuck. The 25 bighas of land nearby came under water as well.
- A small amount of non-inflammable gas was released along with the water.
- A large pit was also created due to the water pressure. Dr Narayan Das Inakhiya, Senior Hydro-Geologist at the Rajasthan State Ground Water Department, attributed the incident in Jaisalmer to an “artesian condition”.

What are artesian conditions?

- It has to do with geology.
- According to the United States Geological Survey’s website, an artesian aquifer refers to water stored under pressure, between layers of sediments and soil below the earth’s surface. It is also described as “confined” water because of hardy materials above and below it.
- What differentiates it from water flowing normally through tube wells or wells is that artesian water can sprout from underground on its own, and is also located deeper below the earth’s surface.
- It is surrounded by poorly permeable rocks that result in high pressure underground.
- When a rupture (like through drilling) happens, that underground pressure forces water upward and toward land.
- The word “artesian” is specifically used when water is “confined under pressure below layers of relatively impermeable rock.”
- It “comes from the town of Artois in France, the old Roman city of Artesium, where the best known flowing artesian wells were drilled in the Middle Ages,” the website says.

Why was water gushing out in the desert?

- In the desert region, water is confined underneath a geological layer of sandstone.
- As soon as the top layer is punctured, water starts flowing upwards due to heavy pressure.
- This phenomenon has previously been observed in places such as Mohangarh and Nachana Samiti Panchayat.

- It has also been spotted in the desert regions of Australia and Africa.

15. Location of Burkina Faso

Context: Those who fled to Ouagadougou, the capital, which has been shielded from violence, find fear instead of respite. They are made into shadows, with many resorting to begging. Most of them are not entitled to support from authorities, and international aid organisations are not authorised to work with them.

The following rivers flow through Burkina Faso:

1. Red Volta (also known as Nazinon)
2. White Volta (also known as Nakambé)
3. Black Volta (also known as Mouhoun)
4. Sirba



16. Polar vortex

Context: At least five people have died in the United States after a winter storm hit a large swathe of the country over the weekend, leading to mass school closures, dangerous road conditions and power cuts.

What is the polar vortex?

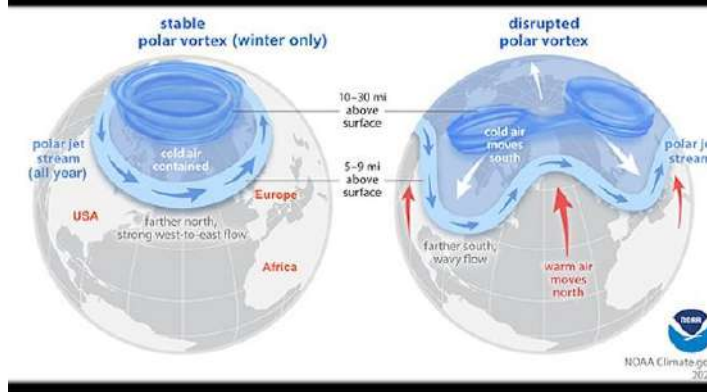
- The polar vortex is a large area of low-pressure and cold air that swirls like a wheel around both of the Earth’s polar regions. There are two types of polar vortex: tropospheric and stratospheric.
- The tropospheric polar vortex occurs at the lowest layer of the atmosphere — it extends from the surface up to about 10 km to 15 km — where most weather phenomena occur.

- The stratospheric polar vortex occurs at around 15 km to 50 km high.
- Unlike the tropospheric polar vortex, the stratospheric polar vortex disappears during the summer and is the strongest during the autumn.

When does the polar vortex cause extreme cold?

- The US, parts of Europe, and Asia experience chilly winds when the polar vortex at the North Pole weakens travel from its usual position.
- As this system weakens, some of the cold, arctic air can break off and migrate south, bringing plenty of cold air with it.
- Areas as far south as Florida may experience arctic weather as a result.
- That happens because when the polar vortex is strong and stable, it keeps the jet stream travelling around the planet in a circular path.
- The jet stream is a narrow band of strong wind in the upper levels of the atmosphere which plays a key role in keeping cold air north and warm air south.
- Without that strong low-pressure system, the jet stream does not have enough force to maintain its usual path. It becomes wavy and rambling.
- When high-pressure systems get in its way, a collection of cold air pushes south, along with the rest of the polar vortex system.

What is the polar vortex, anyway?



17. Location of Austria

Context: Austrian Foreign Minister Alexander Schallenberg will be named caretaker chancellor on Wednesday, taking over from outgoing Karl Nehammer, who quit after the first post-election coalition talks collapsed.

Austria shares borders with eight countries:

- Germany
- Czech Republic
- Slovakia
- Hungary
- Slovenia
- Italy
- Switzerland
- Liechtenstein



18. Location of Mongolia

Context: India is expected to sign a preliminary agreement with Mongolia soon in the area of geology and exploration, a senior Indian government official with direct knowledge of the matter said.

More on the news:

Companies such as Adani, Hindalco and Vedanta have expressed an interest in sourcing copper from Mongolia, the source said. All three companies did not respond to emails from Reuters seeking comment.

Both Indian and Mongolian officials are working out supply routes for Indian companies to source copper and coking coal, with India preferring the route from Vladivostok in Russia despite the longer distance, the official said.

The Altay Mountains and Khangai Mountains are located in Mongolia.

- **Altay Mountains:** These are the highest mountains in Mongolia, stretching across the western and southwestern parts of the country.
- **Khangai Mountains:** These mountains occupy a large portion of central and north-central Mongolia.



19. Location of Cuba

Explanations:

Context: India has extended humanitarian assistance to the people of Cuba in the aftermath of Hurricane Rafael. In a social media post, Ministry of External Affairs Spokesperson, Randhir Jaiswal said that the consignment in the form of Essential Medicines comprising Antibiotics, Anti-pyretics, Pain Killers, ORS and Muscle Relaxants has departed for Cuba January 10.

Caribbean capital cities from south to north:

- Kingston (Jamaica) - 17.9970° N
- Port-au-Prince (Haiti) - 18.5944° N
- Havana (Cuba) - 23.1136° N
- Nassau (Bahamas) - 25.0480° N

Kingston lies furthest south near the center of Jamaica, while Nassau sits furthest north in the Bahamas. Port-au-Prince and Havana lie between them, with Port-au-Prince being closer to Kingston's latitude.



20. Important Channels/Straits

Context: Recently, US President-elect Donald Trump proposed renaming the Gulf of Mexico to the Gulf of America, sparking debates over the geopolitical and historical significance of such a name change.

	Name of channels/straits	Separating nations/islands
1	Yucatan channel	Mexico and Cuba
2	Torres Strait	Australia from New Guinea
3	Strait of Messina	Sicily island and Italy
4	Denmark Strait	Greenland and Iceland

21. Location of gulf of Thailand

Context: The gunman who killed a former Cambodian opposition MP in inner Bangkok last week refused to reveal the mastermind behind the assassination out of fear for his family's safety, according to police.

The countries that "open up" in the Gulf of Thailand are:

1. **Thailand:** A major portion of the gulf's coastline belongs to Thailand.
2. **Cambodia:** Shares a significant coastline with the Gulf of Thailand.
3. **Vietnam:** Has a coastline along the northeastern part of the gulf.
4. **Malaysia:** Borders the southernmost part of the Gulf of Thailand.



22. Location of Serbia

Context: Serbia's striking university students protested outside the Balkan country's top court on Sunday to draw their attention to what they say have been violations of their civil rights under the populist authorities, including pressure from the secret service.

The Balkan Mountains:

- The **Balkan Mountains**, also known as the **Stara Planina** ("Old Mountain"), are a prominent mountain range in **southeastern Europe**, primarily located in **Bulgaria**.
- The range stretches westward into parts of eastern **Serbia**, forming a natural boundary and contributing to the topographical diversity of the region.
- These mountains are part of the larger **Balkan Peninsula**, which derives its name from this mountain range.

Geographical Importance:

- The **Balkan Mountains** serve as an important natural barrier and have historically influenced cultural, economic, and political aspects of the region.
- The range also has a significant ecological value, being home to diverse flora and fauna, as well as national parks in Bulgaria.



23. Sea of Azov

Context: An emergency task force arrived in Russia's southern Krasnodar region on January 12 as an oil spill in the Kerch Strait from two storm-stricken tankers continues to spread a month after it was first detected, officials said.

Sea of Azov:

- The Sea of Azov is an inland shelf sea in Eastern Europe connected to the Black Sea by the narrow **Strait of Kerch**, and is sometimes regarded as a **northern extension of the Black Sea**.
 - Shelf sea is a shallow water region which submerges a part of the continent.
- The sea is bounded by **Russia** on the east, and by **Ukraine** on the northwest and southwest.
- The Sea of Azov is bordered by Russia and Ukraine, but Georgia lies further south, bordering the Black Sea and not the Sea of Azov.
- The Sea of Azov is one of the smallest seas in the world, not the largest. The Caspian Sea is the largest enclosed body of water by surface area.
- The Sea of Azov is one of the least saline seas in Europe due to significant freshwater inflow from rivers like the Don and Kuban. Its salinity is much lower compared to seas like the Mediterranean.



24. Parbati-Kalisindh-Chambal-Eastern Rajasthan Canal Project

Context: THE flagship river-link irrigation project, which will provide a lifeline to 23 districts in Rajasthan, envisages the submergence of 37 sq km in the Ranthambhore tiger reserve effectively cutting it into two sections, according to project documents reviewed by The Indian Express.

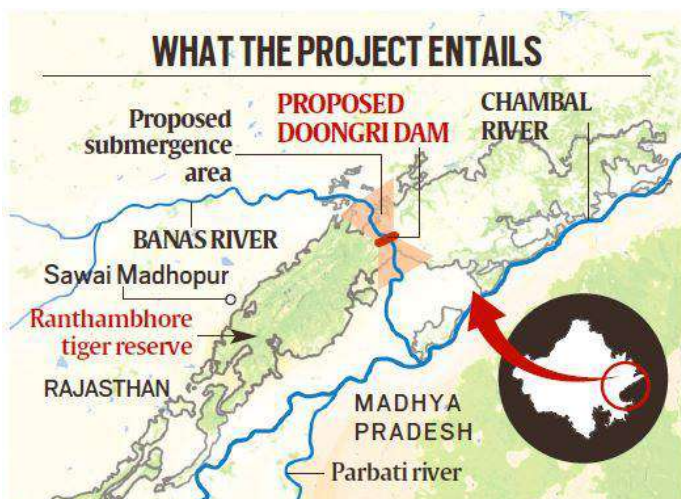
Concerns regarding Parbati-Kalisindh-Chambal-Eastern Rajasthan Canal Project (PKC-ERCP):

- The submergence will be caused by the largest dam proposed under the Parbati-Kalisindh-Chambal-Eastern Rajasthan Canal Project (PKC-ERCP), which is part of the ambitious Interlinking of Rivers (ILR) program. The canal project is expected to channel surplus water of the Chambal River basin for irrigation, drinking and industrial use to 23 districts of Rajasthan, benefitting 3.45 crore people.
- Of the PKC-ERCP's total submergence area of 408.86 sq km in Rajasthan, 227 sq km will go under the reservoir of a proposed 39-m-high and 1.6-km-long dam across Banas River, a tributary of Chambal, near village Doongri, about 30 km from Sawai Madhopur town.

- Of this, project details show, 37.03 sq km belong to Ranthambhore national park (392 sq km) and Keladevi wildlife sanctuary (674 sq km), both part of the Ranthambhore tiger reserve (1,113 sq km), currently home to 57 tigers.

Chambal River:

- It is an important river in the **Malwa plateau** and a principal **tributary of the Yamuna River**, thus forms part of the greater **Gangetic drainage system**.
- It flows through three Indian states: **Madhya Pradesh, Rajasthan, and Uttar Pradesh**.
- It is one of the **most pollution-free rivers** in India.
- **Course:**
- It rises in the **Vindhya Range** just south of Mhow, in **western Madhya Pradesh**.
- From its source, it **flows north into southeastern Rajasthan**.
- Turning northeast, it **flows past Kota** and **along the Rajasthan–Madhya Pradesh border**; shifting east-southeast, it forms a **portion of the Uttar Pradesh–Madhya Pradesh border** and flows through Uttar Pradesh to empty into the Yamuna.
- **Total Length: 960 km.**
 - It is a **rainfed river**, and the overall drainage basin covers an area of 143,219 sq. km.
 - To its **south, east, and west**, the **basin is defined by the Vindhyan mountain ranges**, while the **north-western boundary is marked by the Aravalli range**.
 - **Tributaries:** The main tributaries of Chambal include the Banas and Mej rivers on the left and the Parbati, KaliSindh, and Shipra rivers on the right.
 - **Major Dams:** Gandhi Sagar Dam, Rana Pratap Sagar Dam, and Jawahar Sagar Dam.



25. Sada Region

Context: The unique flat-top landscapes called sada, located in the Konkan region of Maharashtra, are rich in biodiversity and cultural significance.

More about Sada Region:

- The Konkan region located between the Arabian sea on one side and the Western Ghats on the other is well-known for its beaches and temples.
- As one travels across the Western Ghats towards Ratnagiri district, the landscape slowly transitions from mountain ranges standing a thousand metres tall, with steep slopes, to rolling hills with flat tops locally called sada, meaning a large flat area. They are the result of centuries of erosion.
- The sada are barren most of the year but become transformed during the monsoons.
- They are similar to the plateaux, locally called pathar, in the Satara district of Maharashtra, of which the Kaas Plateau is a well-known example.
- They are similar to the plateaux, locally called pathar, in the Satara district of Maharashtra, of which the Kaas Plateau is a well-known example.
- The sada, like the pathar, are rocky and harbour unique endemic flora that cover it in the monsoon season.

- The biodiversity survey recorded 459 plant species, of which 105 are endemic to the Konkan region.
- The team recorded 31 species of reptiles, 13 species of amphibians, 169 species of birds, and 41 species of mammals in the region.
- During the monsoons, the locals use small patches of sada to grow rice and millets (like nanchani, Eleusine coracana) with traditional practices that don't require the use of pesticides and chemical fertilisers.
- This said, the sada itself is far more interesting for its biodiversity and culture.
- The analysis of ecosystem services, in a study (to be peer-reviewed) by hydrologists Renie Thomas and Divyanshu Pawar, revealed the villages in the sada have access to fresh water all year round even though they are located between dry, rocky open land and valleys of meandering saline creeks studded with mangroves.
- The waterbodies here have also become habitats for freshwater turtles such as the vulnerable Indian flapshell turtle (*Lissemys punctata*) as well as water sources for leopards, jackals, hyenas, barking deer, and migratory birds, among others.

Threats to Sada region:

- The land-use patterns of this region are changing.
- The open land and some of the croplands are increasingly being converted to orchards or residential areas, with various developmental projects set to come up.
- Mining for laterite stones is another threat.

The fact that the sada is also classified as a 'wasteland' in the Wasteland Atlas makes matters worse.



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26. Chagos island

Context: Fifteen fishermen from Kanniyakumari, Tamil Nadu, were detained near Diego Garcia Island, part of the British Indian Ocean Territory (BIOT), for allegedly crossing maritime boundaries.

Chagos island:

Geographical features:

- The Chagos Islands are an archipelago in the central Indian Ocean, located about 500 kilometers (310 miles) south of the Maldives.
- They are a British Overseas Territory, consisting of seven atolls and over 60 individual islands.
- The archipelago is part of a larger underwater mountain chain extending from the Maldives
- The Great Chagos Bank is the world's largest atoll structure.
- The islands form the southern point of a long ridge extending through the central Indian Ocean
- The archipelago contains about 4,000 square kilometers of living coral reefs
- Its location in the central Indian Ocean makes it an important biological stepping stone between African and Indo-Pacific marine ecosystems

History:

- **Discovery and Early Settlement:** The islands were first discovered by Portuguese explorers in the 16th century. Later, the French established coconut plantations on some islands, using enslaved labor from Africa.
- **British Control:** In 1814, the islands came under British control as part of Mauritius.
- **Detachment from Mauritius:** In 1965, the Chagos Islands were separated from Mauritius, three years before Mauritius gained independence. This move was controversial, as it involved the forced removal of the indigenous Chagossian population.

- **US Military Base:** The largest island, Diego Garcia, was leased to the United States in 1966 to establish a military base. The Chagossians were forcibly relocated to Mauritius and the Seychelles.
- **Ongoing Controversy:** The forced removal of the Chagossians and the continued presence of the US military base have been the subject of ongoing controversy and legal challenges.



27. Location of Austria

Context: Austria's sharp-tongued far-right leader Herbert Kickl does not exactly cut a dashing figure but he has skilfully tapped voter anxieties over migration, the war in Ukraine and the Covid-19 pandemic.

Starting from Germany, looking at its direct neighbours on the route to Italy:

- Germany borders Austria and Switzerland on its southern border
- Both Austria and Switzerland border Italy, so we have two possible routes:
 - Germany → Austria → Italy
 - Germany → Switzerland → Italy
- Therefore, looking at the options, we need to cross only one country (either Austria OR Switzerland) to reach Italy from Germany.



28. Ephemeral Island Formation

Context: A mysterious island appeared in the Caspian Sea in 2023 due to a mud volcano eruption and vanished by the following year, fascinating scientists with its transient nature.

Ephemeral Island Formation

- In early 2023, a mud volcano eruption in the Caspian Sea gave rise to a temporary island. By late 2024, the island had nearly disappeared, eroding back into the sea like a fleeting mirage.
- This phenomenon, caused by the Kumani Bank mud volcano—also known as Chigil-Deniz—has occurred multiple times since the volcano's first recorded eruption in 1861.
- Located about 25 kilometres (15 miles) off Azerbaijan's eastern coast, Kumani Bank is known for creating these short-lived islands during its powerful eruptions.
- Satellite imagery from the Operational Land Imager (OLI) on Landsat 8 and OLI-2 on Landsat 9 documented the island's dramatic appearance and gradual shrinking.
- In November 2022, satellite images showed the volcano's crest still submerged beneath the sea. By February 14, 2023, the island had emerged, with a visible sediment plume trailing away from it.
- Further satellite observations indicated the island appeared sometime between January 30 and February 4, measuring roughly 400 meters (1,300 feet) across, according to geologist Mark Tingay of the University of Adelaide.
- By the end of 2024, only a small remnant of the island remained visible above the water.

Rivers flowing into the Caspian Sea:

1. **Volga** - Yes, flows into the Caspian Sea through a large delta in Russia
2. **Ural** - Yes, empties into the Caspian Sea near Atyrau, Kazakhstan
3. **Amu Darya** - No, historically flowed into the Aral Sea (though now mostly dries up before reaching it)
4. **Kura** - Yes, flows into the Caspian Sea in Azerbaijan
5. **Syr Darya** - No, flows into the Aral Sea (or at least used to before extensive irrigation use)
6. **Terek** - Yes, empties into the Caspian Sea in Dagestan, Russia

29. Limpopo River

Context: South African police ended a rescue operation at an abandoned gold mine on Wednesday and said they believe they have brought out all the survivors and retrieved all the bodies after hundreds of miners were trapped for months in one of the country's deepest mines while working illegally.

More on the news:

- At least 78 miners were confirmed dead, police said, and 246 survivors had been rescued. The victims were suspected to have died of starvation or dehydration, civic groups said, although no cause of death has been released for any of them.

Limpopo River:

- It flows through four countries: South Africa, Botswana, Zimbabwe, and Mozambique, eventually emptying into the Indian Ocean
- The Limpopo River forms the boundary between:
 - South Africa and Botswana
 - South Africa and Zimbabwe



30. West African Rivers

Context: Four days after military officers seized power, the Economic Community of West African States slapped tough economic and financial measures on landlocked Niger, one of the world's poorest countries. Inflation in Niger peaked at a record high of 15.5% in June last year before falling towards the end of the year, data from the National Statistics Institute showed.

1. Niger River (Empties into the Atlantic Ocean):

- **Origin:** The Niger River originates in Guinea, flows through Mali, Niger, and Nigeria.
- **Mouth:** It empties into the **Atlantic Ocean** via the Gulf of Guinea.

2. Senegal River (Empties into the Atlantic Ocean):

- **Origin:** It originates from the Fouta Djallon Highlands in Guinea.
- **Course:** Flows through Mali, Senegal, and Mauritania.
- **Mouth:** It empties into the **Atlantic Ocean** at Saint-Louis, Senegal.

3. Volta River (Empties into the Atlantic Ocean):

- **Origin:** The Volta River is formed by the confluence of the Black Volta and White Volta rivers in Ghana.
- **Mouth:** It empties into the **Atlantic Ocean** via the Gulf of Guinea.

4. Zambezi River (Does not empty into the Atlantic Ocean):

- **Origin:** It originates in Zambia and flows through Angola, Namibia, Botswana, Zimbabwe, and Mozambique
- **Mouth:** It empties into the **Indian Ocean** at the Zambezi Delta in Mozambique.

5. Limpopo River (Does not empty into the Atlantic Ocean):

- **Origin:** The Limpopo River originates in South Africa and flows through Botswana, Zimbabwe, and Mozambique.
- **Mouth:** It empties into the **Indian Ocean** near Mozambique.

31. Strait of Johor

Context: Singapore is exploring new initiatives such as manufacturing of semiconductors and building a semiconductor ecosystem in India and participating in the creation of a new generation of technological solutions, the city-state's President, Tharman Shanmugaratnam, said on January 16.

Strait of Johor:

- **Location:** The Strait of Johor is a narrow strait separating the island nation of Singapore from the southernmost tip of Peninsular Malaysia (Johor state).
- **Significance:** It serves as a natural border between Singapore and Malaysia. The Johor–Singapore Causeway, a road and rail link, crosses this strait.



32. Bharathapuzha river

Context: In a tragic incident, four members of a family drowned in the Bharathapuzha river at Cheruthuruthy here on January 16 evening.

About the Rivers:

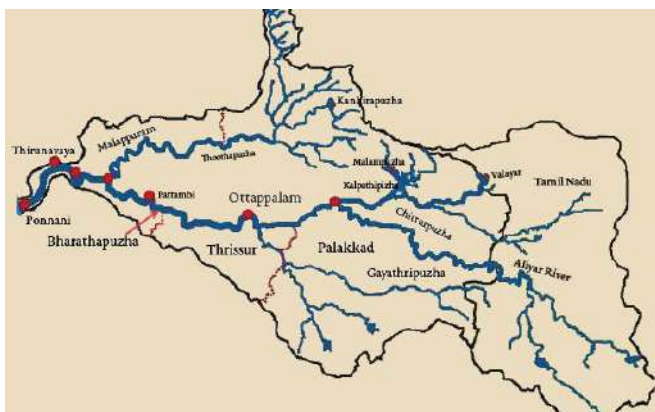
- **Kannadipuzha, Kalpathipuzha, Gayathripuzha, and Thuthapuzha** are significant tributaries of the Bharathapuzha River, which is the second-longest river in Kerala.

Bharathapuzha River (Nila):

- **Length:** Approximately 209 km.
- **Origin:** The river originates from the Anamalai Hills in the Western Ghats in Tamil Nadu and flows through Kerala before draining into the Arabian Sea.
- **Importance:** It is known as the lifeline of central Kerala and is vital for irrigation, drinking water, and cultural heritage.

Tributaries:

- These rivers contribute significantly to the flow of the Bharathapuzha:
 - **Kannadipuzha:** A major tributary originating from the foothills of the Western Ghats.
 - **Kalpathipuzha:** Known for flowing through the Palakkad region.
 - **Gayathripuzha:** Originates in the Nelliampathy Hills and is one of the longest tributaries.
 - **Thuthapuzha:** Originates from the Silent Valley National Park and contributes significantly to the Bharathapuzha.



33. Location of Red Sea

Context: Threats in the Gulf of Aden, Red Sea and in waters adjacent to the East African countries might increase and the Indian Navy is striving to boost its presence and keep the sea routes safe, Defence Minister Rajnath Singh said on January 17.

1. Qeshm Island (Not located in the Gulf of Aden):

- **Location:** Qeshm Island is in the Strait of Hormuz, near the Persian Gulf, and is part of Iran.
- **Relevance to the Gulf of Aden:** The island is far from the Gulf of Aden, being located in the northern Arabian Sea region.

2. Perim Island (Located in the Gulf of Aden):

- **Location:** Perim Island (Mayyun) is located at the southern entrance of the Red Sea, in the Bab-el-Mandeb Strait, which connects the Red Sea to the Gulf of Aden.
- **Relevance to the Gulf of Aden:** It is directly connected to the Gulf of Aden and acts as a strategic point at the entrance.

3. Al-Ikhwan Island (Located in the Gulf of Aden):

- **Location:** Al-Ikhwan Island is part of Yemen and is located within the Gulf of Aden.
- **Relevance to the Gulf of Aden:** This island is directly within the waters of the Gulf of Aden.

4. Hengam Island (Not located in the Gulf of Aden):

- **Location:** Hengam Island is near the Strait of Hormuz, off the southern coast of Iran.
- **Relevance to the Gulf of Aden:** Like Qeshm Island, Hengam is far from the Gulf of Aden and located near the Persian Gulf.



34. Location of South Sudan

Context: South Sudan's police imposed a nationwide curfew from 6 p.m. (1600 GMT) on January 17 after a night of deadly rioting in the capital over the alleged killing of South Sudanese people by the army and allied groups in Sudan.

South Sudan shares borders with the following countries:

- **Sudan:** To the north
- **Ethiopia:** To the east
- **Kenya:** To the southeast
- **Uganda:** To the south
- **Democratic Republic of the Congo:** To the southwest
- **Central African Republic:** To the west



35. Great Salt Lake

Context: The Great Salt Lake has lost significant water over the past three decades, primarily due to water diversions for agriculture, with 80% of agricultural water used for alfalfa and hay crops.

Great Salt Lake (USA)

- Lost over 70% of its surface area
- Reached historic low levels in 2023
- Causes: Climate change, water diversion, drought

Lake Poopó (Bolivia)

- Second largest lake in Bolivia
- Has completely dried up several times

- Causes: Climate change, mining activities, water diversion

Lake Urmia (Iran)

- Lost about 90% of its water volume
- Was once the largest lake in Middle East
- Main causes: Dam construction, agricultural water use

Lake Chapala (Mexico)

- Mexico's largest freshwater lake
- Suffered severe shrinkage periods

Affected by agricultural water use

	Lakes	Locations
1	Lake Poopó	Bolivia
2	Great Salt Lake	USA
3	Lake Urmia	Iran
4	Lake Chapala	Mexico

36. Lake Naivasha, Kenya

Context: For someone who fishes for a living, nothing says a bad day like spending over 18 hours on a lake and taking home nothing. Recently, a group of fishermen were said to be stranded on Kenya's popular Lake Naivasha for that long and blamed the water hyacinth that has taken over large parts of it.

The mountain nearest to equator:

- Mount Kenya: 0°10'S (0.17°S)
- Mount Kilimanjaro: 3°04'S (3.07°S)
- Mount Kinabalu: 6°05'N (6.08°N)
- Mount Apo: 6°59'N (6.98°N)

Mount Kenya is the nearest to the equator, being only about 0.17 degrees south of the equator.



37. Location of Colombia

Context: A fresh outbreak of guerrilla violence amid a faltering peace process in conflict-riddled Colombia has left more than 80 people dead in just over three days, officials reported on January 19.

Colombia shares borders with five South American countries:

- Venezuela to the east
- Brazil to the southeast
- Peru to the south
- Ecuador to the south
- Panama to the northwest



38. Volcanoes & Locations

Context: A volcano in eastern Indonesia has erupted at least a thousand times this month, according to an official report Sunday as efforts were underway to evacuate thousands of villagers living near the rumbling mountain.

More on the news:

- Mount Ibu, on the remote island of Halmahera in North Maluku province, sent a column of smoke up to four kilometers (2.5 miles) into the sky in an eruption January 15.

	Volcanoes	Locations
1	Ebeko	Russia
2	Nyamulagira	Democratic Republic of Congo
3	Kanlaon	The Philippines
4	Mount Ibu	Indonesia

39. Ambohiby's Volcanic Features

Context: From the International Space Station, an astronaut photographed Madagascar's Ambohiby volcanic complex, showcasing a blend of ancient geology and modern human pressures.

Ambohiby's Volcanic Features

- An astronaut aboard the International Space Station (ISS) captured the image above of the Ambohiby volcanic complex, located in the central highlands of Madagascar.
- The extinct volcanic crater is approximately 15 kilometers (9 miles) wide.
- Most of the landscape in the image is light brown, indicating a lack of forest cover.
- In contrast, greener areas farther west (along the left third of the image) retain more of the original forest of Madagascar's central highlands.

Geological History and Structure

- Geologists estimate that the Ambohiby complex formed around 90 million years old, during the breakup of the ancient supercontinent Gondwana.
- The volcanic structure is characterized by semi-concentric rings, which are highlighted by dark rock ridges that form curved hills.
- Just east of the crater, two parallel fault lines can be seen.
- These faults are common in areas where volcanic activity has occurred in the past.

Human Impact and Local Agriculture

- Towns exist in and around Ambohiby, but their small size makes them difficult to discern at the resolution of this image.
- Brighter patches are fields on flat, easy-to-plow upland surfaces.
- A dark, rectangular patch within the crater appears to be a burned area over a plot of land.

Environmental Changes in Madagascar

- Natural forests once covered a majority of Madagascar's surface.
- But in the past several decades, the island nation's population has increased rapidly—from 5 million in 1960 to 27 million in 2020.
- One major consequence of the population growth is that the natural forest is now being lost at one of the fastest rates in the world.
- Trees are cut to clear the land for new pasture and farmland and for fuel and building materials.



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40. Vaigai River

Context: The Madurai Bench of the Madras High Court has directed local bodies in Tamil Nadu's to prepare an actionable timeline to rejuvenate the Vaigai River.

From south to north, the rivers are arranged as follows:

1. Vaigai (Tamil Nadu)
2. Ponnaivar (Tamil Nadu)
3. Palar (Tamil Nadu)
4. Pennar (Andhra Pradesh)
5. Brahmani (Odisha)



41. Jawaharlal Nehru Port Authority

Context: The Jawaharlal Nehru Port Authority (JNPA) in Mumbai is set to become India's first port to enter top global ports with 10 million TEUs (twenty-foot equivalent units) by 2027, Union Minister of Ports, Shipping & Waterways, Sarbananda Sonowal, said on January 21 after launching projects worth nearly ₹2,000 crore towards expanding capacity at the JNP Port.

1. Syama Prasad Mookerjee Port (Kolkata Port)

Kolkata Port, officially known as Syama Prasad Mookerjee Port, is India's oldest operating port and the only major riverine port in the country. Situated in Kolkata, West Bengal, it is approximately 203 kilometres from the sea and was established by the British East India Company.

- **Infrastructure Enhancements:** The port comprises two main dock systems:
 - **Kolkata Dock System (KDS):** Primarily handles container traffic.
 - **Haldia Dock Complex (HDC):** Designed for larger vessels due to its deep-water capabilities.
- **Export and Import:** Exports tea, jute products, and textiles, and imports coal, fertilisers, and machinery, with direct shipping services enhancing trade with ASEAN countries.

2. New Mangalore Port

New Mangalore Port, also known as New Mangalore Port Trust (NMPT), is a major all-weather **port** in Panambur, Mangalore, Karnataka. Established in 1975, it is the only major port in Karnataka. Covering approximately 480 hectares, it features the deepest inner harbour on the west coast of India.

- **Export:** Iron ore concentrates and pellets, iron ore fines, manganese, granite stones, coffee, cashew nuts, and containerised cargo.
- **Imports:** Crude oil, petroleum products, LPG, wood pulp, timber logs, and fertilisers.

3. Deendayal Port (Kandla Port)

Deendayal Port, formerly Kandla Port, is a major seaport in Gujarat's Kutch district, established in 1955 and it was renamed as Deendayal Port in 2017 under Indian Ports Act, 1908.

- **Strategic Location:** Situated in Kandla Creek, 90 km from the Gulf of Kutch, it is a protected natural harbour and a critical trade gateway.
- **Cargo Handling:** India's largest port by cargo volume, handling approximately 132.3 million metric tonnes (MMT) in 2023–24.
- **Export and Import:** Specializes in bulk liquid and dry cargo, including petroleum, chemicals, grains, salt, and textiles.
- A **Satellite port** (one that already exists or is created near a port that is reaching capacity) is proposed between **Tuna-Tekra** and **Kandla Creek**.
- **Trade Facilitation:** The port will enhance trade through key corridors, including:
 - India-Middle East-Europe Economic Corridor (IMEEC).
 - International North-South Transportation Corridor (INSTC).

42. Lakes of the world

Context: January 21, fire at the Grand Kartal Hotel, in Kartalkaya, in the Koroglu mountains in Bolu province left at least 79 people dead and 51 injured. It came near the start of a two-week winter break for schools when hotels in the region are filled to capacity.

Lakes in descending order of their depth:

1. **Lake Baikal (Russia):** 1,642 meters (5,387 feet)
2. **Caspian Sea (Eurasia):** 1,025 meters (3,363 feet)
3. **Lake Van (Turkey):** 451 meters (1,480 feet)
4. **Lake Chad (Chad, Cameroon, Niger, and Nigeria):** 15 meters (4.6 meters)

43. Cabo Verde

Context: The World Bank's new report estimates that Cabo Verde, a small archipelago located off the coast of West Africa, will need to invest \$842 million over 2024-2030, to address its climate and development challenges.

About Cabo Verde:

- **Location:** Cabo Verde is an island nation situated in the Atlantic Ocean, approximately 570 kilometres west of Senegal, off the northwestern coast of Africa.
- **Neighbour nations:** The nearest country is **Senegal** on the African mainland.
- **Capital:** Praia, located on Santiago Island.
- **Geographic features:**
 - **Volcanic islands:** Cabo Verde consists of 10 volcanic islands divided into the Barlavento (windward) and Sotavento (leeward) groups.
 - **Climate:** The islands experience a moderate climate with stable temperatures but are extremely arid.
 - **No Major Rivers:** Due to its arid climate, Cabo Verde lacks major rivers, relying instead on rainfall and underground water resources.

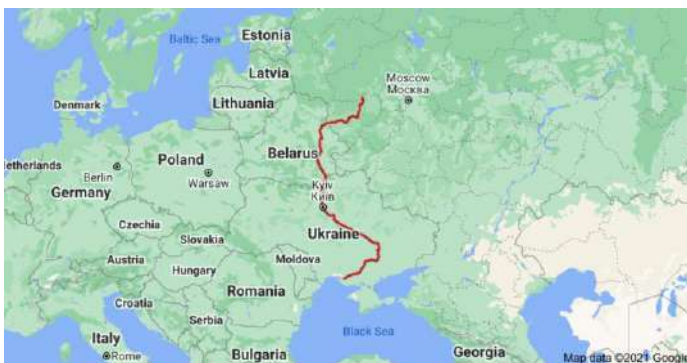
	Name of archipelagos	Associated Oceans
1	Aleutian Islands	Pacific Ocean
2	Azores Islands	Atlantic Ocean
3	South Georgia Islands	Southern Ocean
4	Svalbard Archipelago	Arctic Ocean

44. Dnieper River

Context: With many of his political opponents either jailed or exiled abroad, the 70-year-old authoritarian leader Alexander Lukashenko is back on the ballot; unlike the 2020 election, he now faces only token challengers; he was first elected in 1994; early voting began on January 21 and concludes on January 26.

The **Dnieper River** flows through **three** of the listed countries:

1. **Russia** (its source is in the Valdai Hills in Russia)
2. **Belarus** (it flows through central and southern Belarus)
3. **Ukraine** (it is the longest river in Ukraine and flows through Kyiv and other major cities before emptying into the Black Sea)



45. Location of Lebanon

Context: Israel announced on January 24 that the withdrawal of its forces from southern Lebanon would continue beyond the 60-day period stipulated in a November ceasefire agreement with Hezbollah.

Lebanon and Anti-Lebanon Mountain range:

- The Lebanon and Anti-Lebanon are two parallel mountain ranges in the eastern Mediterranean region.
- The Lebanon Mountains are located in western Lebanon, while the Anti-Lebanon Mountains form the border between Lebanon and Syria, with the Beqaa Valley separating the two ranges.



46. Location of Bulgaria

Context: The 31st Surva International Festival of Masquerade Games has brought together over 12,000 participants in Pernik, Southwestern Bulgaria, the Pernik Municipality's press center said on Sunday. By comparison, last year's festival attracted 10,000 attendees.

Bulgaria's neighbouring countries:

1. Romania (to the north, separated by the Danube River)
2. Serbia (to the west)
3. North Macedonia (to the southwest)
4. Greece (to the south)
5. Turkey (to the southeast)



47. Differences Between Seas and Oceans

Context: When we think of vast bodies of water, our minds often drift to images of endless blue horizons, waves crashing against sandy shores, and the serene quietness of aquatic life. But what exactly differentiates a sea from an ocean?

Differences Between Seas and Oceans

• Geographical Location

- Oceans are vast, continuous bodies of saltwater covering about 71% of Earth's surface.
- There are five major oceans: Pacific, Atlantic, Indian, Southern, and Arctic.
- Oceans are interconnected, allowing water and marine life to flow globally.
- Seas are smaller, mostly enclosed by land, and connected to oceans through narrow passages.
- Notable seas include the Mediterranean Sea, Caribbean Sea, and South China Sea.
- Seas are more accessible for fishing, shipping, and tourism.

• Depth and Volume

- Oceans are significantly deeper and hold more water than seas.
- Average ocean depth: 12,080 feet (3,682 meters); deepest point (Challenger Deep): 36,070 feet (10,994 meters).
- Oceans contain abyssal plains, trenches, and mid-ocean ridges.
- While the deepest trenches are found in oceans, seas can also have trenches. For example, Caribbean Sea has Cayman Trench (depth of about 7,686 meters) and Puerto Rico Trench (depth of about 8,376 meters).
- Seas are relatively shallower, with depths ranging from hundreds to a few thousand feet. Example: The Mediterranean Sea has an average depth of 4,900 feet (1,500 meters).
- Shallower depth allows greater light penetration, affecting marine life diversity.

• Salinity Levels

- Seas generally have higher salinity due to proximity to land, river inflow, and evaporation.
- Example: The Dead Sea has extremely high salinity due to high evaporation and minimal freshwater influx.
- Oceans maintain relatively stable salinity levels due to continuous water movement.
- Average ocean salinity: ~35 ppt (parts per thousand).

• Climate Influence

- Oceans regulate Earth's climate by absorbing and releasing solar heat.
- Ocean currents distribute heat globally, impacting weather patterns.
- Seas influence regional climates, particularly coastal areas, but have less global impact.
- The smaller size and shallower depth of seas result in less heat storage capacity.

48. Lake Chad

Context: In a classroom nestled in Cameroon's lush highlands, a former rebel fighter teaches logic and philosophy. His students know him as calm and thoughtful, but his past tells a more turbulent story.

Lake Chad:

Lake Chad is a large, shallow lake in the Sahel region of Africa. It's unique because it sits at the intersection of four countries:

- **Chad:** The lake is named after this country, and a significant portion of it lies within Chad's borders.
- **Cameroon:** A smaller part of the lake extends into Cameroon.
- **Niger:** The western edge of Lake Chad touches Niger.
- **Nigeria:** The southwestern portion of the lake is within Nigeria.



49. Kailash Mansarovar Route

Context: India and China on Monday decided to resume the Kailash Mansarovar Yatra, stopped since 2020. The decision was made at the meeting between foreign secretary Vikram Misri and Chinese foreign minister Wang Yi.

Kailash Mansarovar Route:

There are two main routes to reach Kailash Mansarovar:

Via Nepal (Lipulekh Pass)

- Starting point: New Delhi → Kathmandu → Nepalgunj → Simikot → Hilsa
- Then crossing into Tibet/China through Lipulekh Pass
- Considered relatively easier but longer route

Via China/Tibet (Nathu La Pass)

- Starting point: New Delhi → Gangtok (Sikkim)
- Then entering Tibet through Nathu La Pass
- Motorable road available
- Shorter but more expensive route

Via Uttarakhand (Lipulekh Pass)

- Starting point: New Delhi → Dharchula (Uttarakhand)
- Through Lipulekh Pass into Tibet
- This is now facilitated by the new road to Lipulekh Pass

While,

- The Shipki La Pass route in Himachal Pradesh is not an official route for the Kailash Mansarovar Yatra. The recognized routes are via **Lipulekh Pass (Uttarakhand)** and **Nathu La Pass (Sikkim)**, along with the **route via Nepal**.

50. Location of Laos

Context: The Indian embassy in Laos has rescued 67 Indian men who were duped and trafficked into cyber-scam centres operating at a special economic zone, taking the total number of citizens saved from such scams in the Southeast Asian country to 924, the mission said in a statement.

Laos is a landlocked country in Southeast Asia, and it shares borders with the following neighboring countries:

1. **China** - to the north
2. **Vietnam** - to the east
3. **Cambodia** - to the southeast
4. **Thailand** - to the west
5. **Myanmar (Burma)** - to the northwest



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51. Highest Peaks and associated countries

Context: In an effort to honour William McKinley, Trump ordered renaming of North America's tallest peak from Denali back to Mount McKinley; the U.S. Board on Geographic Names will play a vital role; it ensures geographic names accurately represent the nation's history and changing face.

	Highest Peaks	Countries
1	Denali (Mount McKinley)	USA
2	Mount Aconcagua	Argentina
3	Mount Catherine	Egypt
4	Mont Elbrus	Russia

52. Storm Eowyn

Context: Storm Eowyn, a bomb cyclone, has caused widespread destruction across the British Isles, particularly in Ireland and Scotland.

What is Storm Eowyn?

- Storm Eowyn is a powerful bomb cyclone, characterized by its rapid drop in air pressure (50 millibars within 24 hours), more than double the threshold for "explosive cyclogenesis."
- It originated on January 22, 2025, off the eastern US coast and rapidly traversed the North Atlantic, covering 2,000 miles to reach western Scotland by January 24, 2025.

Impacted Region:

- The storm has severely affected Ireland and Scotland, with gusts reaching up to 114 mph at Mace Head, Ireland.

What is a Bomb Cyclone?

- A bomb cyclone is a rapidly intensifying storm system characterized by a sudden and significant drop in atmospheric pressure. It occurs when the central pressure of a storm system drops by at least 24 millibars within 24 hours—a process known as bombogenesis.

- These storms are often associated with extreme weather, including heavy snowfall, strong winds, coastal flooding, and blizzard conditions.

How Does a Bomb Cyclone Form?

A bomb cyclone typically develops when:

1. **Cold and Warm Air Masses Collide** – When cold, dry air from the Arctic meets warm, moist air from tropical regions, it creates an unstable atmospheric condition.
2. **Rapid Pressure Drop** – The sharp temperature contrast causes air to rise quickly, leading to a rapid decrease in barometric pressure.
3. **Strong Winds and Storm Intensification** – The steep pressure gradient leads to powerful winds and storm intensification.
4. **Moisture Supply** – If the storm system is over an ocean, warm waters provide additional moisture, fueling heavy precipitation.

Where Do Bomb Cyclones Occur?

- **North America:** Common along the East Coast (Nor'easters) and Midwest.
- **North Atlantic & Europe:** Can cause severe winter storms.
- **Northwestern Pacific:** Leads to intense storms affecting Japan and Russia.
- **Southern Hemisphere:** Similar systems can occur near Antarctica.

Impacts of a Bomb Cyclone

- **Heavy Snowfall & Blizzards:** Can disrupt transportation and cause power outages.
- **Hurricane-Force Winds:** Can damage infrastructure and cause coastal flooding.
- **Severe Rain & Flooding:** In coastal areas, storm surges can lead to flooding.

Extreme Cold & Wind Chill: Can make temperatures feel significantly lower, posing risks to humans and animals.

Why is the Magnetic North Pole Moving?

- Scientists hypothesize that activity in Earth's core is driving the magnetic pole to shift.
- The molten iron and other metals in Earth's core generate the planet's magnetic field.
- As this liquid iron flows into the outer shell of the planet, changes occur, causing the magnetic field to adjust, resulting in a shift of the magnetic pole.

What is the Magnetic North Pole?

- The magnetic North Pole is a point on Earth's surface where the planet's magnetic field lines converge vertically.
- Unlike the geographic North Pole, which remains fixed, the magnetic North Pole drifts due to changes in Earth's magnetic field.
- The drift is influenced by the movement of Earth's molten core.

How Do Scientists Track the Movement?

- Scientists use the **World Magnetic Model (WMM)**, which predicts the magnetic North Pole's location based on data from ground measurements and satellites.
- The WMM is updated every five years, providing detailed tracking of the magnetic pole's patterns and movements.

Accelerated and Fluctuating Movement of the Magnetic North Pole

- The magnetic North Pole has been moving faster over recent decades, having been first discovered about 400 km from Canada in 1831.
- The pole has since drifted toward Russia, with recent movement showing it getting closer to Siberia.
- From 1990 to 2000, the pole drifted at 55 km per year, but the speed decreased to about 35 km per year by 2015.
- This rate of drift fluctuates and is closely monitored, with the WMM providing updated predictions.

Importance of the Magnetic North Pole's Movement for Navigation and Protection

- The movement of the magnetic North Pole is crucial for navigation systems, such as **GPS** and **compasses**, which rely on Earth's magnetic field.
- The magnetic field also acts as a shield against harmful solar radiation.

By understanding the drift of the magnetic North Pole, scientists can predict future changes in Earth's magnetic field, which may affect navigation systems and environmental protection.

53. Geographical entities located in Ethiopia

Context: Ethiopia is waging an “escalating crackdown” on civil society, Human Rights Watch said on January 29, denouncing the suspension of two independent human rights groups in recent weeks.

Geographical entities located in Ethiopia:

1. **Blue Nile River:** The Blue Nile originates from **Lake Tana** in Ethiopia and flows through the country before joining the White Nile in Sudan.
2. **Lake Tana:** Lake Tana is located in northern Ethiopia and is the source of the Blue Nile.
3. **Danakil Desert:** The Danakil Desert is located in northeastern Ethiopia, extending into Eritrea and Djibouti. It is known for its extreme heat and volcanic activity.
4. **Ogaden Desert:** The Ogaden Desert is an arid region located in southeastern Ethiopia.
5. **Lake Nakuru:** Lake Nakuru is located in **Kenya**, not Ethiopia. It is part of the Great Rift Valley and is famous for its flamingos.



54. Mount Taranaki

Context: A mountain in New Zealand considered an ancestor by Indigenous people was recognized as a legal person on January 30 after a new law granted it all the rights and responsibilities of a human being.

More on the news:

- Mount Taranaki — now known as Taranaki Maunga, its Māori name — is the latest natural feature to be granted personhood in New Zealand, which has ruled that a river and a stretch of sacred land are people before.
- The pristine, snow-capped dormant volcano is the second highest on New Zealand's North Island at 2,518 meters (8,261 feet) and a popular spot for tourism, hiking and snow sports.
- The legal recognition acknowledges the mountain's theft from the Māori of the Taranaki region after New Zealand was colonized.
- It fulfils an agreement of redress from the country's government to Indigenous people for harms perpetrated against the land since.

55. Location of South Africa

Context: A daughter of former South African President Jacob Zuma was arrested Thursday and appeared in a court on terrorism charges for allegedly inciting violence through social media posts before and during riots that shook the country four years ago and left more than 350 people dead.

South Africa shares borders with the following countries:

- **Namibia**
- **Botswana**
- **Zimbabwe**
- **Mozambique**
- **Eswatini (formerly Swaziland)**
- It also completely surrounds the country of **Lesotho**



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ENVIRONMENT

1. Blossoming Seas: The Marvel of Phytoplankton

Context: Satellite images from late December 2024 revealed a stunning phytoplankton bloom off the Patagonian Shelf, illustrating the rich aquatic diversity and productivity in the South Atlantic.

More about the news:

- The vibrant swirls of green and blue captured by NASA's PACE satellite not only highlight the natural beauty but also the ecological significance of these blooms in global carbon cycling and marine health.

Blossoming Seas: The Marvel of Phytoplankton

- Bloom season has been underway for several months, showcasing vibrant activity in the nutrient-rich South Atlantic waters off Argentina.
- During austral spring 2024, satellites captured a striking image of a large phytoplankton bloom along the Patagonian Shelf. These tiny aquatic organisms thrived through the extended daylight of the Southern Hemisphere summer, coloring the ocean's surface in vivid shades of green and blue into late December.

Technological Insight: Satellite Monitoring of Oceanic Phenomena

- On December 28, 2024, the Ocean Color Instrument (OCI) aboard NASA's PACE (Plankton, Aerosol, Cloud, ocean Ecosystem) satellite captured an intricate image of the bloom swirling around the Falkland Islands (Islas Malvinas).
- The Patagonian Shelf-break front, enriched by airborne dust, iron-laden currents, and deep ocean upwelling, provides an abundance of nutrients that fuel these phytoplankton communities.
- These microscopic sunlight harvesters not only drive the region's rich aquatic diversity but also sustain productive fisheries.

Dynamic Shifts in Marine Life

- The various colours visible in the image likely reflect a mix of phytoplankton communities.

- The proportions of these communities change throughout the months-long bloom based on nutrient availability and other environmental factors.
- In this scene, chlorophyll-rich diatoms and other phytoplankton types that colour the water green may be giving way to coccolithophores, said Ivona Cetinić, an oceanographer at Morgan State University and member of NASA's Ocean Ecology lab.

2. Country's Groundwater Resources

Context: The Central Ground Water Board (CGWB), in collaboration with State Groundwater Departments, releases annual reports on groundwater resources. The 'National Compilation on Dynamic Ground Water Resources of India, 2024' offers a comprehensive state-wise overview, serving as a foundation for effective policies and management strategies.

Country's Groundwater Resources

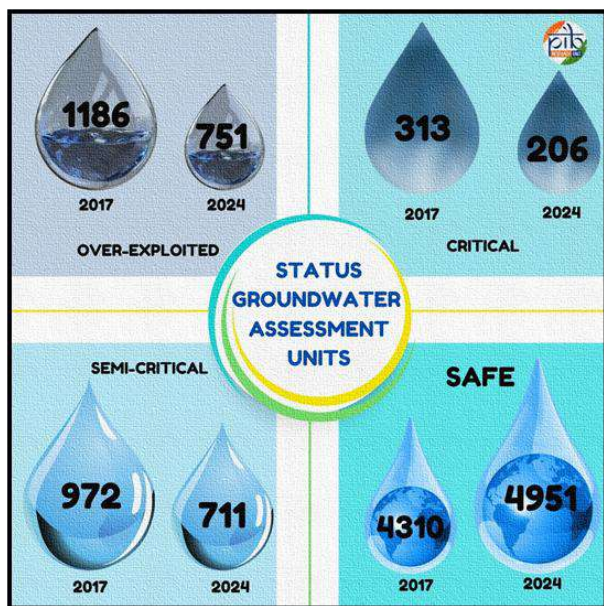
- According to the latest report, the total annual groundwater recharge is assessed at 446.90 Billion Cubic Meters (BCM), with an extractable resource of 406.19 BCM and an annual extraction of 245.64 BCM.
- The report highlights increased recharge, mainly due to water bodies, tanks, and conservation structures and shows improvements in groundwater.

conditions in 128 units compared to 2023.



The year 2024 has seen positive advancements in several key areas, with notable highlights including:

- **Total Annual GW Recharge has increased (15 BCM) substantially and Extraction has declined (3 BCM) in 2024 from 2017 assessment.**
- Recharge from Tanks, Ponds and WCS (Water Control System) has shown a consistent increase in the last five assessments. In the year 2024, it has increased by 0.39 BCM w.r.t. 2023.
- With respect to the year 2017, there is an increase of 11.36 BCM in recharge from Tanks, Ponds & WCS (from 13.98 BCM in 2017 to 25.34 BCM in 2024).
- The percentage of Assessment Units under Safe Category have increased from 62.6% in 2017 to 73.4 % in 2024. The percentage of Over Exploited Assessment units have declined from 17.24 % in 2017 to 11.13 % in 2024.



Clean Groundwater: Essential for Future Generations

- Maintaining groundwater quality is just as crucial as its recharge for sustainable water management. Key pollutants such as **Arsenic, Fluoride, Chloride, Uranium, and Nitrate** pose serious health risks, either through direct toxicity or long-term exposure. Additionally, Elevated Electrical Conductivity (EC) can indicate contamination from agricultural runoff, industrial discharge, or saline intrusion, while Iron contamination may lead to gastrointestinal issues, highlighting the importance of careful water quality monitoring.

- To assess the critical areas impacted by contamination, the **Annual Groundwater Quality Report for 2024** offers a comprehensive analysis of groundwater quality across India, drawing insights from data collected at over 15,200 monitoring locations and 4,982 trend stations. The report emphasizes the importance of not only preserving groundwater but also ensuring its quality for effective, long-term water management.
- The report further reveals that **81% of groundwater samples are suitable for irrigation, with 100% of groundwater samples from the North-Eastern states being rated "excellent" for irrigation, underscoring the favorable conditions for agriculture in the region.**

3. Umred-Pauni-Karhandla Wildlife Sanctuary

Context: The Bombay High Court took suo moto cognizance of an incident involving tourists cornering a tigress and her cubs in Umred-Pauni-Karhandla Wildlife Sanctuary, exposing lapses in wildlife protection and monitoring protocols.

About Umred-Pauni-Karhandla Wildlife Sanctuary:

- It is spread over Pauni tehsil in Bhandara district and Umred, Kuhi, and Bhivapur Taluka of Nagpur district in Maharashtra.
- It was established in 2013 and is spread across an area of 189 sq. km.
- The Wainganga River and the Gose Khurd Dam lie along the northeast boundaries of the sanctuary, while State Highway 9 and Bhivapur Town bound the southern side.
- The forest along the Wainganga River connects this sanctuary to the Tadoba Andhari Tiger Reserve.
- It lies 80 km from Pench Tiger Reserve and 50 kilometers southwest of Nagzira Wildlife Sanctuary.

- **Flora:**

- The forest is made up of **teak, bamboo, tendu**, mahua, and other indigenous tree species.
- **Teak makes up 60 percent** of the crop composition.

- **Fauna:** The sanctuary is home to resident breeding **tigers**, herds of **Gaur**, wild dogs, and also **rare animals like flying squirrels, pangolins**, and honey badgers.

4. Greenhouse gas emission (GHG) inventory report

Context: As part of its global climate commitments, India recently submitted its latest report detailing its greenhouse gas emission (GHG) inventory and the efforts it has taken to curb emissions.

More about the report:

- The report highlighted that the emissions intensity of its gross domestic product (GDP), which reflects the energy efficiency of its economic activities, reduced by 36% between 2005 and 2020.
- The report also detailed sources of emissions, and the status of targets spelt out on climate action.

What is the Biennial Update Report (BUR)?

- Under the United Nations Framework Convention on Climate Change (UNFCCC), developing countries are obliged to submit a detailed report on their efforts towards climate action.
- This report, submitted as part of obligations under the Paris climate agreement, is called the Biennial Update Report or BUR.
- Important submissions in BURs comprise an overview of the country's national circumstances vis-à-vis climate, socio-economic factors, and forestry, as well as a detailed inventory of the national greenhouse gas (GHG) emissions, their sources, and natural sinks.
- It also contains important updates on national action plans to mitigate emissions, methods to measure those actions along with information on the financial, technological and capacity-building support the country has received to combat climate change.

India's updated NDCs:

In August 2022, India updated its NDCs to UNFCCC, under which India has promised **three main targets for 2030:**

- 45 percent reduction in **emission intensity** (emission per unit of GDP) from 2005 levels.
- 50 percent share of **renewables** in electricity generation.
- Creation of 2.5 to 3 billion tonnes of **additional carbon sink** through forests.

Rest of the targets are part of Panchamrita that India is aspiring to achieve.

5. Hollongapar Gibbon Wildlife Sanctuary

Context: The Standing Committee of the National Board for Wildlife (NBWL), chaired by the Union Environment Minister has approved a proposal to carry out oil and gas exploration in the eco-sensitive zone of the Hollongapar Gibbon Wildlife Sanctuary in Assam's Jorhat district.

About Hollongapar Gibbon Wildlife Sanctuary:

- It is located in the Jorhat district of **Assam, India**.
- It is the only sanctuary in India named after a gibbon due to its distinction for containing the densest gibbon populations in Assam.
- It is situated at an altitude between 100 and 120 m (330 and 390 ft), the topography gently slopes downward from southeast to northwest.
- **River:** The **Bhogdoi River** creates a waterlogged region dominated by semi-hydrophytic plants along the border of the sanctuary.
- **Flora:**
 - The upper canopy of the forest is dominated by the Hollong tree, while the Nahar dominates the middle canopy.
 - The lower canopy consists of evergreen shrubs and herbs.

- **Fauna:**

- It contains India's only **gibbons—the hoolock gibbons**, and Northeastern India's only nocturnal primate—the **Bengal slow loris**.
- Also found at the sanctuary are Indian elephants, tigers, leopards, jungle cats, wild boar, three types of civet, four types of squirrels, stump-tailed macaque, northern pig-tailed macaque, etc.

Hoolock gibbon:

The Hoolock gibbon is notable as the only species of ape found in India, and it resides in the dense forests of Northeast India. Key details include:

- **Geographical Distribution:** Primarily found in the states of Assam, Arunachal Pradesh, Nagaland, and other northeastern regions.
- **Habitat:** Prefers tropical evergreen forests, where it is arboreal and diurnal.
- **Conservation Status:** Listed as **Endangered** on the IUCN Red List due to habitat loss, deforestation, and hunting.
- **Behavior and Characteristics:** Unlike monkeys, it does not have a tail and is highly agile, swinging between trees using its arms (a behavior known as brachiation).

6. Mission Mausam

Context: Prime Minister Narendra Modi on Tuesday will launch 'Mission Mausam', a groundbreaking initiative aimed at making India a weather-ready and climate-smart nation, as part of the celebrations marking the 150th Foundation Day of the India Meteorological Department (IMD).

More about the news:

- The event, set to take place at Bharat Mandapam in New Delhi, marks a significant step in the country's efforts to strengthen its weather surveillance and climate resilience capabilities.

The mandate of the mission:

- Mission Mausam focuses on enhancing atmospheric observations with next-generation radars, satellites, and high-performance computers, while improving the understanding of weather and climate processes.

- The mission will also provide critical air quality data to aid long-term weather management and intervention strategies.

- In addition to launching Mission Mausam, PM Modi will unveil the IMD Vision-2047 document, which outlines a roadmap for weather resilience and climate change adaptation.
- The plan highlights advancements in weather forecasting, climate change mitigation, and weather management strategies.

Implementing agencies:

- Approved by the Union Cabinet in September 2024, Mission Mausam comes with a budget of Rs 2,000 crore over two years.
- The project will primarily be implemented by the **India Meteorological Department, the Indian Institute of Tropical Meteorology, and the National Centre for Medium-Range Weather Forecasting.**

Benefits of the mission:

- The mission is expected to benefit a wide array of sectors, including agriculture, disaster management, defence, aviation, energy, and health.
- Additionally, it will support data-driven decision-making in urban planning, transport, and environmental monitoring.

7. Nagarahole Tiger Reserve

Context: Visitors to Nagarahole Tiger Reserve in Karnataka are likely to spot Spotted deer, whose population has steadily increased to 28 per sq. km.

About Nagarahole Tiger Reserve:

1. Location:

- a. The reserve covers an area of approximately **847.981 sq km** in the districts of **Mysore and Kodagu** in Karnataka.
- b. **Water Bodies:** Nagarahole River flows through the reserve and joins the Kabini River, which forms a boundary with Bandipur Tiger Reserve.

- c. **Contiguity:** Connected with Wayanad Wildlife Sanctuary (Kerala) and Bandipur Tiger Reserve (Karnataka).

2. Origin and History:

- a. The reserve has a rich history dating back to the reign of the Wodeyar dynasty, the former rulers of the Kingdom of Mysore, when Nagarhole was an exclusive hunting reserve for the kings.
- b. It was subsequently established as a wildlife sanctuary by Coorg State in 1955, upgraded to a national park in 1988, and brought under the fold of Project Tiger in 1999.

3. Ecological Characteristics:

a. Vegetation:

- The predominant vegetation is of **southern tropical, moist, mixed deciduous type**, with a **substantial eastern portion** transitioning into dry deciduous type.
- The forests are interspersed with **swampy fallows** called '**hadlu**,' dominated by **grasses and sedges**, providing a **favorable habitat for wild herbivores**.
- Commercially important trees** such as **rosewood, teak, sandalwood, and silver oak** are found in the reserve.

b. Fauna:

- The reserve supports a **diverse assemblage of carnivores and herbivores**, including **tigers, leopards, Asiatic wild dogs, sloth bears, Asiatic elephants, gaurs, sambar, chital, muntjac, four-horned antelopes, wild pigs, and mouse deer**.
- The **South-western langur** is also found in the reserve.



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8. Munnar Wildlife Division

Context: A faunal survey in the Munnar Wildlife Division has led to the addition of 24 new species of birds, butterflies, and odonates to its checklist.

More on the news:

- The exercise, undertaken by the Forest Department in association with the Travancore Nature History Society, simultaneously surveyed the Mathikettan Shola National Park (MSNP), Pambadum Shola National Park (PSNP), Anamudi Shola National Park (ANP), Kurinjimala Wildlife Sanctuary (KWLS), Eravikulam National Park (ENP), and Chinnar Wildlife Sanctuary (CWLS) from January 8 to 12.
- The area, lying between 500 and 2,800 metres in elevation, was surveyed by 21 teams comprising 78 delegates.
- A total of 217 species of birds were documented during the survey, including 11 new species, thereby increasing the bird population in the Munnar Wildlife Division to 258.
- The additions include the Brown Hawk Owl, Barred Buttonquail, Spotted Owlet, Mottled Wood Owl, Baya Weaver, Red Munia (Red Avadavat), Richard's Pipit, Jerdon's Bushlark, Golden-Headed Cisticola, Large Grey Babbler, and Chestnut-Bellied Nuthatch.

- Eravikulam National Park (ENP) and Anamudi Shola National Park (ANP):** These two parks are geographically close to each other, both being part of the **Western Ghats** in the Idukki district.
- Mathikettan Shola National Park (MSNP) and Pambadum Shola National Park (PSNP):** Both parks are located in the Idukki district and are contiguous, with MSNP near Poopara and PSNP closer to Munnar.
- Anamudi Shola National Park (ANP) and Pambadum Shola National Park (PSNP):** These two parks lie next to each other, both being part of the Shola forests in the Idukki district.

Pambadum Shola National Park (PSNP) and Eravikulam National Park (ENP): Although both are in the Idukki district, they are not directly contiguous. ENP lies to the northwest of Munnar, while PSNP is situated to the southeast, with other areas such as Kurinjimala Wildlife Sanctuary lying in between.

9. Indian Grey wolf

Context: A wolf has given birth to eight pups at the Bankapur Wolf Sanctuary in Koppal district recently.

About Indian Grey wolf:

- It is a subspecies of grey wolf that ranges from Southwest Asia to the Indian Subcontinent.
- **Behavior:** It travels in smaller packs and is less vocal than other variants. They are nocturnal and hunt from dusk to dawn.
- **Appearance:** It is intermediate in size lies between the Tibetan and Arabian wolf, and lacks the former's luxuriant winter coat due to its living in warmer conditions.
- **Habitat:** The Indian wolf inhabits areas dominated by scrub, grasslands and semi-arid pastoral agro-ecosystems. They live in warmer conditions.
- **Distribution:** It has a wide distribution range that extends from the Indian subcontinent to Israel.
- As per IUCN's Red Book Indian grey wolves are classified as Least Concern species.
- Wildlife (Protection) Act of 1972 classifies them as Schedule I species.

Threat: This species population is getting impacted by Habitat loss and depletion of prey species etc.

10. Asan Wetland

Context: In a significant citizen science effort, a bird counting campaign at the Asan Wetland in Dehradun district of Uttarakhand has yielded impressive results, with volunteers identifying 5,225 birds across 117 different species.

About Asan Wetland:

- **Location:** Situated in Dehradun district, Uttarakhand, at the confluence of the Asan River and the Eastern Yamuna Canal.
 - Lies near the borders of Uttarakhand and Himachal Pradesh.
- **Rivers and History:**
 - Created due to the damming of the Asan River at the Asan Barrage (Dhalipur Lake) in 1967 during the construction of the Dhalipur powerhouse.

- Declared Uttarakhand's **first Ramsar site** in 2020, highlighting its global ecological significance.

	Ramsar Sites	Locations
1	Ankasamudra Bird Conservation Reserve	Karnataka
2	Nandur Madhameshwar	Maharashtra
3	Asan Conservation Reserve	Uttarakhand
4	Pala Wetland	Mizoram

11. Black Panther

Context: Indian Forest Service (IFS) officer recently shared a video of a rare black panther strolling in lush greenery of north Bengal.

What is a Black Panther?

- The black panther, a colloquial term for melanistic (dark-colored) large felines in the genus Panthera, is known for its striking black fur and mysterious allure.

Habitat:

- **Found across three continents: Asia, Africa, and the Americas.**
- Commonly inhabit dense tropical rainforests, grasslands, and mountainous regions.
- **Global Range:** Southwest China, Southern India, Nepal, Malaysia, Indonesia, Burma.
- **Indian Range:** Found in Kabini Forest (Karnataka), Nagarhole National Park, Periyar Wildlife Sanctuary, Silent Valley, and Sundarbans.



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Characteristics:

- **Physical Features:** Glossy black or dark brown fur with faint spotted patterns visible in sunlight.
- **Eyes:** Striking emerald green, giving a fierce and elegant look even in darkness.

Behavioural Traits:

- **Solitary and territorial hunters.**
- Known for exceptional intelligence, sharp eyesight, and strong sense of smell.
- Males are polygamous in nature.

Conservation Status:

- **IUCN Red List:** Vulnerable.
- **CITES:** Appendix I (strictly regulated trade).
- **Indian Wildlife (Protection) Act, 1972:** Schedule I (maximum protection).
- **Threats:** Habitat loss, poaching, and declining prey populations.

12. Wetland cities under the Ramsar Convention

Context: Ahilya Nagri, Indore and the city of lakes, Udaipur have become the first wetland cities of India to be accredited globally among the 'wetland cities' under the Ramsar Convention. The announcement for the accreditation was made Friday night, on 24th January 2025 ahead of the World Wetlands Day that falls on February 2 every year.

More on the news:

- The Independent Advisory committee was established on Wetland City Accreditation, which accredited 31 new cities to the list that includes two from India.
- Bhopal, the state capital of Madhya Pradesh was also nominated, however it missed out on the accreditation by the committee.

Ramsar Convention:

- The Ramsar Convention is an intergovernmental treaty between 172 countries of the world that lays down the framework for conservation and a cautious wise use of the wetlands as well as their resources through local, regional and global actions and international cooperation.

- This convention on wetlands was adopted in 1971 in the Iranian city of Ramsar. Presently, 85 cities of India have been protected under the treaty.

How accreditation works?

- 'Accreditation' is the international recognition of the cities that value their natural and man-made wetlands.
- It is granted to only those cities that are able to satisfy the six-point international criteria, such as adopting conservation measures for wetlands and their ecosystem services.
- Accreditation is carried with the objective of promoting conservation and the cautious use of urban and peri-urban wetlands. It also aims to provide sustainable socio-economic benefits to the locales.
- The list of 74 accredited wetland cities has highest 22 from China, followed by France with 9.
- Other cities include Trelew (Argentina), Mechelen (Belgium), Kasane-Kazungula, Shakawe (Botswana), Valdivia (Chile) and others from Iran, Japan, Morocco, Philippines, Poland, South Korea, Serbia, Switzerland and Zimbabwe.

Why Bhopal missed the list?

- Along with Indore and Udaipur, Bhopal was also nominated to be accredited by the committee in the August list.
- But due to ecological concerns, the city missed out to the feat.
- The citizen groups of the city have expressed their concerns regarding the damage to ecological character of the Bhoj wetland in the city.
- Last year, they had reported the matter to the Secretariat mentioning about the proposed road project through the catchment area of the Bhoj wetland, which might threaten the lifeline of the people, the wildlife as well as the waterbodies.

BATCH 3

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SCIENCE & TECHNOLOGY

1. Mixopathy

Context: The Gujarat chapter of the Indian Medical Association (IMA) on Tuesday said “mixopathy” poses “severe risks” to the health of the citizens, and requested lawmakers to consider the long-term implications of such decisions on the health of the people of Gujarat.

Mixopathy:

- **Mixopathy** refers to the practice of combining or mixing different medical systems, such as allopathy (modern medicine), Ayurveda, and homeopathy, for the treatment of patients. This approach involves integrating treatments and methods from various traditional and modern healthcare systems to address a patient's health needs.

Key Features of Mixopathy:

1. Combination of Medical Systems:

- **Allopathy (Modern Medicine):** This refers to conventional medical practices based on scientific research, evidence, and treatments such as pharmaceutical drugs, surgeries, and other modern therapeutic interventions.
- **Ayurveda:** A traditional system of medicine that originated in India, focusing on balancing the body's energies (doshas), diet, herbal treatments, and lifestyle adjustments.
- **Homeopathy:** A holistic system that uses diluted substances to trigger the body's natural healing processes, often based on the concept of "like cures like."

2. The Concept of Integrating Treatments:

- **Mixopathy** involves using treatments from all these systems to provide a more comprehensive and personalized healthcare approach.
- For example, a patient might receive allopathic treatment for an acute condition, while also using Ayurvedic herbs or homeopathic remedies to improve their overall well-being or manage chronic symptoms.

3. Rationale Behind Mixopathy:

- Advocates argue that combining various medical practices may offer patients a broader range of treatment options, leading to more tailored and holistic care.
- Some believe that blending the strengths of different systems can enhance therapeutic outcomes by addressing various aspects of health, such as physical, emotional, and spiritual well-being.

4. Controversies and Criticisms:

- **Scientific Evidence:** Critics argue that mixopathy may lead to inconsistent or unproven treatment practices, as there may be a lack of scientific evidence supporting the efficacy of combining these different systems.
- **Patient Safety:** There is concern about the potential risks of mixing treatments that may not interact well with each other, potentially leading to harmful side effects.

Regulation: There is also debate about the professional boundaries between medical practitioners trained in different systems. Some medical bodies and authorities argue that doctors should specialize in one system to ensure patient safety and high-quality care.



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2. POEM-4

Context: The Indian National Space Promotion and Authorization Centre (IN-SPACe) on December 31 said that it had facilitated the successful establishment and operationalisation of 10 hosted payloads from non-government entities (NGEs) on board the POEM-4 module of the PSLV-C60/SpaDeX mission.

What is POEM-4?

- **POEM-4 (PSLV Orbital Experimental Module)** utilizes the spent PS4 stage of the PSLV rocket, repurposed to host scientific and technological experiments.
- It involved the **PSLV-C60 rocket** carrying the **POEM-4 module**, which performed in-orbit scientific experiments at an altitude of **350 km** with a **55-degree inclination**.

3. 'Willow' Quantum Processor

Context: Google recently unveiled its latest quantum processor, named 'Willow.' The research team that built it also tested it, and the results were published in Nature.

Google Unveils 'Willow' Quantum Processor

Overview

- **What is Willow?**
 - Google's latest quantum processor featuring **105 physical qubits**.
 - Designed to enhance quantum error correction and scalability.
 - Published results in Nature sparked debates about the potential of quantum computing.

Quantum Computing Basics

- **Bits vs. Qubits:**
 - Classical computers use **bits** (0 or 1).
 - Quantum computers use **qubits**, capable of being in a **superposition** (combination of 0 and 1).
 - Qubit states require exponentially more data to represent as their numbers grow.
- **Superposition Advantage:**
 - Allows quantum computers to outperform classical computers in specific tasks.

Challenges in Quantum Computing

- **Fragility of Qubits:**
 - Qubits are sensitive to noise and disturbances, leading to errors.
 - **Coherence time** (time qubits retain their state):
 - Willow achieves **100 microseconds**, surpassing other processors.
- **Error Correction:**
 - Surface code method uses:
 - **Data qubits** for computation.
 - **Measurement qubits** to detect and fix errors without collapsing states.

Willow's Key Innovations

- **Error Rate Reduction:**
 - Uses redundancy (more physical qubits than logical qubits).
 - **Leakage error management:** Addresses qubit states leaking beyond 0 and 1.
 - Demonstrates reduced error rates with increased qubit count.
- **Performance:**
 - Solved **Random Circuit Sampling (RCS)** task in minutes.
 - Equivalent task on classical supercomputers would take **10 septillion years**.

Future Implications

- **Milestones Ahead:**
 - Further reduce error rates.
 - Scale up to larger quantum processors.

- **Potential Applications:**

- **Drug design, materials science, climate modelling, and optimisation problems.**
- Significant societal and scientific impact.

4. Defence Equipment in news

Context: The Indian Navy is set to commission three frontline platforms into service at the Naval Dockyard, Mumbai, on January 15. These are the sixth and last Scorpene-class submarine, Vagsheer; the fourth and last of the Project-15B stealth destroyers, Surat; and the lead ship of the Project-17A stealth frigates, Nilgiri.

	Code names	Defence equipment
1	Project 15B	Stealth destroyers
2	Project-17A	Stealth frigates
3	Project 71	Aircraft carriers
4	Project 75	Diesel electric submarines

5. Hydrogel

Context: Researchers from the Indian Institute of Technology-Guwahati (IIT-G) and the Bose Institute, Kolkata have developed an advanced injectable hydrogel for localised cancer treatment. A statement issued by the IIT-G said this hydrogel serves as a stable reservoir for anti-cancer drugs, releasing it in a controlled manner while sparing healthy cells from harm.

About the Hydrogel:

- It is a water-based polymer network designed to release anti-cancer drugs precisely at the tumour site, sparing healthy cells.
- It has been developed by researchers from IIT-Guwahati and Bose Institute, Kolkata.
- **Features of the Hydrogel:**
 - **Localised Drug Delivery:** Precisely targets cancer cells without affecting healthy cells.
 - **Responsive Design:** Reacts to elevated glutathione (GSH) levels abundant in tumour cells.
 - **Biocompatibility:** Mimics living tissues for seamless integration with the biological environment.

- **Stability:** Remains insoluble in biological fluids, ensuring localization at the injection site.

- **Significance:**

- Reduces harmful side effects associated with traditional chemotherapy.
- Enhances precision in cancer therapy, particularly for breast cancer.

Represents a step forward in personalized and localized cancer treatments.

6. Pig Butchering Scam

Context: The Union Home Ministry has flagged the rising threat of pig-butcher scams in India, a sophisticated form of cybercrime where fraudsters deceive victims into investing in fake online trading platforms.

About Pig Butchering Scam:

- It is also known as a “sha zhu pan” scam, is a type of online investment fraud that involves scammers creating fake online personas to lure victims into fraudulent investment schemes.
- The term “pig butchering” comes from the scammers’ practice of “fattening up” their victims by building trust over time before “slaughtering” them and stealing their money.
- **How it is carried out?**
 - It all begins with the “host” contacting people online through social media, dating apps, or deceptive messages.
 - Once they’ve found a target, known as the “pig,” the host establishes a false sense of friendship and encourages them to explore cryptocurrency trading.
 - Using a fraudulent trading app, the host deceives the victim into believing they’re making profits from fabricated trades.
 - Gradually, as the victim’s trust grows, the host persuades them to invest more money, a tactic referred to as “fattening the pig” before the scam is revealed.
 - When victims attempt to withdraw their funds, the fake platform either makes excuses or imposes substantial fees, ultimately exposing the scam. Retrieving lost funds is exceedingly difficult due to the nature of blockchain transactions.

7. Selective Silencing

Context: New research from Columbia University reveals that cells can selectively inactivate one parent's gene copy, challenging traditional genetics. This discovery explains why some people with disease-causing mutations experience no symptoms and may pave the way for new treatments.

Selective Silencing:

- The selective silencing phenomenon in genetics refers to the process in which certain cells in the body "selectively" inactivate one copy of a gene (either the maternal or paternal copy), while keeping the other copy active.
- This selective inactivation can happen at the cellular level, where the gene from one parent is silenced more often than the other, potentially affecting how genes contribute to cellular functions and traits.
- This phenomenon is different from the traditional expectation that both gene copies (one from each parent) contribute equally to the function of the cell.
- In selective silencing, only one copy is used in certain cells, and this process can vary depending on the type of cell or even change over time. For example, white blood cells and kidney cells may exhibit different patterns of gene silencing.
- Recent research, such as a study by Columbia University, has shown that this selective silencing can influence disease outcomes.
- It helps explain why some individuals who carry disease-causing genes may remain symptom-free—because the disease-causing gene from one parent might be silenced in certain cells, thereby preventing the disease from manifesting.
- This discovery highlights the complexity and plasticity of genetic expression, suggesting that our DNA is more dynamic and variable than previously understood.

8. Tidal Tail

Context: Astronomers have made a groundbreaking discovery approximately 430 million light-years from Earth in the Leo constellation, revealing a nascent ultra-diffuse galaxy forming at the end of the longest tidal tail ever observed, associated with the galaxy NGC 3785.

More about news:

- This finding marks a significant advancement in understanding galaxy evolution and the processes that lead to the formation of such faint structures.
- The tidal tail, which extends an impressive 1.27 million light-years from NGC 3785, is a result of gravitational interactions between this galaxy and a neighboring one.
- These tidal forces pull material away from each galaxy during close encounters, creating long streams of stars and interstellar gas.
- The research team from the Indian Institute of Astrophysics (IIA), led by Professor Sudhanshu Barway and including Ph.D. student Chandan Watts, conducted detailed analyses of this extraordinary structure.

About Tidal Tail:

A tidal tail in astrophysics refers to a long, extended stream of stars, gas, and dust that is ejected from a galaxy due to gravitational interactions with another galaxy. These structures are typically formed during close encounters or collisions between galaxies, when tidal forces—caused by the gravitational pull of one galaxy on another—disrupt the distribution of matter within the galaxies.

Key Characteristics of Tidal Tails:

1. Formation:

- When two galaxies pass close to each other, their gravitational forces can stretch and distort their shapes.
- This interaction can cause material to be stripped away from the outer regions of the galaxies, forming elongated tails that extend into space.

2. Composition:

- Tidal tails are made up of stars, gas, and sometimes dark matter that were pulled from the galaxies during the interaction.

3. Visibility:

- Tidal tails can be observed using telescopes, often appearing as faint, extended features around interacting galaxies.
- They are more prominent in galaxies with significant amounts of stars and gas.

4. Examples:

- A famous example of tidal tails can be seen in the **Antennae Galaxies**, where two colliding galaxies have created spectacular, long streams of material.

5. Significance in Galaxy Evolution:

- Tidal tails are important for understanding galaxy mergers and the processes that shape galaxies over time.
- The material in these tails can sometimes lead to the formation of new stars, contributing to the evolution of the galaxy system.

9. MicroRNAs

Context: miRNAs are molecules that turn off gene expression. This fundamental advance, which won Victor Ambros and Gary Ruvkun a Nobel Prize in 2024, is another example of an unexpected finding arising from curiosity

About MicroRNAs (miRNAs):

- **Definition:** miRNAs are small, non-coding RNA molecules that regulate gene expression post-transcriptionally.
- **Functions:**
 - Bind to complementary mRNA sequences to suppress protein production.
 - Ensure precise gene expression during development and physiological processes.
- **Role in Gene Suppression:** miRNAs reduce protein synthesis by promoting mRNA degradation or hindering translation.
- **Applications:** Potential in diagnostics and therapeutics for cancer, genetic disorders, and more.



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The microRNA prize

- The discovery of microRNAs (miRNA) challenged the central dogma, which said RNAs were mere conduits of information that flowed from DNA to proteins.
- miRNAs are a class of molecules that turn off gene expression at the right time and place.
- This fundamental advance, which won Victor Ambros and Gary Ruvkun a Nobel Prize in 2024, is another example of an unexpected finding arising from curiosity. The duo discovered in *C. elegans* that miRNAs could bind corresponding cellular RNAs to reduce protein expression.
- It is established that gene regulation by miRNAs is an essential process during development and for organisms to have normal physiological processes. There is increasing recognition of the value of miRNAs in diagnostics and therapeutics as well.

10. AnemiaPhone

Context: AnemiaPhone, a technology developed by Cornell University researchers to accurately, quickly, and cheaply assess iron deficiency, has been transferred to the Indian Council of Medical Research (ICMR) for integration into its programmes for anaemia alleviation, women's health, and maternal and child health.

More about news:

- A release issued by Cornell University said that AnemiaPhone would enable access to rapid screening, and diagnosis of iron deficiency at the point of need.
- Iron deficiency is a leading cause of anaemia, which affects 50% to 70% of pregnant women in India.

Working of the technology:

- The technology requires a small finger stick, a drop of blood on a test strip similar to a COVID-19 home test, and a few minutes for the reader to assess.

- The information is uploaded to a clinical database via mobile phone, wireless tablet or computer.
- Healthcare workers can interpret the test and provide guidance, triage and referral, or intervention on the spot.

11. Gaddi dog

Context: The Gaddi dog, a loyal and resilient shepherd dog from the Himalayas, has been officially recognized as an indigenous breed by the National Bureau of Animal Genetic Resources (NBAGR).

More about the news:

- The Gaddi dog is now officially recognised as a registered breed by National Bureau of Animal Genetic Resources (NBAGR).
- This recognition makes the dog the fourth indigenous canine breed to be registered, following the Rajapalayam and Chippiparai from Tamil Nadu and the Mudhol from Karnataka.
- The recognition follows years of scientific study and a formal application process initiated by Himachal's department of animal husbandry in Dec 2022.
- The NBAGR team conducted extensive evaluations and engaged with local shepherds to understand the breed better.

More about Gaddi Dog:

- They are found around **Pir Panjal range, Jammu & Kashmir, and Himachal Pradesh.**
- **Features:**
 - Sturdy build with a height of around 28 inches and a weight of about 40 kg.
 - Thick, weather-resistant coat suitable for extreme cold.
 - **Known for its exceptional guarding skills against predators like wolves and leopards.**

Loyal, protective, and highly intelligent.

12. Quantum Physics Meets Nano-Scale Electronics

Context: Discovering that electrons can manifest as 'split-electrons' in nanoscale circuits, scientists are now on the brink of a technological revolution that could lead to the practical use of Majorana fermions in quantum computing, thanks to a novel use of quantum interference.

Topological quantum computers a step closer with a new method to 'split' electrons.

- Electrons, once thought to be indivisible, may display behaviors suggesting they can split into two halves under quantum interference.
- **Groundbreaking research explores how nanoelectronic circuits, governed by quantum mechanics, allow electrons to choose pathways and interfere with themselves, creating effects akin to the mysterious Majorana fermion.**

Quantum Physics Meets Nano-Scale Electronics

- Scientists have long understood electrons as indivisible, fundamental particles.
- However, groundbreaking research reveals that a peculiar feature of quantum mechanics can create states that mimic the behaviour of half an electron.
- These so-called "split-electrons" could be pivotal in advancing quantum computing.
- The discovery, recently published in Physical Review Letters, was led by Professor Andrew Mitchell from University College Dublin's School of Physics and Dr. Sudeshna Sen from the Indian Institute of Technology in Dhanbad.
- Both are theoretical physicists specializing in the quantum properties of nanoscale electronic circuits.

Quantum Mechanics Redefines Miniaturized Electronics

- The miniaturization of electronics has reached the point now where circuit components are just nanometers across.
- At that scale, the rules of the game are set by quantum mechanics, and you have to give up your intuition about the way things work.

- A current flowing through a wire is actually made up of lots of electrons, and as you make the wire smaller and smaller, you can watch the electrons go through one-by-one.
- We can now even make transistors which work with just a single electron.
- When a nanoelectronic circuit is designed to give electrons the 'choice' of two different pathways, quantum interference takes place.

The quantum interference we see in such circuits is very similar to that observed in the famous double-slit experiment.

13. Genome India Project

Context: The 'Genome India' database will be available to researchers across the world; it will serve as a template for investigations into disease, drug therapy; PM says it will strengthen biotech economy

About Genome India Project:

- It is a national initiative started in January 2020 to map the genetic diversity of India's population.
- It is a multi-institution consortium project which is supported and funded by the Department of Biotechnology, Government of India.
- It aims to decode the **genetic diversity of India's population** through large scale genome sequencing.
- **Genome India Project Aims**
 - Create an exhaustive catalogue of **genetic variations** (common, low frequency, rare, single nucleotide polymorphisms, or SNPs, and structural variations) in Indians.
 - **Create a reference haplotype structure for Indians. This reference panel can be used for imputing missing genetic variation in future studies.**
 - Design genome-wide arrays for research and diagnostics at an affordable cost.
 - Establish a biobank for DNA and plasma collected for future use in research.

• Genome India Project Key highlights:

- **Genome sequencing of 10,000 individuals:** The project successfully sequenced genomes of 10,074 samples, covering 99 ethnic groups.
- **Creation of a genetic database:** Data is securely stored at the Indian Biological Data Centre and will serve as a reference for researchers.
- **Genetic insights for public health:** The study revealed unique genetic variations, some with clinical significance, paving the way for precision medicine.
- **Phase 1 analysis:** Detailed quality checks and joint genotyping of 5,750 samples have uncovered rare genetic variations unique to Indian populations.
- This 'Genome India' database will now be available to researchers across the world for investigations and is housed at the Indian Biological Data Centre (IBDC), in Faridabad, Haryana.
- **Significance:** It can help advance the treatment of genetic and infectious diseases.

14. ESA/JAXA BepiColombo mission

Context: On January 8, 2025, the ESA/JAXA BepiColombo mission completed its sixth and final flyby of Mercury, capturing stunning images just hundreds of kilometers above the surface. These photos revealed icy craters and volcanic plains, offering insights into the planet's impact and volcanic history.

More about the news:

Gravity Assist for Orbit Insertion

- The spacecraft passed within 295 km of Mercury's surface, using a gravity assist manoeuvre to guide its entry into orbit by late 2026.
- It captured detailed views of Mercury's north pole, including permanently shadowed craters and sunlit plains.

Revealing Secrets with M-CAMs

- Images taken by BepiColombo's monitoring cameras (M-CAMs) unveiled unprecedented details of Mercury.
- This was the last chance for M-CAMs to capture up-close images before their separation from the orbiters in 2026.

Exploring Shadowed Craters

- **Flying over Mercury's 'terminator' – the boundary between day and night – M-CAM 1 provided unique views of shadowed craters, including Prokofiev, Kandinsky, Tolkien, and Gordimer.**
- These craters, among the coldest spots in the Solar System, may contain frozen water.
- Investigating this possibility is a key mission goal.

Legacy of BepiColombo's Flybys

- This final flyby marked a significant milestone in unveiling Mercury's mysteries, setting the stage for detailed studies once the mission enters orbit in late 2026.

15. Operation Cyber Shield

Context: 'Operation Cyber Shield' is a major campaign initiated by the Rajasthan Police targeting cyber fraudsters. Recently, 30 cybercriminals were arrested during searches at multiple locations in Jaipur, where they had defrauded individuals through various scams totaling ₹30 crore.

Key Details:

- The operation focused on dismantling networks of cybercriminals engaging in fraud.
- Some fraudsters even impersonated monks and astrologers, exploiting people's beliefs to conduct scams.
- It highlighted the growing threat of cybercrime and efforts by law enforcement to address it.
- Transactions in 130 bank accounts linked to the fraud have been frozen.
- The team conducted raids in Bindayaka, Kalwar and Harmada areas and seized computer monitors, CPUs, laptops, ATM cards, cheque books, pass books, and other items.

16. Plasticizers

Context: A team of researchers headed by Dr. Pravindra Kumar, Professor at the Department of Biosciences and Bioengineering, IIT Roorkee has successfully used an enzyme — esterase enzyme — produced by soil bacteria *Sulfobacillus acidophilus* to break down diethyl hexyl phthalate (DEHP) plasticizer.

What are plasticizers?

- Plasticizers are chemicals added to plastics and personal care products to enhance flexibility and shine and are commonly found in items such as baby toys, shampoos, soaps, and food containers.
- Plasticizers can be absorbed through the skin, making them a direct threat to human health.

More about news:

- Using the esterase enzyme derived from the soil bacterium *Sulfobacillus acidophilus*, researchers demonstrated its ability to break down DEHP into environmentally safer compounds like mono-(2-ethylhexyl) phthalate (MEHP) and 2-ethyl hexanol.
- The enzyme, structurally analyzed through X-ray crystallography, remains active for a month and exhibits high degradation efficiency.
- To scale production, the enzyme's genes were cloned into *E. coli*, enabling large-scale aerobic culture.
- The team also combined this enzyme with others from *Comamonas testosteroni* to further break down DEHP into water and carbon dioxide, offering a comprehensive solution to plasticizer pollution.
- This breakthrough, funded by THDC India Limited and published in the journal *Structure*, marks a significant step toward addressing environmental challenges posed by plasticizers, paving the way for a cleaner and safer future.

17. Combat Air Teaming System (CATS)

Context: Ahead of Aero India 2025, Hindustan Aeronautics Ltd. (HAL) achieved a significant milestone by conducting the engine ground run of a full-scale demonstrator, Combat Air Teaming System (CATS) — Warrior, on January 11.

More about the news:

- HAL said that this demonstrates the synergy between various R&D centres of HAL with Aircraft design and integration by the Aircraft Research & Design Centre (ARDC), indigenous Mission Computer from SLRDC and indigenous power plant from AERDC.
- The defence PSU has been developing CATS which involves the Light Combat Aircraft Tejas as the mother-ship platform along with components such as the Hunter, Alpha and Warrior.
- A senior HAL official involved in HAL's R&D has said the CATS is a combined air teaming system with the mothership flying on top along with Hunter which can inflict strikes deep inside the enemy territory.
- The Alpha will be equipped with swarm drones and the Warrior can strike after entering nearly 700 km inside the enemy territory.

18. Small Language Models

Context: With the internet as the primary data source for GenAI models, further significant gains in performance may require innovative approaches beyond sheer data volume.

Why are smaller models in demand?

- The race towards building large AI models has been building up ever since OpenAI released their 175 billion parameter LLM, GPT-3, in 2020.
- In the next three years, the company's LLMs further increased in size with GPT-4 trained on 1.7 trillion parameters.
- But, in 2024, researchers started to look at language models differently as scaling training data, scoured from the Internet, was giving marginal gains.
- The idea of building smaller language models emerged then.
- This is evident in announcements made by Big Tech firms.

- Most of them released a nifty language model alongside their flagship AI models.
- Google DeepMind released Gemini Ultra, Nano and Flash models, while OpenAI and Meta launched their GPT-4o mini and Llama 3 models.
- Amazon-backed Anthropic AI launched Claude 3 and Haiku alongside its Opus.

What are the pros and cons of small language models?

- **Small Language Models (SLMs) are cheaper and ideal for specific use cases.**
- For a company that needs AI for a set of specialised tasks, a large AI model is not required.
- Training small models require less time, less compute and smaller training data.
- **French start up Mistral AI, an SLM provider, pitched its AI model to be as efficient as LLMs for specialised, focused applications.**
- Microsoft released a family of small language models called Phi (the latest Phi-3-mini comprised 3.8 billion parameters).
- **Apple Intelligence, the AI system deployed in the latest iPhones and iPads, runs on-device AI models that can sort of match the performance of top LLMs.**
- If LLMs are built to achieve Artificial General Intelligence (AGI), small language models are made for specific use cases.

How does it work for India?

In a country like India, where the scope of AI adoption is immense but resources are constrained, the diminutiveness of SLMs is perfect.



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19. Battlefield tourism

Context: 77 forward sites alongside the country's border which have witnessed some military action in the past — including several other spots along the Line of Actual Control (LAC) — have now been shortlisted by the Indian Army for “battlefield tourism” in conjunction with the Ministry of Tourism.

More about the news:

- The Indian Army has shortlisted 77 forward sites along the country's border, including several spots along the LAC, for battlefield tourism in collaboration with the Ministry of Tourism.
- These sites have historical significance due to past military actions.
- The initiative, named “Bharat Ranbhoomi Darshan,” will be launched on January 15, 2024, by Defence Minister Rajnath Singh to mark the 77th Army Day, featuring a dedicated website with comprehensive information about all sites.
- Notable selected locations include strategic sites in multiple regions: Dras, Kargil, and Siachen base camp in Ladakh; Longewala in Rajasthan; and Bum La and Kibithu in Arunachal Pradesh.
- The dedicated website will serve as a one-stop destination for visitors, offering virtual tours, historical narratives, interactive content, travel planning assistance, and permit application procedures.
- These sites will also be promoted under the Incredible India campaign.
- Many sites are situated along borders with China and Pakistan, marking locations of significant conflicts such as the 1962 Sino-Indian War, the 1967 conflict at Nathu La in Sikkim, and the 1971 Battle of Longewala during the Indo-Pakistan War.
- The Army is working to transform these historically restricted areas into accessible tourist destinations, complete with existing war memorials and museums that will provide accurate historical narratives about the battles and their aftermath.
- The initiative aims to boost connectivity, tourism, and socio-economic development in border regions through collaboration between the Army and local civil authorities, while maintaining operational readiness.

20. Blue Ghost Mission 1

Context: In a groundbreaking effort to enhance lunar exploration, NASA has launched the Blue Ghost Mission 1, featuring a suite of scientific investigations and technology demonstrations aboard a Firefly Aerospace spacecraft.

More about the mission:

- This mission, part of NASA's Artemis campaign, aims to test new technologies on the Moon's surface, including lunar drilling and dust mitigation methods, which will pave the way for future manned missions and extended lunar stays.
- The successful collaboration between NASA, Firefly, and SpaceX marks a significant milestone in establishing a sustainable human presence on the Moon and beyond.

Launching the Artemis Era: NASA's Moon Mission Begins

- NASA has launched a suite of scientific investigations and technology demonstrations aboard a commercial spacecraft, destined for the Moon.
- These projects aim to study the Moon's environment and test innovative technologies to help future astronauts land safely on the lunar surface as part of the Artemis campaign.
- Blue Ghost Mission 1, Firefly Aerospace's first Commercial Lunar Payload Services (CLPS) flight for NASA, lifted off at 1:11 a.m. EST aboard a SpaceX Falcon 9 rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida.
- The mission is scheduled to land on the Moon on Sunday, March 2.

21. Entity List

Context: The United States recently removed three Indian nuclear entities Bhabha Atomic Research Centre (BARC), Indira Gandhi Atomic Research Centre (IGCAR), and Indian Rare Earths (IRE) from its restrictive Entity List.

More on the news:

- The move was notified in a press release by the US department of commerce, which mentioned that the removal followed an interagency review.
- The updated listing also includes modifications to one existing entry of India, eliminating three entities under that category.
- The entities removed are Indian Rare Earths, the Indira Gandhi Atomic Research Center (IGCAR), and the Bhabha Atomic Research Center (BARC).

What is the Entity List?

- **The Bureau of Industry and Security (BIS) publishes the names of certain foreign persons – including businesses, research institutions, government and private organizations - that are subject to specific license requirements for the export, reexport and/or transfer (in-country) of specified items.**
- The persons on the Entity List are subject to individual licensing requirements and policies.
- Inclusion on this list indicates that the US government has reasonable grounds to believe these entities may engage in activities contrary to US national security or foreign policy interests.
- Being placed on the Entity List does not outright prohibit transactions but imposes stringent licensing requirements that complicate international business dealings.

22. Lipochondrocytes

Context: An international research team led by the University of California, Irvine has identified a newly discovered type of skeletal tissue with significant potential to advance regenerative medicine and tissue engineering.

More about the discovery:

- **Most cartilage relies on an external extracellular matrix for strength, but “lipocartilage,” which is found in the ears, nose and throat of mammals, is uniquely packed with fat-filled cells called “lipochondrocytes” that provide super-stable internal support, enabling the tissue to remain soft and springy – similar to bubbled packaging material.**

- Published in Science, the study explains how lipochondrocytes form and sustain their own lipid reserves, maintaining a constant size.
- Unlike typical fat cells (adipocytes), lipochondrocytes do not shrink or expand in response to changes in food intake.
- Lipocartilage’s resilience and stability provide a compliant, elastic quality that’s perfect for flexible body parts such as earlobes or the tip of the nose, opening exciting possibilities in regenerative medicine and tissue engineering, particularly for facial defects or injuries.

23. Third launchpad at the Satish Dhawan Space Center

Context: The Union Cabinet on Thursday (January 16) approved the setting up of a third launchpad at the Satish Dhawan Space Center (SDSC) in Sriharikota — a spindle-shaped island on the east coast of Andhra Pradesh.

Pulicat Lake:

Pulicat Lake is the second-largest brackish water lake in India, located on the border of Andhra Pradesh and Tamil Nadu. It is known for its ecological importance and serves as a haven for migratory birds. The rivers that drain into Pulicat Lake are mainly small rivers and streams originating from the Eastern Ghats or nearby regions.

Nagavali River (Does not empty into Pulicat Lake):

- **Origin:** Rises in the Eastern Ghats of Odisha.
- **Flow:** It flows through Odisha and Andhra Pradesh before emptying into the Bay of Bengal.
- **Relevance to Pulicat Lake:** It does not flow towards Pulicat Lake.

Champavathi River (Does not empty into Pulicat Lake):

- **Origin:** Arises in the Eastern Ghats in Andhra Pradesh.
- **Flow:** Flows through Vizianagaram district and drains into the Bay of Bengal.
- **Relevance to Pulicat Lake:** The river does not flow into Pulicat Lake.

Arani River (Empties into Pulicat Lake):

- **Origin:** Originates near the Ponneri region in Tamil Nadu.
- **Flow:** Flows into Pulicat Lake, contributing to its water system.

Kalangi River (Empties into Pulicat Lake):

- **Origin:** Rises in the Eastern Ghats of Andhra Pradesh.

Flow: Flows towards Tamil Nadu and drains into Pulicat Lake.

24. Sunburn damages

Context: Over the years, we have been told that sunburn damages the DNA leading to cell death and inflammation. However, a new study conducted on mice as well as human skin cells has found that is not the full truth.

More about study:

- The researchers found that instead of the DNA, the acute effects of sunburn were actually caused due to damage to the RNA.
- The objective of the study was to describe the impact of UV radiation on the skin and what causes this damage.
- The researchers found the same skin response to UV radiation exists in both mice and human cells. The results of the study were published in the journal *Molecular Cell*.
- mRNA damage triggers a response in ribosomes (protein complexes that “read” the mRNA to synthesise protein), orchestrated by a protein known as ZAK-alpha—the so-called ribotoxic stress response—the new study shows.
- The response can be described as a surveillance system within the cells, which registers the RNA damage, leading to inflammatory signalling and recruitment of immune cells, which then leads to inflammation of the skin.

25. Large Magellanic Cloud’s Tarantula Nebula

Context: Hubble reveals the vibrant star-forming complexities of the Large Magellanic Cloud’s Tarantula Nebula, a spectacular display of cosmic dust and colourful stellar phenomena.

More about the news:

- Today’s Hubble Space Telescope image showcases a stunning cosmic scene filled with dust and starlight from the Large Magellanic Cloud, one of the Milky Way’s satellite galaxies.
- This dwarf galaxy, located about 160,000 light-years away in the constellations Dorado and Mensa, is much smaller than our own Milky Way but still holds remarkable celestial wonders.

Stellar Giants in the Tarantula Nebula

- Although the Large Magellanic Cloud has only 10-20% of the Milky Way’s mass, it contains some of the most spectacular star-forming regions in our cosmic neighborhood.
- The featured image captures a section on the outskirts of the Tarantula Nebula, the largest and most active star-forming region in the nearby Universe.
- At its core, the Tarantula Nebula harbors the most massive stars ever discovered, each weighing around 200 times more than our Sun.

What is the Large Magellanic Cloud (LMC)?

- The Large Magellanic Cloud (LMC) is a satellite galaxy of the Milky Way Galaxy, classified as a dwarf irregular galaxy.
- It is one of the closest galactic neighbors to the Milky Way, located approximately 163,000 light-years away.

Key Features of the LMC:

- It contains regions of active star formation, such as the Tarantula Nebula, the most active star-forming region in the Local Group of galaxies.
- The LMC, along with the Small Magellanic Cloud (SMC), forms part of the Magellanic System, which includes a stream of gas called the Magellanic Stream.

26. La Perouse Naval exercise

Context: The Navies of nine Indo-Pacific countries, including India, are taking part in a multilateral exercise, La Perouse, hosted by France in the strategic straits of Malacca, Sunda, and Lombok, between the Indian Ocean and the Pacific Ocean.

More on news:

- The Indian Navy has deployed its guided-missile destroyer INS Mumbai for the exercise scheduled from January 16 to 24 and led by the French Carrier Strike Group (CSG) headed by the carrier Charles de Gaulle.
- The three straits are critical choke points as these provide entry and exit into the Indian Ocean Region. With forays by the Chinese Navy in the region rising, the straits are under increased focus.

Straits from West to East:

1. Sunda Strait (between Java and Sumatra)
2. Lombok Strait (between Bali and Lombok)
3. Makassar Strait (between Borneo and Sulawesi)
4. Luzon Strait (between Taiwan and Luzon/Philippines)



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27. Supersonic Combustion Ramjet

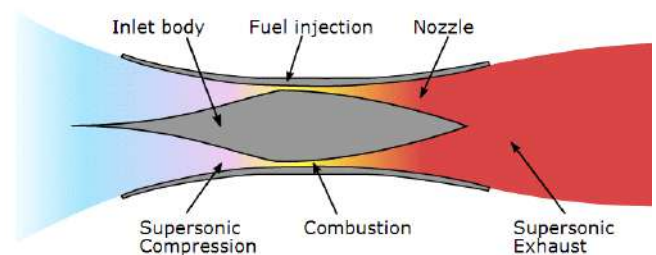
Context: Defence Research & Development Laboratory (DRDL), a Hyderabad-based laboratory of Defence Research and Development Organisation (DRDO) has taken the initiative in developing a long-duration Supersonic Combustion Ramjet or Scramjet powered Hypersonic technology.

More on the news:

- DRDL recently developed these technologies and demonstrated a cutting-edge Active Cooled Scramjet Combustor ground test for 120 seconds for the first time in India.
- The successful ground test marks a crucial milestone in developing next-generation hypersonic missiles.

Difference in Ramjet and scramjet technology:

- **Ramjet:** Requires airflow to be slowed down to subsonic speeds for combustion
- **Scramjet (Supersonic Combustion Ramjet):** Maintains combustion at supersonic speeds
- This fundamental difference in air compression and combustion process is the key distinguishing factor between these two propulsion technologies.



The principle of operation of a scramjet engine

About Supersonic Combustion Ramjet (Scramjet):

- **What is Scramjet Technology?**
 - A Scramjet is an air-breathing engine designed to sustain combustion at supersonic speeds, operating efficiently at hypersonic speeds (Mach 5+).
- **Developed by:** Indigenous efforts by DRDL (DRDO) in collaboration with industry partners.

- **How it works:**

- Utilises the vehicle's **forward motion** to compress atmospheric oxygen for combustion, eliminating the need to carry an oxidiser.
- Fuel mixes with compressed air in the combustion chamber, igniting to produce thrust at high speeds.
- Innovative **flame stabilization techniques** ensure ignition in extreme conditions.

- **Key Features:**

- **Air-Breathing Engine:** Uses atmospheric oxygen, reducing propellant weight.
- **Advanced Thermal Barrier Coating (TBC):** High-temperature resistance, enhancing engine performance.
- **Endothermic Scramjet Fuel:** Developed indigenously, it improves cooling and ignition efficiency.
- **No Moving Parts:** Reduces mechanical complexities, increasing reliability.

28. ADAS

Context: Recently, the Indian automobile market has witnessed the widespread integration of ADAS features in four-wheeler vehicles, significantly enhancing car safety.

What is ADAS?

- **ADAS stands for Advanced Driver Assistance Systems, a combination of technologies designed to improve driver safety, enhance convenience, and minimize the risk of accidents.**
- It integrates sensors, cameras, and processors to analyze real-time data and provide alerts or automated assistance to the driver.

How Does ADAS Work?

- **Sensors and Cameras:** Commonly used sensors include **RADAR**, **LiDAR**, and **SONAR**, paired with 360-degree cameras that monitor the vehicle's surroundings.
- **Data Processing:** Real-time data is processed by onboard computers to assess the environment, make decisions, and alert the driver or take automated actions.

- **Response Mechanism:** Based on processed data, ADAS can initiate actions such as braking, steering corrections, or collision warnings faster than human reaction times.

Key Features of ADAS:

- **Collision Intervention Systems:** Prevents incoming collisions by detecting obstacles.
- **Automatic Emergency Braking (AEB):** Applies brakes if the driver does not react to warnings.
- **Blindspot Alert and Avoidance:** Warns of vehicles in blind spots and adjusts accordingly.
- **Lane Departure Alert and Lane Keep Assist:** Alerts and steers the vehicle back into its lane if it deviates.
- **Traffic Sign Recognition:** Identifies road signs and informs the driver.
- **Driver Drowsiness Detection:** Monitors driver fatigue and provides alerts.
- **Adaptive Cruise Control:** Maintains a safe distance from the vehicle ahead by adjusting speed.
- **Parking Assist:** Automates or assists during parking using cameras and sensors.

While features that are not part of ADAS,

- **Tire Pressure Monitoring System (TPMS):** This system monitors tire pressure to prevent blowouts, improving safety but not directly aiding in driving tasks.
- **Rain-Sensing Wipers:** These automatically adjust wiper speed based on rainfall intensity, a convenience feature but not core to driving automation.



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29. Antivenoms

Context: India, known as the 'snakebite capital of the world,' records over 58,000 deaths annually from venomous snakebites, despite being the largest producer and consumer of antivenoms.

What are Antivenoms?

- Antivenoms are life-saving medicines used to neutralize snake venom toxins. Produced by injecting venom into animals (usually horses), their immune systems generate specific antibodies, which are then extracted, purified, and formulated as antivenoms.
- The Big Four Snakes: India's primary venomous snakes contributing to most snakebite deaths are: Indian Cobra (*Naja naja*), Common Krait (*Bungarus caeruleus*), Russell's Viper (*Daboia russelii*) and Saw-scaled Viper (*Echis carinatus*)

How is Antivenom Produced?

- Venom Extraction:** Snakes are milked to collect venom in controlled conditions.
- Immunization:** Horses are injected with small, increasing doses of venom over weeks to stimulate antibody production.
- Antibody Extraction:** Antibodies generated in the horses' blood are extracted, purified, and processed into antivenoms.
- Formulation:** The purified antibodies are prepared for clinical use, ensuring safety and effectiveness.

Among the listed snake species, the ones found in India are:

- Common Krait:** Yes, this snake is native to India and is a part of the "Big Four" venomous snakes in the country.
- Russell's Viper:** Yes, also native to India and another member of the "Big Four."
- Rattlesnakes:** No, these snakes are found in the Americas.
- Saw-scaled Viper:** Yes, found in India and is part of the "Big Four."
- Cottonmouths:** No, these are native to the southeastern United States.
- Sidewinders:** No, these are found in North American deserts.

30. Crosspathy

Context: The Maharashtra Food and Drugs Administration has, in a recent directive, allowed homeopathic practitioners, who have completed a certificate course in modern pharmacology, to prescribe allopathic medications.

What is crosspathy?

- Crosspathy refers to the practice of medical professionals using treatments or prescribing medications outside the system of medicine in which they are formally trained and licensed.
 - For example:** A homeopath prescribing allopathic (modern medicine) medications, or vice versa.

Why is it being challenged?

- In 2017, the Maharashtra Medical Education and Drug Department had issued a notification allowing homeopathic practitioners to practise modern medicine.
- As per this notification, doctors who had obtained the Licentiate of the Court of Examiners of Homeopathy degree from 1951-1982 (the degree was abolished in 1982), and were registered with the Maharashtra Medical Council, were allowed to practise modern medicine.
- This directive was challenged in the Bombay High Court by the Indian Medical Association (IMA). The High Court issued a stay, with the Bench questioning the risk that could be posed to patients if these doctors were allowed to practise allopathy.

What is SC's stance on 'crosspathy'?

- In 1996, in *Poonam Verma versus Ashwin Patel and Others*, which involved a homeopath treating a patient with allopathic medications and the patient subsequently dying, the Supreme Court held the homeopath liable for negligence as he had prescribed medications that he was not qualified to.
- A 2015 research paper by Suresh Bada Math et al states: "Across judgments, the judiciary has held that cross-system practice is a form of medical negligence; however, it is permitted only in those states where the concerned governments have authorised it by a general or special order."

31. China's EAST project

Context: China's EAST project has set a new global record by maintaining a high-confinement plasma state for over 17 minutes, paving the way for future clean energy solutions by mimicking the sun's fusion process.

More about the news:

- **China's Experimental Advanced Superconducting Tokamak (EAST), also known as the "artificial sun," has set a new world record by sustaining high-confinement plasma for an impressive 1,066 seconds.**
- This achievement, reached on January 20, marks a major step forward in the quest to develop fusion power as a clean and limitless energy source.
- The 1,066-second milestone represents a significant leap in fusion research. It was accomplished by the Institute of Plasma Physics (ASIPP) at the Hefei Institutes of Physical Science (HFIPS), part of the Chinese Academy of Sciences.
- This new record greatly exceeds the previous world record of 403 seconds, also set by EAST in 2023.

Experimental Advanced Superconducting Tokamak (EAST)

- **About:**
 - It is a **nuclear fusion** reactor facility, designed and **developed by China**.
 - **The facility is called an "artificial sun" because it mimics the nuclear fusion reaction that powers the real sun – which uses hydrogen and deuterium gases as fuel.**
 - The EAST has been used since 2006 by scientists from all around the world to conduct fusion-related experiments.
 - The EAST project is part of the **International Thermonuclear Experimental Reactor (ITER) facility**, which will become the world's largest nuclear fusion reactor when it becomes operational in 2035.

Purpose:

- To replicate the process of nuclear fusion, which is the same reaction that powers the sun.

Working:

- **The EAST harnesses extremely high temperatures to boil hydrogen isotopes into a plasma, fusing them together and releasing energy.**
- Fuel is heated to temperatures of over 150 million degrees C so that it forms a hot plasma "soup" of subatomic particles.
- With the help of a strong magnetic field, the plasma is kept away from the walls of the reactor to ensure it does not cool down and lose its potential to generate large amounts of energy.
- The nuclei of deuterium and tritium — both found in hydrogen — are made to fuse together to create a helium nucleus, a neutron along with a whole lot of energy.

32. Blue lurker

Context: Discovered in the M67 star cluster, the "blue lurker" captivates astronomers with its quick spin and complex past involving a triple-star system, offering insights into the evolution of stars and the formation of white dwarfs.

More on the news:

- What makes the blue lurker stand out is its unexpectedly fast rotation, which led to its discovery.
- Despite this rapid spin, it otherwise resembles a typical Sun-like star.
- The name "blue" can be misleading, as the star's colour blends in with the surrounding solar-mass stars in the cluster.
- This ability to blend in is why it's described as "lurking" among the others.

What is blue lurker?

In cosmology, a "blue lurker" is a type of star that appears ordinary at first glance but has an unusually high rotational speed that doesn't match its age.

- **How they are formed:** Blue lurkers are thought to form through a complex process involving a triple-star system. Two of the stars in the system merge, creating a more massive star that eventually sheds material. This material is then absorbed by the third star, causing it to spin up and rejuvenate.
- **Characteristics:**
 - **Rapid rotation:** They spin much faster than expected for their age.
 - **"Lurking" appearance:** They blend in with other stars in their cluster, making them difficult to distinguish.
 - **Often accompanied by a white dwarf:** The remnant of the merged stars.

Blue lurkers provide valuable insights into the evolution of stars and the dynamics of multiple-star systems. By studying these unique stars, astronomers can gain a better understanding of how stars interact and evolve over time.

33. Four fundamental forces of universe

Context: Researchers hypothesize a fifth force of nature that could explain the intricate relationship between dark matter and dark energy, suggesting a revolutionary expansion of the Standard Model of physics.

The four fundamental forces of universe:

The universe is governed by four fundamental forces, which dictate the interactions between particles and objects at all scales, from the subatomic level to the cosmic scale. These forces are:

1. Gravity

- **Nature:** Gravity is the force of attraction between objects with mass. It is the weakest of the four forces but operates over infinite distances, making it dominant on cosmic scales.
- **Role:** Governs the motion of planets, stars, galaxies, and the large-scale structure of the universe. It also keeps objects bound to Earth.

2. Electromagnetism

- **Nature:** Electromagnetism is the force responsible for interactions between charged particles (positive and negative charges). It is much stronger than gravity and also operates over infinite distances.

- **Role:** Governs electricity, magnetism, and light (electromagnetic waves). It binds electrons to nuclei in atoms and is responsible for chemical reactions and the structure of matter.

3. Strong Nuclear Force (Strong Interaction)

- **Nature:** The strong nuclear force is the strongest of the four forces, but it operates only at extremely short ranges (within the nucleus of an atom, approximately 1 femtometer or 10^{-15} meters).
- **Role:** Binds protons and neutrons together in the nucleus of an atom, overcoming the repulsive electromagnetic force between positively charged protons. It also holds quarks together to form protons, neutrons, and other particles.
- **Mediator:** Mediated by **gluons**, which "glue" quarks together.
- **Example:** The stability of atomic nuclei, such as in helium or uranium.

4. Weak Nuclear Force (Weak Interaction)

- **Nature:** The weak nuclear force is weaker than the strong force and electromagnetism but stronger than gravity. It operates at very short ranges (even shorter than the strong force).
- **Role:** Responsible for processes like radioactive decay (e.g., beta decay) and nuclear fusion in stars. It can change the flavour of quarks (e.g., turning a neutron into a proton) and is essential for the Sun's energy production.
- **Mediator:** Mediated by **W and Z bosons**.
- **Weak Nuclear Force drives radioactive decay and stellar processes.**
- **Example:** The decay of a neutron into a proton, an electron, and an antineutrino.

Key Differences and Unification:

- **Strength:** Strong > Electromagnetism > Weak > Gravity.
- **Range:** Gravity and electromagnetism have infinite ranges, while the strong and weak forces operate only at subatomic scales.

- **Unification:** Physicists have successfully unified electromagnetism and the weak force into the **electroweak force** at high energies. The ultimate goal is to unify all four forces into a single framework, often referred to as a **Theory of Everything**.

34. Indian Army's robotic dogs, 'MULE'

Context: During the 76th Republic Day parade in Kolkata, the Indian Army's robotic dogs, 'MULE', demonstrating their advanced functionalities and stole the show.

What are MULEs?

- **Multi-utility-legged equipment, also called MULE, is the Indian Army's robotic dog aimed to perform many functions. They sport a sleek design and are high-functioning four-legged equipment.**
- A MULE has a payload capacity of 12 kg and can be operated using WiFi or Long-Term Evolution (LTE). While WiFi can be used for short ranges, LTE is used for distances up to 10 km. Several payloads such as thermal cameras and radars can be attached to a MULE. Even a firing platform can also be integrated into it.
- It is an analog-faced machine that can be controlled by an easy-to-operate remote control.
- One of the key features of a MULE is that it can be operated in several terrains including snow and mountains. It can easily climb mountains at an incline of 45 degrees and climb steps as high as 18 cm.



35. piezoelectric material

Context: The stove lighter, a simple yet ingenious kitchen tool used globally. By generating small sparks, it ignites gas stoves, making cooking both easy and efficient.

What is a piezoelectric material?

- **A piezoelectric material is a special type of material that has the unique ability to convert mechanical stress (like squeezing or stretching) directly into electrical energy, and vice versa.**
- Piezoelectrics are amazing materials with a particularly interesting property: they can effectively create a surplus and a deficiency of electrons when they are under some pressure.
- As it happens, they can also easily remove this surplus when the applied pressure is removed.
- The reason these materials can do this is because the atoms in a piezoelectric material are arranged in a slightly funny periodic pattern.
- They also usually have two types of atoms that have two different charges.
- One has a surplus of electrons and the other has a deficiency, i.e. they are negative and positive ions.
- Now, under no extra pressure, these atoms are arranged in an alternating pattern and in such a way that there is no surplus of electrons at one end compared to another.
- When some pressure is applied, the picture changes.
- The structure of these materials is such that, under pressure, the positive ions move in one direction and the negative ones move in the other direction.
- This creates a surplus at one end of the material and a deficiency at the other end.
- Essentially, the material has become a battery!
- With some meticulous physics and engineering, this surplus/deficiency of electrons, created when the pressure is applied, can be made to be quite high – practically enabling the electrons to fly through the air, just like in the case of lightning.
- This is the spark you saw when you clicked the lighter.

36. BHASHINI Platform

Context: Tripura has become the first northeastern state to sign an MoU with Bhashini, a Digital India initiative, to promote multilingual governance and bridge the digital divide by enabling access to digital services in regional languages.

About BHASHINI Platform

- **BHASHINI**, or the **BHASHa** **IN**terface for India, is India's Artificial Intelligence (AI)-led language translation platform, breaking down language barriers and enabling conversations between speakers of different Indian languages.
- It aims to enhance internet accessibility and digital services in Indian languages, incorporating **voice-based functions** and **promoting content creation in diverse languages**.
- Launched in July 2022 under the **National Language Translation Mission (NLTM)**, BHASHINI aims to **provide technology translation services in 22 scheduled Indian languages**.
- It aims to make **Artificial Intelligence and Natural Language Processing (NLP)** resources available in the **public domain** to be used by Indian MSMEs, startups, and individual innovators.
- **BHASHINI** is implemented by the **Digital India BHASHINI Division**, a division under the Digital India Corporation, a Section 8 Company of the Ministry of Electronics and Information Technology.
- The platform is accessible through dedicated **Android and iOS apps**, providing a user-friendly experience.
- This online platform also has a **separate 'Bhasadaan' section** which **allows individuals to contribute to multiple crowdsourcing initiatives**.



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37. WASP-127b

Context: An international team of researchers have observed ferocious winds blowing on an alien planet outside the Solar System. WASP-127b is being ravaged by winds at speeds of 33,000 kilometres per hour.

More about the news:

- More than 5,800 planets beyond our solar system - called exoplanets - have been discovered. WASP-127b is a type called a "hot Jupiter," a gas giant that orbits very close to its host star.
- WASP-127b's diameter is about 30% larger than Jupiter, our solar system's largest planet. But its mass is only about 16% that of Jupiter, making it one of the least dense - puffiest - planets ever observed.
- In a new study published in the journal *Astronomy & Astrophysics*, researchers revealed that these winds are blowing extremely fast, especially around the equator.

Findings on WASP-127b:

- The planet orbits its star every roughly four days at just about 5% of the distance between Earth and the sun, leaving it scorched by stellar radiation.
- Like our moon is to Earth, one side of WASP-127b perpetually faces its star - the day side.
- Until just a few years ago, astronomers could only measure the mass and radius of extrasolar planets – meaning planets orbiting stars other than our Sun.
- Researchers are now using high-resolution infrared spectroscopy to study the planet.
- They not only examined the wind but also to observed the atmosphere of WASP-127b and found water vapour (H₂O) and carbon monoxide (CO).
- Another key finding of this research is that different regions of the exoplanet could be studied individually due to the large differences in wind speeds, even though the planet cannot be visually resolved like those in our solar system.
- Researchers discovered that the jet stream on one side of the planet, at the boundary between day and night, is slightly hotter than on the opposite side.
- Meanwhile, the cooler temperatures at the planet's poles explain the lack of a detectable signal from those regions.

38. Sputnik Moment

Context: U.S. export controls on high-tech chips may have inadvertently fuelled the success of start-up DeepSeek's AI chatbot, sparking fears in Washington there could be little it can do to stop China in the push for global dominance in artificial intelligence.

The Sputnik Moment:

- The term "**Sputnik Moment**" originates from the launch of the Soviet Union's **Sputnik 1** satellite in 1957, which was the world's first artificial satellite.
- This event was a major shock to the United States, as it signified that the Soviet Union had taken the lead in space technology and missile development during the Cold War.
- The phrase "**Sputnik Moment**" has since been used metaphorically to describe a critical point in time when a nation realizes it is lagging behind in a significant technological or scientific area, prompting urgent efforts to catch up or surpass competitors.

In modern contexts, this term is often used in discussions about technological advancements, innovation races, and national security, especially in areas like artificial intelligence, quantum computing, and space exploration.

39. Spix's macaw

Context: Reliance's Vantara, dedicated to restoring India's wildlife through its conservation programmes, partnered with the Association for the Conservation of Threatened Parrots (ACTP) to reintroduce Spix's macaws (*Cyanopsitta spixii*) to Bahia, Brazil.

Spix's macaw

- **Spix's macaw (*Cyanopsitta spixii*)**, also known as the little blue macaw, is a macaw species that was endemic to Brazil.
- It is a member of tribe Arini in the subfamily Arinae (Neotropical parrots), part of the family Psittacidae (the true parrots).
- It was first described by German naturalist Georg Marcgrave, when he was working in the State of Pernambuco, Brazil in 1638 and it is named for German naturalist Johann Baptist von Spix, who collected a specimen in 1819 on the bank of the Rio São Francisco in northeast Bahia in Brazil.

- This bird has been completely extirpated from its natural range, and following a several-year survey, the IUCN officially declared it extinct in the wild in 2000.
- However, after over 20 years of conservation efforts, 200 macaws have been bred from just two parent birds, and 52 individual birds have since been reintroduced into their natural environment in June 2022.

40. NASA's Axiom-4 Mission

Context: Indian astronaut Group Captain Shubhanshu Shukla will be the pilot of the upcoming Axiom-4 mission to the International Space Station (ISS). Mr. Shukla, who is also one of the four astronaut-designates selected for India's Gaganyaan mission, will become the first Indian astronaut to go to the ISS. The mission will be launched from the agency's Kennedy Space Center in Florida.

NASA's Axiom-4 Mission

Axiom-4 is a significant private astronaut mission to the International Space Station (ISS), marking several milestones:

- **First Indian Astronaut to the ISS:** The mission will carry Shubhanshu Shukla, an Indian Air Force officer and ISRO astronaut, making him the first Indian to visit the ISS.
- **International Collaboration:** It includes astronauts from Poland and Hungary, representing their nations' first missions to the space station in decades.
- **Private Spaceflight Advancement:** The mission, organized by Axiom Space in collaboration with NASA, demonstrates the growing role of private companies in space exploration.

Objectives:

- **Scientific Research:** The crew will conduct various scientific experiments in fields like materials science, biology, and Earth observation.
- **Technology Demonstrations:** The mission will showcase new technologies and capabilities for future space missions.

- **Educational Outreach:** The astronauts will engage in educational activities to inspire the next generation of explorers.

Significance:

- Axiom-4 represents a new era of space exploration, where private companies and international partnerships play a crucial role.
- It signifies a step towards more accessible space travel and collaborative scientific endeavors.

41. Asteroid Bennu

Context: In a groundbreaking discovery, asteroid Bennu, once thought to be just a floating space rock, has revealed something extraordinary. Samples brought back by NASA's OSIRIS-REx spacecraft suggest that the very ingredients for life were scattered throughout the early solar system.

NASA's asteroid discovery may prove life didn't start on Earth—it came from space

- NASA's latest asteroid discovery has sent shockwaves through the scientific world.
- The Bennu samples, delivered by the OSIRIS-REx mission, contain something astonishing, 14 of the 20 amino acids life on Earth uses to build proteins and all five nucleobases found in DNA and RNA. These are the very blueprints of life itself.
- Even more shocking, scientists detected high levels of ammonia and formaldehyde—key ingredients that, under the right conditions, could spark the formation of complex molecules.
- While traces of these building blocks have been found in meteorites before, never has such a pristine sample been studied directly from space

Are left-handed amino acids the key to life? NASA's Bennu asteroid sparks new mysteries

- NASA's new discovery from the Bennu asteroid opens a new chapter in its search for life beyond Earth.
- The samples brought from the asteroid, rich in amino acids and other elements required to build life, indicate that the raw material for life is much more widely distributed in the solar system than we thought so far.

42. Growing crops in space

Context: A batch of cowpea seeds — better known as lobia in Hindi or thattapayaru in Tamil — have successfully sprouted in space, days after they were taken into orbit by an Indian Space Research Organisation (ISRO) mission. The space agency has also successfully operated India's first space robotic arm, it announced on January 4.

More about the experiment:

- The two experiments were part of the 24 payloads flown on the PSLV-C60 SpaDeX mission's PS4-Orbital Experiment Module (POEM-4) on December 30.
- VSSC's CROPS (Compact Research Module for Orbital Plant Studies) experiment onboard PSLV-C60 POEM-4 successfully sprouted cowpea seeds in 4 days. Leaves are expected soon.
- ISRO also did, the Relocatable Robotic Manipulator-Technology Demonstrator (RRM-TD) a 7 Degree of Freedom (DoF) robotic arm that will perform relocation through 'inchworm walking' to defined targets on the POEM-4 platform.

Growing crops in space

- The CROPS payload, developed by the Vikram Sarabhai Space Centre (VSSC), is envisioned as a multi-phase platform to develop and evolve ISRO's capabilities for growing and sustaining flora in extraterrestrial environments.
- "Designed as a fully automated system, a five- to seven-day experiment is planned to demonstrate seed germination and plant sustenance until the two-leaf stage in a microgravity environment," ISRO had said prior to the launch.
- The experiment plans to grow eight cowpea seeds in a closed-box environment with active thermal control.



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INTERNATIONAL RELATIONS

1. Indonesia & BRICS

Context: Indonesia will formally join BRICS as a full member, Brazil's government said on January 6, further expanding the group of major emerging economies that also includes Russia, India, China and South Africa.

More on news:

- Indonesia's foreign ministry said in a statement on January 7 that it welcomed the announcement and that "BRICS membership is a strategic way to increase collaboration and partnership with other developing nations."
- Indonesia, the world's fourth most populous nation, had previously expressed its desire to join the group as a means of strengthening emerging countries and furthering the interests of the so-called Global South.
- Brazil, which holds the bloc's presidency in 2025, said in a statement that member states approved Indonesia's entry by consensus as part of an expansion push initially endorsed at the 2023 BRICS summit in Johannesburg.

Seas from South to North:

1. Timor Sea (southernmost)
2. Arafura Sea
3. Banda Sea
4. Celebes Sea (northernmost)



2. Economic Community of Central African States

Context: An attack on Chad's presidential palace left 18 assailants dead and six in custody, with one soldier killed and three wounded, state media reported January 9.

Economic Community of Central African States (ECCAS):

The Economic Community of Central African States (ECCAS) is a regional intergovernmental organization aimed at promoting economic and social development in Central Africa.

Key Points:

- Founded:** October 18, 1983, in Libreville, Gabon.
- Mission:** To achieve collective autonomy, raise the standard of living of its populations, and maintain economic stability through harmonious cooperation.
- Membership:** 11 member states: Angola, Burundi, Cameroon, Central African Republic, Chad, Republic of the Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Rwanda, and São Tomé and Príncipe.
- Focus Areas:**
 - Political Affairs, Peace, and Security:** Addressing regional conflicts and promoting stability.
 - Common Market, Economic, Monetary, and Financial Affairs:** Fostering trade, investment, and economic integration.
 - Environment, Natural Resources, Agriculture, and Rural Development:** Sustainable resource management and agricultural development.
 - Land Use and Infrastructure:** Improving transportation, energy, and communication infrastructure.
 - Gender Promotion, Human and Social Development:** Promoting gender equality and social development.

3. UN Committee of Experts on Big Data and Data Science for Official Statistics

Context: Recently, India has joined the UN Committee of Experts on Big Data and Data Science for Official Statistics (UN-CEBD).

About UN Committee of Experts on Big Data and Data Science Official Statistics:

- It was created in 2014 with Australia as its first Chair.
- It was created to further investigate the benefits and **challenges of Big Data**, including the potential for monitoring and reporting on sustainable development goals.
- **Governance**
 - **Advisory Board:** It is the management body of the UN-CEBD. It is scheduled to meet about 4 times per year to review the work of the UN-CEBD and give strategic direction.
 - **UN Bureau:** The Bureau takes care of the ongoing operations of the UN-CEBD
- **Mandate**
 - To provide a strategic vision, direction and coordination for a global programme on **big data for official statistics**, including for indicators of the 2030 Agenda for Sustainable Development;
 - To promote practical use of big data sources, including cross-border data, while building on existing precedents and finding solutions for the many existing challenges,
 - To also promote capacity-building, training and sharing of experience;
 - **To foster communication and advocacy of the use of big data for policy applications, especially for the monitoring of the 2030 Agenda for Sustainable Development;**
 - To build public trust in the use of big data for official statistics.



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4. India and Oman

Context: India and Oman are holding the fifth round of talks for a proposed free trade agreement here to boost bilateral economic ties, an official said on January 14.

About Gulf Cooperation Council (GCC):

- **What it is?**
 - It is a **political and economic alliance of six Middle Eastern countries—Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman**. The GCC was established in Riyadh, Saudi Arabia, in May 1981.
- **Objective:**
 - The purpose of the GCC is to achieve unity among its members based on their common objectives and their similar political and cultural identities, which are rooted in Arab and Islamic cultures. The **Presidency of the council rotates annually**.
- **Organizational structure:**
 - **The Supreme Council** is the highest authority of the organization. It is composed of the heads of the Member-States. Its presidency rotates periodically among the Member States in alphabetical order.
 - **The Ministerial Council:** It is composed of the Foreign Ministers of all the Member States or other ministers deputizing for them. It meets every three months to implement the decisions of the Supreme Council and to propose new policy.
 - **The Secretariat General:** It is the administrative arm of the alliance, which monitors policy implementation and arranges meetings.



5. Nigeria now “partner country” of the BRICS

Explanation

Context: Nigeria has been admitted as a “partner country” of the BRICS bloc of developing economies, according to Brazil, the group’s chair.

- **Abuja, Nigeria's Capital:** Located at approximately 9.0°N latitude.
- **Addis Ababa, Ethiopia:** Located at approximately 9°N latitude; Almost exactly at the same latitude as Abuja; Difference from Abuja: ~0°
- **Sanaa, Yemen:** Located at approximately 15.3°N latitude; Difference from Abuja: ~6.3°
- **Chennai, India:** Located at approximately 13.1°N latitude; Difference from Abuja: ~4.1°
- **Jakarta, Indonesia:** Located at approximately 6.2°S latitude; Difference from Abuja: ~15.2° (also crosses the equator)

Therefore, Addis Ababa is the closest to Abuja’s latitude.



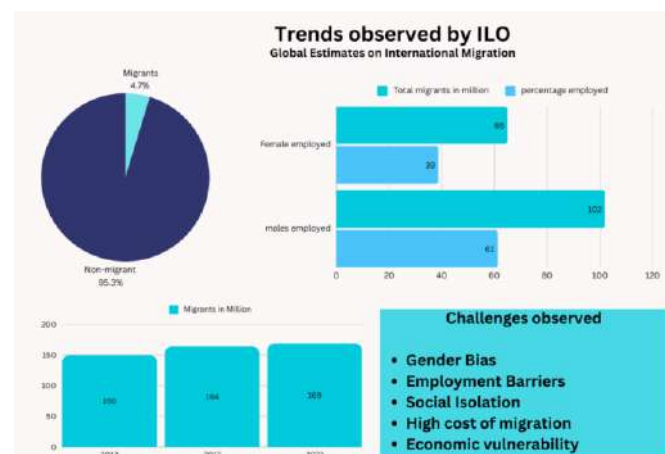
6. Global Estimates on International Migrant Workers 2022

Context: The Global Estimates on International Migrant Workers 2022, released by the International Labour Organization (ILO), highlights the significant role of international migrants (IMs) in the global workforce.

Major Highlights of Report:

- **Global migrant estimates:** The report estimates approximately **169 million** international migrant workers recorded in 2022.
 - This accounts for **4.7% of the global workforce**.
 - **Note:** Global workforce stands for the number of people employed or unemployed, but are willing to work.

- **Incremental trend:** The estimate of migrant workers has increased from previous years, i.e., 164 million in 2017 and 150 million in 2013.
- **Regional distribution:** Over 68.4% of all migrants are in high-income nations like Europe, North America and Arab states.
- **Gender disparity:** The report has highlighted the evident gender disparity in the migrant labour force
 - Only 38.7% of female migrants are employed as compared to the 61.3% of male migrants.
 - Females are predominantly employed in the service sector, that too in the sectors associated with the care **economy**.
- **Sectoral distribution of migrants:** Migrant population dominates the service sector i.e., 68.4% migrants are employed in the service sector.
 - Female migrants dominate the service sector **80.1% females** as compared to **60.8% male** counterparts.
- **Comparison with the non-migrants:**
 - The service sector is out-numbered by migrants.
 - The manufacturing sector is marginally dominated by migrants.
 - The agriculture sector is predominantly handled by non-migrants.



7. World Health Organisation

Context: Recently, the United States, under President Donald Trump, has signed an executive order to withdraw from WHO, citing reasons such as mishandling of the COVID-19 pandemic and the lack of reforms within the organization.

World Health Organisation

- The World Health Organization (WHO), established in 1948, is a specialized agency of the **United Nations** that connects nations, partners and people to promote health, keep the world safe and serve the vulnerable – so everyone, everywhere can attain the highest level of health.

Governance structure and functioning of WHO

The governance structure of the WHO is designed to support the implementation of its mandate and the achievement of its objectives. It includes:

- **Membership:** WHO currently has 194 member states.
- **World Health Assembly (WHA):** The highest decision-making body of WHO and comprises representatives from all member States.
- **Secretariat:** Responsible for carrying out the policies and programs approved by the WHA.
- **Director-General:** Director-General heads the WHA and is supported by a senior management team.
- **Regional Offices:** WHO also has six regional offices: Africa, the Americas, **Southeast Asia**, Europe, Eastern Mediterranean, and Western Pacific.
 - Each regional office is responsible for coordinating and supporting WHO's work in their respective regions.
- **Meetings:** The WHA meets annually to set policies, approve the budget and elect the Director-General.
- **Funding mechanism:** WHO gets its funding from two main sources:
 - **Assessed contributions:** These are the dues countries pay in order to be a member of the Organization.
 - **Voluntary contributions:** It is from Member States (in addition to their assessed contribution) or from other partners like United Nations organizations, intergovernmental organizations, philanthropic foundations, the private sector etc.

Why USA decided to leave WHO?

Reasons Cited:

- Mishandling of the COVID-19 pandemic.
- Perceived political bias within the organization.
- Unequal financial burden on the US compared to other countries, particularly China.

Impact On India:

Health Programmes

- Reduced WHO support for India's programs on tuberculosis, malaria, HIV, and maternal health.
- Challenges in implementing WHO guidelines for vaccine coverage and disease prevention.

Collaborative Research

- Loss of expertise impacts India's capacity-building partnerships with WHO.

8. Françafrique

Context: West African countries are moving away from traditional colonial ties with France, seeking partnerships with global powers for security and economic cooperation.

The story so far:

- On January 1, Ivory Coast President Alassane Ouattara announced that French troops would withdraw from the country by the end of the month.
- On December 26, in Chad, France handed over its military base in Faya-Largeau and began the withdrawal of troops following the termination of a defence cooperation agreement in November.
- On December 3, Senegalese President Bassirou Diomaye Faye called for the closure of all French military bases, commenting that their presence was "incompatible" with the country's national sovereignty.
- Senegal, Ivory Coast, and Chad have joined three West African countries — Mali, Niger, and Burkina Faso — asking for French troop's withdrawal, marking a major blow to France's waning influence in the region.

Françafrique

Françafrique is a term used to describe the network of close political, economic, and military ties between France and its former colonies in sub-Saharan Africa. While there's no definitive list of countries explicitly included in Françafrique, the term generally refers to countries in:

- **West Africa:** Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo
- **Central Africa:** Cameroon, Central African Republic, Chad, Republic of the Congo

The above-mentioned countries:

1. **Benin:** French is the official language.
2. **Burkina Faso:** French is the official language.
3. **Côte d'Ivoire (Ivory Coast):** French is the official language.
4. **Nigeria:** English is the official language (former British colony).
5. **Ghana:** English is the official language (former British colony).
6. **Kenya:** English and Swahili are the official languages (former British colony).
7. **Chad:** French is one of the official languages.

9. March 23 Movement

Context: Intense fighting between the Congolese army and the M23 rebels is exacerbating the security crisis in eastern DR Congo. More than 100,000 civilians have been forced to flee in recent days as the M23 rebel fighters advance towards North Kivu's provincial capital, Goma, bordering Rwanda and Uganda.

March 23 Movement:

- **M23 Movement** refers to the March 23 Movement, which is a rebel military group based in eastern areas of the Democratic Republic of the Congo (DRC), mainly operating in the province of North Kivu.
- This outfit has been formed in April 2012, when some 300 soldiers, all former members of the National Congress for the Defence of the People (CNDP), mutinied against the Armed Forces of the Democratic Republic of the Congo (FARDC), complaining of poor conditions.

10. Nordic and Baltic capital cities

Context: Sweden can send criminals to serve their sentences in prisons abroad, a government-appointed commission said on Wednesday, as the country struggles to handle an influx of new inmates arising from a wave of gang crime.

Nordic and Baltic capital cities from northernmost to southernmost:

1. Helsinki (60.2°N)
2. Oslo (59.9°N)
3. Stockholm (59.3°N)
4. Copenhagen (55.7°N)
5. Riga (56.9°N)



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ART AND CULTURE

1. Homo juluensis

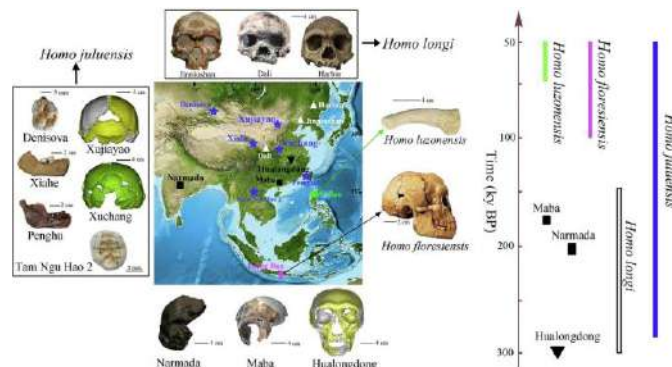
Context: Researcher Christopher J. Bae identified *Homo juluensis*, a new human species that coexisted with Denisovans in Asia.

About the news:

- A University of Hawai'i researcher may have identified a new human species, *Homo juluensis*, which could encompass enigmatic groups like the Denisovans—ancient human relatives whose stories are still being unraveled.
- Professor Christopher J. Bae, a renowned anthropologist at the University of Hawai'i at Mānoa's Department of Anthropology in the College of Social Sciences, has dedicated over 30 years to studying human ancestors across Asia.
- His latest findings, published in *Nature Communications*, shed light on the complex interactions and diversity of ancient human-like species that coexisted in Asia during the late Middle to early Late Pleistocene, a time frame spanning approximately 300,000 to 50,000 years ago.

About *Homo juluensis*:

- Homo juluensis* lived approximately 300,000 years ago in eastern Asia, hunted wild horses in small groups, and made stone tools and possibly processed animal hides for survival before disappearing around 50,000 years ago.**
- Importantly, it was proposed that the new species include the enigmatic Denisovans, a population known primarily through DNA evidence from a few physical remains found in Siberia, and a few fossils found in Tibet and Laos.
- More research is clearly needed to test this relationship, which is primarily based on similarities between jaw and teeth fossils from these different sites.



2. Indus Valley script

Context: Tamil Nadu Chief Minister M.K. Stalin announced on Sunday a \$1-million prize for experts or organisations that succeeded in deciphering the scripts of the Indus Valley Civilisation for everyone to understand.

Indus Valley script:

The Indus Valley script, associated with the Harappan civilization (c. 2600–1900 BCE), remains one of the most intriguing mysteries of ancient history. Key points include:

- Undeciphered Nature:** Despite decades of research, the script has not been fully deciphered due to the absence of a bilingual inscription (like the Rosetta Stone) and the brevity of texts (most inscriptions are 5–26 symbols long).
- Non-Phonetic Characteristics:** The script is widely regarded as non-phonetic, with scholars suggesting it is a system of symbols rather than a true alphabet.
- Composition:** The script consists of about 400–600 unique symbols, indicating it may represent a logo-syllabic system (combining logos and syllables) rather than an alphabet.
- Linguistic Debate:** There is no consensus on whether the symbols represent a Dravidian, Indo-Aryan, or an entirely unknown language.
- Comparison with Other Scripts:** Unlike Mesopotamian cuneiform or Egyptian hieroglyphs, the Indus script has not yielded clear patterns linking it to known linguistic traditions.

3. Kuka Rebellion

Context: On January 17, the Punjab Chief Minister paid tribute at a function held at the Namdhari Shaheed Smarak in Malerkotla to commemorate Kuka Martyrs' Day.

About Kuka Rebellion:

- **What it is:**
 - The Kuka Rebellion was an anti-British uprising led by the Namdhari sect, also known as Kukas, in Punjab. The movement combined religious reform and resistance to colonial authority.
- **Occurred in:** The rebellion reached its peak in January 1872, with significant clashes in Malerkotla and Malaudh Fort.
- **Leaders:** The rebellion was spearheaded by Satguru Ram Singh, founder of the Namdhari sect, along with leaders like Kuka Hira Singh and Lehna Singh.
- **Reason behind the movement:**
 - **Religious Reform:** Opposition to social vices like meat consumption, alcohol, and foreign goods.
 - **Colonial Oppression:** Discontent with British rule and native collaborators loyal to the colonizers.
 - **Cow Slaughter:** Protests against cow slaughter, which deeply offended the sentiments of the Kukas.
- **Events during the movement:**
 - **Attack on Malerkotla** (January 13, 1872): Kukas clashed with officials following a cow slaughter incident.
 - **Assault on Malaudh Fort** (January 15, 1872): A Kuka contingent attacked the fort under a pro-British ruler but faced strong resistance.
 - **Mass Executions:** After their surrender, 49 Kukas were executed on January 17 and 17 more on January 18 by being blown up with cannons.

- **Suppression:** The British, led by John Lambert Cowan, acted with extreme brutality. Thousands of people were forced to witness these executions to serve as a deterrent.
- **Changes after the revolt:**
 - **Exile of Leaders:** Satguru Ram Singh and key leaders were exiled to Rangoon, Burma, marking the suppression of the movement.
 - **Legacy of Martyrdom:** Stories of bravery, such as the sacrifice of 12-year-old Bishan Singh and Waryam Singh, inspired future resistance movements.



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MISCELLANEOUS

1. UDISE+

Context: The total enrolment of students has dropped by over a crore in 2023-24 from that of the previous years, show the latest data released by the Education Ministry.

More about report:

- A total of 24.8 crore students enrolled in the academic year 2023-24, the Unified District Information System for Education Plus (UDISE+) report released by the Ministry said.
- Over the past four years, the enrolment number has hovered around 26 crores.

The Unified District Information System for Education Plus (UDISE+)

- It is a digital application with the mandate of collecting information from all recognized schools imparting formal education from Pre-primary to XII.
 - UDISE+ now serves as the official statistics system of the Ministry of Education and is now operational in all the districts of the country.
 - UDISE+ covers more than 14.72 lakhs of schools, 98.08 lakhs of teachers and 24.80 crores of children.
- **Launched In:** It was launched in 2018-2019 to speed up data entry, reduce errors, improve data quality and ease its verification.
- **Revitalised UDISE+:** It was launched in 2022-23 and captures data on more than 60 fields for each student.
- **Nodal Ministry:** Department of School Education & Literacy, Ministry of Education.
- **Objective:** To utilise the information collected for planning, optimizing resource allocation and implementation of various education-related programs and assessments of progress made.

- **Data Collection:** UDISE+ collects information through an online data collection form (DCF) on parameters ranging from school, Infrastructure, teachers, enrolments, examination results, dropouts, etc. spread across 11 sections.
 - UDISE+ has the school as the unit of data collection and district as the unit of data distribution.
- **UDISE Code:** The selected schools on the platform are provided a UDISE Code acting as a national level unique identifier.
- **Unique Educational ID (EID):** A separate unique educational ID (EID) for every student has been created in the UDISE+ portal to cover each and every child under the ecosystem of UDISE+.
- **Functions:**
 - **Database of Schools:** Provides a platform to organize and classify all school data across the country and enables real-time exchange of information
 - Improved monitoring, measurement and tracking of vital KPIs related to school performance.
 - Enables leveraging data analytics on school data to identify factors affecting school performances.

Time-series data allows to study the trend over years and monitor improvement/growth.



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2. Rajagopala Chidambaram

Context: Rajagopala Chidambaram, a distinguished nuclear scientist and former principal scientific adviser to the Government of India, passed away at 3:20 am on January 4 at Jaslok Hospital in Mumbai following age-related complications. He was 88.

More about news:

- Chidambaram was a pivotal figure in India's nuclear history, playing a key role in both the nation's first nuclear test, **Pokhran I (Operation Smiling Buddha)** on May 18, 1974, and the second, **Pokhran II (Operation Shakti)** in 1998.
- His contributions earned him the Padma Shri in 1975 and the Padma Vibhushan in 1999.

	Name of operations	Countries
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2	Operation First Lightning	USSR/Russia
3	Operation Hurricane	UK
4	Project 596	China

3. Anji Khad Bridge

Context: The Indian Railways has achieved a significant milestone with the completion of the Anji Khad Bridge, India's first cable-stayed rail bridge.

About Anji Khad Bridge:

- It is located in Reasi district, Jammu and Kashmir.
- It connects Katra and Reasi as part of the USBRL Project.
- It is spanned the Anji River Valley at a height of 331 meters from the riverbed.
- It is being built by Indian Railways.
- Features:**
 - Length:** 725.5 meters.
 - Cable-stayed span:** 473.25 meters supported by 96 cables (length: 82-295 meters).
 - Main Pylon:** 193 meters high from the foundation.

	Bridges	Locations	Special Features
1	Anji Khad Bridge	Jammu and Kashmir	India's first cable-stayed rail bridge
2	Bogibeel Bridge	Assam	India's longest rail-cum-road bridge
3	Dobra-Chanti Bridge	Uttarakhand	India's longest motorable suspension bridge.

4. SEED scheme for denotified tribes

Context: With the Centre's SEED scheme for denotified tribes only now taking off, caste certificates being denied to them in 29 States, and the Idate Commission's 2017 report in cold storage, anger among the denotified tribes (DNT), semi-nomadic tribes (SNT), and nomadic tribes (NT) is growing across States such as Uttar Pradesh, Haryana, and Gujarat.

• Idate Commission:

- The government had constituted the National Commission for DNTs/NTs/SNTs in 2015 under the chairmanship of Bhiku Ramji Idate, which had put out its final report in 2017, calling for the government to expedite the final classification of these communities, count their population by including a caste census column in the 2021 census, and provide a sub-quota for them under SC/ST/OBC quotas in public education and employment.
- The Idate commission had concluded there were a total of 1,526 DNT, NT, and SNT communities across the country, of which 269 were not yet categorised as SC, ST, or OBC.

- Renke Commission (2008):** National Commission for Denotified, Nomadic and Semi-Nomadic Tribes; First comprehensive study of DNTs' socio-economic conditions; Made 76 recommendations for DNT welfare and development

- Criminal Tribes Act Enquiry Committee (1949-1950):** Also known as the Ananthasayanam Ayyangar Committee; First committee formed after independence to look into the status of Criminal Tribes; Recommended repeal of the Criminal Tribes Act.

While,

- Ranganath Mishra Commission is associated with status of minorities in India.

5. Nautor Land

Context: The Union Home Ministry is deliberating on a proposal to regularize nautor land in Ladakh, allowing locals to claim ownership over government-owned wastelands they have cultivated or tended to for years.

About Nautor Land:

- **Definition:** Nautor refers to barren or wasteland owned by the government that can be allotted to individuals for cultivation or other productive use, subject to approval by competent authorities.
- **Purpose:** Regularizing nautor land grants legal ownership to locals who have utilized such land over the years.
- **History:**
 - **Jammu and Kashmir:** Originated under a rule established by Hari Singh, the former king of Jammu and Kashmir, in 1932.
 - **Himachal Pradesh:** The nautor policy was adopted in 1968 but later halted due to administrative concerns.
- **Found in:** Predominantly implemented in hilly and remote areas, such as **Leh** and **Kargil** in Ladakh and parts of **Himachal Pradesh**.
- **Features:**
 - **Ownership Transfer:** Aimed at granting ownership to locals using government wastelands.
 - **Preservation of Local Interests:** Prevents the exploitation of resources by outsiders.
 - **Cultural and Economic Value:** Recognizes traditional practices of land use, contributing to local

6. Chillai Kalan

Context: From December 21 every year, the Kashmir Valley experiences 40 days of the harshest winter spell, locally known as Chillai Kalan.

The preparation for the harsh winter spell:

- In preparation for the harsh winter spell, they brace for surviving the challenges nature throws at them.
- To keep warm, they use mobile earthen pots covered with intricately woven wicker, known as kangri; hot embers put in it raise the temperature.
- They often carry this inside their long traditional cloaks known as pherans.
- For keeping the houses and masjids warm, they construct hamams inside the structures, where one room is covered with carved and polished stones and firewood is burnt in a cavity under it.
- Hamams are a great place for small social gatherings in winters. Family members often prefer to eat in winters inside the warmth of these hamams.
- Many families prepare for the winter well ahead in the summer by sun-drying vegetables to be cooked during hostile weather, when availability of essentials is scarce because roads remain blocked by heavy snow.
- Smoked fish is another delicacy that is prepared ahead and consumed in the winter.
- Preserving food in such a manner is an important practice in winter when produce becomes scarce.
- One of the most cherished delicacies is harissa, a minced meat preparation mostly for breakfast that provides enough warmth for the whole day.
- **Additionally, khewa, a traditional sweet tea, with saffron, cardamom, cinnamon and other spices, is commonly prepared, showcasing the culinary heritage of Kashmir.**
- Some families also engage in various activities such as making handicrafts and artistic woodwork and weaving carpets, spending quality time indoors, reinforcing the community spirit.

7. Sudan Drone Strike

Context: A drone strike on one of the last functioning hospitals in El-Fasher, the capital of Sudan's North Darfur state, killed 67 people and injured dozens, activists and a medical source as said on January 25.

Among the above-mentioned countries, both the regions are associated with Sudan.

The major disputed territories in Sudan include:

Abyei Region

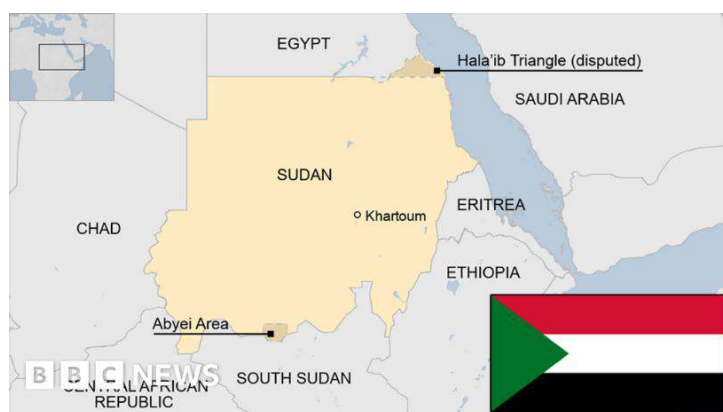
- Located between Sudan and South Sudan
- Rich in oil resources
- Both countries claim ownership
- Currently has a special administrative status

Halayeb Triangle

- Disputed between Sudan and Egypt
- Located along the Red Sea coast
- Currently administered by Egypt
- Sudan continues to claim sovereignty

Kafia Kingi

- Located at the border junction of Sudan, South Sudan, and Central African Republic
- Rich in natural resources
- Disputed between Sudan and South Sudan
- Currently controlled by Sudan



8. A23a iceberg

Context: The 'world's biggest iceberg', "A23a iceberg", which is more than twice the size of London, is drifting toward South Georgia Island, raising concerns among scientists that it could disrupt the feeding patterns of young penguins and seals. The massive ice block is slowly moving from Antarctica and could collide with South Georgia, a vital wildlife breeding ground in the South Atlantic.

What is A23a iceberg?

- The massive A23a iceberg, covering around 3,500 square kilometers (1,350 square miles), broke off from the Antarctic shelf in 1986 and remains the world's largest and oldest iceberg.
- After remaining stationary for more than three decades, it finally began moving in 2020, with its northward progression occasionally hindered by oceanic forces causing rotational movements.
- Andrew Meijers, a physical oceanographer at the British Antarctic Survey, told news agency AFP that satellite observations indicate the "megabergs" has maintained its integrity, unlike previous large icebergs that typically fragment into smaller pieces whilst traversing the Southern Ocean.
- Meijers noted that while the iceberg's exact path remains uncertain, current projections suggest it could reach South Georgia's continental shelf within two to four weeks.

What might happen next?

- The iceberg may drift past the continental shelf into open waters beyond South Georgia, a British overseas territory located about 1,400 kilometers (870 miles) east of the Falkland Islands.
- Alternatively, it could collide with the sloping seabed, potentially becoming lodged for months or fragmenting into smaller pieces.
- Weighing just under a trillion tonnes, this colossal block of freshwater is being carried by the Antarctic Circumpolar Current, the world's most powerful ocean jet stream.



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