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DAILY PRELIMS NOTES COMPILATION
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What do our CSE 2022 TOPPER say?

Thank you sir.
The DPN notes were very comprehensive and useful. I used it to supplement my newspaper knowledge. It really helped in dealing with the current affairs portion of the prelims exam, since you compile it from so many sources.
Would recommend students to maintain their own digital notes using that source.
After I didn't clear first prelims, I joined your mains master notes which helped me identify key areas for note making.
Thank you sir for your relentless effort in updating these notes. They're helpful for the aspirants.

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Economy

Proposal by SEBI on Domestic MFs to invest in their Overseas Counterparts

Sub: Economy

Sec: Capital market

Tag: SEBI on Domestic MFs to invest in their Overseas Counterparts

The Securities and Exchange Board of India (SEBI) on May 17 floated a consultation paper **proposing a framework for facilitating investments by domestic Mutual Funds (MFs) in their overseas counterparts**.

Framework's Purpose

- **Strong Economic Growth:** SEBI notes India's strong economic growth prospects and observes that Indian securities offer attractive investment opportunities for foreign funds.
- **International Exposure:** Several international indices, ETFs, MFs, and UTs allocate a part of their assets towards Indian securities. **For instance, the MSCI Emerging Markets Index holds 18.08% exposure to Indian securities.**
- **Diversification:** Indian mutual funds diversify their portfolios by launching feeder funds that invest in overseas instruments such as units of MF, UTs, ETFs, and/or index funds.
- **Ambiguity:** There is ambiguity about investments with Indian exposures, deterring domestic MFs from investing in these instruments.

Proposals by SEBI

- **Upper Limit Cap:** The upper limit for investments made by **overseas instruments in India is capped at 20% of their net assets**. This cap is deemed appropriate to balance facilitating investments in overseas funds with exposure to India and preventing excessive exposure.
- **Pooled Investment Vehicle:** Indian mutual funds must ensure that **contributions of all investors of the overseas MF/UT are pooled into a single investment vehicle.**
- **Proportional Gains:** All investors of the overseas instrument must receive gains proportionate to their contribution.
- **Autonomous Management:** Investments should be made autonomously by the manager of the overseas instrument without any influence from investors or undisclosed parties.
- **Public Disclosures:** SEBI seeks periodic public disclosures of the portfolios of such overseas MF/UTs for transparency.

Breaching the Investment Limit

- **Observance Period:** If the overseas instrument breaches the 20% limit, the Indian mutual fund scheme investing in the overseas fund will enter a six-month observance period to rebalance its portfolio.
- **Investment Suspension:** Further investment in the overseas instrument will be allowed only when the exposure drops below the limit.
- **Liquidation Requirement:** If the portfolio is not rebalanced within this period, the MF must liquidate its investment in the overseas instrument within six months.

ECB Cuts Interest Rates Amid Inflation Concerns

Sub: Economy

Sec: Capital Market

The European Central Bank (ECB) has initiated its first interest rate cut since 2019, reflecting progress in tackling inflation while acknowledging that the fight against inflation is far from over.

Key Details:

- **Interest Rate Cut:** The ECB reduced its deposit rate to 3.75% from a record high of 4.0%.

Market Response and Analyst Insight:

- **Uncertainty on Further Easing:** The ECB did not indicate whether this rate cut would be followed by further easing in July.
- **Economic Outlook:** Diego Iscaro, head of European economics at S&P Global Market Intelligence, stated that it is unlikely to see back-to-back cuts, reflecting the cautious approach of the ECB given the current economic conditions.

Conclusion:

The ECB's decision to cut interest rates signals an attempt to manage inflation while navigating a complex economic landscape. The persistence of inflationary pressures, despite recent progress, underscores the challenges the ECB faces in achieving its inflation targets. The cautious tone and lack of commitment to future rate cuts indicate that the central bank is closely monitoring economic developments before making further policy adjustments.

European Central Bank (ECB)

The **European Central Bank (ECB)** is the central bank for the eurozone, consisting of the 20 European Union (EU) member countries that have adopted the euro as their common currency.

Key Functions of the ECB:

- **Monetary Policy:**
  - **Price Stability:** Aim to keep inflation rates below, but close to, 2% over the medium term.
  - **Interest Rates:** Sets key interest rates to influence economic activity and inflation.
  - **Open Market Operations:** Conducts open market operations to manage liquidity and guide interest rates.
- **Foreign Exchange Operations:**
  - Manages the euro area's foreign reserves.
  - Conducts foreign exchange operations to stabilize the euro's exchange rate when necessary.
- **Financial Stability and Supervision:**
  - **Banking Supervision:** Oversees significant eurozone banks through the Single Supervisory Mechanism (SSM).
  - **Macroprudential Policies:** Implements policies to maintain financial system stability and prevent systemic risks.
- **Issuing Currency:**
  - Responsible for issuing euro banknotes and overseeing the production of euro coins, in collaboration with national central banks.

- **Economic Research and Statistics:**
    - Conducts economic research and provides statistical information to support policy decisions and ensure transparency.

SEBI Expands Promoter Definition for IPO-Bound Companies

Sub: Economy

Sec: Capital Market

Introduction: The Securities and Exchange Board of India (SEBI) has expanded the **definition of promoters for companies preparing for an initial public offering (IPO). This move aims to enhance transparency and accountability in the listing process.**

Current SEBI Regulations:

- **Definition of Promoter:** A promoter controls the affairs of the company, can appoint the majority of directors, or is named as such in the offer document.
- **Previous Threshold:** Founders holding 25% were considered promoters due to their negative control and power to block special resolutions.

New Guidelines:

- **Lower Threshold:** Founders holding 10% or more must classify themselves as promoters.
- **Collective Holding:** Founders collectively holding 10% will be considered promoters if they are key managerial personnel (KMP) or directors.
- **Immediate Relatives:** Immediate relatives of promoters will also be deemed promoters if they are on the company board, are KMPs, or hold 10% or more in the company, directly or indirectly.

Impact of New Guidelines:

- **Increased Coverage:** Immediate relatives holding significant shares, even if not directly involved in management, will now be classified as promoters.
- **Example Scenario:** A non-executive director who is a brother or father of a promoter, with no shares, will be considered a promoter. This extends to in-laws if connected through shareholding relatives.

Declassification Challenges:

- **LODR Regulations:** Regulation 31A of the LODR Regulations makes it difficult for individuals classified as part of the promoter group to be declassified as public shareholders.
- **Practical Implications:** This is particularly challenging for married daughters or other relatives who may not have an active role in the company.

Case Study: Flair Writing Industries:

- **Initial Promoters:** Khubilal Jugraj Rathod and Vimalchand Jugraj Rathod.
- **Subsequent Inclusions:** Relatives Rajesh Rathod, Mohit Rathod, and Sumit Rathod, each holding 10%, were included as promoters, along with several in-laws.

Subjective Definition Issues:

- **Court Rulings:** The subjective definition of promoters has been debated in courts.
- **Need for Objectivity:** Moving towards a more objective test for determining control is considered beneficial.

Definition of Immediate Relatives:

- **Inclusions:** Spouse, parents, brothers, sisters, or children of the person or their spouse.

Conclusion: SEBI's expanded promoter definition aims to cover a broader range of individuals with significant influence or shareholding in IPO-bound companies. While this promotes greater transparency, it also presents challenges in declassification and may affect individuals not actively involved in company management. The new guidelines necessitate careful consideration by companies and their advisors to ensure compliance and avoid unintended consequences.

SEBI - Listing Obligations and Disclosure Requirements (LODR) Regulations in 2015

The Securities and Exchange Board of India (SEBI) introduced the Listing Obligations and Disclosure Requirements (LODR) Regulations in 2015 **to enhance transparency, accountability, and investor protection in the securities market.** These regulations provide a comprehensive framework for the listing of securities on stock exchanges and prescribe the obligations and disclosure requirements for listed entities.

SEBI's New Directive: Auditors Must Certify Use of Pre-IPO Funds

Sub: Economy

Sec: Capital market

The Securities and Exchange Board of India (SEBI) has issued a **new directive requiring auditor-certified disclosures on the utilization of pre-IPO funds.**

This move **aims to ensure transparency and accountability in the use of funds raised before a company's initial public offering (IPO).**

Key Provisions

- **Auditor Certification**: Companies must provide certified disclosures about how pre-IPO proceeds are used in relation to the objectives stated in the IPO issue.
- **General Corporate Purposes (GCP)**: If the disclosures are not made, the funds will be adjusted towards the GCP portion of the IPO.
- **GCP Limitation**: Companies can allocate a maximum of 25% of IPO proceeds to GCP. This rule potentially limits the flexibility of managing pre-IPO funds.

Implications for Companies

- **Reduced Flexibility**: Companies may face restrictions in managing their pre-IPO proceeds. For example, **if a company raises 20% of its total IPO proceeds through a pre-IPO, its GCP allocation will significantly decrease. For a ₹100 crore issue with ₹20 crore raised pre-IPO, the GCP portion would reduce to ₹5 crore from ₹25 crore.**
- **Need for Clarity**: Companies seek clarity on whether certified pre-IPO utilization allows flexibility in **fund usage or if pre-IPO funds must strictly adhere to the objects stated in the IPO offer document.**

Conclusion

SEBI's directive aims to bring greater transparency and control over the utilization of pre-IPO funds. While the move is intended to safeguard investor interests and ensure proper use of funds, it also imposes stricter guidelines that may limit corporate flexibility. The industry awaits further clarification to understand the full implications of these regulations.

IPO

- IPO is the **selling of securities to the public in the primary market.**
- **Primary market** deals with **new securities being issued for the first time.** It is also known as the new issues market.
- It is different from secondary market where existing securities are bought and sold. It is also known as the stock market or stock exchange.
- It is when an unlisted company makes **either a fresh issue of securities or an offer for sale of its existing securities** or both for the first time to the public.
- It is generally used by **new and medium-sized firms** that are **looking for funds to grow** and expand their business.

SEBI Tightens Norms on Financial Influencers and Eases Delisting Rules

Sub: Economy

Sec: Capital market

Overview: India's markets regulator, the Securities and Exchange Board of India (SEBI), has introduced new regulations to **address the rising influence of unregulated financial influencers who advise on stocks and investments through social media** platforms like YouTube and Instagram.

Key Points:

- **Ban on Unregulated Financial Influencers:** SEBI has mandated brokers and mutual funds to **stop using the services of unregulated financial influencers** for marketing and advertising campaigns.
- **Exemption for Investor Education:** Financial influencers engaged in genuine investor education are exempt from the new restrictions.
- **Reason for the Regulation:** The decision aims to tackle issues related to **certain individuals and unregulated entities making inappropriate claims and inducing investors to deal in securities.**

Context:

- The popularity of financial influencers has surged with the growth of the Indian stock market.
- The number of trading accounts in India has **increased from 36 million in April 2019 to 154 million in April 2023.**

Changes to Derivative Trading

New Criteria for Derivative-Linked Stocks:

- SEBI has introduced new criteria to determine which stocks can be linked to derivative products, such as futures and options.
- The total number of stocks eligible for derivative trading will increase slightly.

Easing Delisting Rules

Revised Delisting Mechanism:

1. **Fixed Price Offers:** Companies can now offer shareholders fixed prices for their shares as an alternative mechanism to delist from stock exchanges.
2. **Current Method:** Previously, delisting was carried out through a reverse book-building process.

These changes are expected to simplify the process for companies wishing to exit stock exchanges.

SEBI's Focus:

- SEBI continues to **enhance market integrity and investor protection through regulatory measures.**
- The new norms for financial influencers and the eased delisting rules are part of SEBI's broader efforts to ensure fair practices and market efficiency.

Who are Finfluencers?

Individuals with public social media platforms offering advice and sharing personal experiences about money and investment in stocks.

Need for Regulations:

- **Unregistered Advisors:**
  - The rise in the number of unregistered investment advisors giving unsolicited stock tips on social media.
- **Market Manipulation:**
  - Certain companies use social media platforms to inflate their share prices through finfluencers.
- **Fraud Risks:**

- Both listed and non-listed companies are vulnerable to fraud, especially with the increase in digital data thefts and technological risks.

- **Financial and Ethical Impact:**
  - Diversion of funds/assets can lead to shareholder wealth erosion, financial crises, ethical dilemmas, and reputational risks.

The U.S. Challenges Global Confidence in the Dollar

Sub: Economy

Sec: External Sector

The United States has recently undertaken several actions **that some argue could undermine the global dominance of the dollar as the world's reserve currency**.

This includes **high-profile legal cases, an increasing use of sanctions, and accumulating significant debt**. Despite these concerns, the global financial community struggles to find a credible alternative to the dollar.

Key Concerns and Actions

- **Legal System and Rule of Law**:
- The conviction of former President Donald Trump and subsequent criticisms of the U.S. legal system have raised questions about the country's rule of law.
- Concerns about the **possible weakening of U.S. institutions, including the Federal Reserve, could undermine trust in the dollar.**
- **Sanctions and Foreign Policy**:
- The U.S. has **increased the use of sanctions as a foreign policy tool**, leading to a perception that American financial policy could destabilize global trust in the dollar.
- **National Debt**:
- The U.S. continues to **accrue massive amounts of debt, compelling international investors to fund these excesses** despite concerns about long-term stability.

Global Perspectives

- **Asia's Search for Alternatives**:
  - Asian financial leaders are **actively seeking ways to reduce their reliance on the U.S. dollar and enhance non-dollar trade flows.**
  - However, efforts to **establish alternative systems have been slow and largely ineffective due to geopolitical tensions** and the relative unattractiveness of other options.
- **Central Banks' Strategy**:
  - Despite geopolitical tensions, **central bank reserve managers plan to increase their dollar holdings over the next 12-24 months due to the need for liquidity and the lack of viable alternatives.**

Dollar's Dominance: Why It Persists

- **Economic and Institutional Strength**:
  - The U.S. economy's size, the depth of its financial markets, and the strength of its institutions underpin the dollar's global role.
  - Democratic principles and a belief in the rule of law continue to support confidence in the dollar.
- **Relative Stability**:
  - Even with its flaws, the **U.S. legal and financial system remains more independent and reliable than many other countries**, making it the preferred choice for global investors.

Conclusion

The United States is pushing the boundaries of global financial norms, which could potentially undermine confidence in the dollar. **However, due to the lack of credible alternatives, the dollar remains the dominant global currency. Investors and financial leaders continue to monitor the situation closely, balancing concerns about U.S. policies with the recognition** that, for now, the dollar remains the most reliable option in a turbulent global financial landscape.

Reserve currency?

A reserve currency is a foreign currency or precious metal that is held in large quantities; it may be held by a country's government, central bank, or other monetary authority. It is used for participating in the global economy, such as through international transactions or investments.

- A reserve currency **reduces exchange rate risk** since there's no need for a country to exchange its currency for the reserve currency to do trade.
- Reserve currency **helps facilitate global transactions**, including investments and international debt obligations.
- A large percentage of **commodities are priced in the reserve currency**, causing countries to hold this currency to pay for these goods.

Before the mid-20th century, reserves were mostly gold and silver. Modern reserves are generally made up of **strong foreign currencies**. Many of them are specifically **designated as reserve currencies by the International Monetary Fund (IMF).**

Starting in the mid-20th century, the U.S. dollar was set as the international reserve currency. Backed by the safest of all paper assets, U.S. Treasuries, **the US dollar is still the most redeemable currency for facilitating world commerce.**

The U.S. dollar isn't the only reserve currency designated by the IMF and other global organizations. **The euro, Chinese renminbi, Japanese yen, and British pound sterling are all popular as reserve currencies.**

Characteristics:

- **Availability**– has the **depth and liquidity** to allow for reliable and efficient international transactions.
- **Acceptability-**can be **freely and easily exchanged for other currencies.**
- **Stability**–**held by many monetary authorities and institutions**, in significant amounts.

Factors that make a currency useful as a reserve currency:

- The **size of the economy** in the country where that currency comes from
- **International integration** of that economy.
- How **open its financial markets** are
- The **currency's convertibility**
- Whether it is used as a **regional or international currency peg**
- **Domestic macroeconomic policies**

America Plus 1

The term "America Plus 1" refers to a **strategic approach where countries, particularly in Asia, aim to reduce their dependence on the United States by diversifying their economic, political, and security engagements.** This strategy is born out of concerns **about over-reliance on the U.S. and the desire to hedge against potential uncertainties in U.S. policies and international relations.**

Key Aspects of "America Plus 1"

- **Economic Diversification:**
- **Trade Partnerships:** Countries are seeking to strengthen trade relationships with other major economies, such as the European Union, Japan, China, and regional blocs like ASEAN.
- **Investment:** Attracting foreign direct investment from multiple sources to reduce reliance on American capital.
- **Political and Diplomatic Engagements:**

- **Multilateral Organizations:** Increasing participation in regional and international organizations to build stronger multilateral ties.
- **Bilateral Relationships:** Deepening bilateral ties with other major powers to balance U.S. influence.
- **Security and Defense:**
- **Defense Alliances:** Forming or strengthening defense alliances and partnerships with other countries.
- **Military Procurement:** Diversifying sources of military equipment and technology to avoid over-dependence on American suppliers.

The "America Plus 1" strategy **reflects a pragmatic approach by countries seeking to balance their dependence on the United States by expanding their global engagements. This diversification effort aims to ensure economic stability, political autonomy, and security resilience in an increasingly multipolar world.**

World Will Amass 'Major' Oil Surplus by 2030: International Energy Agency

Sub: Economy

Sec: External Sector

Key Points:

- **Forecast by IEA:** The International Energy Agency (IEA) predicts a significant surplus of oil by 2030 due to increased production and tempered demand driven by the clean-energy transition.
- **Demand and Supply Projections:**
    - **Global Demand:** Expected to level off at 106 million barrels per day (bpd) by the end of the decade.
    - **Supply Capacity:** Anticipated to reach 114 million bpd.
    - **Surplus:** This will result in a surplus of 8 million bpd.
- **Factors Influencing Demand:**
    - **Pandemic Rebound:** As the effects of the pandemic rebound diminish.
    - **Clean Energy Transition:** Advancements in clean energy reducing the reliance on oil.
    - **China's Economic Structure:** Changes in China's economic structure impacting global oil demand.

International Energy Agency (IEA)

About:

- **Establishment:** The International Energy Agency (IEA) was established in 1974 in response to the 1973 oil crisis.
- **Headquarters:** Paris, France.
- **Members:** Initially founded by 16 OECD (Organisation for Economic Co-operation and Development) countries, the IEA has expanded to include 30 member countries and 8 association countries.
- **Objective:** The IEA aims to ensure reliable, affordable, and clean energy for its member countries and beyond. It focuses on energy security, economic development, environmental awareness, and global engagement.

DGFT Pushes for Continuation of Interest Equalisation Scheme for Exporters

Sub: Economy

Sec: External Sector

Overview:

- **Current Status:** The Directorate General of Foreign Trade (DGFT) is advocating for the **extension of the interest equalisation scheme for exporters**, which is due to expire on June 30.

- **Objective:** The scheme allows exporters to access bank credit at subsidised interest rates to enhance their competitiveness.

Key Points:

- **Interest Equalisation Scheme:**
  - **Subsidy Details:** The scheme provides a 2% interest subvention for loans to exporters in 410 identified sectors and a 3% subvention for MSME exporters.
  - **Implementation History:** Introduced in April 2015 for five years, it has been extended multiple times.
- **Benefits to Exporters:**
  - **Cost of Credit:** Exporters use the scheme to reduce their credit costs, enhancing their competitiveness.
  - **Export Bodies' Support:** Bodies like the Federation of Indian Export Organisations (FIEO) argue the scheme is crucial for maintaining export competitiveness.
- **Current Discussions:**
  - **Consultations:** DGFT has consulted with export bodies and banks, finding strong support for the scheme's continuation.
  - **Finance Ministry's Role:** While the DGFT supports extending the scheme, the Finance Ministry is cautious about increasing subvention rates, a major demand from exporters.
- **Exporters' Demands:**
  - **Extension Period:** Exporters are requesting an extension of 3-5 years to ensure stability and predictability.
  - **Increased Subvention Rates:** They argue for a 2% increase in subvention rates due to higher interest rates in India compared to competitor countries.
- **Government Response:**
  - **DGFT's Position:** The DGFT is pushing for the scheme's continuation based on its benefits in reducing credit costs for exporters.
  - **Finance Ministry's Concerns:** The Finance Ministry is evaluating the scheme's extension duration but is hesitant to raise subvention rates.
- **Economic Impact:**
  - **Export Competitiveness:** The scheme is seen as a critical tool for making Indian exports competitive in the global market.
  - **Interest Rates:** The demand for higher subvention rates is linked to the increase in the repo rate from 4.4% to 6.5%.

Conclusion: The continuation of the interest equalisation scheme is vital for maintaining the competitiveness of Indian exports. **While the DGFT is in favor of extending the scheme, the Finance Ministry's stance on the subvention rates remains a point of contention**. The decision on the extension period and possible rate adjustments is awaited as the scheme approaches its expiration date.

<u>Interest Equalisation Scheme (IES)</u>

The Interest Equalisation Scheme (IES) is a key financial initiative launched by the Indian government **to support exporters by providing subsidized interest rates on export credit.**

The Interest Equalisation Scheme was **first implemented on April 1, 2015, to provide financial relief and promote competitiveness among Indian exporters**.

The scheme offers interest subsidies on pre- and post-shipment export credit in Indian Rupees.

Implementation and Duration

- **Initial Validity**: The scheme was initially valid for five years, up to March 31, 2020.
- **Extensions**: It has been extended multiple times, including a one-year extension during the COVID-19 pandemic, with further extensions and additional fund allocations continuing to support exporters.

- **Administration**: The scheme is implemented by the Reserve Bank of India (RBI) through **various public and non-public sector banks that provide pre- and post-shipment credit to exporters**.

Monitoring and Oversight

- The scheme is jointly monitored by the **Directorate General of Foreign Trade (DGFT) and the RBI through a consultative mechanism.**
- This collaboration ensures that the scheme's objectives are met efficiently and any issues are promptly addressed.

Objectives

- **Competitiveness**: Helps identified export sectors to be internationally competitive by reducing their financing costs.
- **Export Performance**: Aims to achieve a high level of export performance by providing financial incentives.
- **Focus on Labour-Intensive Sectors**: Primarily targets labour-intensive sectors to boost employment and production.

Features of the Scheme

- **Certification Requirement**: Eligible exporters must submit a certification from an external auditor to the concerned bank to claim the benefit.
- **Reimbursement Process**: Banks provide the IES benefits to eligible exporters and then claim reimbursement from the RBI based on the external auditor certification furnished by the exporter.
- **Interest Equalisation Rates**:
    - **2% Benefit**: Provided on pre- and post-shipment rupee export credit to merchant and manufacturer exporters of 410 identified tariff lines at the 4-digit level.
    - **3% Benefit**: Provided to all MSME (Micro, Small, and Medium Enterprises) manufacturer exporters.

Recent Modifications

- **Fund-Limited Scheme**: The scheme has now been made fund-limited, meaning the benefits are capped based on the availability of funds.
- **Benefit Cap**: The benefit to individual exporters is capped at Rs 10 Crore per annum per IEC (Import Export Code).
- **Lending Rate Restriction**: Banks that lend to exporters at an average rate of more than Repo + 4% are debarred under the scheme. This ensures that the benefits are passed on to the exporters without excessive lending costs.

Impact

The IES has played a significant role in supporting Indian exporters by **reducing their interest costs, making them more competitive in the global market.** By focusing on labour-intensive sectors, it also promotes employment and contributes to the overall economic growth of the country.

India's Growth and the 'Beneficial Ownership' Hurdle

Sub: Economy

Sec: External Sector

Overview

India aims to become a $5 trillion economy by 2025-26, and foreign investments are critical in achieving this goal. **However, regulatory challenges, particularly regarding the 'beneficial ownership' clause in the Foreign Exchange Management (Non-debt Instruments) Rules, 2019 (FEMA NDI), are creating obstacles.**

FEMA NDI Amendment: Press Note 3 of 2020

- **Objective**: Introduced to prevent opportunistic takeovers by entities from countries sharing land borders with India during the COVID-19 pandemic.
- **Requirement**: Investments from these countries, or where the beneficial owner is from these countries, need prior government approval.

Challenges Posed

- **Lack of Definition**: The term **'beneficial owner' is not clearly defined**, leading to interpretation issues.
- **RBI's Conservative Stance**: Since late 2023, the RBI has adopted a stricter interpretation, impacting Foreign Owned or Controlled Companies (FOCCs).
- **Regulatory Uncertainty**: Lack of clarity on beneficial ownership thresholds creates compliance risks and hesitancy among foreign investors.
- **Time-Consuming Approvals**: The approval process is slow and has a high rejection rate, with significant investments pending or rejected.
- **Penalties**: Severe penalties for non-compliance, potentially up to three times the investment received, pose existential threats to companies.

Proposed Solutions

- **Define 'Beneficial Owner'**:
  - **Ownership Thresholds**: Establish clear thresholds, such as 10% (as per Indian company law) to 25% (recommended by the Financial Action Task Force).
  - **Control Rights**: Specify control-conferring rights, excluding typical investor protection rights like veto powers over mergers.
- **Consultation Mechanism**:
  - Introduce a time-bound consultation process with regulatory authorities to determine whether specific clauses confer control.
- **Indemnity Provisions**:
  - Require foreign investors to provide representations and indemnities, although this may deter some investments.

Implications for India's Growth

- **Enhanced Clarity**: Clear definitions and guidelines can reduce compliance risks and attract more foreign investments.
- **Increased Efficiency**: A streamlined approval process can facilitate quicker investments, vital for start-ups and small enterprises.
- **Economic Stability**: Better regulatory frameworks can enhance investor confidence, contributing to economic stability and growth.

Conclusion

Addressing the ambiguities in the FEMA NDI regulations, **particularly concerning beneficial ownership, is crucial for India to attract and sustain foreign investments**.

Clear definitions, efficient processes, and reasonable compliance requirements will help India move **closer to its $5 trillion economy goal** while safeguarding its economic interests.

Summary of FDI Trends and Challenges in India (FY24)

Sub: Economy

Sec: External Sector

- **Net FDI Inflows**:
  - Net FDI inflows on capital account **fell to $10.6 billion in FY 24 from $ 28 bn in FY 23, a 62% decline from the previous fiscal year, marking the lowest level since 2007.**

- If net repatriation of income by foreign companies ($53 billion) is included, **the retained amount by foreign companies is very minimal.**

- **Gross FDI Inflows and Repatriation**:
  - Gross FDI inflows were $70.9 billion in FY24.
  - Foreign companies repatriated or disinvested $44.4 billion (63% of gross FDI).
- **Outbound Investments**:
  - Indian companies made outbound investments worth $16 billion.
- **Growth in Profits and Dividend Payouts**:
  - FDI companies experienced a 45.2% growth in net profit to $32.4 billion in FY24.
  - Similar growth was observed in dividend payouts in 2023.
- **Repatriation Trends**:
  - FDI repatriation (capital account) increased from $9.8 billion in FY14 to $44 billion in FY24.
  - **Net repatriation of incomes by MNCs from India is rising faster, with an estimated $53 billion in FY24.**
  - Overall, MNCs repatriated $97 billion (capital and net income) in FY24, $27 billion higher than gross FDI flows.
- **Decline in Net FDI and FPI Flows**:
  - Net FDI at $10.6 billion in FY24 is a 13-year low and 59% lower than the FY21 peak of $44 billion.
  - Foreign Portfolio Investment **(FPI) flows have been negative or flat in five of the last eight years, with $35 billion in FY24.**

Reasons for Decline in FDI

- **Global Trade Protectionism**:
  - Rising protectionism since the Global Financial Crisis (2008) and intensification during **the US-China trade war (2018) have led to a decline in global FDI flows.**
  - FDI inflows as a percentage of global GDP fell to 1.3% in 2023, the lowest since 1996.
- **Impact of Trade Conflicts**:
  - Renewed US-China trade conflicts and increased tariffs on Chinese imports have exacerbated the situation.
  - Global trade liberalization phases saw higher growth in India's trade, **but recent protectionism has decelerated trade growth significantly.**
- **Sectoral Concentration of FDI**:
  - FDI inflows in India are concentrated in a few sectors such as IT, trading, and non-conventional energy.
  - The **concentration of the top nine sectors in FDI inflows rose from 49% in FY17 to 70% in FY24.**
  - Manufacturing sector's share in FDI inflows has declined to 30%.

Future Outlook and Recommendations

- **Opportunistic Foreign Capital Flows**:
  - Foreign capital flows are increasingly becoming opportunistic due to recurring global trade conflicts.
- **Reviving Domestic Economy**:
  - India needs to revive domestic savings and demand to stimulate private capital expenditure, employment, export competitiveness, and overall productivity.
- **Selective Gains from China+1 Theme**:

- Only a few sectors like **electric equipment, general machinery, auto parts, semiconductors, and apparel can sustain gains from the China+1 strategy.**

This above-mentioned analysis highlights the **challenges India faces in attracting and retaining foreign direct investment amidst global trade shifts and protectionism**.

The emphasis on the need for domestic economic revival and strategic focus on specific sectors aligns with the broader goal of achieving sustainable economic growth.

JP Morgan Forecasts Doubling of Foreign Holdings in Indian Government Bonds

Sub: Economy

Sec: EXTERNAL Sector

Overview:

- **JP Morgan predicts non-resident holdings of India Government Bonds (IGBs) to nearly double** from the current 2.5% to over 4.4% in the next year.
- This prediction is due to **proactive measures by Indian authorities to enhance the accessibility of the IGB market** for foreign investors.

Index Inclusion:

- **India will join JP Morgan's flagship Emerging Market Local Currency Government Bond indices (GBI-EM GD)** starting June 28, 2024, over a phased period of 10 months.
- **Only bonds under the Fully Accessible Route (FAR) are eligible** for this index. Currently, 27 FAR-designated IGBs meet the inclusion criteria.

Market Reforms:

- JP Morgan, highlighted that **India's market reforms have improved the accessibility of its domestic market** for global investors, making IGBs eligible for index inclusion.
- These reforms include **better regulatory frameworks and increased market transparency**.

Expected Inflows:

- With index inclusion, **foreign inflows are expected to be between $20 billion and $25 billion**. This is based on the estimated assets under management (AUM) tracking the GBI-EM GD and the anticipated 10% weight of India in the benchmark.

Duration and Yield:

- **India will have the highest duration across the index** (7.03 years) compared to the Emerging Market/EM Asia average (5.97 years).
- The **yield-to-maturity for Indian bonds is above average at 7.09%** versus EM Asia's 3.98%.

Market Size and Turnover:

- **India's local debt stock is among the largest in emerging markets**, with outstanding bonds over $400 billion, second only to China.
- The **turnover in Indian local market instruments is significant**, with over $350 billion in 2023, accounting for more than 9% of total EM local debt trading volume.

Structural Participation:

- **JP Morgan sees ample scope for increased non-resident participation** in the local bond market, currently one of the lowest in EM.
- The **phased inclusion of Indian bonds in JP Morgan's GBI-EM Global index is expected to sustain demand** for these bonds, as index-tracking funds will need to allocate resources accordingly.

Significance:

- **Inclusion of Indian bonds in the JP Morgan index reflects India's growing significance** in the global financial markets.

- **Enhanced foreign participation is likely to lead to more liquidity and stability** in the Indian bond market, potentially lowering borrowing costs for the Indian government.

Fully Accessible Route (FAR) by RBI

Introduction:

- **Objective:** To enable non-residents to invest in specified Government of India dated securities without any investment restrictions.
- **Implementation Date:** Effective from April 1.
- **Specified Securities:** Government Securities as notified by the RBI for investment under the FAR route.
- **Eligible Securities:** All new issuances of Government securities (G-secs) of 5-year, 10-year, and 30-year tenors.
- **Investment Ceilings:** Non-resident investors can invest in specified government securities without being subject to any investment ceilings.

Existing Investment Routes:

- **Medium Term Framework (MTF):**
- **Introduction:** Introduced in October 2015.
- **Purpose:** For Foreign Portfolio Investment (FPI) in Central Government Securities (G-secs) and State Government Securities (SDLs).
- **Nature:** FPI includes securities and other financial assets passively held by foreign investors.
- **Voluntary Retention Route (VRR):**
- **Purpose:** Encourages FPIs to **undertake long-term investments** in Indian debt markets.

Benefits of FAR:

- **Ease of Access:** Simplifies the process for non-residents to invest in Indian government securities.
- **Global Bond Indices:** Facilitates the inclusion of Indian G-secs in global bond indices.
- **Attract Large Funds:** Helps attract substantial funds from major global investors, including pension funds.
- **Stable Foreign Investment:** Encourages the inflow of stable foreign investment in government bonds.

In summary, the **Fully Accessible Route (FAR) introduced by the RBI significantly opens up Indian government securities to non-resident investors, potentially boosting foreign investment and aiding the inclusion of Indian bonds in global indices**. This new route complements existing frameworks like the MTF and VRR, aiming to foster a more robust and inclusive bond market in India.

Bond Yield

- **Bond Yield:** The return an investor expects to receive each year over the bond's term to maturity.
- **Factors Influencing Bond Yield:** Partially depends on coupon payments and the prevailing market price of the bond.

Coupon Payments:

- **Coupon Payments:** Periodic interest income obtained as a reward for holding bonds.
- **Face Value:** Bondholders receive the bond's face value at the end of the bond's life.
- **Market Trading:** Bonds may be bought at par value, discount, or premium as they trade in the secondary market.

Bond Yield vs. Price:

- **Inverse Relationship:** Price and yield are inversely related.
    - As the price of a bond increases, its yield decreases.
    - As the yield increases, the price of the bond decreases.

Example:

- **Interest Rate Fall:**
    - New bonds offer lower interest payments.
    - Existing bonds with higher interest payments become more valuable.
    - Price of existing bonds increases.
    - As bond prices increase, the yield for new investors decreases because the return on purchasing the bond is lower.

Coupon Amount: The annual interest rate paid on a bond, expressed as a percentage of the face value.

Coupon Rate: The sum of coupons paid in a year divided by the face value of the bond.

Payment Frequency: Coupons are paid from the issue date until maturity.

Credit Card Transactions Abroad Under Scanner Again

Sub: Economy

Sec: External Sector

Key Points:

- **Government Focus**: With the increase in remittances under the **Liberalised Remittance Scheme (LRS)**, international credit card spending is now a significant area of government scrutiny.
- **Current Status**: Although on the government's radar, a decision regarding the implementation date for bringing international credit card transactions under LRS has yet to be finalized.

Background:

- **LRS Coverage**: Debit cards are already included under LRS, **while international credit card transactions were temporarily excluded from being counted as LRS** and subject to Tax Collected at Source (TCS).
- **Previous Notification**: In May, the Finance Ministry issued a notification to include credit cards under LRS with a **20% TCS**. However, **implementation was postponed to allow banks and card networks to develop the necessary IT solutions.**

LRS Limits and Provisions:

- **Remittance Limit**: Under LRS, all residents, including minors, can remit up to **$250,000 per financial year** for permissible current or capital account transactions.
- **Potential Inclusion**: Reports indicate that the **Reserve Bank of India (RBI)** has instructed banks to **prepare for the inclusion of international credit card spending in LRS.**

Significance:

- **Monitoring and Regulation**: As international travel and spending increase, the government aims to better monitor and regulate the outflow of funds through credit card transactions abroad.
- **Tax Implications**: Bringing international credit card transactions under LRS will subject them to TCS, ensuring better tax compliance and monitoring.

Conclusion:

- The inclusion of international credit card transactions under LRS **reflects the government's efforts to tighten control over outbound remittances and ensure comprehensive financial oversight.**

Liberalised Remittance Scheme (LRS)

About:

- **Introduction:** This scheme was introduced by the Reserve Bank of India in 2004.
- **Eligibility:** All resident individuals, including minors, are allowed to remit up to USD 250,000 per financial year (April – March) for any permissible current or capital account transaction or a combination of both.

Not Eligible:

- The scheme is not available to corporations, partnership firms, Hindu Undivided Families (HUF), Trusts, etc.

- **Frequency of Remittances:** No restrictions on frequency, but once the limit of USD 250,000 is reached in a financial year, no further remittances can be made under LRS.

Uses of Remitted Money:

- **Expenses:** Can be used for private or business travel, medical treatment, study, gifts and donations, and maintenance of close relatives.
- **Investments:** Investment in shares, debt instruments, and immovable properties overseas.
- **Foreign Currency Accounts:** Individuals can open, maintain, and hold foreign currency accounts with banks outside India for transactions permitted under the scheme.

Prohibited Transactions:

- **Specific Prohibitions:** Any purpose prohibited under Schedule-I (like purchasing lottery tickets, proscribed magazines, etc.) or restricted under **Schedule II of Foreign Exchange Management (Current Account Transactions) Rules, 2000.**
- **Foreign Exchange Trading:** Trading in foreign exchange abroad.
- **High-Risk Countries:** Capital account remittances to countries identified by FATF as "non-cooperative countries and territories".
- **Terrorism Risk:** Remittances to individuals and entities posing significant terrorism risks as advised by the Reserve Bank.

Requirements:

- **PAN Requirement:** It is mandatory for the resident individual to provide their Permanent Account Number (PAN) for all LRS transactions made through Authorized Persons.

Tax Collected at Source (TCS)

Definition:

- **Seller's Tax:** TCS is the tax payable by a seller, collected from the buyer at the time of sale of specified goods or services.

Governance:

- **Section 206C:** Governed by Section 206C of the Income-tax Act, specifying applicable goods/services and TCS rates.
- **Goods/Services:** Applicable to goods/services like liquor, timber, tendu leaves, scrap, minerals, motor vehicles, parking lots, toll plazas, mining, quarrying, and foreign remittance under LRS.

Requirements:

- **TAN:** The seller must have a Tax Collection Account Number (TAN) to collect and deposit TCS with tax authorities.
- **TCS Certificate:** The seller must issue a TCS certificate to the buyer within a specified time, showing the amount of tax collected and deposited.
- **Credit Claim:** The buyer can claim credit for the TCS amount when filing their income tax return.

Foreign Exchange Management Act (FEMA), 1999

Overview:

- **Legal Framework:** Provides the legal framework for the administration of foreign exchange transactions in India.
- **Enforcement:** Came into force on 1st June 2000.

Transaction Classification:

- **Current Account Transactions:**
    - **Definition:** Transactions by a resident that do not alter their assets or liabilities outside India.
    - **Examples:** Payments related to foreign trade, travel, education, etc.
- **Capital Account Transactions:**
    - **Definition:** Transactions that alter a resident's assets or liabilities outside India.

- **Examples:** Investment in foreign securities, acquisition of immovable property abroad, etc.

Industry's Call for Revisiting Chinese FDI Curbs and High Import Tariffs

Sub: Economy

Sec: External Sector

Context:

- **Current Situation:** India's electronics sector is **heavily dependent on imports** for vital components, leading to high manufacturing costs due to tariffs.
- **PLI Scheme:** The **Production Linked Incentive (PLI) scheme,** introduced in April 2020 to offset some cost disadvantages, is now seen as insufficient in countering the high tariff-induced costs.

Key Points from CII Report:

- **Inadequate Support:** The 4%-6% fiscal support under the PLI scheme is inadequate to negate the overall cost disadvantages compared to China and Vietnam.
- **Restrictions on FDI:** The restrictions on foreign direct investment (FDI) from countries sharing land borders with India, aimed at preventing predatory acquisitions during the pandemic, are now considered outdated and need reconsideration.
- **Non-restrictive Approach:** CII advocates for a non-restrictive approach towards investments, component imports, technology transfer, ease of inward movement of skilled manpower, and easing non-trade tariffs.

Proposals:

- **Rationalize Import Tariffs:** The import tariffs on priority sub-assemblies and components should be rationalized to 5% or lower to make Indian product manufacturers competitive.
- **Increase Fiscal Support:** A scheme to provide fiscal support in the range of 6%-8% for critical components production should be introduced.
- **Balance Between Imports and Exports:** A balance between imports and exports of higher value-added products is essential for long-term industrial sustainability.

Current Import Duties:

- **High Tariff Ranges:** India's import duties on 118 electronic-related tariff lines range from zero to 27.5%, with the majority falling in the 10%-15% range.
- **Zero Tariff Lines:** About 47.2% of the electronic imports pass through under zero tariff, while the remaining 52.8% are subjected to tariffs largely over 10%.

Priority Components and Sub-assemblies:

- **Import Dependence:** Batteries, camera modules, mechanicals, displays, and printed circuit boards are either nominally produced in India or are heavily import-dependent.
- **Demand Projections:** In 2023, India's demand for components and sub-assemblies was $45.5 billion to support $102 billion worth of electronics production. This demand is expected to touch $240 billion for $500 billion worth of electronics output by 2030.

Recommendations:

- **Tariff Comparison:** India should aim to align its tariff rates with those of **key competing economies like China and Vietnam to make its electronics sector more competitive.**
- **Investment Environment:** Creating a friendly investment environment by revisiting FDI restrictions and rationalizing tariffs is crucial for the growth of India's electronics manufacturing sector.

Conclusion: The industry urges the government to **revisit and revise the existing FDI curbs and high import tariffs to enhance the competitiveness of India's electronics sector**.

This involves **rationalizing tariffs, increasing fiscal support, and fostering a non-restrictive investment environment to transition from an import-dependent assembly-led manufacturing** to a component-level value-added manufacturing ecosystem.

Overview of the Production Linked Incentive (PLI) Scheme

Purpose:

- To scale up domestic manufacturing capability.
- To promote import substitution.
- To generate employment.

Launch:

- **Date**: March 2020.
- **Initial Target Industries**:
    - Mobile and allied component manufacturing.
    - Electrical component manufacturing.
    - Medical devices.

Coverage:

- **14 Key Sectors**:
    - Mobile manufacturing.
    - Medical devices.
    - Automobiles and auto components.
    - Pharmaceuticals.
    - Drugs and specialty chemicals.
    - Telecom and networking products.
    - Electronic products.
    - White goods (ACs and LEDs).
    - Food products.
    - Textile products.
    - Solar PV modules.
    - Advanced chemistry cell (ACC) battery.
    - Drones and drone components.

Mechanism:

- **Incentives**: Financial rewards for manufacturing in India.
- **Criteria**: Based on a percentage of revenue over up to five years.
- **Eligibility**: Both domestic and foreign companies.

The PLI scheme is a cornerstone in India's strategy to boost domestic manufacturing, reduce import dependency, create employment, and integrate Indian manufacturers into global value chains.

Critical Minerals: First Six Blocks Awarded

Sub: Economy

Sec: External Sector

Key Points:

- **New Auction Tranche:**
    - Union Mines Minister **G. Kishan Reddy** introduced a **fresh tranche of auctions** for **21 blocks** of critical and strategic minerals.
- **First Six Blocks Awarded:**
    - Winners announced for **six blocks** from the first auction held last November.
    - Mining activity in these blocks will focus on **phosphorite, lithium, graphite, and manganese**.

- **Locations:** Odisha, Tamil Nadu, Uttar Pradesh, and Chhattisgarh.

- **Offshore Mineral Auctions:**
  - **Auction process for offshore minerals** to start within the first 100 days in office.
  - Initial auction will include **10 offshore blocks** that have been identified.
- **Government's Commitment:**
  - Mines Secretary emphasized that the awarded mines will **begin production at the earliest possible**.
  - Aim to achieve **self-sufficiency** in the import-dependent sector.

Key Facts about Critical Minerals:

- **Essential for Modern Technologies and Economies:** Critical minerals are vital for the functioning of modern technologies, economies, or national security.
- **Supply Chain Risk:** There is a risk that the supply chains of these minerals could be disrupted.

Dynamic Criticality:

- The 'criticality' of minerals changes over time as supply and societal needs shift.

Applications:

- **Advanced Technologies:** Used in mobile phones, computers, fiber-optic cables, semiconductors, banknotes, defense, aerospace, and medical applications.
- **Low-Emission Technologies:** Essential for electric vehicles, wind turbines, solar panels, and rechargeable batteries.
- **Common Products:** Crucial for products like stainless steel and electronics.

Examples of Critical Minerals:

- Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Lithium, Vanadium, etc.

Critical Minerals in India:

- **List of 30 Critical Minerals:** Includes Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium, and Cadmium.

Rare Earth Elements (REE):

- **Seventeen Elements:** REE are a set of seventeen elements in the periodic table, including the fifteen lanthanides plus scandium and yttrium.
- **Metals:** REE are all metals, often referred to as the "**rare earth metals.**"

Abundance and Mining:

- **Relatively Abundant:** Despite being called "rare," they are relatively abundant in the Earth's crust.
- **Mining Difficulty:** They are difficult to mine **due to their typically low concentrations in geologic deposits.**

Properties and Sale:

- **Similar Properties:** Many similar properties cause them to be found together in geologic deposits.
- **Oxide Compounds:** Often sold as oxide compounds, hence also referred to as "rare earth oxides."

India's Current Account Surplus in Q4 FY24

Sub: Economy

Sec: External Sector

India's current account recorded a **notable surplus of $5.7 billion (0.6% of GDP) in Q4 FY24, a significant turnaround from a deficit of $1.3 billion (0.2% of GDP) a year ago.**

This marks the first surplus after ten consecutive quarters of deficit. The surplus is attributed to several factors, **including a reduction in the merchandise trade deficit and a rise in net services receipts.**

Summary:

India's current account recorded a **$5.7 billion surplus in Q4 FY24**, marking the first surplus in ten quarters. This improvement was driven by a **narrowing trade deficit**, higher services exports, and increased **financial inflows**. Overall, the FY24 current account deficit **moderated to $23.2 billion**, significantly lower than the previous year. Key contributors included higher **net invisibles receipts** and **portfolio investment inflows**, despite a drop in **net FDI inflows**.

Current Account Deficit (CAD) vs. Current Account Surplus (CAS)

- **Current Account Deficit (CAD):**
  - **Definition:** Occurs when a country's imports of goods and services are greater than its exports.
  - **Implication:** Indicates a net outflow of domestic currency to foreign markets. It can lead to borrowing from foreign sources, impacting national debt and economic stability.
  - **Investor Sentiment:** High CAD can deter foreign investment due to concerns about the country's economic health.
- **Current Account Surplus (CAS):**
  - **Definition:** Occurs when a country's exports of goods and services exceed its imports.
  - **Implication:** Indicates a net inflow of foreign currency, strengthening the local currency and increasing foreign exchange reserves.
  - **Economic Health:** Generally seen as a sign of economic strength, as it suggests that the country is competitive in international markets and has robust foreign currency reserves.

Twin Deficits:

CAD and Fiscal Deficit: Together, they form the twin deficits that can impact the stock market and investor confidence.

Fiscal Deficit: The gap between the government's expenditure requirements and its receipts, indicating the money the government needs to borrow during the year.

Implications:

- **Economic Impact:**
  - **Significance:** CAD affects the overall economy, stock markets, and individual investments.
  - **Investor Sentiment:** A lower CAD can improve investor sentiment, making the country's currency more attractive.
- **Foreign Exchange Reserves:**
  - **Surplus Impact:** A surplus in the current account means more money is flowing into the country than out, boosting foreign exchange reserves and the value of the local currency.

India-UK FTA Negotiations

Sub: Economy

Sec: External Sector

Visas Not a Priority

- Indian High Commissioner to the UK, ***Vikram Doraiswami***, stated that **visas are not the primary concern** for India in the Free Trade Agreement (FTA) with the UK.
- Despite frequent British media reports emphasizing visa issues, India's main focus lies elsewhere in the FTA discussions.

India's Priorities

- **India seeks ease of movement for highly skilled professionals**, particularly in IT and healthcare, to deliver services in the UK.
- There is also a push for ***tariff reductions*** on various goods exported to the UK.

UK's Priorities

- The UK aims for **greater access to India's services sector**.
- The UK also seeks ***reduced duties*** on goods ***such as whiskey and cars.***

Specifics on Skilled Movement

- India is not aiming to use the FTA primarily to increase migration to the UK.
- The focus is on ***Mode 4 of the General Agreement on Trade in Services (GATS)***, which deals with the movement of natural persons delivering services in a trade partner's territory.
- Doraiswami highlighted the need for **easier intra-company transfers**, noting the presence of over 970 Indian subsidiaries in the UK.

Student Visas

- **Student visas and post-study work visas were not positioned as critical** to the FTA by Doraiswami.
- The attractiveness of the UK as a study destination will be judged against other countries like the **US, Canada, and Australia**, which offer post-degree work opportunities.

Indo-Pacific and Security

- Without directly mentioning China, Doraiswami stressed the importance of a **rules-based order and freedom of navigation in the Indo-Pacific** for India.
- The **UK and European countries share this interest**, presenting an area for potential collaboration.

Context of FTA Negotiations

- The **India-UK trade agreement negotiations have been ongoing since 2022**, with the 14th round concluded before the Indian elections in April 2024.
- The India Global Forum event, where these comments were made, is an annual platform for Indian and British policymakers, industrialists, and others to discuss bilateral issues

This nuanced approach underscores the broader and more strategic elements of the FTA discussions between India and the UK, beyond the often-highlighted visa issues.

General Agreement on Trade in Services (GATS)

GATS: The General Agreement on Trade in Services is a treaty of the World Trade Organization (WTO) that came into effect in January 1995. **It aims to create a credible and reliable system of international trade rules, ensure fair and equitable treatment of all participants, stimulate economic activity through guaranteed policy bindings**, and promote trade and development through progressive liberalization.

Key Features:

Coverage: GATS covers all service sectors, except those supplied in the exercise of governmental authority.

Principles: Non-discrimination (Most-Favored Nation Treatment and National Treatment), transparency, and the progressive liberalization of services

The 4 Modes of Supply under GATS

Mode 1: Cross-Border Supply

Services are supplied from one country to another, without the movement of either the supplier or the consumer.

Example: A software company in India providing software services to a client in the United States via the internet.

Implication: This mode deals with services that can be delivered digitally or through other means without physical presence, such as online consultancy or data processing.

Mode 2: Consumption Abroad

Consumers or firms use a service in another country.

Example: A tourist from France traveling to India and utilizing services such as hotels, tours, or medical treatments.

Implication: This involves the movement of the consumer to the location where the service is provided. It's significant in sectors like tourism, education, and healthcare.

Mode 3: Commercial Presence

A service provider establishes a presence in another country to provide services.

Example: A UK-based bank opening a branch in India.

Implication: This mode involves foreign direct investment (FDI) and requires businesses to set up subsidiaries or branches in the host country. It covers sectors like banking, retail, and telecommunications.

Mode 4: Presence of Natural Persons

Individuals travel from their home country to another country to supply services.

Example: An Indian IT consultant working temporarily on a project in Germany.

Implication: This mode involves the temporary movement of workers to provide services in another country. It's often associated with professional services, IT, and consultancy.

India's External Debt

SUB: Economy

SEC: External Sector

Overall Debt and Growth:

- **Total External Debt:** $663.8 billion, an increase of $39.7 billion from March 2023.
- **Debt-to-GDP Ratio:** Declined to 18.7% from 19.0% in the previous year.

Valuation Effect:

- **Impact of Currency Appreciation:** The appreciation of the U.S. dollar against the Indian rupee and other major currencies (yen, euro, and SDR) accounted for a valuation effect of $8.7 billion.

Debt Composition:

- **Currency Breakdown:**
  - **U.S. Dollar-Denominated Debt:** Largest share at 53.8%.
  - **Indian Rupee-Denominated Debt:** 31.5%.
  - **Yen:** 5.8%.
  - **SDR (Special Drawing Rights):** 5.4%.
  - **Euro:** 2.8%.
- **Debt Categories:**
  - **Loans:** Largest component at 33.4%.
  - **Currency and Deposits:** 23.3%.
  - **Trade Credit and Advances:** 17.9%.
  - **Debt Securities:** 17.3%.

Sectoral Increase:

- **Government and Non-Government:** Both sectors saw an increase in outstanding debt over the year.

Implications and Observations:

- **Economic Management:** The decline in the debt-to-GDP ratio suggests effective management of external debt relative to economic growth.
- **Currency Risk:** The significant proportion of U.S. dollar-denominated debt highlights exposure to currency risk, particularly fluctuations in the value of the dollar.
- **Loan Dependency:** Loans as the largest component of external debt indicate a reliance on borrowed funds for economic activities.

Public Debt

- Public debt refers to the total amount of money that a government owes to external creditors and domestic lenders.
- **India's Public Debt:** Comprises all obligations of the Union government that are required to be settled using funds from the Consolidated Fund of India.

Main Types:

- **External Debt:** The portion of a country's debt owed to foreign creditors, including foreign governments, international organizations, and private entities outside the country.
- **Characteristics:** Subject to exchange rate fluctuations and international economic conditions.
- **Internal Debt:** Debt owed to lenders within the country, including individuals, banks, and other domestic institutions.

Indian Government Bonds in JP Morgan Index

Sub: Economy

Sec: External Sector

Inclusion and Timeline:

- **The inclusion of Indian Government Bonds (IGBs)** in JP Morgan's emerging markets bond indices will start on June 28, 2024.
- This inclusion will be phased over 10 months until March 31, 2025.
- Expected to bring in **$20-25 billion** over this period.

Impact on Indian Economy:

- The inflows will help India manage external finances and **boost foreign exchange reserves**.
- **Reserve Bank of India (RBI)** will need to use instruments to manage the resultant inflationary pressures.

JP Morgan's Announcement:

- Announced in September last year.
- India to be included in the **GBI-EM Global index**.
- **23 IGBs** meet the eligibility criteria.
- India is expected to reach the maximum weight of 10 percent in the GBI-EM Global Diversified Index (GBI-EM GD).
- Analysts expect **$2-3 billion** flows to India every month.

Eligibility Criteria:

- Eligible instruments require a notional outstanding above **$1 billion** and at least 2.5 years of remaining maturity.
- **FAR-designated IGBs** issued during the phase-in period will also be included.

Estimated Inflows:

- Estimates range between **$20 billion to $25 billion** in the 10-month period.

Market Impact:

- An HSBC report noted **$10.4 billion** inflows since the inclusion announcement.
- Foreign portfolio investors have purchased **$8.06 billion** of Indian debt.

Effect on Bond Market:

- Likely to lead to fresh active flows in the debt market.
- Will help India finance its **fiscal and current account deficit (CAD)**.
- Enhance liquidity and ownership base of **government securities (G-secs)**.

Challenges for RBI:

- RBI has tools to manage the impact of inflows.

Additional Inclusions:

- Indian government bonds to be included in the **Bloomberg Emerging Market (EM) Local Currency Government Index** from January 31, 2025.

JPMorgan Government Bond Index-Emerging Markets (GBI-EM)

- **Benchmark Index:** Tracks the performance of local-currency-denominated sovereign bonds issued by emerging market countries.
- **Purpose:** Provides investors with a representative measure of the fixed income market within emerging market economies.
- **Inclusion:** Comprises government bonds issued by various emerging market countries.
- **Dynamic Composition:** The composition may change over time based on eligibility criteria.

India's Inclusion:

- **Eligible Bonds:** JPMorgan has identified 23 Indian government bonds with a combined nominal value of USD 330 billion for inclusion in the GBI-EM.
- **Weight in Index:** India's weight is expected to reach the maximum threshold of **10%** in the GBI-EM Global Diversified, and approximately **8.7%** in the GBI-EM Global index.
- **Benchmark Impact:** India's local bonds will become part of the GBI-EM index and its suite of indices, which serve as benchmarks for approximately USD 236 billion in global funds.

Significance of India's Inclusion in GBI-EM Index

Enhanced Investment Attractiveness:

- **Coveted Destination:** Positions India as an attractive investment destination.
- **Potential Inflows:** Expected to attract substantial inflows of USD 45-50 billion over the next 12-15 months.

Economic Stability and Financing Ease:

- **Funding Alternative:** Eases financing constraints related to India's fiscal and current account deficits.
- **Lower Risk Premia:** Reduces India's risk premia and funding costs, fostering economic stability.
- **Risk Premia:** The additional return expected from a risky asset over a risk-free asset.

Fully Accessible Route (FAR)

Brief:

- **Introduction:** RBI has introduced the Fully Accessible Route (FAR) to enable non-residents to invest in specified government bonds.

Key Features:

- **Investment:** Eligible investors can invest in specified government securities under FAR without any investment ceilings.
- **Existing Routes:** Operates alongside the **Medium-Term Framework (MTF)** and the **Voluntary Retention Route (VRR).**

Benefits:

- **Ease of Access:** Substantially eases access for non-residents to Indian government securities markets.
- **Global Bond Indices Inclusion:** Facilitates inclusion, enhancing the visibility of Indian bonds in international markets.
- **Stable Foreign Investment:** Encourages stable foreign investment inflows into government bonds, promoting financial stability.

Voluntary Retention Route (VRR)

Brief:

- **Introduction:** RBI introduced the Voluntary Retention Route (VRR) to encourage Foreign Portfolio Investors (FPIs) for long-term investments in Indian debt markets.

Key Features:

- **Aggregate Investment Limit:** ₹40,000 crores for VRR-Govt and ₹35,000 crores for VRR-Corp.
- **Minimum Retention Period:** Three years, during which FPIs must maintain a minimum of 75% of the allocated amount in India.
- **Operational Flexibility:** Greater flexibility in terms of instrument choices and exemptions from certain regulatory requirements for FPIs.

CBIC to Launch Automated Currency Exchange Rate Publishing System on July 4

Sub: Economy

Sec: External Sector

Overview:

The Central Board of Indirect Taxes and Customs (CBIC) will introduce the **automated Exchange Rate Automation Module (ERAM) system** on July 4, replacing the manual process of notifying exchange rates. This new system is part of CBIC's ongoing efforts to digitize customs processes for better trade facilitation.

Key Features of ERAM:

- **Automated Publishing:** ERAM will automatically publish the exchange rates of 22 currencies online, enhancing the ease of access for importers and exporters.
- **Publication Schedule:** The exchange rates will be updated on the **ICEGATE website** twice a month, specifically on the evening of the 1st and 3rd Thursdays, and will take effect from midnight the following day.
- **Accessibility:** A link on the CBIC website will redirect users to the ICEGATE website where the published rates can be viewed. **The rates will be stored for future reference, allowing users to check historical rates.**

Benefits:

- **Trade Facilitation:** The automated system is expected to streamline the process of obtaining exchange rates, reducing the administrative burden on importers and exporters.
- **Enhanced Digitalization:** The move is part of CBIC's broader initiative to enhance digitalization within customs processes, aiming for greater efficiency and transparency.

The launch of ERAM marks a significant step in this direction, ensuring timely and accurate publication of exchange rates, which are crucial for international trade transactions.

Indian Customs Electronic Gateway (ICEGATE):

- **National Portal:** ICEGATE is the national portal of Indian Customs, part of the Central Board of Indirect Taxes and Customs (CBIC).
- **E-Filing Services:** Provides electronic filing services to trade, cargo carriers, and other trading partners.

User Base:

- **Registered Users:** More than 1.6 lakh users are registered with ICEGATE.
- **Service Reach:** These users serve over 12.5 lakh importers/exporters.

Key Services Offered:

- **E-Filing:**
    - **Bill of Entry:** Electronic filing of import goods declaration.
    - **Shipping Bills:** Electronic filing of export goods declaration.
    - **E-Payment:** Payment of Customs Duty electronically.
    - **Common Signer Utility:** Free web-based utility for signing all Customs documents.
    - **E-Sanchit:** Online filing of supporting documents.
    - **IGST Refund:** End-to-end electronic processing of IGST refunds.

Customs Processing:

- **EDI System:** All electronic documents/messages handled by ICEGATE are processed by the Indian Customs EDI System (ICES).
- **Coverage:** ICES operates at more than 250 Customs locations.

Benefits:

- **Faster Customs Clearance:** Integration with partner agencies enables quicker processing and clearance.
- **Enhanced Trade Facilitation:** Provides comprehensive support to importers/exporters, improving efficiency and reducing delays.

Highlights of Direct Tax Collections

Sub: Economy

Sec: Fiscal Policy

The latest data on India's direct tax collections for the **first quarter of the fiscal year 2024-25 (ending June 17, 2024)** highlights significant trends in **both personal income tax (PIT) and corporate income tax (CIT).**

- **Overall Growth**:
  - Net direct tax collections increased by 21% year-on-year, reaching approximately ₹4.63 lakh crore by June 17, 2024, up from ₹3.82 lakh crore in the same period last year.
- **Personal Income Tax (PIT) and Securities Transaction Tax (STT)**:
  - PIT and STT contributed a significant 60.7% of the total net direct tax receipts.
  - This indicates a **growing reliance on personal income and securities transaction** taxes compared to corporate taxes.
- **Corporate Income Tax (CIT)**:
  - The share of corporate taxes in the total net direct tax receipts has declined to 39.1%.
  - This marks a notable shift from previous years where corporate taxes constituted a larger portion of the direct tax revenue.
- **Comparison with Previous Fiscal Year (FY24)**:
  - In FY24, net direct tax collections saw a 17.7% increase, totalling ₹19.58 lakh crore.
  - The share of PIT in the total net direct taxes rose to 53.3%, up from 50.1% the previous year.
  - Conversely, the **share of CIT declined to 46.5%, down from 49.6%.**
- **Advance Tax Collections**:
  - Advance tax collections for the current year grew by 27.3%, amounting to ₹1,48,823 crore.
  - Out of this, ₹1,14,353 crore was paid as CIT and ₹34,470 crore as PIT.
- **Gross Tax Collections**:
  - Before accounting for refunds, **gross direct tax collections increased by 22.2%, reaching approximately ₹5.16 lakh crore by June 17, 2024, compared to ₹4.22 lakh crore in the same period last year.**
  - Gross CIT collections were ₹2.26 lakh crore, while PIT and STT collections were ₹2,88,993 crore.
- **Tax Deducted at Source (TDS)**:
  - TDS yielded ₹3,24,787 crore among the minor heads of tax receipts.

Analysis and Implications

- **Shift in Tax Structure**:
  - The increasing share of PIT and STT indicates a **broadening of the tax base with more individuals and transactions being brought under the tax net.**

- The decline in the share of CIT suggests either a slower growth in corporate profits or a shift in the tax policy focus towards indirect taxes and personal income.

- **Policy Implications**:
  - The government may need to consider measures to **stimulate corporate growth and profitability to balance the tax structure.**
  - Encouraging corporate investments and **providing incentives for business expansion could help in increasing CIT contributions.**
- **Economic Implications**:
  - Higher PIT and STT collections reflect a positive trend in personal incomes and stock market activities, which are essential indicators of economic health.
  - The significant growth in **advance tax collections indicates strong revenue expectations from both individuals and corporations.**

Conclusion

The data indicates a robust growth in India's direct tax collections driven primarily by PIT and STT.

The declining share of CIT **highlights a potential area of focus for policymakers to ensure balanced and sustainable tax revenue growth**. The government may need to explore strategies to boost corporate profitability and investments to maintain a healthy and diverse tax base.

Insurance Body Seeks Cut in GST on Health Policies

Sub: Economy

Sec: Fiscal Policy

Key Points:

- **Reduction in GST**:
  - The **Confederation of General Insurance Agents' Associations of India** has urged the government to **reduce GST on individual health insurance policies** from 18% to 5%.
  - This reduction aims to **encourage people to avail health insurance policies** as a measure of social security.
- **Growth in Premiums vs. Coverage**:
  - The general insurance industry collected **₹109,000 crore in premiums under the health portfolio** in fiscal 2023-24 (FY24).
  - Despite the **gross premium doubling over the last five years**, the number of lives covered and policies issued **remained meager**.
- **Out-of-Pocket Expenses**:
  - **Out-of-pocket expenses for health** remain high at 48.2%, leading to substantial medical bills for common people.
  - Senior citizens with health insurance often face high premiums of **₹12,000 to ₹15,000 per lakh** from their limited income resources.
- **Regional Disparities**:
  - The stagnation in the share of health insurance is restricted to only **five states** in India.
  - Vast areas of other states remain **underpenetrated** in terms of health insurance coverage.
- **Decline in Policy Renewals**:
  - The **renewal rate of health insurance policies** is declining alarmingly due to **frequent premium hikes and medical inflation**.
- **Global Context of GST on Insurance**:
  - India has the **highest GST on insurance in the world**.

- The confederation argues that this needs to be addressed to attain the goal of **"Insurance for all by 2047"**.

- **Recommendations by the Standing Committee on Finance**:
  - The committee, in its 66th report submitted to both houses of Parliament in February 2024, recommended the **rationalization of GST on health insurance**.

Implications:

- **For Policymakers**:
  - Lowering the GST on health insurance can make these policies more accessible, **improving social security** and health coverage.
- **For the General Public**:
  - A reduction in GST could lead to **lower premium costs**, making health insurance more affordable, especially for senior citizens and low-income groups.
- **For the Insurance Industry**:
  - Reduced GST could **boost policy renewals** and expand coverage, addressing the current decline in policy renewals due to high costs.
- **For Regional Development**:
  - Addressing regional disparities in health insurance coverage can lead to **more equitable access to health services** across the country.

Conclusion:

The Confederation of General Insurance Agents' Associations of India's call to reduce GST on health insurance from **18% to 5%** highlights a critical step towards making health insurance more affordable and widespread. This measure, aligned with the goal of **"Insurance for all by 2047"**, can significantly impact **social security, economic burden on families**, and the overall growth of the insurance sector in India.

IRDAI Vision 2047: Insurance for All

Objective:

- **Insurance for All by 2047** aims to ensure every citizen has appropriate life, health, and property insurance coverage.
- Every enterprise is supported by suitable insurance solutions.
- **Make the Indian insurance sector globally attractive**.

Pillars:

- Insurance Customers (Policyholders)
- Insurance Providers (Insurers)
- Insurance Distributors (Intermediaries)

Focus Areas:

- Making available the right products to the right customers.
- Creating a robust grievance redressal mechanism.
- Facilitating ease of doing business in the insurance sector.
- Ensuring the regulatory architecture is aligned with market dynamics.
- Boosting innovation.
- Enhancing competition and distribution efficiencies while mainstreaming technology.
- Moving towards a principle-based regulatory regime.

Significance:

- **Affordable Insurance Access**: Helps households across the country access affordable policies covering health, life, property, and accidents.
- **Faster Claim Settlements**: Policies offer faster claim settlements, sometimes within hours.

- **Additional Benefits**: Includes benefits like gym or yoga memberships.

State of the Insurance Sector in India

Growth and Density:

- **Life insurance density** increased from **USD 11.1 in 2001 to USD 91 in 2021**.
- **Total global insurance premiums** in 2021 increased by **3.4% in real terms**, with non-life insurance growing by **2.6%**.

Significance of IRDAI in Transforming the Insurance Sector

Insurance Growth:

- **Insurance penetration** (percentage of insurance premium to GDP) at **4.2% in 2021-22** compared to **2.71% in 2001-02**.
- **Insurance Density** (ratio of premium to population) at **$91 in 2021-22** compared to **$11.5 in 2001-02**.
- **'Insurance for All' by 2047**: IRDAI has committed to enable **'Insurance for All' by 2047**, where every citizen has appropriate life, health, and property insurance cover etc.

Expanded Regulatory Role:

- New intermediaries have started operating in the market, like corporate agents, Bancassurance (selling insurance products through banks), online sales, etc.
- **Digital Transformation**: Accelerated by the authority's guidance on e-KYC, paperless policies, digital payments, etc.

Major Initiatives by IRDAI

Bima Sugam:

- An **online insurance marketplace** for buying, selling, and servicing insurance policies as well as settling claims.
- Part of IRDAI's Bima Trinity - **Bima Vistaar, Bima Vahak, and Bima Sugam**.

Saral Jeevan Bima:

- Provides basic protection to self-employed individuals or people in low-income groups.

Integrated Grievance Management System:

- To create a central repository of grievances across the country and provides various analyses of data indicative of areas of concern to the insurance policyholder.

Pan India Survey:

- Conducted through the National Council of Applied Economic Research (NCAER) to improve its strategy of creating insurance awareness.

Mandating Board Approved Policy for Insurers:

- Insurers are mandated to have a **Board approved Insurance Awareness Policy** with an action plan for organizing various activities promoting consumer awareness on various aspects of insurance.

Conclusion

As the insurance sector continues to evolve, IRDAI remains committed to adapting and enhancing its regulations to meet the changing needs. **IRDAI's initiatives in areas such as promoting financial inclusion, encouraging innovation, etc., will be instrumental in driving the sustainable growth of the insurance sector.**

States Seek Improvements in 50-Year Interest-Free Loan Scheme

Sub: Economy

Sec: Fiscal Policy

Key Highlights:

1. **Union Finance Minister's Assurance:**

- **Assured Consideration:** Finance Minister Nirmala Sitharaman has assured that States' ideas and inputs for the Union Budget 2024-25 will receive "due consideration."
- **Pre-Budget Consultation:** This assurance was given during pre-Budget consultations on June 22, where State Ministers made several suggestions.

2. **Scheme for Special Assistance to States for Capital Investment:**

- **Launch:** The scheme was first launched in 2020-21.
- **Current Allocation:** The Union government has proposed to allocate ₹1.3 lakh crore for 2024-25, the same amount as in 2023-24.
- **State Suggestions:** Ministers from States suggested improvements to the scheme.
- **Purpose:** The scheme is intended to support capital investment projects in States.

3. **Meeting Participants:**

- **Attendees:** Finance Ministers from several States, Chief Ministers of Goa, Meghalaya, Mizoram, Nagaland, and Sikkim, and Deputy Chief Ministers of Bihar, Madhya Pradesh, Odisha, Rajasthan, and Telangana attended the meeting.

4. **Financial Support to States:**

- **Timely Devolution:** The Finance Minister emphasized the Union Government's support to States through timely tax devolution.
- **Grants and GST Compensation:** Finance Commission grants and arrears of GST Compensation are provided to stimulate growth.

5. **Conditional Loans:**

- **Untied Loans:** Most of the loans under the scheme are untied.
- **Conditional Allocation:** A part of the allocation is conditional and linked to citizen-centric reforms and sector-specific capital projects.
- **Criteria Fulfillment:** States are encouraged to avail these loans by meeting the requisite criteria.

Summary: States have requested improvements to the **50-year interest-free loan scheme aimed at capital investments**, with the Finance Minister assuring that their inputs will be considered for the Union Budget 2024-25. The scheme's proposed allocation for 2024-25 remains ₹1.3 lakh crore. **The meeting highlighted the Union Government's commitment to support States through tax devolution, grants, and GST compensation, with an emphasis on fulfilling criteria for conditional loans.**

Scheme for Special Assistance to States for Capital Investment

About:

- **Financial Assistance:** The scheme provides financial assistance to State Governments in the form of a 50-year interest-free loan for capital investment projects.
- **Allocation for FY 2022-23:** A total financial assistance of ₹1 lakh crore is allocated to states for the financial year 2022-23.
- **Above Borrowing Ceiling:** This loan is over and above the normal borrowing ceiling allowed to states for FY 2022-23 and must be spent within the same year.

Eligible Parts of the Scheme:

- **New or Ongoing Projects:** The scheme covers both new and ongoing projects, as well as settling pending bills for ongoing capital projects.
- **Project Submission:** States can submit projects of higher value than the allocated funds, indicating their preference or priority.

Different Parts of the Scheme:

- **Capital Works:** Priority is given to projects under the PM Gati Shakti Master Plan.
- **PM Gati Shakti:** Related expenditures under this initiative.
- **PM Gram Sadak Yojana:** Rural road development projects.

- **Digitisation Incentives:** Projects promoting digital infrastructure.
- **Optical Fibre Cable:** Enhancing digital connectivity.
- **Urban Reforms:** Initiatives for urban development.
- **Disinvestment and Monetisation:** Projects related to disinvestment and monetisation.

Exclusion:

- **Small Projects:** Projects with a capital outlay of less than ₹5 crore (₹2 crore for North East) are not eligible.
- **Repair and Maintenance:** Projects for repair and maintenance, irrespective of the capital outlay, are excluded.

Sticky inflation: Why is RBI refusing to cut interest rates?

Sub: Eco

Sec: Monetary Policy

Context:

- The Reserve Bank of India (RBI) unveiled its latest bi-monthly monetary policy review and for the eighth time in a row RBI decided that it would not change the benchmark policy rate.

More on news:

- The **repo rate** was raised sharply between May 2022 and February 2023 but it has stayed stagnant at the 6.5% level since then.
- **Repo rate has stayed within the so-called "comfort zone" of the RBI** ,anywhere between 2% and 6% — since September 2023 and the RBI has not changed the repo rate since February 2023.
- **The RBI's policy statement predicts** that inflation is likely to fall below the 4% target in the near future but that fall would only be due to temporary reasons.

What is Repo Rate and Reverse Repo rate?

- **Repo rate is the rate at which the central bank of a country** (Reserve Bank of India in case of India) lends money to commercial banks in the event of any shortfall of funds.
- The **repo rate is the interest rate at which the RBI** lends money to commercial banks.
- Reverse repo rate is the rate at which the RBI borrows money from commercial banks within the country.

What is the goal of RBI's monetary policy?

- The **primary goal is to maintain price stability in the economy.**
- The RBI aims to ensure that prices **do not fluctuate beyond a reasonable degree.**
- This fluctuation is measured by the retail inflation rate and the rate of price rise that is faced by the average individual consumer.
- The RBI is required to target an inflation rate of 4%, which means that the general price level should go up by 4% from one year to another.

Why is the RBI not cutting interest rates?

- The **retail inflation rate has been coming down closer to the 4% mark.**
- Despite keeping the **repo rate consistently high**, the retail inflation has not dropped to touch the 4% mark since January 2021.
- The RBI has expressed its **concern over the stickiness of inflation.**
- In the first four months of 2024, the inflation rate has been**10%, 5.09%, 4.85%, and 4.83%, respectively.**
- The RBI does not cut the repo rate as soon as the **overall inflation rate falls to (or below) the 4% target in any one month.**

- The RBI typically cuts the **repo rate when it finds that economic activity needs a boost**.
- India's **gross domestic product (GDP) growth rate has been surprisingly strong over the past year in particular.**
- Most economists are waiting to see how the political compulsions of a coalition government will impact the Centre's commitment to fiscal deficit i.e. the amount of money the government intends to borrow from the market.
- Higher than anticipated fiscal deficit has implications for both inflation (if more fresh money is printed) or interest rates (if there is less money for the private sector to borrow).

What is Sticky Inflation?

- **Sticky inflation refers to a phenomenon** where prices do not adjust quickly to changes in supply and demand, leading to persistent inflation.
- **Sticky inflation is an undesirable economic situation where there is a combination of stubbornly high inflation, (and often stagnant growth).**
- Sticky inflation is often associated with cost-push factors, i.e. factors which cause a rise in the inflation rate but also lead to lower spending and economic growth.
- A basis point is one hundredth of a percentage point.
- The federal funds rate is the rate at which banks lend balances to each other overnight.

RBI Maintains Status Quo, Raises FY25 GDP Growth Forecast to 7.2%

Sub: Eco

Sec: Monetary Policy

Key Highlights:

- **Policy Repo Rate:** The Reserve Bank of India (RBI) decided to keep the policy repo rate unchanged at **6.5%**, with a majority vote of 4:2.
- **Monetary Policy Stance:** The RBI continues with the stance of withdrawal of accommodation.
- **Growth Forecast:** Revised FY25 GDP growth forecast to **7.2%** from the previous estimate of 7%.

Monetary Policy Committee (MPC) Decision:

- The six-member MPC maintained the repo rate at **6.5%**.
- External members Ashima Goyal and Jayanth Varma voted for a **rate cut of 25 basis points (bps)** and a change in stance to neutral. Other four members voted in favor of maintaining the current rate and stance.

Inflation and Economic Outlook:

- **Inflation Trends:** Inflation is moderating, mainly driven by the core component, although food inflation remains elevated.
- **Price Stability:** The RBI aims to ensure inflation aligns with the target on a durable basis while maintaining economic growth.
- **CPI Inflation Projection:** Retained at **4.5%** for FY25, with quarterly projections of Q1 at 4.9%, Q2 at 3.8%, Q3 at 4.6%, and Q4 at 4.5%.

Remarks by RBI Governor Shaktikanta Das:

- Highlighted that **domestic economic activity has shown resilience**, with a revival in rural demand driven by improving farm sector activity.
- Emphasized the need for **price stability** and **monetary policy's flexibility** in addressing inflation.
- Clarified that RBI's decisions are primarily driven by **domestic growth-inflation conditions**, despite monitoring global economic policies.

Perspectives:

- **Nomura:** The RBI's policy decision was expected, but the vote split indicates growing divergence within the MPC.
- **Goldman Sachs:** Anticipates a shallow easing cycle with total **50 bps rate cuts** from the RBI, likely in Q4 CY24 and Q1 CY25.
- **State Bank of India:** Liquidity management will be critical, and RBI may need innovative tools for liquidity augmentation.

Future Projections:

- **GDP Growth:** Revised upward to **7.2%** for FY25.
- **Rate Cut Expectations:** Economists expect the first rate cut in the Oct-Dec quarter of 2024, with cumulative easing of 75 bps in FY25.

Concluding Note:

- The RBI remains focused on **price stability** while supporting **economic growth**, with inflation control being a key priority. The central bank continues to adapt its policies to meet domestic economic needs amidst global uncertainties.

Monetary Policy Committee (MPC)

Objective	A statutory and institutionalized framework under the Reserve Bank of India Act, 1934, for maintaining price stability, while keeping in mind the objective of growth.
Chairman	The Governor of RBI is the ex-officio Chairman of the committee.
Function	The MPC determines the policy interest rate (repo rate) required to achieve the inflation target (4%).
Recommendation	An RBI-appointed committee led by the then deputy governor Urjit Patel in 2014 recommended the establishment of the Monetary Policy Committee.
Policy Repo Rate	**6.50%**
Definition	The rate at which the central bank (RBI) lends money to commercial banks in the event of any shortfall of funds. The central bank purchases the security.
Standing Deposit Facility (SDF) Rate	**6.25%**
Definition	A liquidity window through which the RBI gives banks an option to park excess liquidity without needing to provide collateral.
Marginal Standing Facility Rate	**6.75%**
Definition	A window for scheduled banks to borrow overnight from the RBI in an emergency when interbank liquidity dries up completely.
Bank Rate	**6.75%**
Definition	The rate charged by the RBI for lending funds to commercial banks.
Fixed Reverse Repo Rate	**3.35%**
Definition	The rate at which the RBI borrows money from commercial banks within the country. This mechanism is used to control liquidity in the banking system.
Cash Reserve Ratio (CRR)	**4.50%**
Definition	The minimum amount of deposit (NDTL) that commercial banks have to hold as reserves with the central bank.

Statutory Liquidity Ratio (SLR)	**18.00%**
Definition	The minimum percentage of deposits that a commercial bank must maintain in the form of liquid cash, gold, or other securities.

Global Central Banks Recalibrate as Policy Easing of 2024 Fizzles

Sub: Economy

Sec: Monetary policy

Overview:

- **End of 2023 Expectations:**
  - Major central banks were expected to shift to **lower interest rates**, making borrowing cheaper.
  - Optimism was high among investors and organizations like the International Monetary Fund (IMF).
- **Reality Check:**
  - ***Persistent inflation and resilient economic and wage growth have largely halted the anticipated joint easing of monetary policy.***

Key Developments:

- **Federal Reserve's Position:**
  - In December 2023, **Fed discussed the possibility of rate cuts**, raising hopes for looser financial conditions.
  - By mid-2024, the **Fed anticipated only a single quarter-percentage-point rate cut by year-end**, down from three cuts projected earlier.
  - Fed emphasized the need to get policy right, **indicating the initial move to loosen policy would be "consequential."**
- **Economists vs. Markets:**
  - Economists consistently predicted fewer rate cuts than market expectations.
  - In December, **markets expected the Bank of England (BoE) to cut rates by May, but economists forecasted a third-quarter cut**, which is now widely expected in August.
  - Similarly, the European Central Bank (ECB) was expected by economists to make its first cut in June, while market pricing implied multiple cuts throughout the year.
- **Current Central Bank Actions:**
  - **European Central Bank and Bank of Canada** made modest initial cuts in response to earlier promises when inflation seemed to be falling faster.
  - **Bank of England** is expected to hold rates steady in its last policy meeting before Prime Minister Rishi Sunak's term ends, delaying the move toward lower borrowing costs.

Inflation and Economic Growth:

- **Headline Inflation and Wage Growth:**
  - BoE faced higher-than-expected inflation in the services sector and substantial annual wage growth, delaying rate cuts.
  - ECB officials warned of "bumps in the road" as they aimed to bring inflation back to the 2% target by the end of 2025.

Managing Expectations:

- **Central Bank Messaging:**

- Powell's December comments seemed to solidify views that rate cuts were imminent, but the reality has been more measured.
- ECB and other central banks are **balancing inflation control with economic growth, aiming to avoid overly restrictive policies that could harm fragile recoveries**.

Conclusion:

- **Symbolic vs. Actual Impact:**
  - While the timing of the first-rate cut is symbolically important, its macroeconomic effect might be less significant.

Summary:

The anticipated global shift to **lower interest rates in 2024 has largely fizzled, with major central banks confronting persistent inflation and resilient economic growth**.

Economists have been more accurate than **markets in predicting the timing and extent of rate cuts, reflecting a cautious approach by central banks like the Federal Reserve, Bank of England, and European Central Bank.** Managing expectations remains crucial as central banks navigate the trade-offs between inflation control and economic growth.

Russia, N. Korea sign defence pact, vow to assist each other if attacked

Sub: Economy

Sec: Monetary Policy

Russia-North Korea Mutual Defence Pact:

- **Russian President Vladimir Putin** and **North Korean leader Kim Jong-un** signed a **partnership agreement** promising **mutual aid** against aggression.
  - The deal includes a clause requiring the countries to come to each other's aid if either is attacked
- The deal marks a significant upgrade in their relations, covering **security, trade, investment, and cultural ties,** and could be the **strongest connection** since the **Cold War.**

Summit Details:

- **Putin** visited **North Korea** for the **first time** in **24 years**.
- The **summit** occurred amidst escalating tensions with the West and concerns over potential arms deals between North Korea and Russia.

Historical Context:

- **North Korea** and the **Soviet Union** had a **1961 treaty** requiring **Soviet military intervention** if **North Korea** was attacked, which was replaced by a **weaker pact** in **2000** after the **USSR's collapse**.

Implications:

- The **U.S.** and its allies worry **North Korea** might supply **Russia** with **munitions** for its **war in Ukraine**, in exchange for **economic assistance** and **technology** that could **enhance North Korea's nuclear capabilities**.
- **Kim Jong-un** described the deal as the **"strongest ever treaty"** between the two nations, indicating full support for Russia's actions in Ukraine.
- This partnership signals a significant geopolitical shift, potentially impacting global security dynamics.

RBI Cancels Licence of City Co-operative Bank

Sub: Economy

Sec: Monetary Policy

Key Points:

- **Licence Cancellation**:

- The **Reserve Bank of India (RBI)** has cancelled the licence of **The City Co-operative Bank Ltd**, Mumbai.
- The cancellation is due to the bank **not having adequate capital and earning prospects**.

- **Banking Operations Cease**:
  - As a result of the licence cancellation, the bank **ceases to carry on banking business** effective from the close of business on **June 19, 2024**.
- **Winding Up and Liquidation**:
  - The **Commissioner for Cooperation and Registrar of Cooperative Societies, Maharashtra**, has been requested to issue an order for the **winding up of the bank**.
  - A **liquidator will be appointed** for the bank as per the RBI's request.
- **Non-Compliance with Banking Regulation Act**:
  - The RBI stated that the bank **failed to comply with the requirements** of specific sections of the **Banking Regulation Act, 1949**.

Implications:

- **For Customers**:
  - Customers will need to seek alternative banking options and will have to follow the procedure set by the liquidator for claiming their deposits.
- **For Employees**:
  - Employees of The City Co-operative Bank Ltd will be directly affected by the cessation of operations and the subsequent winding up of the bank.
- **For the Cooperative Banking Sector**:
  - This action underscores the RBI's stringent oversight and regulatory measures to ensure the financial health and stability of banks in India.
- **For the Regulatory Framework**:
  - Reinforces the importance of **compliance with the Banking Regulation Act** to maintain a bank's licence and operate within the financial system.

Conclusion:

The RBI's decision to cancel the licence of The City Co-operative Bank Ltd, Mumbai highlights the critical importance of maintaining **adequate capital and earning prospects**. This move serves as a reminder of the stringent regulatory environment within which banks must operate, ensuring the stability and trust in the financial system.

Capital Adequacy Ratio (CAR)

- **Definition**:
  - **Capital Adequacy Ratio (CAR)**: Ratio of a bank's capital to its risk-weighted assets and current liabilities.
  - Also known as **Capital-to-Risk Weighted Asset Ratio (CRAR)**.
- **Purpose**:
  - Ensures banks do not take excessive leverage and risk insolvency.
- **Regulatory Requirements**:
  - **Basel III Norms**: Stipulate a minimum CAR of **8%**.
  - **RBI Norms**: Require Indian scheduled commercial banks to maintain a CAR of **9%**.

Co-operative Banking

- **Definition**:
  - Financial entities belonging to members who are both owners and customers.
- **Regulation**:

- Registered under the **States Cooperative Societies Act**.
- Regulated by both **Registrar of Co-operative Societies** and **Reserve Bank of India (RBI)**.
- Governed by **Banking Regulations Act, 1949** and **Banking Laws (Co-operative Societies) Act, 1955**.

- **Features**:
  - **Customer Owned Entities**: Members are both customers and owners.
  - **Democratic Member Control**: Members elect a board of directors democratically.
  - **Profit Allocation**: Profits are allocated to reserves, and sometimes distributed to members.
  - **Financial Inclusion**: Significant role in financial inclusion of rural populations.
  - Classified into **Urban** and **Rural** co-operative banks based on region.

Difference Between UCBs and Commercial Banks

- **Regulation**:
  - **Urban Co-operative Banks (UCBs)**: Partly regulated by RBI. Banking operations regulated by RBI; management and resolution by Registrar of Co-operative Societies.
- **Ownership and Borrowing**:
  - In UCBs, borrowers can be shareholders, unlike in commercial banks where shareholders and borrowers are distinct groups.

SBI Chairman Khara Advocates for Tax Relief on Interest Income in Upcoming Budget

Sub: Economy

Sec: Monetary Policy

Key Proposal:

- **SBI** has proposed tax relief on interest income.

The rationale is that this relief would **help banks attract more savings** which could then be utilized for **funding long-term infrastructure projects**.

Current Tax Scenario:

- **Banks are required to deduct tax** when the interest income from deposits across all branches exceeds ₹40,000 in a year.
- For **savings accounts**, interest earned up to ₹10,000 is exempt from tax.

Khara's Argument:

- Providing **tax relief on interest earnings** in the Budget would **incentivize depositors**.
- This, in turn, would enable the banking sector to **mobilize deposits for capital formation** in the country.

Budget Expectations:

- The **Full Budget for 2024-25** is expected to be presented by Finance Minister Nirmala Sitharaman next month.
- Given the current economic growth rate, Khara anticipates a **14-15% loan growth** for FY24-25.

Significance:

- **Tax relief on interest income** could potentially enhance the savings rate among the population.
- Increased savings would **provide banks with more funds** to support long-term infrastructure projects, crucial for economic development.

Conclusion:

- Khara's proposal highlights the need for **fiscal measures** that could boost the banking sector's capacity to fund critical infrastructure, thereby fostering economic growth and development.

Bank deposits are growing but how well are they protected?

Sub: Economy

Sec: Monetary Policy

Context: With interest rates rising, deposits have grown. On an absolute basis, the year-on-year growth in value of insured deposits was 3.4 per cent from September 2022 to September 2023. The rise was higher in previous years at 6.4 per cent from 2021 to 2022, and 10.9 per cent from 2020 to 2021.

But how well protected are FDs? It turns out that only 44 per cent of bank deposits were covered by insurance as of September 2023.

And this proportion has been on a decline since 2021, per RBI data. In September 2022, 49 per cent of deposits were insured down from 50.9 per cent in September 2021 and 2020.

Deposit Insurance:

- Deposit insurance is a **protection cover for deposit holders** in a bank when the bank fails and does not have money to pay its depositors.
- This insurance is provided by **Deposit Insurance and Credit Guarantee Corporation (DICGC)** which is a **wholly owned subsidiary of the RBI**.
- DICGC insures all bank deposits, such as **savings, fixed, current and recurring deposit for up to the limit of Rs 5 lakh per bank.**
- DICGC covers depositors of **all commercial banks and foreign banks** operating in India, state, central and urban co-operative banks, local area banks and regional rural banks provided the bank has bought the cover from DICGC.
- The DICGC does not include the following types of deposits:
    - Deposits of foreign governments.
    - Deposits of central/state governments.
    - Inter-bank deposits.
    - Deposits of the state land development banks with the state co-operative bank.
    - Any amount due on account of any deposit received outside India.
    - Any amount specifically exempted by the DICGC with previous approval of RBI.

Government Amendments to EPS Withdrawal Benefits

Sub: Economy

Sec: Inflation and unemployment

- **Amendment Details:**
    - The government amended the Employees' Pension Scheme (EPS), 1995 to allow **withdrawal benefits for members with less than 6 months of contributory service**.
    - Previously, withdrawal benefits were **calculated based on completed years of contributory service and wages on which EPS contributions were made.**
- **Impact of the Amendment:**
    - More than 7 lakh EPS members annually will now benefit from this amendment.
    - Withdrawal benefits will now be proportionate to the number of completed months of service and the wages on which EPS contributions were paid.
- **Rationalization of Benefits:**
    - The amendment rationalizes payment by considering every completed month of service.
    - It is estimated **that over 23 lakh members annually will benefit** from the modified calculation.
- **Previous Issues Addressed:**

- Earlier, only members with 6 months or more of contributory service were entitled to withdrawal benefits.
- Many claims (approximately 7 lakh) were rejected annually due to insufficient contributory service.

- **Example of Calculation Change:**
  - Previously, a member with 2 years and 5 months of service and a monthly wage of Rs. 15,000 received Rs. 29,850 as withdrawal benefit.
  - With the amendment, the benefit increases to Rs. 36,000 for the same service duration.
- **Expert Opinions:**
  - Emphasized the amendment's benefit to **temporary and short-term employees, enhancing social security.**
  - Noted the **positive impact on employees needing early access to funds for medical expenses or emergencies.**
- **Broader Implications:**
  - The amendment reduces the **requirement from 10 years of service to 6 months for withdrawal, expanding coverage and social security benefits**.

Employees' Pension Scheme (EPS):

- **Establishment and Administration:**
  - EPS was introduced in 1995 and is **administered by the Employees' Provident Fund Organisation (EPFO), under the Ministry of Labour and Employment.**
- **Purpose and Coverage:**
  - It provides pension benefits to employees in the organized sector upon retirement, generally at the **age of 58 years.**
- **Membership:**
  - Employees who are members of the Employees' Provident Fund (EPF) automatically become members of EPS.
  - Both employers and employees contribute to the EPF, with a portion of the employer's contribution diverted to EPS.
- **Contribution Details:**
  - Both employer and employee contribute 12% of the employee's monthly salary (basic wages plus dearness allowance) to the EPF scheme.
  - Of the employer's 12% contribution, **8.33% is allocated towards the EPS.**
  - The **EPF scheme is mandatory for employees whose basic wage is less than Rs. 15,000 per month**.
- **Benefit Provision:**
  - EPS ensures that employees receive a pension upon retirement, which is calculated based on their years of service and the contributions made to the EPS.

Does Inequality Lead to Growth?

Sub: Economy

Sec: National Income

Tag: Inequality Lead to Growth

The relationship between inequality and economic growth is complex and debated.

- **Incentives for Entrepreneurship:**

- Some argue that inequality incentivizes entrepreneurs to start businesses, boosting employment and welfare.
- However, evidence shows that inequality can have several harmful economic effects.
- **Impact on Democratic Processes:**
- Inequality harms democratic processes by concentrating wealth and power, undermining fair representation and participation.
- **Monopoly Power and Consumption:**
- ***Billionaire Wealth:*** Billionaires often accumulate wealth through monopolistic practices.
- ***Effect:*** They can set prices, **leading to higher mark-ups above production costs.**
- ***Real Wages:*** Higher mark-ups reduce real wages and purchasing power.
- ***Greedflation:*** Companies raising prices to increase profit margins in response to demand-supply shocks contribute to high inflation.
- ***Welfare Loss:*** Monopolistic economies produce less output than competitive ones, leading to welfare losses.
- **Economic Efficiency and Welfare:**
- ***Multiplier Effect:*** Investment boosts worker incomes, increasing consumption and incomes of goods-sellers.
- ***Monopolistic Impact:*** Higher mark-ups reduce real wages, weakening the multiplier effect.
- ***Consumption Patterns:*** The rich consume a smaller proportion of their income, dampening economic expansion.
- **Redistribution and Economic Growth:**
- ***Wealth vs. Profits:***
- ***Investment Decisions:*** Influenced by future profit expectations, not accumulated wealth.
- ***Example:*** Taxing wealth like Gautam Adani's doesn't impact investment in airports, as future profits depend on demand.
- ***Redistributive Policies:*** Can strengthen the multiplier effect by increasing income for lower-income groups, enhancing purchasing power.
- ***Curtailing Monopolies:*** Can lower prices and increase real wages, boosting demand and economic activity.
- **Policy Considerations:**
- ***Balanced Redistribution:*** Must avoid excessively high taxation rates that could harm the economy.
- ***Thomas Piketty's Proposal:*** Taxing billionaire wealth to provide basic income can foster new entrepreneurship and economic growth, **even if some wealthy individuals reduce investment.**

Conclusion

While inequality may incentivize entrepreneurial activity, its overall economic effects are more nuanced. ***Excessive inequality, particularly through monopolistic practices, leads to lower real wages, reduced consumption, and weaker economic growth.***

Redistribution, when implemented judiciously, can enhance economic efficiency and growth by increasing the purchasing power of a broader segment of the population, creating a healthier and more balanced economy.

Understanding Greedflation

Greedflation is a term used to describe a phenomenon **where companies significantly raise prices to increase profit margins, often exploiting situations of economic instability or supply-demand imbalances.**

This practice can contribute to inflation rates, impacting the overall cost of living.

- **Price Manipulation:** Companies with substantial market power **may take advantage of economic disruptions, such as pandemics or supply chain issues,** to increase prices more than necessary to cover increased costs.
- **Profit Maximization:** Instead of merely passing on cost increases to consumers, companies use these situations to **expand their profit margins**, thus leading to higher than justified prices.

Economic Impact: This behavior can exacerbate inflationary pressures, **leading to a higher cost of living for consumers, especially in essential goods and services.**

India's Looming Financial Crisis

Sub: Economy

Sec: National Income

Rapid Credit Growth and Its Consequences

- **Rapid credit growth** is akin to a siren song, promising prosperity but often leading to financial crises.
- The narrative of **"this time is different"** is driven by **India's digital infrastructure** hype, promoting financial innovation and inclusion, **but also leading to a poorly regulated financial sector and consumers living beyond their means.**

Applauding the Surge

- In December 2023, the **IMF Board of Directors** praised the performance of India's financial sector, noting robust growth in bank lending and low levels of non-performing assets.
- The **National Council of Applied Economic Research** in March 2024 highlighted a **20% increase in bank lending** over the previous year, **with a significant increase in personal loans while lending to industry lagged.**

The House of Cards

- The financial sector appears healthy as long as **new loans can pay off old ones.** The **IMF** knows this well: when lending slows, households and businesses reduce spending to repay debt, causing an economic crunch.

Household Debt Boom

- Financial intermediaries have expanded household lending at between **25% and 30% a year**.
- **Unsecured household loans** make up almost **a quarter** of total household loans.
- As of January 2024, Indians owned almost **100 million credit cards**, up from **20 million in 2011**.
- **Indian household debt** is 40% of GDP, which is low by international standards
- **The household debt-service-to-income ratio is 12%, is among the highest in the world** because of high interest rates and predominantly short duration loans. Indeed, the Indian household debt-service ratio is alarmingly similar to that in the United States and Spain just before their 2008 financial crises, when high household debt-service burdens precipitated major economic downturns

Financial Services Industry

- India's financial services industry is **large and chaotic**, with **30-odd large providers** and thousands of smaller players, including fly-by-night NBFCs and fintechs.
- After COVID-19, **lending shifted towards households, with fintechs offering loans at high-interest rates.**

The Looming Crisis

- Despite buoyant credit growth, **household consumption** is increasing slowly.
- Defaults on loans will lead to more defaults **due to the interconnected nature of banks, NBFCs, and fintechs, causing a cascading economic contraction.**

Preventing the Crisis

- Preventing the crisis requires **downsizing the financial services industry** to match lending capacity with productive borrowing needs.

- **Weakening the rupee** is necessary to expand exports and cushion the downturn when it comes.
- Indian policymakers have committed to the notion that finance will spur growth despite the risks, and they view a strong exchange rate as a metric of national strength.

In conclusion, India's rapid credit growth, while currently celebrated, **carries significant risks that could lead to a severe financial crisis. Addressing these issues requires careful policy adjustments and a shift away from the current reliance on credit-driven growth.**

NSSO Survey Findings: Impact of COVID-19's Second Wave on India's Informal Economy

Sub: Economy

Sec: National Income

The National Sample Survey Office (NSSO) conducted an **Annual Survey of Unincorporated Sector Enterprises (ASUSE) to assess the impact of COVID-19**, particularly the second wave, on **India's informal non-agricultural sector.**

The NSSO survey underscores the significant **impact of the COVID-19 second wave on India's informal non-agricultural sector but also showcases a robust recovery**. With continued monitoring and supportive policies, the sector is poised to contribute significantly to job creation and economic value in the post-pandemic period.

The Government has taken a number of measures to formalise the informal sector. The details are as under: -

i. Pradhan Mantri Rojgar Protsahan Yojana (PMRPY): -

Government is implementing Pradhan Mantri Rojgar Protsahan Yojana (PMRPY) since 2016 with the objective to incentivise employers for creation of new employment and also aimed to bring informal workers to the formal workforce.

Under the scheme, Government of India is paying Employer's full contribution i.e. 12% towards Employees' Provident Fund (EPF) and Employees' Pension Scheme (EPS) both (as admissible from time to time) for a period of three years to the new employees through Employees' Provident Fund Organisation (EPFO). The terminal date for registration of beneficiary through establishment was 31 st March 2019. The beneficiaries registered upto 31st March, 2019 will continue to receive the benefits for 3 years from the date of registration under the scheme. As on 3 rd March, 2021, benefits have been provided to 1.21 crore beneficiaries through 1.52 lakh establishments.

The total outlay of the PMRPY scheme for entire period of the scheme is Rs. 10178.60 Crore.

ii. Aatmanirbhar Bharat RozgarYojana (ABRY):-

Aatmanirbhar Bharat Rozgar Yojana (ABRY) has been launched to incentivize employers for creation of new employment along with social security benefits and restoration of loss of employment during COVID-19 pandemic. Under the scheme;

- An employee drawing monthly wage of less than Rs. 15000/- who was not working in any establishment registered with the Employees' Provident Fund Organization (EPFO) before 1st October, 2020 and did not have a Universal Account Number or EPF Member account number prior to 1st October 2020 is eligible for the benefit.
- Any EPF member possessing Universal Account Number (UAN) drawing monthly wage of less than Rs. 15000/- who made exit from employment during Covid pandemic from 01.03.2020 to 30.09.2020 and did not join employment in any EPF covered establishment up to 30.09.2020 is also eligible to avail benefit.

This scheme being implemented through the **Employees' Provident Fund Organisation (EPFO),** that reduces the financial burden of the employers of various sectors/industries and will encourage them to hire more workers. Under ABRY, Government of India is crediting for a period of two years, both the employees' share (12% of wages) and employers' share (12% of wages) of contribution payable or only the employees' share, depending on employment strength of the EPFO registered establishments.

The scheme has commenced from 1st October 2020 and shall remain open for registration of eligible employers and new employees up to 30th June 2021. Government will pay the subsidy for two years from the date of registration. The total outlay of the ABRY scheme for entire period of the scheme is Rs. 22810 Crore.

Equity Derivatives: Not for the Uninitiated

Sub: Economy

Overview

Equity derivatives, **such as futures and options, are financial instruments used primarily for hedging purposes.**

However, for individual investors, **these instruments often lead to substantial losses due to a lack of expertise and awareness.**

SEBI's Warning

In May 2023, the Securities and Exchange Board of India (SEBI) issued a circular highlighting the risks associated with equity derivatives trading for individual investors:

- **Losses**: 90% of individual traders in equity derivatives incurred net losses.
- **Average Loss**: Loss makers registered an average net trading loss of ₹50,000.
- **Transaction Costs**: Loss makers spent an additional 28% of their net trading losses on transaction costs, while those making profits spent between 15-50% of their profits on transaction costs.
- **Risk Disclosure**: SEBI mandated that **traders be prominently shown risk disclosures upon logging into their trading accounts.**

Despite these warnings, individual participation in equity derivatives remains high.

Trading Volume and Participation

- **Increased Activity**: Between May 2023 and April 2024, the average daily turnover (ADT) in equity derivatives **rose from ₹1.62 lakh crore to ₹2.54 lakh crore.**
- **Individual Investors**: The share of individual investors in the equity derivatives turnover slightly decreased from 26.8% to 25.5%, **but the higher traded volume indicates increased participation. The number of individual investors in NSE Futures & Options surged from 10 lakh in 2018-19 to about 96 lakh in 2023-24.**

Issues with Individual Participation

- **Lack of Awareness**: Many individual traders **lack the necessary knowledge and experience** compared to professional traders and proprietary books, which dominate the market.
- **Speculation vs. Investment**: Trading in derivatives is speculative and not aligned with long-term wealth creation. **Most individuals should focus on long-term investments** like stocks and mutual funds.
- **Influencer Courses**: Unregulated short courses by influencers claiming to make participants experts in derivatives trading are misleading. These courses are neither approved by SEBI nor run by licensed professionals.

Fundamental Aspect of Equity Derivatives

- **Purpose**: The primary purpose of the equity derivatives market is **hedging, not speculative trading.** Investors should use derivatives to hedge their portfolios, not as standalone investment tools.
- **Risk Management**: Trading in derivatives without proper knowledge increases risk exposure. Individuals should keep derivative exposure limited and learn through experience over time.

Conclusion

Equity derivatives are complex and require significant expertise. Individual investors should:

- **Limit Exposure**: Keep derivative trades to a small portion of the portfolio.
- **Focus on Long-Term Investment**: Prioritize long-term investments in stocks and managed portfolios.

- **Gain Experience Gradually**: Understand that expertise in derivatives trading comes with years of experience, not short-term courses.

By approaching **equity derivatives cautiously and prioritizing long-term investment strategies, individual investors can avoid substantial losses** and build wealth more effectively.

Creating an Emergency Reserve: Essential Tips for Financial Stability

Sub: Economy

A contingency reserve is a **crucial component of financial planning, designed to meet expenses during uncertain times and cover unexpected costs during normal periods**.

The importance of an emergency reserve, where to park it, and why relying solely on credit cards isn't sufficient.

Why You Need an Emergency Reserve

- **Protection During Crisis**:
  - Think of your contingency reserve as self-insurance that protects your family's well-being during crises such as job loss, medical emergencies, or natural disasters.
- **Handling Unexpected Expenses**:
  - Whether it's a sudden car repair, home maintenance, or any other unforeseen expense, having an emergency reserve ensures you're not caught off guard financially.

Where to Park Your Contingency Reserve

- **Liquid Investments**:
  - The contingency reserve should be kept in highly liquid investments that allow quick access without incurring losses. **Interest-bearing instruments like savings accounts, fixed deposits, or liquid mutual funds are ideal.**
- **Protecting Value**:
  - While aiming to protect the **inflation-adjusted value of your reserve is optimal, at a minimum, strive to protect its nominal value.** This ensures that the money retains its purchasing power over time.

Credit Cards: Not a Reliable Contingency Reserve

- **Credit Limits**:
  - Relying on credit cards can be problematic if your credit limit is exhausted or insufficient due to regular use for lifestyle expenses.
- **Inactive Cards**:
  - If you keep a credit card exclusively for emergencies and don't use it frequently, the issuing company might reduce your credit limit or deactivate the card.
- **Debt Risk**:
  - Using credit cards for emergencies can lead to accumulating high-interest debt, exacerbating financial stress instead of alleviating it.

Importance of Keeping Cash at Home

- **Natural Disasters**:
  - In areas prone to natural disasters like flash floods, tsunamis, or earthquakes, having cash at home is essential. Disasters can disrupt electricity, internet, and phone services, rendering electronic payment methods useless.
- **Accessibility**:
  - Cash provides immediate access to **essential goods and services when electronic transactions are not possible.**

Overcoming Saliency Bias

- **Idle Money Concerns**:

- The main hesitation in maintaining a contingency reserve often stems from the perception that the money is not earning optimal returns. This is known as saliency bias.

- **Perspective Shift**:
  - Viewing the contingency reserve and cash at home as a form of self-insurance can help appreciate the importance of having such a fund. It's about ensuring financial security and peace of mind rather than just focusing on returns.

Conclusion

Establishing an emergency reserve is a fundamental step in financial planning.

By parking your reserve in liquid, low-risk investments, keeping a modest amount of cash at home, and understanding the limitations of credit cards, you can protect yourself and your family against financial uncertainties.

Embracing this approach helps safeguard your well-being during crises and ensures you are prepared for any unexpected expenses.

Decline in Inequality: Is it a Good Thing?- Debroy's Insights

Sub: Economy

Sec: National Income and Indian economy

Key Points:

- **Review of Poverty Line**:
  - **Bibek Debroy**, the Chairman of the Prime Minister's Economic Advisory Council (PMEAC), suggests a need to **revisit India's official poverty line**.
  - The current poverty line, based on the **Tendulkar Committee's 2009 recommendations**, is considered outdated. The expenditure threshold is set at ₹33 a day in urban areas and ₹27 a day in rural areas.
  - The **Rangarajan Committee's 2014 revisions** were not officially accepted, and the **Niti Aayog's Multidimensional Poverty Index (MDPI)** is not recognized as a poverty line.
- **Inequality Debate**:
  - Debroy raises the question of whether the **decline in inequality**, as indicated by the latest **Household Consumption Expenditure Survey (HCES)**, is necessarily a good thing.
  - He highlights the **common debate** on the gap between survey findings and national income accounts, terming it "sterile."
  - **Inequality** as measured by the distribution of consumption expenditure may differ from that measured by personal incomes, which **India does not officially track**.
- **Data Utility**:
  - **Household expenditure surveys** provide inputs for various analyses beyond inequality and poverty.
  - Despite some **standard perennial issues**, such as the gap between aggregate consumption expenditure and national income accounts, these surveys remain crucial.
- **Consideration of Gini Coefficient**:
  - Debroy questions whether a **decline in the Gini coefficient**, a measure of economic inequality, is always positive.
  - He points out that **inequality often increases as economies grow and prosper**.
  - Additionally, he suggests examining **Gini coefficients separately for different states** to get a more nuanced understanding of inequality across regions.

Implications:

- **For Policymakers**:

    - Revisiting the poverty line could provide a more accurate measure of poverty in India, leading to **better-targeted policies**.
    - Understanding the implications of inequality trends is crucial for designing policies that balance **growth and equity**.
- **For Economists and Researchers**:
    - The debate over **measurement methodologies** highlights the need for robust and comprehensive data collection and analysis.
    - Analyzing inequality at both national and state levels can provide deeper insights into **regional disparities**.
- **For the General Public**:
    - A clearer understanding of poverty and inequality metrics can inform public discourse and expectations regarding economic policies.
    - Awareness of regional inequalities might drive demand for **more localized policy interventions**.

Conclusion:

Bibek Debroy's call to revisit India's poverty line and his questions on the implications of declining inequality open **important discussions on economic measurement and policy**. By addressing these issues, India can better tailor its economic policies to foster both growth and **equitable development**.

K-Shaped Recovery and Inflation Trends in India

SUB: Economy

SEC: National Income

K-Shaped Recovery:

- K-shaped recovery refers to an uneven economic recovery where different sectors, industries, or groups within the economy recover at different rates.
- **Current Situation:** India's economic recovery post-pandemic is described as K-shaped, driven by demand for higher-end goods and services.

Impact on Inflation:

- **Inflation Dynamics:** This uneven recovery is fuelling similar trends in inflation, with notable differences in inflation rates across different segments of the economy.
- **Food and Rural Price Rise:** Food prices and rural inflation are rising faster compared to inflation in other goods and services and urban areas.
- **Goods vs. Services Inflation:** Inflation for goods is higher than that for services.

Key Observations by HSBC:

- **Shocks Driving Variance:** The same shocks driving the variance in growth, such as the pandemic and climate change, are also likely driving the variance in prices.
- **Economic Dynamics:** The uneven recovery is linked to broader economic dynamics and external shocks that affect different groups in varying ways.
- Highlights that the factors **causing disparities in economic growth are similarly influencing inflation patterns.**

Conclusion

- **Economic Inequality:** The K-shaped recovery in India **underscores economic inequality, with certain sectors and groups recovering faster and benefiting more than others**.
- **Policy Implications:** Addressing these disparities in **both economic growth and inflation** requires targeted policies that consider the diverse impacts on different segments of the population.

Types of Economic Recovery Shapes

- **Z-Shaped Recovery:**
  - **Description:** Sharp decline followed by a quick and robust recovery.
  - **Characteristics:** The economy surpasses its previous peak.
  - **Key Point: Strong and quick recovery surpassing previous peak.**
- **V-Shaped Recovery:**
  - **Description:** Rapid and robust rebound after a sharp economic decline.
  - **Characteristics:** Quick bounce back, resembling the upward slope of the letter "V."
  - **Key Point: Rapid and robust rebound.**
- **U-Shaped Recovery:**
  - **Description:** Gradual decline followed by a slow and steady recovery.
  - **Characteristics:** Period of stagnation at the bottom before improvement begins.
  - **Key Point: Gradual decline and slow recovery with a period of stagnation.**
- **Elongated U-Shaped Recovery:**
  - **Description:** Extended period of economic downturn before a gradual upturn.
  - **Characteristics:** Similar to U-shaped but with a longer downturn period.
  - **Key Point: Extended downturn before gradual upturn.**
- **W-Shaped Recovery:**
  - **Description:** Sharp economic decline, temporary recovery, another decline, and final recovery.
  - **Characteristics:** Resembles the letter "W" with a double-dip pattern.
  - **Key Point: Double-dip recovery pattern.**
- **L-Shaped Recovery:**
  - **Description:** Sharp economic decline followed by prolonged stagnation or slow growth.
  - **Characteristics:** No significant upward trajectory, economy remains at a lower level.
  - **Key Point: Prolonged stagnation after a sharp decline.**
- **K-Shaped Recovery:**
  - **Description:** Divergent paths for different sectors or segments of the economy.
  - **Characteristics:** Some sectors or groups experience rapid recovery and growth (upward branch of "K"), while others continue to decline or stagnate (downward branch of "K").
  - **Key Point: Divergent paths for different sectors or segments.**

These conceptual models help economists and analysts describe and predict the overall trajectory of an economy in response to various events or shocks. **The actual shape of the recovery depends on factors such as government policies, consumer behavior, global economic conditions, and the nature of the initial shock.**

India's Water Stress and Its Impact on Credit Profile

SUB: Economy

SEC: Indian economy

Moody's Rating and Warning:

- **Current Rating:** India is currently rated Baa3 stable by Moody's, the lowest investment-grade rating.
- **Warning:** Moody's cautions that India's growing water shortage and frequent climate change-driven natural disasters could negatively impact the country's sovereign credit strength.

Implications of Water Stress:

- **Economic Disruption:** A drop in water supply, heavily reliant on monsoon rains, could disrupt factory and farm operations.
- **Inflation:** Water stress could spur inflation in food prices.

- **Income Declines:** Businesses and communities affected by water shortages may see declines in income.
- **Social Unrest:** These factors could spark social unrest.

Water Availability Statistics:

- **Per Capita Availability:** Average annual water availability per capita is projected to drop to 1,367 cubic meters by 2031 from 1,486 cubic meters in 2021.
- **Water Stress Threshold:** A level below 1,700 cubic meters indicates water stress, with 1,000 cubic meters being the threshold for water scarcity (as per the Water Resources Ministry).

Conclusion:

- **Economic Growth and Stability:** The growing water stress could undermine India's economic growth and stability, posing risks to its ability to withstand economic shocks.
- **Need for Efficient Water Management:** Efficient water management and mitigation of environmental risks are crucial for sustaining India's economic growth and maintaining its credit profile.

Credit Rating:

A credit rating is a quantified assessment of the creditworthiness of a borrower. It evaluates the likelihood that the borrower will repay its debt obligations on time.

Credit ratings can be assigned to individuals, corporations, state or provincial authorities, or sovereign governments.

Sovereign Credit Rating (SCR):

- An independent assessment of the creditworthiness of a country or sovereign entity.
- Provides insights into the risk associated with investing in a country's debt, including political risks.

Importance:

- Essential for developing countries to access funding in international bond markets.
- Used by investors to assess the riskiness of a country's bonds.

Obtaining a Rating:

- A country requests a credit rating, and the rating agency evaluates its economic and political environment.

Standards:

- **Moody's:** Baa3 or higher is investment grade; Ba1 and below is speculative.
- **S&P:** BBB- or higher is investment grade; BB+ or lower is speculative or "junk" grade.

Role of Rating Agencies

Function:

Assess the financial strength of companies and government entities, particularly their ability to meet debt obligations.

Provide independent evaluations of credit risk.

Major International Agencies:

The Big Three: Fitch Ratings, Moody's Investors Service, and Standard & Poor's (S&P), controlling about 95% of the global ratings business.

Environment

How long is carbon is stored in plants? Not as long as we think, says study challenging efficacy of tree planting in climate fight

Sub: Environment

Sec: Climate Change

Context:

- A recent study has cast doubts on the **efficacy of nature-based carbon removal projects**, particularly **large-scale tree-planting initiatives aimed** at combating climate change.

Key findings:

- The research suggests that **current climate models,** which predict **how long carbon remains stored in trees,** may be flawed.
- It indicates that these models often **overestimate the duration carbon stays trapped in plants** while underestimating the **impact of climate change on forests**.
- While plants absorb significant amounts of carbon dioxide annually, the **longevity** of this **carbon storage** is **shorter than previously assumed**.
- This revelation challenges the feasibility of relying heavily on forests to mitigate carbon emissions without a concurrent reduction in fossil fuel use.
- The study employed **radiocarbon (Carbon-14) dating techniques** to analyze carbon uptake and turnover in plants globally.
- It found that current estimates of **global plant productivity,** crucial for **carbon sequestration,** may be underestimated.
- This suggests that **carbon cycles** through **plants** and **the atmosphere** more rapidly than previously thought, necessitating a reevaluation of climate models to better account for these dynamics.
- While plants play a vital role in **absorbing carbon dioxide**, the study calls for caution in relying on them as a panacea for climate change without addressing broader emissions reductions.

New Antarctic Ice Tipping Point Discovered as Study Says We've Underestimated Melting

SUB :Environment

SEC: Climate Change

Context:

- New research by the **British Antarctic Survey (BAS)** has **discovered** a concerning way that **large ice sheets can melt** due to **warm seawater** infiltrating the underside of ground-based ice.
- This phenomenon could represent a new **"climate tipping point,"** where a **small change in ocean temperature leads to significant increases in ice melting and ice flow** towards the sea.

Mechanism of Melting:

- **Warm seawater** can travel **long distances** beneath **ice sheets** and infiltrate the space between the land and the ice, causing **localized melting.**
- This process lubricates the **ice bed,** influencing the rate at which ice slides towards the sea, potentially accelerating ice loss.

Implications:

- **Melting** in the **grounding zones of ice sheets** shows **tipping point-like behaviour,** with **small temperature changes** causing **substantial increases in melting and ice flow**.
- Previous research underestimated the **sensitivity** and **potential instability of Antarctic ice compared to Arctic ice,** but recent declines in **Antarctic sea ice extent** highlight its **vulnerability.**
- The researchers emphasize that **current ice sheet models** lack the ability to simulate melting beneath grounded ice, which is critical for accurate projections of sea level rise.

Recent Trends and Projections:

- **Antarctic sea ice extent increased steadily** from **1978** to **2015,** while **Arctic ice melted significantly.**
- **Since 2017, Antarctic Sea ice** has **declined,** reaching **record lows** in **2022** and **2023**.

- The new understanding of **melting mechanisms** suggests that **projections of sea level rise** due to **Antarctic and Greenland ice sheet changes** might be significant underestimates. Researchers are working to incorporate this new knowledge into ice sheet models.

Tipping points:

- Several studies in the past **15 years** have identified different **tipping points** such as the **disintegration of the Greenland ice sheet**, a spontaneous reduction in **Amazon forest cover, melting of glaciers**, or softening of the permanently frozen grounds in the **polar regions** that have large amounts of **carbon trapped** in them.
- Over the years, researchers have identified **at least 15 tipping points**, each correlated with different levels of temperature rise.
- The latest study has identified **nine global and seven regional tipping points** and has re-assessed their dynamics and correlation with **global warming.**

Tamil Nadu forms 20 village committees to strengthen the protection of the mangrove ecosystem

Sub: Environment

Sec: Ecosystem

Context:

- The **IUCN** has **designated mangroves** in **Tamil Nadu, Sri Lanka,** and **Maldives** as **'critically endangered'** in its **first global assessment of mangrove ecosystems.**

Village mangrove committee of Tamil Nadu:

- To protect mangrove cover, the **Tamil Nadu Forest Department** has formed **20 village mangrove committees**.
- Of the **36 geographical areas** assessed globally, **only South India, Sri Lanka, Maldives,** and the **warm temperate northwestern Atlantic region** have **critically endangered mangroves**.
- The **assessment** in **South India** considered **mangroves** in **Muthupet, Ramanathapuram,** and a **small part** of **southern Kerala.**

About IUCN Assessment of mangroves forest:

- First-ever global assessment.
- **Published: Red List of Mangrove Ecosystems**
- **Major findings:** More than half of the world's mangroves are at risk of collapse by 2050.
    - In the absence of additional conservation efforts, by **2050,** about **7,065 km2(- 5%)** more mangroves will be lost and **23,672 km2 (-16%)** will be submerged due to sea level rise.

Mangroves:

- **Mangroves** are a **group of trees and shrubs** that live in the **coastal intertidal zone.**
- There are about **80 different species** of **mangrove trees.** All of these trees grow in **areas with low-oxygen soil,** where **slow-moving waters** allow fine sediments to accumulate.
- **Mangrove forests only grow** at **tropical** and **subtropical latitudes** near the **equator** because **they cannot withstand freezing temperatures.**
- Many **mangrove forests** can be recognized by their **dense tangle of prop roots** that make the trees appear to be standing on stilts above the water. This tangle of roots allows the trees to handle the **daily rise and fall of tides**, which means that most **mangroves get flooded at least twice per day.**
- Mangrove forests **stabilize the coastline**, **reducing erosion from storm surges, currents, waves, and tides.**

- The threats to mangroves have evolved, with past issues including **wood exploitation and agriculture**, now compounded by **climate change, sea-level rise**, and **severe cyclonic storms.**

Pneumatophores (or Aerial roots):

- Aerial roots are roots growing above the ground.
- They are often **adventitious,** i.e. **formed from non-root tissue.**
- They are found in **diverse plant species,** including **epiphytes** such as **orchids (Orchidaceae), tropical coastal swamp trees** such as **mangroves, banyan figs** (Ficus subg. Urostigma), the **warm-temperate rainforest rata** (Metrosideros robusta), and **pohutukawa trees of New Zealand** (Metrosideros excelsa).
- Vines such as **common ivy** (Hedera helix) and **poison ivy** (Toxicodendron radicans) also have **aerial roots**.

Mangroves in Tamilnadu:

- In **Tamil Nadu,** the **mangrove area** has **doubled** from **23 sq.km in 2001** to **45 sq.km in 2021**, according to the **Indian State of Forest Report**.
- **Tamil Nadu's mangrove degradation** is **less severe** than in **neighbouring islands,** though **Muthupet** was **heavily damaged** by the **Gaja Cyclone.**
- **Mangrove restoration** has been **completed** in about **25 sq. km** across several districts in **Tamil Nadu,** with another **15 sq. km** proposed under the **World Bank-funded Tamil Nadu Coastal Restoration Mission.**
- The **State government** is emphasizing the **scientific management of mangroves** and involving **local communities** in their **protection,** providing them with benefits like **fisheries, non-wood products,** and **livelihood protection** against storm surges.

Mangrove forests in India:

Himachal Pradesh Forest Fires

Sub: Environment

Sec: Ecosystem

- Since April 15, 2024, there have been **1,684 forest fires** in Himachal Pradesh. These fires have damaged 17,471 hectares of forest land.
- From **2001** to **2023, H.P.** lost **957 hectares** of **tree cover** from fires and 4.37 thousand hectares from other causes.

What is a Forest Fire?

- Wildfire, also called forest, bush or vegetation fire, can be described as any uncontrolled and non-prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brushland or tundra.

Forest Fires in India: Statistics

- **Forest Fires in India:** According to the biennial **India State of Forest Report (ISFR) 2019** published by the **Forest Survey of India (FSI),** more than **36%** of **India's forest cover** was prone to frequent fires.
    - **About 4%** of the forest cover was 'extremely prone' to fire, and another **6%** was **'very highly'** fire-prone.
- **Vulnerable States:** The eleven main states with frequent occurrence of forest fires in recent times are:
    - Andhra Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Mizoram, Madhya Pradesh, Maharashtra, Odisha, Telangana Uttar Pradesh and Uttarakhand.
- **Forest Fire Vulnerability Across Ecosystems:** According to the **FSI**, severe fires break out in dry deciduous forests, while evergreen, semi-evergreen, and montane temperate forests are comparatively less prone to fires.

- The forests of **Northeast India, Odisha, Maharashtra, Jharkhand, Chhattisgarh,** and **Uttarakhand** are the most vulnerable to fires during the November to June period.
- **Triggering Factors:**
    - Human activities trigger 95% of forest fires in India, such as burning agricultural practices, deforestation, firewood burning etc.
    - Drought and higher temperatures further aggravate the risk of forest fire.
- **Forest Fire Season in India:** November to June is considered to be forest fire season in India especially from February onward as summer approaches.
    - April-May are usually the worst fire months across the country.
- **Forest Fire Situation in 2024:** During March 2024, the highest number of forest fires were reported from **Mizoram** (3,738), **Manipur** (1,702), **Himachal Pradesh** (1684), **Assam** (1,652), **Meghalaya** (1,252), and **Maharashtra** (1,215), as per FSI data.

Causes of Forest Fires:

- Occur during **pre-monsoon summer** due to **moisture stress** and **depletion of snowmelt water**.
- **Rainstorms** in the **pre-monsoon season** are **critical;** less moisture increases fire impact.
- Human activities like unattended campfires and discarded cigarettes.
- Faulty forestry practices and a utilitarian perspective towards forests, excluding community participation.
- Fires emit pollutants like black carbon, contributing to glacier melt and regional climate change.

Historical Transformation of Himalayan Forests:

- Over two centuries, **Himalayan forests** have been transformed, starting with **railway construction in the 1850s**.
- British exploitation of forests for railway construction led to the **loss of customary rights and deforestation**.
- **Deodar** and **Chir pine** trees were extensively used for **timber** and **resin.**
- **Banj oak forests**, which retain **moisture**, were replaced by commercially valuable **Chir pines**.
- Currently, **17.8%** of **H.P.'s 37,033 sq km forest area** is covered with **Chir pines**, which are prone to fires.

Recommendations:

- **Democratisation of Forests:**
    - Include **local communities** in forest management.
    - **Restore traditional forest rights** for fuel, timber, and fodder extraction.
    - Align with **Schedule V** of the **Indian Constitution** requiring community assent for development activities.
- **Forest Management:**
    - Develop mixed forestry and reduce **pine tree** dominance.
    - Integrate scientific and community knowledge for participatory management.
    - Implement check dams and revive water springs.
    - Establish environmental services at the village level.
    - Seek financial assistance and disaster mitigation funds from the 16th Finance Commission.

Form panel to visit forest diverted on Assam-Nagaland border: NGT to Environment Ministry

Sub: Environment

Sec: Env Law

Tags: forest diverted on Assam-Nagaland border

Context:

- The **National Green Tribunal (NGT)** instructed the **Ministry of Environment, Forest and Climate Change (MoEFCC)** to form a **three-member committee** to **survey a section of a reserve forest** on the **Assam-Nagaland border,** allegedly diverted for an Assam police commando battalion.

Assam- Nagaland Border dispute:

Details:

- The petition claimed that M.K. Yadava, Assam's former Principal Chief Conservator of Forests, **illegally diverted** a significant part of the **forest area without completing compensatory afforestation** and **net present value requirements,** making him liable for restoring the damage.
- **Using forest land** for **non-forestry activities without prior central government permission** violated the **Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.**
- The battalion was intended to **prevent encroachment** by people from **Nagaland** along the **interstate border,** amid a **long-standing boundary dispute** between **Assam** and **Nagaland**.
- In **2023,** the **Environment Ministry** criticized Yadava for approving the **construction of a commando battalion** on **approximately 44 hectares of forest land** on the **Assam-Mizoram border** to address **encroachment issues**, noting that **Assam** also has a **boundary dispute** with **Mizoram.**

Net Present Value (NPV):

- **NPV** is a **monetary approximation** of the value that is **lost** when a **piece of forest land has been razed**.
    - It is a **mandatory one-time payment** that a user has to make for **diverting forestland for non-forest use**, under the **Forest (Conservation) Act, 1980**.
- This is on the basis of the **services and ecological value** and there are **prescribed formulae** for calculating this amount which depends on the **location and nature of the forest** and the **type of industrial enterprise** that will replace a particular parcel of forest.
- It was **developed** by a **committee** led by **Professor Kanchan Gupta,** of the Institute of Economic Growth.
- These payments go to the **Compensatory Afforestation Fund (CAF)** and are used for afforestation and reforestation.
- **When was it introduced?**
    - To regulate forest diversions, the **Supreme Court** introduced a high **'net present value' (NPV)** charge on the lands diverted.

Compensatory afforestation:

- Compensatory afforestation means that every time forest land is diverted for non-forest purposes such as mining or industry, the user agency pays for planting forests over an equal area of non-forest land, or when such land is not available, twice the area of degraded forest land.

Compensatory afforestation Fund:

- The **CAF Act** was passed by the centre in **2016** and the related **rules** were notified in **2018**.
- The **CAF Act** was enacted to **manage** the **funds collected for compensatory afforestation** which till then was **managed** by **ad hoc Compensatory Afforestation Fund Management and Planning Authority (CAMPA)**.
- As per the rules, **90%** of the **CAF money** is to be given to the **states** while **10%** is to be retained by the **Centre**.
- The funds can be used for the treatment of catchment areas, assisted natural generation, forest management, wildlife protection and management, relocation of villages from protected areas, managing human-wildlife conflicts, training and awareness generation, supply of wood-saving devices, and allied activities.

Compensatory Afforestation Fund Management and Planning Authority (CAMPA) Act:

- It seeks to **mitigate** the **impact of the diversion of forest land** for **non-forest purposes** by making sure through a **well-defined institutional mechanism,** that the funds are released and utilized quickly, efficiently and transparently.
- The CAMPA law is **applicable** to **States, Union Territories,** and the **Centre** as well.
- **The objectives of the CAMPA Law are stated below:**
    - To promote afforestation and development activities in order to compensate for forest land that is intended to be diverted to non-forest uses.
    - To law down effective guidelines for the State
    - To facilitate necessary assistance in terms of scientific, technological and other requisites that may be required by the authority responsible for the State CAMPA.
    - To recommend measures based on strategic planning to the authorities of the State CAMPA
    - To resolve issues that arise between inter-state or Centre-State.

30 years of UNCCD

Sub: Environment

Sec: Int conventions

United Nations Convention to Combat Desertification (UNCCD):

- **UNCCD** is a **Convention** to **combat desertification** and **mitigate** the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.
- The **Convention**, the **only convention** stemming from a direct recommendation of the **Rio Conference's Agenda 21,** was adopted in **Paris, France,** on **17 June 1994** and **entered into force** in **December 1996.**
- It is the **only internationally legally binding framework** set up to address the problem of desertification.
- The Convention is based on the **principles of participation, partnership and decentralization**—the backbone of good governance and sustainable development.
- It has **197 parties,** making it **near universal** in reach.
- The **Holy See (Vatican City)** is the **only state** that is **not a party** to the convention that is eligible to accede to it.
- To help publicise the Convention, **2006** was declared **"International Year of Deserts and Desertification"** but debates have ensued regarding how effective the International Year was in practice.

Secretariat:

- It has been located in **Bonn, Germany,** since **January 1999,** and **moved** from its first Bonn address in **Haus Carstanjen** to the **new UN Campus (NewYork, USA)** in July **2006**.

Agenda 21:

- **Agenda 21** is a **non-binding action plan** of the **United Nations** with regard to sustainable development.
- It is a product of the **Earth Summit (UN Conference on Environment and Development)** held in **Rio de Janeiro, Brazil,** in **1992.**
- It is an **action agenda for the UN,** other multilateral organizations, and individual governments around the world that can be executed at local, national, and global levels.
- **One major objective** of the **Agenda 21** initiative is that every local government should draw its own local Agenda 21.
- Its **aim** initially was to achieve **global sustainable development by 2000,** with the **"21"** in **Agenda 21** referring to the **original target of the 21st century.**

Flagship initiatives of UNCCD:

Initiative	Details
Global Land Outlook (GLO)	Underscores land system challenges, showcases transformative policies and practices, and points to cost-effective pathways to scale up sustainable land and water management.
Great Green Wall Initiative	Implemented across 22 African countries To restore **100 million hectares** of currently degraded land; sequester 250 million tons of carbon and create 10 million green jobs by 2030.
Changwon Initiative	Named after the COP10 venue Changwon and coordinated by the Korea Forest Service Promoting science-based and collaborative action towards ending land degradation.
Greening Drylands Partnership	Promotes synergies between ecosystem restoration of degraded lands, climate change mitigation and biodiversity conservation. Pilot projects, implemented through GDP, enable countries to test in practice the approaches and policies that the **UNCCD** helped to develop over the years to tackle **DLDD (Desertification, Land Degradation and Drought)**.
The Drought Initiative	**The Drought Initiative focuses on:** setting up drought preparedness systems, particularly national drought plans working together at the regional level to reduce drought vulnerability and risk providing a toolbox that stakeholders can use to boost the drought resilience of both people and ecosystems
The Peace Forest Initiative (PFI)	To demonstrate the linkages between land, peace and security. It is designed to address restoration of ecosystems and land-based resources including land, soil, water and forests in fragile and conflict-affected locations.

Land Degradation Neutrality (LDN):

- **UNCCD defines LDN** as "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services to enhance food security remain stable, or increase, within specified temporal and spatial scales and ecosystems."
- The impacts of land degradation will be felt by most of the world's population. Land degradation also changes and disrupts rainfall patterns, exacerbates extreme weather like droughts or floods, and drives further climate change. It results in social and political instability, which drives poverty, conflict, and migration.
- **Achieving LDN requires three concurrent actions:**
    - firstly, avoiding new degradation of land by maintaining existing healthy land;

- secondly, reducing existing degradation by adopting sustainable land management practices that can slow degradation while increasing biodiversity, soil health, and food production; and
- thirdly, ramping up efforts to restore and return degraded lands to a natural or more productive state.

The UNCCD's objectives for LDN include:

- maintaining or improving the sustainable delivery of ecosystem services
- maintaining or improving land productivity to enhance global food security
- Increasing the resilience of land and the populations dependent on it
- seeking synergies with other social, economic, and environmental objectives
- reinforcing and promoting responsible and inclusive land governance

India's Efforts to Check Land Degradation:

- **India** is focusing on **sustainable land and resource management** for **livelihood generation** at the community level to make the local lands healthier and more productive for providing a better homeland and a better future for its inhabitants.
- The **National Action Programme for combating desertification** was prepared in **2001** to take appropriate action in addressing the problems of desertification.
- Following the global call for the submission of nominations for **World Restoration Flagships, India** endorsed **six restoration flagships** that target the restoration of **12.5 million hectares** of degraded land.
- Some of the **major programmes** which address issues related to land degradation and desertification, being implemented currently are as follows:
  - **Integrated Watershed Management Programme (IWMP) (Pradhan Mantri Krishi Sinchayee Yojana)**
  - **National Afforestation Programme (NAP)**
  - **National Mission for Green India (GIM)**
  - **The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS),**
  - **Soil Conservation in the Catchment of River Valley Project**
  - **National Watershed Development Project for Rainfed Areas (NWDPRA)**
  - **Fodder and Feed Development Scheme-component of Grassland Development including Grass Reserves.**
  - **Command Area Development and Water Management (CADWM) programme,**
  - **Soil Health Card Scheme, etc.**

Catalytic boost for cheaper biodiesel production

Sub: Environment

Sec: Int Conventions

Development of Cost-Effective Water-Repellent Catalyst for Biodiesel Production:

- Scientists from **Assam, Odisha, China,** and **the UK** have developed a **water-repellent catalyst** to **reduce the cost of producing environmentally friendly biodiesel**.
- The research on the **"spherical superhydrophobic activated carbon catalyst"** has been published in Advanced Functional Materials.

Research Team:

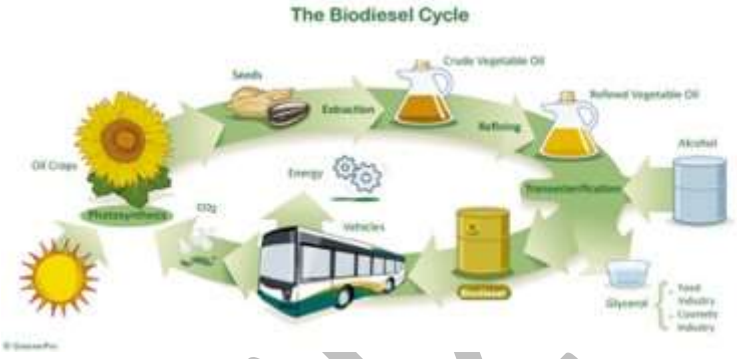
- Arpita Das, Kangkana Saikia, Samuel Lalthazuala Rokhum (NIT Silchar, Assam)
- Chandrakanta Guchhait, Bimalendu Adhikari (NIT Rourkela, Odisha)
- Da Shi (University of Cambridge, UK)
- Hu Li (Guizhou University, China)

Key Features of the Catalyst:

- The catalyst **mimics the water-repelling properties** of **lotus leaves,** preventing the poisoning of active sites by water produced during biodiesel production.
- It is derived from **biomass (cellulose)**, making it **eco-friendly, abundant,** and **affordable.**
- It is **highly robust** and can **withstand the water by-product,** enhancing its effectiveness and reusability.

Biodiesel:

- **Biodiesel** is a **liquid fuel** produced from **vegetable oils** and **animal fats** through **transesterification.**
- It is used as a **replacement** or as a **blending** with **petroleum-based diesel** in various combinations such as **B5, B20, B100,** etc.
- **B20** (commonly used due to cost-effectiveness, low emissions and compatibility with conventional engines) is a blend containing **20%** biodiesel and **80%** petroleum diesel.
- B100 (less commonly used) is a **pure biodiesel**.



Impact on Biodiesel Production:

- The novel catalyst significantly **reduces** the **cost of biodiesel production.**
- Current **biodiesel** costs in **India** are around **₹100 ($1.2) per litre;** the new catalyst can reduce this to **approximately 37 cents per litre**.
- This makes **biodiesel** a more **cost-effective** and **sustainable energy source** compared to **diesel,** which costs at least **₹87 per litre** in India.

Significance:

- The catalyst improves the efficiency and cost-effectiveness of the biodiesel production process.
- It supports broader adoption of biodiesel, contributing to a greener future.
- The green synthesis strategy offers a sustainable method for biomass waste disposal and enhances the utility of biochar as an alternative to graphene and carbon nanotubes.

EU Environmental Council adopts nature restoration law in historic win for continent's environment

Sub: Environment

Sec: Int Conventions

Context:

- The **EU Environmental Council** adopted the **Nature Restoration Law (NRL)** on June 17, 2024, marking a significant **environmental milestone** for **Europe**.

Details:

- The law was endorsed by **20 member states,** representing **66.07%** of the **EU population**.
- The regulation will be published in the EU's Official Journal, becoming **directly applicable across all member states,** with a **review** set for **2033** to assess its impacts on agriculture, fisheries, forestry, and broader socio-economic effects.
- The **#RestoreNature coalition** (BirdLife Europe, ClientEarth, EEB, WWF EU) praised the law, calling for immediate implementation by member states.

Nature Restoration Law (NRL): Purpose and Goals

- Proposed by the **European Commission** on **June 22, 2022**, under the **EU biodiversity strategy for 2030** and the **European Green Deal**.
- Over **80%** of **European habitats** are currently in **poor condition,** prompting the need for this regulation to not just preserve but actively restore nature.
- The **NRL** aims to restore nature, addressing the decline in biodiversity and ecosystem health.
- By **2030**, member states must implement measures to restore at least **20%** of the **EU's land and sea areas**.
- All European ecosystems in need of restoration must be restored by **2050**.

Covered Ecosystems:

- The **NRL** targets a wide range of ecosystems, including terrestrial, coastal, freshwater, forests, agricultural, urban, wetlands, grasslands, rivers, lakes, marine ecosystems, seagrass, sponge, and coral beds.

Specific Measures and Targets:

- Measures to **reverse** the **decline of pollinators** by **2030**.
- **Increase** in **grassland butterflies, organic carbon** in **cropland mineral soils**, and **agricultural land** with **high-diversity features.**
- **Increase** in **forest bird populations** and **no net loss of urban green spaces** and **tree canopy cover by 2030.**
- Restoration of drained peatlands and planting of at least three billion additional trees by 2030.
- **Removal of human-made barriers** to achieve at least **25,000 km** of **free-flowing rivers by 2030.**

IISc researchers develop sustainable method to remove heavy metal contaminants from groundwater

Sub: Environment

Sec: Pollution

Context:

- **Indian Institute of Science (IISc)** researchers have created an innovative method for **removing heavy metals** like **arsenic** from **groundwater**.

Collaborations and Field Testing:

- **NGO Partnerships**:
  - **IISc** collaborates with the **INREM Foundation** and **Earthwatch**.
  - Systems are being tested in rural areas such as **Bhagalpur (Bihar)** and **Chickballapur (Karnataka)**.

Features of the New Method:

Three-Step Process:

- Designed to effectively extract heavy metals from groundwater.
- Ensures that the extracted heavy metals are disposed of sustainably.
- Prevents untreated heavy metal sludge from contaminating landfills and re-entering groundwater.

Environmental Focus:

- Emphasizes the safe disposal of contaminants, addressing a common oversight in existing methods.
- This method prevents the re-entry of arsenic into the environment after its removal.

System Characteristics:

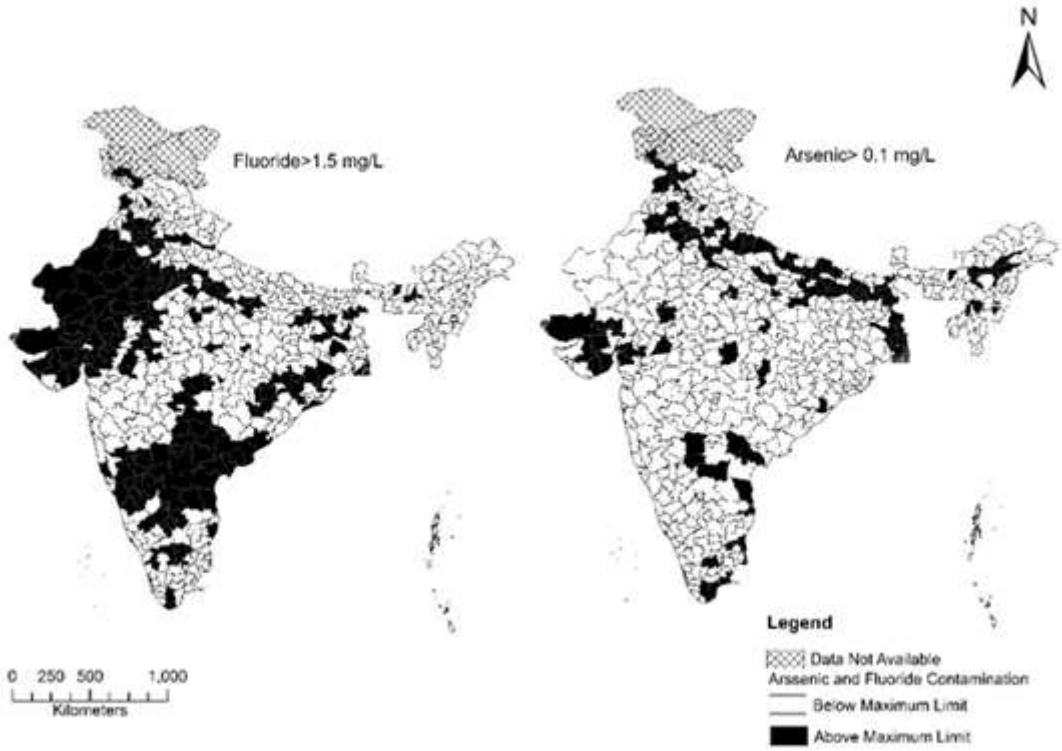
- **Ease of Use**:
  - Simple assembly and operation.

- Manufacturing the adsorbent material involves an uncomplicated process.

- **Pilot Testing**:
  - A pilot-scale adsorption column system in the lab produced WHO-standard safe drinking water for two people for three days.
- **Toxicity Reduction**:
  - Organic species used are approximately **50 times less toxic** than the **inorganic forms** typically found in **groundwater**.

Arsenic and Fluoride Contamination:

- **113 districts** in **21 states** in **India** have **arsenic levels exceeding 0.01 mg/l.**
- **223 districts** in **23 states** have **fluoride levels above 1.5 mg/l.**
- These levels surpass the limits set by the **Bureau of Indian Standards** and **WHO**, posing significant health risks.



India is world's second largest emitter of nitrous oxide

Sub: Environment

Section: Pollution

India's Nitrous Oxide (N2O) Emissions:

- India is the **second-largest emitter** of **N2O**, contributing nearly **11%** of global man-made emissions in **2020**, behind **China** at **16%**.
  - The **top five country emitters** by volume of anthropogenic N2O emissions in 2020 were China (16.7%), India (10.9%), the United States (5.7%), Brazil (5.3%), and Russia (4.6%).
- The **primary source** of **N2O emissions** in **India** is from the use of **nitrogen fertilizers** in **agriculture**.
- **Factors Driving Emissions:**
  - Increasing **meat and dairy production** leads to **higher N2O emissions** from **manure** and **nitrogen fertilizers** used in animal feed production.
  - **Agricultural emissions** continue to **rise,** whereas emissions from **fossil fuels** and the **chemical industry** are **stabilizing or declining**.

Atmospheric Concentrations:

- The atmospheric concentration of **N2O** reached **336 parts per billion in 2022**, **25%** above pre-industrial levels.
- In comparison, **CO2 concentration** was **417 parts per million in 2022.**
- While **CO2 reduction** remains a major focus, the **rapid increase** and **long atmospheric lifespan** of **N2O** highlight the need for urgent mitigation efforts.

Impact of Nitrogen Fertilizers

- **N2O emissions** from **human activities** have surged by **40%** over the past four decades, with a notable acceleration between 2020 and 2022.
- **Agricultural** activities, particularly the **use of nitrogen fertilizers** and **animal manure,** account for **74%** of **anthropogenic N2O emissions.**
- **N2O emissions** are responsible for **6.4%** of the **effective radiative forcing** of **greenhouse gases,** adding approximately **0.1°C to global warming**.

Emission Trends and Projections

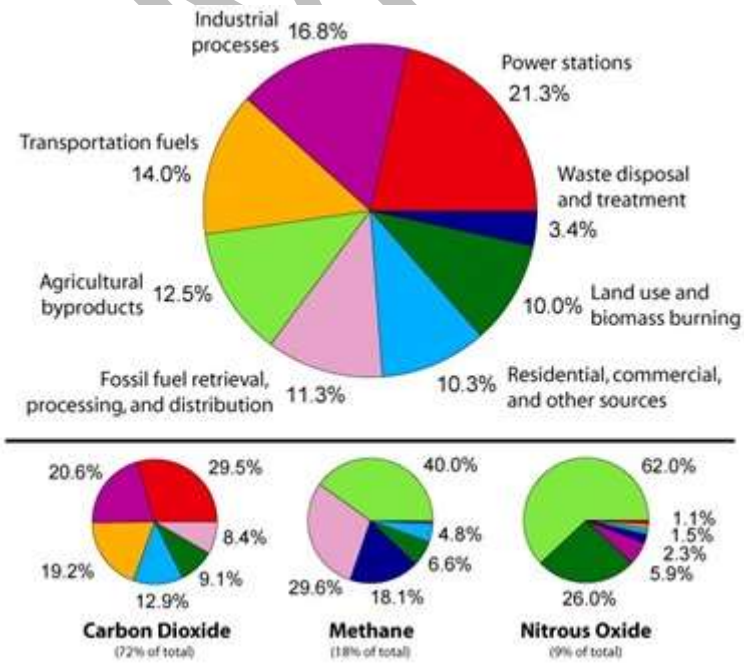
- **IPCC Findings**: Recent **N2O concentration levels surpass** the most pessimistic IPCC scenarios, potentially leading to **global temperatures exceeding 3°C** by century's end.
- **Paris Agreement Goals**: To meet **net-zero targets** and **stabilize global temperatures below 2°C,** anthropogenic N2O emissions must **decline by at least 20%** from 2019 levels by 2050.

Environmental and Health Impact:

- N2O remains in the atmosphere for approximately **117 years**, affecting climate and ozone.
- **Inefficient use of synthetic nitrogen fertilizers** and **animal manure** also pollutes groundwater, drinking water, and coastal waters.

Greenhouse gases:

- The major greenhouse gases are water vapour, which causes about 36–70% of the greenhouse effect; carbon dioxide (CO2), which causes 9–26%; methane (CH4), which causes 4–9%; nitrous oxide (N2O) that accounts for about 5.6 percent of greenhouse gas emissions from human activities and ozone (O3), which causes 3–7%.



Call to Action

- **Report Insights**: The report underscores the urgency for India to address N2O emissions from heavily subsidized nitrogen fertilizers.
- **Policy Recommendation**: Experts suggest repurposing fertilizer subsidies to support alternative agricultural practices and reduce N2O emissions.

Bihar: Human-made wetlands Nagi & Nakti recognised under Ramsar Convention

Sub: Environment

Sec: Protected Area

Context:

- **Bihar's Nagi** and **Nakti Bird Sanctuaries** have been designated as **wetlands of international importance** under the **Ramsar Convention.**
- This recognition raises the **total number of Ramsar sites** in **India** to **82.**
- **Bihar's first Ramsar site, Kanwar Lake** in **Begusarai district,** was designated in **2020**.

About Nagi and Nakti wetlands:

- The **Nagi** and **Nakti Bird Sanctuaries** are **human-made wetlands** located in **Jamui district, Bihar.**
- These wetlands provide habitats for a wide variety of flora and fauna, especially **migratory birds**.
- **Nagi Bird Sanctuary** spans **791 hectares,** while **Nakti** covers **333 hectares.**
- **Ecological Importance:**
    - The wetlands were developed primarily for **irrigation** via the **Nakti Dam,** which also created **habitats** for over **150 species of birds, mammals, fish, aquatic plants, and reptiles.**
    - Notable species include the **endangered Indian elephant** and the **vulnerable native catfish Wallago Attu.**
    - The surrounding area comprises largely **dry deciduous forest and hills.**
- **Bird Habitat and Count:**
    - Designated as **bird sanctuaries** in **1984,** these wetlands **support over 20,000 birds during winter,** including significant populations of the **red-crested pochard.**
    - The **Asiatic Waterbird Census 2023** reported the **Nakti bird sanctuary** as having the **highest bird count** with **7,844 birds**, followed by the **Nagi bird sanctuary** with **6,938 birds.**

Ramsar Convention on Wetlands

- It is an international treaty for **"the conservation and sustainable use of wetlands"**.
- It is also known as the Convention on Wetlands.
- It is named after the city of Ramsar in Iran.
- The Convention was signed on **2nd of February 1971**.
- The **2nd of February** each year is **World Wetlands Day.**
- The number of parties to the convention (COP) is **171.**
- At the centre of the Ramsar philosophy is the **"wise use"** of wetlands.
- **Wise use:** maintenance of ecological character within the context of sustainable development.
- **Australia** was the first country to accede to the convention.
- First Ramsar site: **Cobourg Peninsula, Australia**.
- The countries with the **most Sites** are the **United Kingdom** with **175** and **Mexico** with **142.**

- **Bolivia** has the **largest area** under **Ramsar protection**.

Criteria for Identification of Wetlands under Ramsar Convention:

If a wetland:

- contains a representative, rare, or unique example of a natural or near-natural wetland type.
- supports vulnerable, endangered, or critically endangered species; or threatened ecological communities.
- supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
- supports plant and/or animal species at a critical stage in their life cycles or provides refuge during adverse conditions.
- regularly supports 20,000 or more water birds.
- regularly supports 1% of the individuals in a population of one species or subspecies of water birds.
- supports a significant proportion of indigenous fish subspecies.
- is an important source of food for fishes, spawning ground, nursery and/or migration path.
- is an important source of food and water resource, increased possibilities for recreation and eco-tourism, etc.

The Montreux Record:

- The **Montreux Record** is a **register of wetland sites** on the List of Wetlands of International Importance where **changes in ecological character have occurred, are occurring, or are likely to occur** as a result of technological developments, pollution or other human interference.
- It is maintained as part of the Ramsar List.
- From India, **Keoladeo National Park** (Rajasthan) and **Loktak Lake** (Manipur) are under Montreux record.

Ramsar sites:

Cancel green nod given to Great Nicobar project: Cong.

Sub: Environment

Sec: Protected Area

About the Great Nicobar Development project

- **Project Area:** 130 sq. km. of pristine forest

- A **"greenfield city"** has been proposed, including
- An International Container Transshipment Terminal (ICTT),
- A greenfield international airport,
- A power plant, and
- A township for the personnel who will implement the project.
- A total 166.1 sq km along the island's southeastern and southern coasts have been identified for project along a coastal strip of width between 2 km and 4 km.
- Some 130 sq km of forests have been sanctioned for diversion, and 9.64 lakh trees are likely to be felled.
- The port will be controlled by the Indian Navy, while the airport will have dual military-civilian functions and will cater to tourism as well.
- Roads, public transport, water supply and waste management facilities, and several hotels have been planned to cater to tourists.

Environmental and Legal Issues

- **Environmental Concerns:**
  - Potential destruction of pristine rainforest
  - The project is located in an **earthquake-prone zone**
  - Permanent subsidence during the 2004 tsunami
  - Cutting down of 9.6 lakh trees, with compensatory afforestation planned in Haryana
- **Impact on Indigenous Tribes:**
  - Threat to the survival and well-being of the **Shompen**, a **Particularly Vulnerable Tribal Group (PVTG)**
  - Alleged violations of tribal rights and inadequate consultation with the Tribal Council

Legal and Administrative Actions

- **Environmental Clearance:** Granted by an expert committee, despite concerns
- **National Green Tribunal (NGT):**
  - Legal challenge leading to the formation of an expert committee
  - Investigation led by the **Secretary of the Environment Ministry**; results not yet public
- **Classified Project:** Details withheld from the public portal by **Ministry of Home Affairs**, citing **"strategic importance"**

Great Nicobar:

- **Great Nicobar** is the **southernmost island of the Nicobar Islands** Archipelago.
- It covers 1,03,870 hectares of unique and threatened tropical evergreen forest ecosystems.
- It is home to a very rich ecosystem, including 650 species of angiosperms, ferns, gymnosperms, and bryophytes, among others.
- In terms of fauna, there are over 1800 species, some of which are endemic to this area.
- **Ecological Characteristics:**
  - The **Great Nicobar Biosphere Reserve** harbours a wide spectrum of ecosystems comprising tropical wet evergreen forests, mountain ranges reaching a height of 642 m (Mt. Thullier) above sea level, and coastal plains.
- **Tribe:**
  - The **Mongoloid Shompen Tribe,** about 200 in number, live in the forests of the biosphere reserve, particularly along the rivers and streams.
  - They are hunters and food gatherers, dependent on forest and marine resources for sustenance.

- Another **Mongoloid Tribe, Nicobarese,** about 300 in number, used to live in settlements along the west coast.
- After the tsunami in 2004, which devastated their settlement on the western coast, they were relocated to Afra Bay in the North Coast and Campbell Bay.

India's largest leopard safari opens at Bannerghatta

Sub: Environment

Sec: Protected Area

Context:

- Inauguration of **South India's First and Country's Largest Leopard Safari** at **Bannerghatta Biological Park (BBP)** in **Karnataka.**

Details:

- A safari area of 20 hectares is demarcated and fenced as per **Central Zoo Authority guidelines.**
- Currently, **eight leopards** are released in the open forest area.
- **Bannerghatta** has a **significant population of free-ranging leopards** (Panthera pardus).
- **Terrain:** undulating with natural rocky outcrops and semi-deciduous forest.
  - Enclosed with a 4.5-metre high vertical chain-link mesh, MS sheets at a 30° inclined angle of 1.5 metres.
- **Leopard cubs** rescued across the State will be raised and shifted to the safari to educate visitors about big cats and human-animal conflicts.
- Four acres within the safari are separated by a solar fence for acclimatisation.

Additional Initiatives Inaugurated by Minister Khandre at BBP:

- Renovated **elephant weaning centre**.
- Babycare room at the **butterfly park**.
- Children's play area.
- Entrance arch.
- Flagging off of **electric buggies** and **zoo installations.**
- Naming of a **male elephant calf** as **Swaraj**.
- Release of **six hamadryas baboons** for public display.

Future Developments Proposed at BBP

- New naturalistic enclosures for **emus** and **rheas** costing ₹50 lakh.
- **Hunting cheetah enclosure** estimated at ₹1.5 crore.
- **Hamadrya** and **olive baboon** enclosure at ₹1.5 crore.
- **Indian grey wolf** enclosure at ₹1.5 crore.

- Development of skywalks to connect the **zoo** and the **butterfly park**.

Details of species in the news:

Species	Description
Emus 	• The **emu** is a species of **flightless bird endemic to Australia,** where it is the **largest native bird.** • It is the **only extant member** of the **genus Dromaius** and the **second-tallest living bird** after its **African ratite relative,** the **common ostrich.** • The **emu's native ranges** cover most of the **Australian mainland.** • The **Tasmanian, Kangaroo Island** and **King Island** subspecies became **extinct** after the European settlement of Australia in 1788.
Rheas 	• **Rheas**, also known as **ñandus** or **South American ostrich,** are **moderately sized South American ratites** (**flightless birds** without a keel on their sternum bone) of the order Rheiformes. • They are distantly related to the **African ostriches** and **Australia's emu** (the largest and second-largest living ratites, respectively), with **rheas** placing just behind the **emu in height and overall size**.
Hamadryas Baboon 	• The **hamadryas baboon** is a species of **baboon** within the **Old World monkey family**. • It is the **northernmost** of **all the baboons,** being **native** to the **Horn of Africa** and the **southwestern region** of the **Arabian Peninsula.** • These regions provide **habitats** with the advantage for this species of **fewer natural predators** than **central** or **southern Africa** where other baboons reside. • The **hamadryas baboon** was a **sacred animal** to the **ancient Egyptians** and appeared in various roles in ancient Egyptian religion, hence its alternative name of '**sacred baboon**'.
Olive Baboon 	• The **olive baboon**, also called the **Anubis baboon**, is a member of the **family Cercopithecidae Old World monkeys**. • The species is the **most wide-ranging of all baboons**, being **native to 25 countries** throughout **Africa,** extending from **Mali eastward** to **Ethiopia** and **Tanzania**. • Isolated populations are also present in some mountainous regions of the Sahara. • It inhabits **savannahs, steppes, and forests.** • The common name is derived from its **coat colour,** which is a **shade of green-grey** at a distance. • A variety of communications, vocal and non-vocal, facilitate a complex social structure.

Indian grey wolf

- The **Indian wolf (Canis lupus pallipes)** is a subspecies of **grey wolf** that **ranges** from **Southwest Asia** to the **Indian subcontinent.**
- It is **intermediate in size** between the **Himalayan wolf** and the **Arabian wolf** and **lacks** the **former's luxuriant winter coat** due to it living in warmer conditions.
- Within this subspecies, the **"Indian plains wolf"** is **genetically basal to all other extant Canis lupus** apart from the **older lineage Himalayan wolf,** with both proposed as separate species.
- The **Indian wolf** is **one of the most endangered populations** of **grey wolf** in the **world.**

Railways to build canopy bridges across track in Assam gibbon habitat

Sub: Environment

Sec: Species in news

Tags: Assam gibbon habitat

Context:

- The **Northeast Frontier Railway (NFR)** has allocated **funds** to **build canopy bridges** to aid **India's only ape species** in crossing a railway track that splits its **main habitat in eastern Assam**, **Hollongapar Gibbon Sanctuary.**

Details:

- The railway track divides the **2,098.62-hectare Hollongapar Gibbon Sanctuary** in **Jorhat district,** home to the **highest concentration** of **hoolock gibbons**.
- The railway track has disrupted their arboreal lifestyle, making crossing the track risky.
- **NFR,** in consultation with the **Assam State Forest Department, Wildlife Institute of India (WII),** and other stakeholders, decided to **install canopy bridges** inside the **sanctuary** to **facilitate gibbon movement** across the track, separated by the **Mariani-Dibrugarh railway track.**
- The gibbons preferred the natural canopy over the artificial bridge.

About Hoolock Gibbon (Hoolock hoolock):

- **Gibbons**, the **smallest and fastest of all apes**, live in **tropical and subtropical forests**.
  - They are one of the **20 ape species** on Earth.
- The **tailless Hoolock Gibbon** is the **only ape found in India.**
- The primate is **native to eastern Bangladesh, Northeast India** and **Southwest China.**

- They are primarily **arboreal**, which means they live in trees.
- They are known for their **vocalizations** and spend most of their time in the upper canopy of tall trees, particularly the **hollong (Dipterocarpus macrocarpus).**
- The estimated population of hoolock gibbons is **12,000.**
- Like all apes, they are **extremely intelligent,** with **distinct personalities** and **strong family bonds.**
- **Key threats:** Habitat loss and fragmentation, and hunting.
- **The Hoolock Gibbon is categorized into two types:**
- **Western hoolock gibbon:**
    - It inhabits **all the states of the northeast**, restricted between the **south of the Brahmaputra River** and **east of the Dibang River.** Outside **India**, it is found in **eastern Bangladesh** and **north-west Myanmar.**
    - It is listed as **Endangered** under the **International Union for Conservation of Nature (IUCN) Red List**.
- **Eastern hoolock gibbon:**
    - It inhabits specific pockets of **Arunachal Pradesh** and **Assam** in **India** and in **southern China** and **northeast Myanmar** outside India.
    - It is listed as **Vulnerable** under the **IUCN Redlist**.
    - In **India**, both species are listed on **Schedule 1** of the **Indian (Wildlife) Protection Act 1972.**

Hollangapar Gibbon Sanctuary:

- Formerly known as the **Gibbon Wildlife Sanctuary** or **Hollongapar Reserved Forest**.
- It is an **isolated protected area** of **evergreen forest** located in **Jorhat district, Assam, India**.
- Initially in **1881**, its forests used to extend to the **foothills of the Patkai mountain range.**
- Since then, the forest has been fragmented and surrounded by **tea gardens** and **small villages.** In the early **1900s, artificial regeneration** was used to develop a well-stocked forest, resulting in the **site's rich biodiversity.**
- It contains **India's only gibbons** – the **hoolock gibbons**, and **Northeastern India's only nocturnal primate** – the **Bengal slow loris.**
- In addition to the **gibbon,** the **HGS** is home to **six other primate species,** making it an area with the **highest biodiversity of primate species** of any Protected Area in the country.
- **Western hoolock gibbon** is the **flagship species** of the **HGS**.
- The **upper canopy** of the forest is dominated by the **hollong tree** (Dipterocarpus macrocarpus), while the **nahar** (Mesua ferrea) dominates the **middle canopy.** The **lower canopy** consists of **evergreen shrubs and herbs.**
- The habitat is threatened by **illegal logging, encroachment of human settlements,** and **habitat fragmentation**.

Adjutant loses territory

Sub: Environment

Sec: Species in news

Greater adjutant stork (Leptoptilos dubius):

- Once found widely across **southern Asia** and **mainland southeast Asia,** the **greater adjutant** is now **restricted** to a **much smaller range** with **only three breeding populations; two in India**, with the **largest colony** in **Assam** and a **smaller one** around **Bhagalpur;** and another breeding population in **Cambodia.**
    - **Habitat in Assam**: Brahmaputra valley, Assam, primarily in the districts of Guwahati, Morigaon, and Nagaon.
- **Breeding and Feeding**:

- Breeding season: October to February.
- Dependence on wetlands for foraging and tall trees for roosting and nesting.

- **Diet**: Principally carnivorous, feeding on **fish, frogs, snakes,** other reptiles, eels, birds, offal and **carrion**. It shares the habit of scavenging with vultures.
- These storks are **not migratory** and **rely entirely on the threatened wetlands** of **Assam**.
- **Conservation Status**: Listed as **endangered** on the **Red List** of Threatened Species by the International Union for Conservation of Nature (IUCN).
- **Historical Population**: Guwahati once had the **largest concentration** of these storks in India.

Habitat Challenges:

- **Rapid urbanization** has led to the **loss of wetlands,** a **critical habitat** for these storks.
- Many are now **confined to a garbage dumping site** near the **Deepor Beel Wildlife Sanctuary, a Ramsar site**.
- **Habitat Destruction**:
  - **Wetlands** and **roosting trees** are being destroyed by encroachment, overfishing, and drainage projects.
  - Many roosting trees are on private land and are being cut down.
- **Human Interaction**:
  - Local communities often drive the birds away due to the strong odour of their droppings and the presence of rotting meat brought to feed their hatchlings.

Wild horse species return to Kazakh steppes

Sub: Environment

Sec: Species in news

Context:

- After a long flight from Prague, the release of three **Przewalski horses** into the **Kazakh steppe- the native habitat of this endangered species.**

About the project:

Organizations Involved:

- The project is run by the **Prague** and **Berlin zoos.**
- The **Association for the Conservation of Biodiversity** in Kazakhstan (Albert Salemgareyev) is also involved.

Objective:

- The **aim** is to **preserve the Przewalski horse**, an **endangered species** with a **common ancestry** with **modern domestic horses but genetically different.**

First Release:

- The first three horses, named **Zorro, Ypsilonka,** and **Zeta II,** arrived earlier in the month.

- Four more horses arrived from **Berlin** and were released in the afternoon.
- Initial observation will take place in the **Golden Steppe nature reserve**.

Przewalski horses:

- Also called the **takhi, Mongolian wild horse** or **Dzungarian horse**, is a **rare** and **endangered horse** originally **native** to the **steppes of Central Asia.**
- It is named after the **Russian geographer and explorer Nikolay Przhevalsky.**
- Once **extinct in the wild**, since the **1990s** it has been **reintroduced** to its **native habitat** in **Mongolia** in the **Khustain Nuruu National Park**, **Takhin Tal Nature Reserve,** and **Khomiin Tal,** as well as several other locales in **Central Asia** and **Eastern Europe.**
- The **Przewalski's horse** is **stockily built, smaller,** and **shorter** than its domesticated relatives.
- They have a **dun coat** with **pangaré features** and often have **dark primitive markings**.
- **Przewalski horses** are **one of the world's last breeds of wild horses.**
- They can **withstand harsh winters,** like those in **Kazakhstan** where temperatures can drop **below -30°C.**
- There are now **2,000 Przewalski horses** worldwide, mainly in **China, Mongolia, France, Russia,** and the **Chernobyl exclusion zone.**
- The **Chernobyl population** was introduced in **1998** and has grown to **210**.

Other horse breeds:

- **American mustang** and the **Australian brumby**.
- Both are **feral horses** descended from **domesticated animals**.

Other Conservation Efforts in Kazakhstan:

- The **Saiga antelope,** another **endangered species,** has seen its population grow to about **two million** due to conservation efforts by **Kazakh authorities** and NGOs.
- **Saiga antelope:**
    - The saiga antelope is a species of antelope which during **antiquity** inhabited a vast area of the **Eurasian steppe,** spanning the foothills of the **Carpathian Mountains** in the northwest and **Caucasus** in the **southwest** into **Mongolia** in the **northeast** and **Dzungaria** in the **southeast.**
    - Today, the dominant subspecies (S. t. tatarica) only occurs in **Kalmykia** and **Astrakhan Oblast** of **Russia** and in the **Ural, Ustyurt** and **Betpak-Dala regions** of **Kazakhstan.**
    - It is **regionally extinct** in **Romania, Ukraine, Moldova, China** and **southwestern Mongolia.**
    - The **Mongolian subspecies (S. t. mongolica)** occurs **only** in **western Mongolia**.

Kazakh steppe:

- The Kazakh Steppe, also called the **Great Dala,** is a **vast region of open grassland** in **Central Asia**, covering areas in **northern Kazakhstan** and **adjacent areas of Russia**.
- It lies **east** of the **Pontic–Caspian steppe** and **west** of the **Emin Valley steppe**, with which it forms the **central** and **western part** of the **Eurasian steppe.**
- The **Kazakh Steppe** is an **ecoregion** of the **temperate grasslands, savannas,** and **shrublands biome** in the **Palearctic realm.**
- The steppe extends from the **east** of the **Caspian Depression** and **north** of the **Aral Sea**, all the way to the **Altai Mountains.**
- It is the **largest dry steppe region** on **earth.**
- The region has a **cold semi-arid, continental climate**.

World Crocodile Day 2024: In 50th year of India's saurian conservation, one of its architects worried for Bhitarkanika

Sub: Environment

Sec: Species in news

Crocodile Conservation Project:

- India launched the **Crocodile Conservation Project** in **1975** in **Odisha's Bhitarkanika National Park**, former hunting grounds of the **Kanika princely state**.
- The project **aimed** to **protect crocodiles' natural habitat** and revive their population through captive breeding.
- Notable contributors included **Sudhakar Kar,** known as **Odisha's 'Crocodile Man,'** and **Australian herpetologist HR Bustard**.
- Conservation efforts began with **breeding** and **rearing centres** for **saltwater crocodiles, muggers,** and **gharials** in **34 locations across India,** including Bhitarkanika.
- In **1975**, **Bhitarkanika** had **only 95 saltwater crocodiles.** Today, the population has grown to **1,811**.

Current Issues:

- The **human-crocodile conflict** in **Bhitarkanika** is a **growing concern**. Locals have been warned **not to enter water bodies** inhabited by **estuarine crocodiles**.
- Forest officials have erected barricades around **120 river ghats** to **prevent crocodile attacks**.
- Since **2014**, **crocodile** attacks have led to **50 deaths,** influencing local politics, with villagers expressing dissatisfaction with incumbent politicians for inadequate safety measures.

Crocodile:

- Crocodiles are known for their semi-aquatic lifestyle and are found in various freshwater habitats, including rivers, lakes, marshes, and estuaries.
- The **three crocodiles of India**, **the Saltwater Crocodile, Mugger Crocodile,** and **Gharial,** are listed as **Least Concern, Vulnerable,** and **Critically Endangered** respectively on the **IUCN Red List of Threatened Species**.

Estuarine or Saltwater Crocodile (Crocodylus porosus)

IUCN Red List Status: Least Concern

- Saltwater crocodiles are found in **coastal regions** and **estuaries** across **Southeast Asia, Northern Australia,** and the **Indian subcontinent.**
- In **India,** the **Saltwater Croc** is primarily found in the **mangrove habitats** of the **Sundarbans** in **West Bengal,** the **Bhitarkanika Wildlife Sanctuary** in **Odisha**, and the **Andaman and Nicobar Islands.**
- Among the **largest living croc species,** adult saltwater crocodiles can reach lengths of up to 7 meters (23 feet).
- They are known for their **ability to inhabit both saltwater and freshwater habitats** and are **proficient swimmers**.

Mugger or Marsh Crocodile (Crocodylus palustris)

IUCN Red List Status: Vulnerable

- **Muggers** have a **broader distribution**, ranging from **parts of Iran to the Indian subcontinent.**
- Muggers are found in various **freshwater habitats**, including **rivers, lakes, and marshes.** They are distributed across different states in India, such as **Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Maharashtra,** and others.
- Muggers are **smaller** compared to saltwater crocs, with adult lengths typically ranging from 3 to 4 meters (9.8 to 13.1 feet).
- Muggers are **well-adapted** to **freshwater environments** and are known to be **more tolerant of different water conditions** than **saltwater crocs**.
- **Medium-sized crocodiles** (max. length of 4-5m) with the broadest snout of any living Crocodylus species, **Mugger Crocodiles** are **hole-nesting species,** with **egg-laying** taking place during the dry season.

Gharial (Gavialis gangeticus)

IUCN Red List Status: Critically Endangered

- The **Gharial** derives its name from a **bulbous knob-like bump** on the snout of breeding males that resembles a **ghara,** which in Hindi means an **earthen pot**.
- The bulbous snout makes them the **only crocodile species on the planet with a visible difference between males and females.**
- Largely **piscivorous,** their long, slender snout and rows of sharp teeth make them efficient fish catchers.
- Adults are dark olive or brownish olive in colour, while the juveniles are greyish brown with five irregular bands on the upper body and nine on the tail.
- Once a common sight within the **subcontinent's riverine ecosystems,** local gharial populations have declined by **98 per cent** since the **1940s**, with **fewer than 250** adult gharials remaining in the wild in 2006.
- Concerted conservation efforts have since borne fruit, with a recent survey by the **Wildlife Trust of India (WTI)** reporting **1,255 gharials** in the Chambal River alone.

Elephant have names for each other-Animal behaviour of elephant in depth

Sub: Environment

Sec: Species in news

Context:

- **Wild African elephants use name-like calls** to address each other, a rare behaviour among nonhuman animals.
- This **remarkable behaviour was observed by scientists from Colorado State University (CSU), in collaboration with Save the Elephants and Elephant Voices.**

Elephants use names just like humans:

- **Dolphins and parrots** call one another by 'name' by imitating the signature call of the addressee.
- The **ability to produce new sounds, necessary for identifying individuals by name, is uncommon among animals.**
- **Arbitrary communication**, where a sound represents an idea without imitating it, greatly expands communication capability and is considered a next-level cognitive skill.

Complex social interactions:

- **Elephant evolution diverged from human evolution** tens of millions of years ago, yet both species have developed complex social networks and communication systems.

- Researchers propose that the development of arbitrary vocal labeling in both species may have been driven by similar social pressures.
- Elephants communicate using a broad range of vocalizations that convey identity, age, sex, emotional state, and behavioral context.
- Their calls, which span a wide frequency spectrum including infrasonic sounds, can coordinate group movements over long distances.

Elephants respond to their names:

- The experts also observed that **elephants are more likely to address** each other by name over long distances or when adults are communicating with calves.

Strengthening conservation efforts:

- The researchers believe that **understanding elephant communication and cognition can strengthen conservation efforts.**
- Elephants are classified as **endangered due to poaching** and habitat loss, and effective communication could aid in their protection.
- Further research is needed to isolate the names within the calls and explore whether elephants name other things they interact with, such as food, water, and places.
- Despite the challenges in collecting data, the study provides new insights into elephant behavior and the importance of social reinforcement in their communication.

About Elephant Communication:

- Elephants communicate using a rich array of vocalizations, gestures, and chemical signals. They produce a range of sounds, from low-frequency rumbles that can travel over long distances to higher-pitched trumpets and roars.

Social bonds

- These low-frequency rumbles, often below the range of human hearing, play a crucial role in maintaining social bonds and coordinating movements, especially within their herds.

Body language

- In addition to vocal sounds, elephants use body language to convey information and emotions.
- They flap their ears, raise their trunks, and make specific postures to signal aggression, submission, or excitement.

Physical touch

- Physical touch is also important; elephants often greet each other by entwining trunks, and they use trunk touches to reassure and comfort one another.

Chemical communication

- Chemical communication is another vital aspect of elephant interaction.
- Elephants have highly developed olfactory senses and use scent to convey information about reproductive status, individual identity, and emotional states.
- They can detect pheromones in urine, dung, and secretions from glands located near their eyes and feet, which help them communicate over long distances.

About Elephants:

- India is home to **nearly 60% Asian elephants** and the last count of the species in 2017 had put the number at **29,964.**
- While the number of elephants in India has increased in the past few years, the species is listed as **'Endangered' on the IUCN Red List Of threatened species and Schedule I of The Wildlife Protection Act.**
- The South Indian States Of **Karnataka, Kerala, Andhra Pradesh, and Tamil Nadu** are home to nearly 44% of India's elephant population.

- The number of elephant reserves in India is 32 with the latest addition being the **Agasthyamalai Elephant Reserve in 2022.**

Limbless amphibian added to Kaziranga's fauna

Sub: Environment

Sec: Species in news

Context:

- A **limbless amphibian**, the **striped caecilian (Ichthyophis spp)**, was **recorded** for the **first time** in **Kaziranga National Park and Tiger Reserve**.
- The discovery was made during a **rapid herpetofauna survey** conducted from June 14-17 by a team of herpetologists with support from various institutions and experts.

Importance of Herpetofauna:

- **Reptiles** and **amphibians**, collectively known as **herpetofauna**, are **critical** for **pest control** and **environmental indicators**.
- They are the **least studied** but **highly vulnerable** to **climate change**.
- **Caecilians** are **limbless amphibians** that primarily live **burrowed under soil.**
    - Their presence is **crucial** for understanding **evolution** and **intercontinental speciation.**

Conservation Efforts

- **Kaziranga National Park** continues to **reveal its rich biodiversity**, with new species discoveries highlighting the need for **comprehensive conservation efforts** that include **lesser-known** yet **ecologically significant species** like the **striped caecilian**.
- The conservation efforts are traditionally focused on the **'Big Five'** (rhinoceros, tiger, elephant, wild water buffalo, and swamp deer).
- There is increasing attention on the **ecological significance** of **herpetofauna**.

About Kaziranga National Park:

Location	• State of **Assam** • Located on the edge of the **Eastern Himalaya biodiversity hotspot**.
Feature	• Single largest undisturbed and representative area in the **Brahmaputra Valley floodplain**.
Legal Status	• Declared as a National Park in 1974. • Declared a tiger reserve since 2007.
International Status	• Declared a **UNESCO World Heritage Site** in 1985. • Recognized as an Important Bird Area by BirdLife International.

Biodiversity	• The park features **diverse habitats** like **flood plains, wetlands, grasslands,** and **hill tracts**.
	• **Species Count:**
	  ○ **24 species** of **amphibians** and **74 species** of **reptiles**.
	  ○ Home to **21** of **India's 29 species** of **tortoises** and **freshwater turtles.**

Important Fauna found	• Home of the **world's most one-horned rhinos**. • (Note – Pobitora Wildlife Sanctuary has the highest density of one-horned rhinos in the world and second highest number of Rhinos in Assam after Kaziranga National Park) • The **'big four'** species— Rhino, Elephant, Royal Bengal tiger and Asiatic water buffalo.

Flora	• Alluvial inundated grasslands • Alluvial savanna woodlands • Tropical moist mixed deciduous forests • Tropical semi-evergreen forests.
River passing through	• Brahmaputra River (northern and eastern boundaries) • Diphlu River (southern boundary) • Mora Dhansiri.
Highways	• National Highway 37 passes through the park area
Other national parks in Assam	• Dibru-Saikhowa National Park, • Manas National Park, • Nameri National Park, • Rajiv Gandhi Orang National Park.

Back from the brink: IUCN changes Iberian lynx's status to 'vulnerable' from 'endangered' in conservation success story

Sub: Environment

Sec: Species in news

Context:

- The **Iberian Lynx (Lynx pardinus)** has been **reclassified** from **'Endangered'** to **'Vulnerable'** by the **IUCN** on June 20.
- Population **increased** from **62 mature individuals** in **2001** to **648** in **2022**.
- Total population, including **young lynx**, is now over **2,000**.

Conservation Efforts:

- Efforts over nearly **25 years** have focused on:
  - **Increasing prey abundance,** specifically the **Endangered European rabbit** (Oryctolagus cuniculus).
  - Protecting and restoring **Mediterranean scrub** and **forest habitats.**
  - Reducing **human-caused deaths**.
- **Genetic diversity** has been **expanded** through **translocations** and an **ex-situ breeding program**.
- Since 2010, over 400 lynxes have been **reintroduced** to parts of **Portugal** and **Spain**.
- **Occupied range increased** from **449 km²** in **2005** to **3,320 km²**.

Remaining Threats:

- **Fluctuations** in **European rabbit populations** due to **virus outbreaks.**
- **Susceptibility to diseases** from **domestic cats, poaching, road kills,** and **habitat changes** from **climate change**.

Future Plans:

- Continued efforts are needed for the Iberian lynx to thrive.
- Plans include **reintroducing** the **species** to **new sites** in **central and northern Spain**.
- Scientists believe the species could reach Fully Recovered status in 100 years if conservation efforts remain effective.

Iberian Lynx (Lynx pardinus):

- The Iberian lynx is the **world's most endangered feline species.**
- **Characteristic Features:** Of all **lynx**, the **Iberian** has the **most heavily spotted coat**.

- The cat has white underparts. This species, like other cat species, is **sexually dimorphic,** with **males** being **heavier and longer than females**.
    - **Sexual dimorphism** is the **systematic difference** in form between individuals of different sex in the same species.

- **Habitat:** The **Iberian lynx** lives in **Mediterranean forests** composed of **native oaks** and **abundant undergrowth and thickets**.
    - It favours a **mixture of dense scrub** for **shelter** and **open pasture for hunting.**
    - **Iberian lynx** are found **only in two small areas of southwest Spain** on the **Iberian Peninsula,** west of the **Pyrenees mountains.**
- **Threats:**
    - Habitat destruction and alteration due to agricultural and industrial development
    - Conversion of native Mediterranean forest to plantations with no undergrowth
    - Direct persecution
    - Killed by automobiles
    - Caught illegally or hunted with dogs
    - Killed in traps set for other predators
- **Conservation Status:**
    - The **Iberian lynx** is protected under **Appendix II** of the **Convention on International Trade in Endangered Species (CITES)**.

Pariej: Mugger crocodile and several turtles, both Schedule I animals, burnt to death in Kheda lake

Sub: Environment

Sec: Species in news

Incident at Pariej Lake in Gujarat:

- Recently, a fire broke out at **Pariej Lake** in **Kheda district, Gujarat**, where **desilting** and **dredging work** was underway.
- Due to the fire, a **5-foot-long mugger crocodile** and **several turtles**, **all protected under Schedule I** of the **Wild Life (Protection) Act, 1972**, died.

Details:

- **Kheda** lies in the **Charotar region of Gujarat**, located between the **Sabarmati** and **Mahi rivers**.
- **Pariej,** at 8 sq. km, was the **largest waterbody in Kheda.**
- The lake is a significant wetland attracting numerous birds and is also home to **mugger crocodiles** and **turtles.**
- The fire was exacerbated by the **dry conditions** caused by the **draining of the reservoir** since February.
- Rescuers discovered **mugger crocodile** burrows during their rescue efforts, managing to save five crocodiles but losing one juvenile to smoke or heat.
- The incident raised concerns about the **lack of precautions** taken during the project, with experts criticizing the state's Irrigation Department for not consulting wildlife authorities before initiating work in the sensitive habitat.

Mugger or Marsh Crocodile (Crocodylus palustris)

IUCN Red List Status: Vulnerable

- **Muggers** have a **broader distribution**, ranging from **parts of Iran to the Indian subcontinent.**

- Muggers are found in various **freshwater habitats**, including **rivers, lakes, and marshes.** They are distributed across different states in India, such as **Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Maharashtra,** and others.
- Muggers are **smaller** compared to saltwater crocs, with adult lengths typically ranging from 3 to 4 meters (9.8 to 13.1 feet).
- Muggers are **well-adapted** to **freshwater environments** and are known to be **more tolerant of different water conditions** than **saltwater crocs**.
- **Medium-sized crocodiles** (max. length of 4-5m) with the broadest snout of any living Crocodylus species, **Mugger Crocodiles** are **hole-nesting species,** with **egg-laying** taking place during the dry season.

What is in Great Nicobar, site of NITI Aayog's mega project?

Sub: Env

Sec: Species in news

Great Nicobar: Location and Environment

- **Great Nicobar** is the **southernmost tip of India,** part of the **Andaman and Nicobar archipelago** with over **600 islands**.
- It is hilly, covered with lush rainforests, and receives about **3,500 mm of annual rainfall.**
- The **island** hosts **endangered** and **endemic species** like the **giant leatherback turtle, Nicobar megapode, Great Nicobar crake, Nicobar crab-eating macaque,** and **Nicobar tree shrew.**
- It has an area of 910 sq km with **mangroves** and **Pandan forests** along its coast.

Giant leatherback turtle

- It is the **largest turtle in the world.**
- It is the **only species of sea turtle** that **lacks scales and a hard shell**.
- They are named for their **tough rubbery skin** and have **existed** in their current form **since the age of the dinosaurs**.
- These turtles are **highly migratory** and can s**wim over 10,000 miles a year** between nesting and foraging grounds.
- They are also accomplished divers with the **deepest recorded dive** reaching nearly **4,000 feet deeper** than most marine mammals.
- It has a unique **thermoregulatory adaptation** that allows them to **maintain core body temperatures** at **extremely cold depths.**
- **Distribution:** It is found in every ocean except the Arctic and Antarctic.
- They have the widest global distribution of any reptile, with nesting mainly on tropical or subtropical beaches.
- **Conservation status**
  - **IUCN:** Endangered
  - **CITES:** Appendix I

Nicobar megapode

- The **Nicobar megapode** or **Nicobar scrubfowl** (Megapodius nicobariensis) is a **megapode** found in some of the **Nicobar Islands** (India).
- Like other **megapode relatives**, it builds a large mound nest with soil and vegetation, with the eggs hatched by the heat produced by decomposition.

- The Nicobar Islands are on the edge of the distribution of megapodes, well separated from the nearest ranges of other megapode species.
- Being restricted to small islands and threatened by hunting, the species is **vulnerable to extinction**.
- The 2004 tsunami is believed to have wiped out populations on some islands and reduced populations on several others.

Great Nicobar crake

- Usually found near **water bodies,** the **Great Nicobar Crake** is a **thick and short bird**, with **heavy legs** and **moderately longer toes** and **short claws.**
- It has a moderately long neck and a short tail.
- The presence of a **pale green bill,** heavy **orange-red legs** and **black banded-under parts** together makes it different from other known members of Water Crakes.

Nicobar crab-eating macaque

- The **Nicobar long-tailed macaque** (Macaca fascicularis umbrosa, popularly known as the **Nicobar monkey)** is a subspecies of the **crab-eating macaque** (M. fascicularis), **endemic** to the **Nicobar Islands** in the Bay of Bengal.
- This primate is found in **three of the Nicobar Islands**—**Great Nicobar, Little Nicobar and Katchal**—in biome regions consisting of tropical and subtropical moist broadleaf forests.
- **IUCN:** Vulnerable

Nicobar tree shrew

- The **Nicobar treeshrew** (Tupaia nicobarica) is a **treeshrew species** within the Tupaiidae.
- It is **endemic** to the **Nicobar Islands** where it inhabits the **islands' rainforests.**
- It is threatened by **habitat loss.**
- Although previously listed as an **endangered species,** the **Nicobar treeshrew** is now commonly found in its appropriate habitats.
- The **Nicobar treeshrew** was first described by Johann Zelebor in 1868.
- The **Nicobar treeshrew only occupies** the **Indian Islands of Great Nicobar** and **Little Nicobar** and can be found on the **highest points of these two islands, 640 m above sea level.**

Communities on Great Nicobar:

- **Shompen:** Approximately **250 individuals**, living mostly in **interior forests, isolated, hunter-gatherers**, classified as a **Particularly Vulnerable Tribal Group (PVTG)**.
- **Nicobarese:** Engage in **farming** and **fishing**, divided into **Great Nicobarese** (450 individuals, resettled in **Campbell Bay** post-2004 tsunami) and **Little Nicobarese** (850 individuals, living in **Afra Bay, Pulomilo**, and **Little Nicobar**).

Settler Population:

- The majority are **settlers from mainland India,** including **retired military servicemen** and their families settled between **1968** and **1975** from various states (Punjab, Uttar Pradesh, Bihar, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu).
- Around **330 households** settled in **seven revenue villages** on the **east coast: Campbell Bay, Govindnagar, Jogindernagar, Vijaynagar, Laxminagar, Gandhinagar, and Shastrinagar.**

- **Campbell Bay** is an administrative hub with local offices.
- There were additional migrations of fisherfolk, labourers, businesspersons, and administrative staff post-2004 tsunami.
- The total population of settlers is approximately 6,000.

Flamingos under threat: Climate impact jeopardising delicate balance of Tanzania's Lake Natron

Sub: Environment

Sec: Species in news

Threats to Flamingos at Lake Natron- Tanzania:

- Millions of **pink flamingos** transform **Lake Natron, Tanzania,** into a dazzling sight, but this is under **threat** due to **human activities** and **climate change**.
- **Lake Natron** and **Lake Bogoria** in **Kenya**, part of **Africa's Great Rift Valley,** are hostile to most life but ideal for **flamingos** due to their caustic soda and hypersaline water.
- **Lake Natron, a Ramsar site,** has the perfect conditions for **flamingos,** but this balance is being disrupted.

Causes of Disruption:

- Factors like **agriculture, pollution,** and **climate change** are **altering water levels** and **salinity,** impacting **flamingo nesting sites**.
- **Extreme weather** causes **flooding** and **salinity reduction,** affecting **algae growth** which is crucial for flamingo food.
- **Prolonged dry seasons** concentrate **salinity beyond algae tolerance**, causing food shortages for flamingos.

Human Impact and Conservation Efforts:

- A proposed **soda ash extraction project** in **2006**, abandoned in **2008**, exemplifies ongoing threats to the ecosystem.
- **Mining activities** near the **lake** could force flamingos to abandon it due to disturbance, crucial for their nesting and reproduction.
- **Local communities** are **educating about sustainable water practices** to protect the **flamingos** and **balance human-wildlife needs.**
- **Flamingos** attract **tourists,** contributing significantly to **Tanzania's GDP** and **foreign exchange revenues.**
- **Flamingos across Africa's Great Rift Valley** face similar threats, making them vital environmental indicators.

Flamingo:

- Flamingos are a type of **wading bird** in the family **Phoenicopteridae**, which is the **only extant family** in the **order Phoenicopteriformes**.
- There are **four flamingo species** distributed throughout the **Americas** (including the Caribbean), and **two species native to Afro-Eurasia**.
- A group of flamingoes is called a **"flamboyance"**.
- **Species: Six extant flamingo species** are recognized by most sources and were formerly placed in **one genus** (have common characteristics) – **Phoenicopterus**.

Species	Geographic location
Greater flamingo (Phoenicopterus roseus)	Parts of Africa, S. Europe and S. and SW Asia (most widespread flamingo).

Africa (e.g. Great Rift Valley) to NW India (most numerous flamingos).

Lesser flamingo
(Phoeniconaias minor)

Temperate S. South America.

Chilean flamingo
(Phoenicopterus chilensis)

High Andes in Peru, Chile, Bolivia and Argentina

James's or Puna flamingo
(Phoenicoparrus jamesi)

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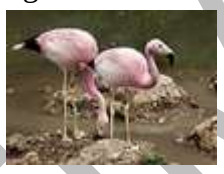
High Andes in Peru, Chile, Bolivia and Argentina

Andean flamingo
(Phoenicoparrus andinus)



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Caribbean islands, Caribbean Mexico, southern Florida, Belize, coastal Colombia, northern Brazil, Venezuela and Galápagos Islands.

American or Caribbean flamingo
(Phoenicopterus ruber)

Lake Natron:

- **Lake Natron** is a **salt or alkaline lake** located in the **north Ngorongoro District** of **Arusha Region** in **Tanzania** at the **border with Kenya.**
- It is in the **Gregory Rift**, which is the **eastern branch** of the **East African Rift**.
- The lake is within the **Lake Natron Basin**, a **Ramsar Site wetland** of international significance.
- It is the **only regular breeding area for Africa's lesser flamingoes,** although this habitat is not protected and is under threat from planned development projects.

Lake Bogoria:

- **Lake Bogoria** (formerly **Lake Hannington**) is a **saline, alkaline lake** that lies in a **volcanic region** in a **half-graben basin** south of **Lake Baringo, Kenya,** a little **north of the equator**.

- **Lake Bogoria**, like **Lake Nakuru, Lake Elementeita,** and **Lake Magadi** further south in the **Rift Valley,** and **Lake Logipi** to the **north,** is home at times to one of the **world's largest populations of lesser flamingos.**
- The lake is a **Ramsar site** and **Lake Bogoria National Reserve** has been a protected National Reserve since November 29, 1973.
- **Lake Bogoria** is **shallow** (about 10 m depth), and is about 34 km long by 3.5 km wide, with a drainage basin of 700 km2. It is **Located in Baringo County.**

Scientists find first evidence that butterflies crossed the Atlantic Ocean

Sub: Environment

Sec: Species in news

Context:

- Scientists discovered that **butterflies** made a **2,600-mile journey** across the **Atlantic Ocean**.

Details:

- **Gerard Talavera** spotted **painted lady butterflies** in **French Guiana** in **2013,** which was **unusual** since **they are not typically found in South America**.
- After a decade of investigation, it was concluded that **these butterflies undertook the first recorded transoceanic flight by an insect.**

Scientific Investigation and Evidence:

- Researchers sequenced the **butterflies' genomes** and found **they were closely related to populations** in **Europe and Africa**.
- **Pollen DNA** on the **butterflies** indicated origins from **tropical Africa.**
- **Isotopes of hydrogen** and **strontium** on their **wings** were **unique to Western Europe.**
- This evidence suggested the **butterflies originated in Africa or Europe, not North America.**

Details of the Migration Journey:

- The **painted lady butterflies** likely **flew** from **West Africa** to **South America,** a distance of **at least 4,200 km.**
- The journey might have been even **longer,** potentially **starting in Europe**, totalling up to **7,000 km.**
- **Painted lady butterflies** are known for **long migrations,** such as the **9,000-mile trip between Europe and Africa**.

Mechanism of Long-Distance Flight:

- To reach **French Guiana, butterflies** would need to fly up to **eight days** without rest.
- Scientists analyzed **wind currents** from the **Sahara,** which could help **butterflies glide and conserve energy.**
- Alternating between **minimal** effort **gliding** and active flight was crucial for the journey.

Implications and Perspectives:

- This discovery reveals **insects' ability to traverse vast distances,** potentially impacting ecosystems more than previously thought.
- It suggests that long-distance insect migrations may be more common and significant than currently understood.

Painted Lady (Vanessa cardui):

- **Vanessa cardui** is the **most widespread** of **all butterfly species.** It is commonly called the painted lady, or formerly in **North America** the **cosmopolitan.**
- Found on every continent except Antarctica and South America.
- Adult butterflies feed on flower nectar and aphid honeydew.

Climate activists vandalise Stonehenge monument

Sub: Environment

Sec: Places in news

Context:

- Climate activists from the **'Just Stop Oil'** group sprayed orange powder on the prehistoric Stonehenge monument, at **Stonehenge, Wiltshire, England.**
- The act occurred **a day before the summer solstice,** a significant time when crowds gather at the site for rituals.

Details of the events:

- The group called for an **end to oil and gas burning and extraction** by **2030**.
- **Message:** "Standing inert for generations works well for stones- not climate policy."

Stonehenge monument:

- **Stonehenge,** built between **3000 BCE** and **1500 BCE,** aligns with the **sun's trajectory during solstices,** marking its importance for historical rituals.
- **Stonehenge** is a **prehistoric megalithic structure** on **Salisbury Plain** in **Wiltshire, England**, two miles (3 km) **west** of **Amesbury.**
- The whole monument, now ruinous, is **aligned towards the sunrise on the summer solstice and sunset on the winter solstice**.
- The **stones** are **set within earthworks** in the **middle of the densest complex of Neolithic and Bronze Age monuments** in **England**, including several hundred tumuli (burial mounds).
- **Stonehenge** is regarded as a **British cultural icon**.
- The site and its surroundings were added to **UNESCO's list of World Heritage Sites in 1986. Stonehenge** is owned by the **Crown** and **managed** by **English Heritage;** the surrounding land is owned by the National Trust.

Just Stop Oil:

- Launched in **2022, Just Stop Oil** describes itself as "a coalition of groups working together to ensure the government commits to halting **new fossil fuel licensing** and production".
- Led by organisers from climate groups Extinction Rebellion and Insulate Britain and funded through donations, the group propagates "Non-Violent Direct Action" and asserts non-violent civil resistance as a way to "demand their rights, freedom and justice… use tactics such as strikes, boycotts, mass protests and disruption to withdraw their cooperation from the state".

Geography

Cauvery delta farmers are gaining resilience by cultivating indigenous rice varieties

Sub: Geography

Sec: Agriculture

Context:

- The **Cauvery delta** has been **crucial for food security in southern India** for centuries, with its **fertile lands** supporting **lush paddy fields and vital canals**.

Challenges faced by paddy cultivators along Cauvery delta:

- In the last decade, **rising temperatures, erratic rainfall,** and **poor irrigation** have impacted **rice production**.
- Smallholder paddy cultivators struggle with **costly, water-intensive modern rice varieties, compounded by high costs of fertilizers and pesticides, reducing the economic viability of rice cultivation**.

Revival of Traditional Farming Practices:

- Farmers in the **Cauvery Delta** are **turning to traditional farming methods** and **resilient rice varieties,** inspired by initiatives like the **'Save our Rice' campaign**.
- Of the **186,000 acres** planted with **traditional paddy in Tamil Nadu, 42,000 acres** are in the **Cauvery delta.**
- **Traditional practices** integrate **soil, water, and livestock,** offering potential solutions to modern agricultural challenges.
- **Traditional varieties of paddy:** Mappillai Samba, Karuppu Kavuni, Thooya Malli, Thanga Samba, and Kichadi Samba.
- **Other varieties** like Kullakaar, Thooyamalli, and Karunkuruvai

Advantages of Traditional Rice Varieties:

- **Traditional rice yields** may be **lower per acre,** but they offer fewer challenges and **cost savings,** such as using their seeds each season.
- Some traditional varieties can sprout again without **replanting, reducing labour.**
- Traditional rice is found in multiple hues (white, red, black, brown), each with unique nutritional and health benefits.
- Traditional rice varieties are **drought-tolerant** and **require less frequent watering** than hybrid varieties.

Environmental and Health Benefits:

- **Traditional rice farming** uses **organic methods, reducing** the need for **chemical fertilizers and pesticides,** which benefits the environment and soil health.
- These methods also support **biodiversity** by using **only insect repellants** and not harming beneficial insects.
- **Traditional rice** is seen as **healthier**, addressing modern dietary issues and lifestyle diseases.

Marketing and Economic Challenges

- **Marketing traditional rice** is **challenging** due to competition from **cheaper, chemically-grown rice**.
- Farmers face difficulties selling their produce at fair prices and often need to transport their rice to specific mills for proper processing.
- **Mudfield Natural Farming** in **Pattukkottai** helps over 100 farmers grow and market traditional rice organically, targeting urban consumers.

Cities warming due to the combined effect of urbanisation, climate change

Sub: Geography

Sec: Climatology

Context:

- Recently, **Delhi** experienced **daytime temperatures above 50°C for two consecutive days,** the highest ever recorded in the city.

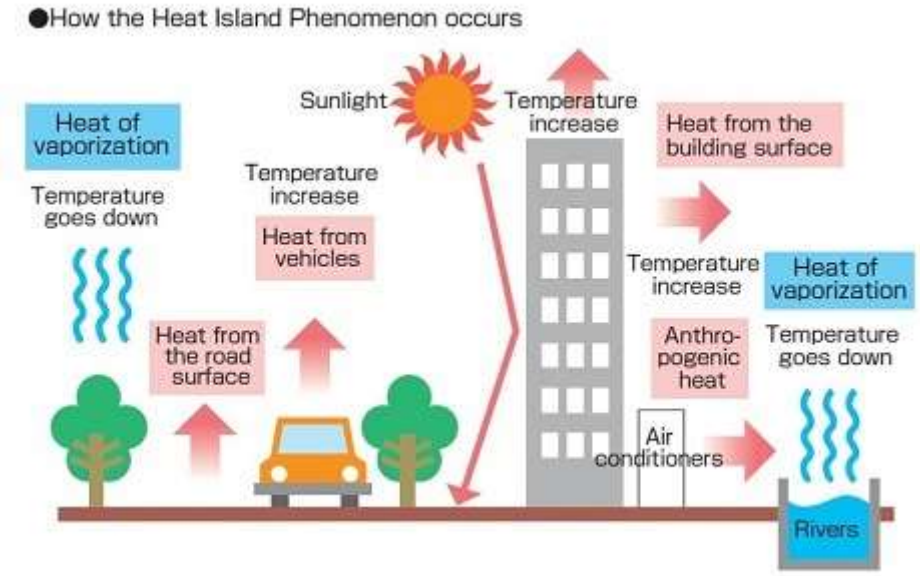
- **Cities** are experiencing **higher temperatures** due to **ongoing climate change** and **rapid urbanization,** which are defining the **Anthropocene**.

Details:

- **India's urban population** is projected to **double by 2050,** adding **more than 450 million residents,** surpassing the **current total population of the United States** and the **European Union**.
- The **urban heat island (UHI) effect** makes **cities warmer** than **rural areas** by **trapping more heat** due to **altered thermodynamic** and **aerodynamic properties.**
- **Climate change** is causing significant **increases** in **record-breaking temperatures** and **prolonged heat waves,** contributing to **complex warming in cities**.
- This **altered micro-climate** affects **heat, rainfall distribution, air pollution dispersion,** and **public health,** necessitating scientifically informed **urban planning.**

Urban Heat Island:

- **Urban heat island** may be defined as the **local and temporary phenomenon** in which **certain pockets within a city** are **experiencing higher heat load** than its surrounding area.
- This rise of heat basically happens due to **buildings and houses of cities** made up of **concrete** where the **heat is trapped** and **not able to dissipate easily.**
- **Urban heat island** is basically induced due to **trapped heat** between establishments made up of concrete.
- The temperature variation can range between **3 to 5 degrees Celsius**.



Study on warming effects:

- A recent study sought to **separate** the **warming effects** of **local urbanization** and **regional climate change** in **141 major Indian cities**.
- The study used **high-resolution night-time land surface temperature data** from **NASA's MODIS sensor,** comparing **urban** and **rural temperatures** from **2003** to **2020**.
- Results showed that the **rate of warming in cities** is **nearly twice** that of the **rest of the country**, with **urbanization** alone causing additional warming of about **60%**.
- An **average increase of 0.53°C per decade** in **night-time land surface temperature** was observed, with **tier-II cities** in **eastern India** experiencing **stronger urbanization-driven warming** than **larger metros.**

India's efforts to reduce warming effects:

- **India** is actively **reducing emissions** and **shifting to non-fossil fuel energy sources,** as outlined in its updated **nationally determined contribution (NDC)** for **climate justice.**

- **State-level heat action plans** and **early warning systems** for **heatwaves** show India's commitment to reducing heat-related mortality.

Recommendations:

- **Tailored city-specific action plans** are needed for **sustainable urban growth,** considering the predominant contributors to warming.
- **Urban heat management** should follow a **differential approach:** local-scale interventions (cool roofs, green infrastructure, urban forests) for cities with high urbanization contributions, and **regional-scale efforts** (large-scale afforestation, rejuvenation of water bodies) for cities with higher climate change impacts.

Highest minimum temperature: Why Delhi's warm nights are cause of worry

Sub: Geography

Sec : Climatology

Context:

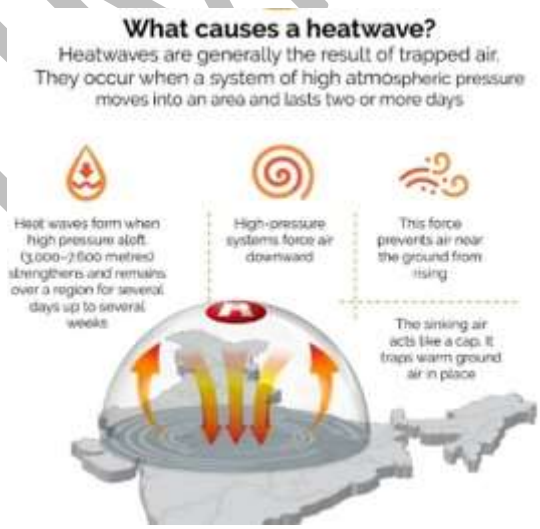
- **Delhi** recorded its **highest minimum temperature** since **1969** on Tuesday, reaching **35.2°C.**

Details:

- The city is experiencing **unusually high day** and **night temperatures,** with **seven heatwave days** in June and **six consecutive warm nights.**
- The **previous highest minimum temperature** was **34.9°C** on **May 23, 1972.** Records before **1969** are **not analyzed,** so it's unclear if this is the highest ever. Two Haryana stations recorded even warmer mornings.

What is a 'warm night'?

- A **warm night** is when the **minimum temperature** is **4.5** to **6.4°C** above normal; a severe warm night exceeds this by more than **6.4°C.** The **day temperature** must be **40°C** or higher for these conditions.
- **Northwest India** is experiencing a significant **rain deficit** and **consistently high temperatures. Increased night temperatures** are causing more **heat stroke** cases, as people find no respite from the heat.



Urban Heat Island effect in Delhi:

- **IMD data** shows June 2024 has had **12 days** with **minimum temperatures over 30°C,** a first since **2011.**
- The **urban heat island effect,** where densely built areas trap heat, is contributing to the **rising temperatures.**
- Studies indicate that cities now cool down more slowly than between **2001** and **2010**, leading to **warmer nights.**

What us Urban Heat Island effect?

- **Urban heat island** may be defined as the **local and temporary phenomenon** in which **certain pockets within a city** are **experiencing higher heat load** than its surrounding area.
- This rise of heat basically happens due to **buildings and houses of cities** made up of **concrete** where the **heat is trapped** and **not able to dissipate easily.**
- **Urban heat island** is basically induced due to **trapped heat** between establishments made up of concrete.
- The temperature variation can range between **3 to 5 degrees Celsius**.

Are heatwaves natural disasters?

Sub: Geography

Sec: Climatology

Heatwaves in North India:

- **North India** is experiencing its **longest heatwave in 15 years,** with at least 100 deaths from heat-related illnesses reported from March 1 to June 18, likely under-reported.
- Discussions are ongoing about **classifying heatwaves as a natural disaster.**

Are Heatwaves a Natural Disaster?

- The **National Disaster Management Act (NDMA)** defines the roles of the Centre and States in disaster response.
- **12 disasters** are currently **eligible** for **state-backed compensation**, including **cyclones, drought, earthquakes, fire, flood, tsunamis, hailstorm, landslides, avalanches, cloudbursts, pest attacks, frost and cold waves,** but **not heatwaves**.
- Special funds at the State and Centre levels are available for these disasters.

The 15th Finance Commission's Role:

- The **15th Finance Commission** oversees **revenue sharing** between the **Centre** and **States**.
- It has so far not expanded the **list of natural calamities eligible for SDRF and NDRF funding**.
- States can use **up to 10%** of their **annual SDRF allocation** for **disasters** not on the official list, including heatwaves.
- The **16th Finance Commission** may review new requests to include heatwaves.

Heatwave Deaths in India:

- Heatwave deaths declined from 1,127 in 2017 to 374 in 2021.
- 33 deaths were reported in 2022, none in 2023, and at least 100 in 2024.
    - The data was collected from the **Zonal Integrated Police Network** and the **Ministry of Home Affairs**.
- The **maximum number of deaths** are reported from **Uttar Pradesh (37), Bihar (17), Rajasthan (16),** and **Odisha (13)**, according to the **National Heat-Related Illness and Death Surveillance** by the **National Centre for Disease Control (NCDC).**
- Heatwaves are becoming more frequent and longer.
- Classification of heatwave deaths is challenging due to co-morbidities and varying definitions of a heatwave.
- Andhra Pradesh, Odisha, Telangana, Gujarat, and Rajasthan report the most heatwave casualties.

State Measures Against Heatwaves:

- States, districts, and cities are developing **Heat Action Plans (HAPs)** to address rising heatwave frequency.
- The **NDMA** and **India Meteorological Department** are collaborating with **23 States** on **HAPs.**
- **HAPs** include a region's heat profile, past heatwave events, temperature trends, vulnerability assessments, and response plans.

About NCDC:

- **NCDC** had its origin as Central Malaria Bureau, established at **Kasauli (Himachal Pradesh)** in **1909** and following **expansion** was renamed in **1927** as the **Malaria Survey of India.**
- The organization was **shifted** to **Delhi** in **1938** and called as the **Malaria Institute of India (MII).**
- In view of the **drastic reduction** achieved in the **incidence of malaria** under **National Malaria Eradication Programme (NMEP)**, Government of India decided to reorganize and expand the activities of the institute to cover other communicable diseases.
- The institute was established to function as a **national centre of excellence for control of communicable diseases.**
- The **function of the institute** also included various areas of training and research using multi-disciplinary integrated approach.
- The Institute has its **headquarters** in **Delhi** and has **8 out-station branches** located at Alwar (Rajasthan), Bengaluru (Karnataka), Kozikode (Kerela), Coonoor (Tamil Nadu), Jagdalpur (Chattisgarh), Patna (Bihar), Rajahmundry (Andhra Pradesh) and Varanasi (Uttar Pradesh).

Number of warm nights in Indian cities leapfrogged 32% during last decade due to climate change: Global report

Sub: Geography

Sec: Climatology

Increase in Warm Nights in India Due to Climate Change:

- Over the last decade, **India** has experienced a **critical increase in warm nights** with **minimum temperatures** due to rising climatic impacts.
- **Jalpaiguri** in **northern West Bengal**, along with cities in **Assam**, is the most impacted.
- A study covering around **300 Indian cities** found a **32% increase** in **hot nights,** averaging 718 nights from 2014-2023 where temperatures reached **25°C or above.**
- Without climate impact, this number would be **significantly lower**, around **543-175 nights.**

What is a 'warm night'?

- A **warm night** is when the **minimum temperature** is **4.5** to **6.4°C** above normal; a severe warm night exceeds this by more than **6.4°C.** The **day temperature** must be **40°C** or higher for these conditions.
- **Northwest India** is experiencing a significant **rain deficit** and **consistently high temperatures. Increased night temperatures** are causing more **heat stroke** cases, as people find no respite from the heat.

Climate Change Impact:

- **Climate change** has significantly **influenced night-time temperatures above 25°C** in **India,** especially in **West Bengal and Assam**.
- Cities like **Jalpaiguri, Guwahati, Silchar, Dibrugarh,** and **Siliguri** experienced **80-86 additional hot nights annually** due to **climate change.**
- The **urban heat island effect** contributes to **higher night-time temperatures** due to the retention of heat by high-rise buildings and concrete.

What us Urban Heat Island effect?

- **Urban heat island** may be defined as the **local and temporary phenomenon** in which **certain pockets within a city** are **experiencing higher heat load** than its surrounding area.
- This rise of heat basically happens due to **buildings and houses of cities** made up of **concrete** where the **heat is trapped** and **not able to dissipate easily.**
- **Urban heat island** is basically induced due to **trapped heat** between establishments made up of concrete.

- The temperature variation can range between **3 to 5 degrees Celsius**.

Regional and National Trends

- The impact of climate change has added **50-80 hot nights annually** in cities across several states including **Kerala, Karnataka, Maharashtra, Tamil Nadu, Punjab, Jammu and Kashmir, Andhra Pradesh, West Bengal,** and **Assam.**
- **Jalpaiguri** had the **highest number of unusually hot nights (868)** during **2014-2023**, followed by **Guwahati, Silchar, Dibrugarh,** and **Siliguri.**
- Major cities like **Chennai, Kolkata, Mumbai,** and others **experienced significant increases in hot nights.**

Challenges and Observations

- The **increasing trend of hot nights** poses challenges for **sleep and health,** particularly for **vulnerable populations without adequate cooling mechanisms.**
- Scientists highlight that the trend is **exacerbated by air pollution and urbanization**, which **trap heat** and **prevent cooling at night.**
- Recent records for night-time heat were broken in cities like **Delhi** and **Alwar,** with **temperatures reaching unprecedented highs.**
- Experts emphasize the severe consequences for human health and the need for immediate action to mitigate these impacts.

Uttarakhand to study risk posed by 13 glacial lakes during monsoon

Sub: Geography

Sec: Climatology

Vulnerability Study of Glacial Lakes in Uttarakhand:

- The **Uttarakhand State Disaster Management Department (USDMA)** is initiating a **vulnerability study** of **13 glacial lakes**, with **five identified** as being in **high-risk zones.**
- **Purpose:** The study aims to provide essential data to prevent calamities such as lake outbursts, particularly during the monsoon season.

Identification and Characteristics of High-Risk Glacial Lakes:

- **Location:** The **high-risk lakes** are located in **Darma, Lasaryanghati,** and **Kutiyangti valleys** in the **Pithoragarh district**, and **Vasudhara Tal Lake** in **Chamoli district.**
- These lakes range from 0.02 to 0.50 sq. km and are situated above 4,000 meters above sea level.

Bathymetry Study and Risk Assessment

- **Approach: USDMA** teams will conduct a **bathymetry study** to gather accurate information on **lake size, glacier formation,** and **melting patterns.**
- **Collaboration:** The **Indo-Tibetan Border Police** has been involved in providing a status report on the high-risk lakes.

Risk Mitigation Strategies:

- **USDMA** plans to **puncture the high-risk lakes** and **install pipes** to **manage potential risks.**

Historical Context and Recent Incidents

- **Uttarakhand** has experienced **two significant glacial lake outburst floods (GLOFs)** in recent years.
- The **2013 Kedarnath Valley GLOF** resulted in 6,000 deaths, while the 2021 **Rishighanga Valley GLOF** claimed 72 lives, highlighting the urgency of preventive measures.

Glacial lake outburst floods (GLOFs):

- A **glacial lake outburst flood (GLOF)** is a release of meltwater from a moraine– or ice-dam glacial lake due to dam failure.
- **GLOFs** often result in catastrophic flooding downstream, with major geomorphic and socioeconomic impacts.

- **GLOFs have three main features:**
    - They involve **sudden** (and sometimes cyclic) releases of water.
    - They tend to be **rapid events**, lasting hours to days.
    - They result in large downstream river discharges (which often increase by an order of magnitude).
- **The following direct causes of glacial lake outburst floods were documented:**
    - Rapid slope movement into the lake
    - Heavy rainfall/snowmelt
    - Cascading processes (flood from a lake situated upstream)
    - Earthquake
    - Melting of ice incorporated in dam/forming the dam (including volcanic activity-triggered jökulhlaups)
    - Blocking of subsurface outflow tunnels (applies only to lakes without surface outflow or lakes with a combination of surface and subsurface outflow)
    - Long-term dam degradation

Delhi-NCR's June deluge a result of rapid, strong monsoon onset in the presence of active Western Disturbance: Experts

Sub: Geography

Sec: Climatology

Extreme Rainfall and Flooding in Delhi and NCR:

- The **extreme rainfall and flooding in Delhi** and the **National Capital Region (NCR)** on the night of June 27-28 was due to the **rapid and strong onset of the southwest monsoon**, combined with an active **western disturbance (WD)**.
- **Interactions** between the **southwest monsoon** and **WDs** have become more **frequent** due to changes in the characteristics of WDs.
- The Safdarjung observatory recorded **228 millimetres of rainfall** by 8:30 am on June 28, marking the **second-highest June rainfall on record,** following the **235.5 mm recorded on June 28, 1936**.

Cause of extreme rainfall:

- The **primary cause** of the **extreme rainfall** was the **rapid and intense onset of the southwest monsoon** over the region on June 28, following a long hiatus from early to mid-June.
- The **presence of a WD** and an **associated cyclonic circulation** over the region contributed to the **heavy rainfall**.
- **WDs,** which are **more common in winter,** have been **occurring more frequently in the summer months** in recent years, due to a **strengthening subtropical jet stream** and its **delayed northward retreat,** leading to **interactions with the monsoon trough** and causing **catastrophic floods**.
    - The **Inter-Tropical Convergence Zone (ITCZ)** changes to **20°-25° N latitude** in **July** and is **positioned** in the **Indo-Gangetic Plain,** while the **southwest monsoons** blow from the **Arabian Sea** and the **Bay of Bengal.** The **ITCZ** at this position is commonly referred to as the **Monsoon Trough**.
- **Excess moisture from the warm Arabian Sea** also contributed to the **torrential rains**. This system allowed the **jet stream** to pump **large amounts of moisture** into **northwest and central India.**

What are Western Disturbances?

- **Western disturbances** are storms that **originate** in the **Caspian or Mediterranean Sea** and **bring non-monsoonal rainfall** to **northwest India**.
- They are labelled as an **extra-tropical storm** originating in the **Mediterranean**, an **area of low pressure** that brings **sudden showers, snow and fog** in **northwest India.**
- The disturbance travels from the **"western"** to the **eastern direction.**
- These travel **eastwards** on **high-altitude westerly jet streams** - massive ribbons of fast winds traversing the earth from west to east.
- Disturbance means an area of **"disturbed"** or **reduced air pressure.**
- Equilibrium exists in nature due to which the air in a region tries to normalise its pressure.

Sub-tropical jet stream:

- A **subtropical jet stream** is a **belt of strong upper-level winds** lying above regions of **subtropical high pressure.**
- Unlike the **polar front jet stream,** it **travels in lower latitudes** and at **slightly higher elevations,** owing to the **increase in height of the tropopause at lower latitudes.**
- The associated **horizontal temperature gradients** of this jet stream do not extend to the surface, so a surface front is not evident.

What grade of coal does India produce?

Sub: Geography

Sec: Eco geo

Context:

- A recent report by the **Organized Crime and Corruption Reporting Project alleged that in 2014, the Adani Group claimed 'low grade' coal**, imported from Indonesia, to be 'high-quality' coal' inflated its value and sold it to Tamil Nadu's power generation company.

More on news:

- There are **17 grades of coal by this metric from grade 1, or top quality coal, with a kilo of it yielding higher than 7,000 kcal**, and the lowest producing anywhere between 2,200-2,500 kcal, as per a classification by the Coal Ministry.
- The Central Electricity Authority (CEA) in 2012 recommended that about 10-15% blending of imported coal can be safely used in Indian power boilers, which are designed for low quality Indian coal.

What are high grade' and 'low grade' coal?

- **Higher quality coal produces less smoke, burns longer, and provides more energy than lower quality coal.**
- **Low-rank coals are those that have undergone minimal metamorphic variation in the process of coal formation.**
- Compared with the high-rank coals—bituminous and anthracite, they retain more moisture and volatile and contain less fixed carbon.

Parameters to determine the quality of Coal:

- **High and low quality are relative term**s and only meaningful in the context of where the coal is used and how they are processed.
- **The Gross Calorific Value (GCV)**, or the amount of heat or energy that can be generated from burning the coal, determines the gradation of coal.
- **Coal being a fossil fuel is a mixture of carbon, ash, moisture and a host of other impurities.**
- The **higher the available carbon in a unit of coal, the greater is its quality or 'grade.'**
- The calorific value is not a useful metric on its own.
- The most important uses of coal are in running thermal power plants or powering a blast furnace to produce steel and both require different kinds of coal.
- **'Coking' coal is the kind needed to produce coke — an essential component of steel making — and thus requires minimal ash content.**
- Non-coking coal, despite its ash content, can be used to generate enough useful heat to run a boiler and turbine.

What are the characteristics of Indian coal?

- Indian coal has historically been evaluated as being high in ash content and low in calorific value compared to imported coal.
- The **average GCV of domestic thermal coal ranges from 3,500-4,000 kcal/kg compared to imported thermal coals of +6,000 kcal/kg of GCV.**
- The average ash content of **Indian coals is more than 40% compared to imported coal which has less than 10% ash content.**
- The consequence of this is that high-ash coal when burnt results in higher particulate matter, nitrogen and sulfur dioxide.
- The government, since 1954, has controlled the price of coal in a way that power companies were disincentivised to use high-grade coking coal for power generation.

What is clean coal?

- **Clean coal technologies** are several generations of technological advances that have led to more efficient combustion of coal with **reduced emissions of sulfur dioxide and nitrogen oxide.**

- **"Clean coal" usually means capturing carbon emissions from burning coal and storing them in underground pockets of porous rock**
- We get clean coal when the carbon content has been increased by reducing its ash content.
- **Coal plants have 'washing plants'** on site which can process the coal in ways that reduce ash and moisture content.
- They employ huge blowers or a **'bath' to remove fine, coarse ash.**
- The other method to **clean coal is coal gasification.**
- The need to **directly burn coal is bypassed by converting it into gas.**
- By relying on an **integrated gasification combined cycle (IGCC) system**, steam and hot pressurized air or oxygen combine with coal in a reaction that forces carbon molecules apart.
- The resulting syngas, a mixture of carbon monoxide, hydrogen, CO2 and water vapor, is then cleaned and burned in a gas turbine to make electricity.
- Since **IGCC power plants create** two forms of energy (steam from the gasification process apart from syngas as fuel), they increase efficiency of the coal used.

What is the future of coal in India?

- **India is the second-largest coal producer in the world, after China.**
- **India, the world's second largest coal consumer of coal.**
- Official data says that India in 2023-24 produced 997 million tonnes of coal, an 11% growth over the previous year.
- Most of this was produced by the **state-owned Coal India Ltd and its subsidiaries.**
- As of March 2024, India produced 261 tonnes of coal, of which 58 million tonnes was coking coal. Renewable energy accounted for 71.5% of the record 13.6 GW power generation capacity added by India in the first quarter of this year, while coal's share (including lignite) of total power capacity dropped below 50% for the first time since the 1960s.

The big chocolate meltdown | Why 2024 cocoa prices are driving people nuts

Sub: Geography

Sec: Eco geo

Impact of Soaring Cocoa Prices on Indian Pâtisseries and Bakers

1. **Rising Cocoa Prices**:
    - **Global cocoa prices** have **increased** by **110%** to **200%**.
    - **Cacao bean prices** reached a record **$12,000 per tonne** in April.
    - A combination of **El Niño, black pod disease, ageing cacao trees,** and **inequitable market practices** in **Ghana** and **Ivory Coast** has contributed to the price hike.
    - Predictions indicate **cocoa** futures could climb to **$20,000 per tonne**.
2. **Operational Challenges**:
    - Importers face **increased cargo prices** due to the **West Asia crisis** and a **weakened rupee (down 10%-12%).**
    - Prices of imported chocolate brands like **Valrhona, Callebaut,** and **Van Houten** have surged by **50%**, with potential increases **up to 100%** by October.
    - Supply chain adjustments take 5-6 months to reflect price changes in India.

About Cocoa Bean:

- Also known as **cacao,** it is the **dried, fermented seed** of **Theobroma cacao, the cacao tree.**
- **Native** to the **Amazon rainforest**, first domesticated **5,300 years ago** by the **Mayo-Chinchipe culture** in **South America**, later introduced to **Mesoamerica**.

- **Tree Lifecycle**
  - **Growth**: Takes five years to mature.
  - **Lifespan**: Typically around 100 years.
- **Varieties of Cocoa Plant**
  - **Forastero**: Most widely used.
  - **Criollo**: Known for its superior flavour.
  - **Trinitario**: A hybrid of Forastero and Criollo.
- **Nutritional Components**
  - **Phytochemicals**: Contains **flavanols, procyanidins, and flavonoids;** may have a blood pressure-lowering effect.
  - **Other Compounds**: Contains **theobromine** and small amounts of **caffeine**.

Historical and Cultural Significance:

- **Mesoamerica**: Used in spiritual ceremonies and as currency.
- **Geographical Zone**: Grows in limited areas; **West Africa** produces nearly **81%** of the world's cocoa.

Processing and Products:

- **Chocolate Production**:
  - **1 kg of chocolate** requires **300-600 cocoa beans**.
  - Beans are roasted, cracked, deshelled into nibs, and then ground into chocolate liquor.
  - Chocolate liquor is mixed with cocoa butter, sugar, and sometimes vanilla and lecithin to make chocolate.
  - Cocoa powder and butter are separated using a hydraulic press or Broma process.
  - Dutch process cocoa is treated with alkali for a different flavour.
  - Roasting affects flavour and can be done on whole beans or nibs.

Production and Trade

- **Global Production (2020)**: 5.8 million tonnes.
- **Leading Producers**: **Ivory Coast (**Or **Côte d'Ivoire) (38%)**, followed by **Ghana** and **Indonesia.**
- **Futures Markets**: London (West African cocoa) and New York (Southeast Asian cocoa).
- **Sustainability Initiatives**: **Swiss Platform for Sustainable Cocoa (SWISSCO), the German Initiative on Sustainable Cocoa (GISCO),** and **Belgium's Beyond Chocolate.**
- **29%** of global production met voluntary sustainability standards in 2016.
- **Deforestation**: A major concern, especially in **West Africa.** Agroforestry practices support sustainable production.
- **Economic Impact**
  - **Significance**: Critical to economies such as **Nigeria's**.
  - **Demand**: Growing at over **3%** annually since 2008.

Cocoa in India:

- **Production:** In India Cocoa is being cultivated in the States of Kerala, Karnataka, Andhra Pradesh and Tamil Nadu.
- **Andhra Pradesh** ranks **first** in **area, production** and **productivity**.
- The **average productivity of cocoa** in **India** is **669 Kg/ha**.
- **Export:** Cocoa is an export-oriented commodity.
    - India earns foreign exchange worth Rs. 1108cores through exports of cocoa beans and its products.
    - India is the **59th largest exporter** of Cocoa Beans in the world. **India** exports it to Malaysia, Indonesia and the U.K. among others.
- **Import:** India is the **17th largest importer** of Cocoa Beans in the world.
    - The current domestic production of cocoa beans is **not sufficient** to meet the demand of the industry. Hence **India** is importing a lion's share of its requirement from other cocoa-growing countries worth Rs.2021crores.
    - **India imports** it mainly from the **Democratic Republic of the Congo**, the **Dominican Republic,** and **Uganda**.

Record Decline in the Share of Imported Coal in the Last Decade

Sub: Geography

Sec: Eco geo

Coal Import Trends:

- The **CAGR** of **coal imports** was significantly high at **21.48%** from fiscal year **2004-05** to **2013-14.**

- However, it **dropped** to **2.49%** from fiscal year **2014-15** to **2023-24.**
- Similarly, the **CAGR** of the share of **imported coal** stood at **13.94%** during the period from fiscal year **2004-05** to **2013-14** but declined to around **-2.29%** in the subsequent period.

India's Coal Reserves and Consumption:

- **India**, with the **fifth-largest coal reserves in the world,** is the **second-largest consumer of coal** due to its rapidly growing economy.
- While the country lacks sufficient **coking coal** and **high-grade thermal coal,** necessitating imports for industries like **steel**, it has an abundance of **medium** and **low-grade thermal coal** for domestic use.

Coal Production Trends:

- Efforts to **increase coal production** have shown positive results over the past decade.
- From fiscal year **2004-05** to **2013-14**, the **compound annual growth rate (CAGR)** of **coal production** was **4.44%.**
- This increased to around **5.63%** from fiscal year **2014-15** to **2023-24**.

Gradation of coal:

- **Coal grade** is an **economic** or **technological classification** of the **relative quality** of coal for a particular use.
- The classification of **coal** is determined based on the **gross calorific value (GCV)** or the **amount of heat or energy** produced when **burning coal**.
- **Coal** being a **fossil fuel** is a **mixture of carbon, ash, moisture** and a host of other impurities. The higher the available **carbon in a unit of coal, the greater is its quality or 'grade.**
- As per a **classification by the Coal Ministry,** There are **17 grades of coal,** where **grade 1 (top quality coal)** with a kilo of it **yielding higher** than **7,000 kcal** and the lowest producing anywhere between **2,200-2,500 kcal**.

Classification of Coal:

- **Coal** is originated from **organic matter wood.** When large tracts of forests are buried under sediments, **wood** is **burnt** and decomposed due to heat from below and pressure from above. The phenomenon makes coal but takes centuries to complete.
- **Classification of Coal** can be done on the basis of **carbon content** and **time period**.
- **On the basis of carbon content, it can be classified into the following three types:**
    - **Anthracite:** It is the **best quality of coal** with the **highest calorific value** and carries **80** to **95% carbon content.** It ignites slowly with a blue flame and is found in small quantities in **Jammu and Kashmir.**
    - **Bituminous:** It has a low level of moisture content with **60** to **80%** of **carbon content** and has a **high calorific value**. **Jharkhand, West Bengal, Odisha, Chhattisgarh** and **Madhya Pradesh** have deposits of **Bituminous.**
    - **Lignite carries 40** to **55% carbon content** and is often brown in colour with **high moisture content** thus, gives smoke when burnt. **Rajasthan, Lakhimpur (Assam)** and **Tamil Nadu** have deposits of **Lignite.**
    - Peat is the first stage of transformation from wood to coal with low calorific value and less than 40% carbon content.

What is holding up the Teesta treaty?

Sub: Geography

Sec: India Physical Geography

Context:

- During the recent state visit of **Sheikh Hasina**, **Prime Minister Modi** announced a technical team would visit **Bangladesh** to discuss the **conservation and management of the Teesta River**.
- This comment reignited speculation about the long-pending **Teesta water-sharing treaty** between **India and Bangladesh.**

International and Constitutional Context:

- **Sharing waters of transboundary rivers** is **mandated** by **international laws** like **The Helsinki Rules.**
- **Article 253** of the **Indian Constitution** allows the government to enter treaties related to transboundary river waters.

West Bengal's Concerns:

- **Sharing Teesta's water with Bangladesh** would severely impact lakhs of people in North Bengal.
- WB has consistently opposed the proposed **water-sharing agreement** and suggested **alternative rivers for sharing instead of Teesta.**

Bilateral Water-Sharing Issues:

- **India** and **Bangladesh** share **54 rivers**, making water sharing a critical bilateral issue.
- The **Ganga water-sharing treaty** was successfully signed in **1996.**
- The **Teesta water-sharing agreement** has been **pending since 2011** due to **West Bengal's opposition.**
- Hydropower projects and the Teesta Barrage Project have made the river's flow erratic, affecting Bangladesh.
- **Environmental Challenges:**
    - Environmental activists have raised concerns about the **ecological impact of hydroelectric projects**.
    - A **glacial lake outburst** in **October 2023** caused **significant damage** and highlighted risks.

Proposed Teesta Water Sharing:

- In **2011**, a proposal suggested **India** would receive **42.5%** and **Bangladesh 37.5%** of **Teesta's water** from December to March.
- **Teesta River:**
    - **Originates** from the **Tso Lhamo Lake** in **north Sikkim,** travels through **West Bengal**, and enters **Bangladesh,** covering significant areas and supporting agriculture and population.
    - A tributary of the Brahmaputra.
    - It flows another 140 km in Bangladesh and joins the Bay of Bengal.
    - **Teesta** is **Bangladesh's fourth-largest transboundary river.**
    - 83% of the river's catchment area lies in India and the remaining 17% is in Bangladesh.
    - **Tributaries:**
        - **Left-** Rangpo River, Lachung River, Ranikhola, Relli River, Talung River, Dik Chhu, Lang Lang Chu
        - **Right-** Rangeet River, Kanaka River, Ringyong Chhu, Ranghap Chhu

Bengal and the Ganga Treaty:

- Signed in **1996**.
- Under the treaty, **upper riparian India** and **lower riparian Bangladesh** agreed to **share the water of this transboundary river at Farakka** (which is the last control structure on river Ganga in India), a dam on the **Bhagirathi river** around 10 km from the **Bangladesh border.**
- **Validity:** The treaty will expire in **2026** when it completes its **30-year term.**

- **Sharing Period:** During the lean period, from **1st January to 31st May every year**, on a **10-day period basis** as per the formula provided in the Treaty.
- **Ganga Water Sharing Formula:**
    - If availability at **Farakka** is **less than 70,000 cusecs:** 50:50 split (35,000 cusecs each).
    - If availability is between **70,000** and **75,000 cusecs:** Bangladesh receives 35,000 cusecs, and India gets the rest.
    - If availability is **75,000 cusecs or more:** India receives 75,000 cusecs, and Bangladesh gets the rest.
    - **Critical Month (April):** Bangladesh is **guaranteed a flow of 35,000 cusecs** in the first and last ten days of April.
    - **Emergency Adjustments:** If flow falls below **50,000 cusecs** in any ten-day period, the two governments will consult for emergency adjustments.
    - **Monitoring:** A **Joint Committee** monitors daily flows at the feeder canal in Farakka and the navigation lock at Hardinge Bridge (the point within Bangladesh where flows are monitored), submitting annual reports to both governments.
- **Concerns:**
    - Mamata Banerjee pointed out adverse impacts on **West Bengal** due to changes in the **Ganga's morphology** and **river erosion**.
    - She emphasized the **displacement and loss of livelihood** caused by these changes and the need to address reduced silt load affecting the Sundarbans delta.

Storm in the rice bowl

Sub: Geography

Sec: Indian Physical Geo

Challenges Facing Cauvery Delta Farmers

- **Cauvery Delta** is famously known as the **Granary of South India**.

Economic and Environmental Issues:

- **Economic Strain**: Farmers face a widening gap between **cultivation costs and returns**, **continuous land fragmentation,** and **reluctance** from the next generation to pursue farming.
- **Water Scarcity**: Dependence on **monsoons, depleted groundwater (below 1,000 feet),** and **insufficient canal water exacerbate problems.**
- **Labour Market Changes**: The **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) (**also called **100 naal thittam)** affects the **availability** and **cost of farm labour. "Outsider workers"** are increasingly involved in farming.
    - The **farmland is shrinking** and the **next generation** is **reluctant** to take up agriculture.

Regional Variations:

- **Karaikal (Puducherry)**: Traditional water distribution systems have improved but still face issues. Farmers are also impacted by **MGNREGS** and **fluctuating crop prices**, such as **cotton**.
- **North Indian Workers**: In areas like **Thiruvarur**, **labour shortages** are mitigated by hiring workers from northern India.
- **Brahmanavayal village**: Located at the **tail end of the irrigation system,** farmers struggle with **water access** and high borewell costs. The **Grand Anicut Canal System** hasn't undergone necessary **silt removal,** despite multiple petitions.

Agricultural Protection and Legislation

- **Tamil Nadu Protected Agricultural Zone Development Act, 2020**: Some regions like **Ariyalur** are excluded, while others feel the Act has not significantly impacted. There are ongoing concerns about **farmland conversion for non-agricultural uses**.

Call for Sustainable Practices:

- **Natural and Organic Farming**: Some farmers adopt **traditional practices** and urge the government to **procure organic rice for Anganwadi**.
- **Water Management**: Emphasis on judicious use of water and implementing **groundwater-recharge programs** is crucial.

Tonga volcano could cause unusual weather for rest of decade: study

Sub: Geography

Sec: Geomorphology

Hunga Tonga-Hunga Ha'apai Eruption:

- Erupted on January 15, 2022, in **Tonga**.
    - **Hunga Tonga–Hunga Ha'apai** is a **submarine volcano** in the **South Pacific** located about 30 km (19 mi) **south** of the **submarine volcano** of **Fonuafo'ou** and 65 km (40 mi) north of **Tongatapu, Tonga's main island.**
    - It is part of the **highly active Kermadec-Tonga subduction zone** and its associated volcanic arc, which extends from **New Zealand** north-northeast to Fiji and is **formed** by the **subduction** of the **Pacific Plate** under the **Indo-Australian Plate**.
    - It lies about 100 km (62 mi) above a very active seismic zone.
- **Consequences:** Triggered a Pacific-wide tsunami and sent sound waves globally multiple times.
- **Study:** New research in the Journal of Climate examines the eruption's climate impacts.

A peculiar feature of Hunga Tonga- Hunga Ha'apai Eruption:

- **Typical Volcanic Smoke** contains **sulphur dioxide,** leading to **short-term cooling** by forming **sulphate aerosols** that **reflect sunlight.**
- But, **Hunga Tonga's** eruption produced **minimal smoke** but released **100-150 million tonnes of water vapour** into the **stratosphere.**
    - This amount of water vapour, unprecedented in volcanic eruptions, **contributes to ozone layer depletion** and **acts as a potent greenhouse gas**.

Key Findings:

1. **Ozone Hole:** The eruption contributed to the **unusually large ozone hole** observed from August to December 2023.
2. **Wetter Summer 2024:** The eruption led to an **unexpectedly wet summer in 2024,** despite predictions of a dry season due to **El Niño.**
3. **Future Weather Effects:** Potential **long-term impacts** on **winter weather patterns** for several years.

Research Approach:

- **Stratospheric Impact:**
    - Researchers used **satellite data** to **monitor water vapour** in the **stratosphere**.
    - **Climate models** simulated future scenarios with and without the water vapour from the eruption.
- **Findings:**
    - **Predicted ozone hole** and **weather impacts**, such as **wetter summers** in **Australia** and **varying winter patterns globally.**
    - Small impact on **global mean temperatures (0.015°C),** indicating high recent temperatures are not due to the eruption.

Long-term Regional Impacts:

- **Australia:** Colder and wetter winters in the northern region up to 2029.

- **North America:** Warmer winters.
- **Scandinavia:** Colder winters.

Delhi water crisis: Supreme Court orders Himachal Pradesh to release 137 cusecs of water to quench Delhi's thirst

Sub: Geography

Sec: Geomorphology

Context:

- The Supreme Court ordered the release of **137 cusecs** of **surplus water** from upstream **Himachal Pradesh** through the **Hathnikund barrage** in **Haryana** into the **Wazirabad barrage** to quench Delhi's drinking water crisis.

Delhi's Water Sources:

- Delhi sources most of its water from the **Yamuna, Ravi-Beas,** and **Ganga rivers.**
    - From the **Ganga** via the **Upper Ganga Canal** in **UP,** Delhi receives **470 cusecs** of water.
    - Two channels from **Haryana,** the **Carrier Lined Channel (CLC)** and the **Delhi Sub Branch (DSB),** supply water from the **Yamuna** and **Ravi-Beas rivers,** providing a total of roughly **565 MGD.**
- The **Delhi Jal Board (DJB)** also **draws water directly from the Yamuna** and supplements its supply with around **135 MGD from groundwater.**

Causes of the Water Shortage:

- The **water treatment plant (WTP)** in **Wazirabad** operated **below capacity** from May 12 to 14 and again from May 18 to June 1.
- This coincided with **record-high temperatures** and a **surge in water demand.**
- The **Wazirabad WTP,** with a capacity of 131 MGD, is the **third largest of DJB's nine WTPs** and primarily depends on water from the **CLC** and **DSB.**
- Issues arose from the plant's dependency on the **Yamuna** at the **Wazirabad reservoir.**

Water Allocation to Delhi:

- A **1994 water-sharing agreement** on the **'surface flow'** of the **Yamuna** among **Haryana, Uttar Pradesh, Rajasthan, Himachal Pradesh** and **Delhi** specifies that **Delhi** is to receive **0.076 billion cubic metres** of water from March to June, with an annual allocation of **0.724 BCM (roughly 435 MGD).**
- This allocation is regulated by the **Upper Yamuna River Board,** and the agreement is due for revision in **2025.**
- In **1996,** the Supreme Court directed that **Delhi** should continue to receive adequate water from Haryana to fill the Wazirabad and Hyderpur reservoirs to capacity.

Upper Yamuna River Board:

- A subordinate office under the Department of Water Resources, RD & GR, Ministry of Jal Shakti, Government of India.

- A memorandum of Understanding (MoU) was signed by the **Chief Ministers** of **Himachal Pradesh, Haryana, Utter Pradesh, Rajasthan** and the **National Capital Territory of Delhi** on 12th May **1994** regarding the allocation of utilizable surface flow of **River Yamuna** up to **Okhla Barrage** among the **co-basin States.**
- The MoU provides for the **creation** of a **board** called the **Upper Yamuna River Board (UYRB)**.

Dams and Barrages on Yamuna river:

- Asan Barrage- On Uttarakhand- Himachal Pradesh Border
- Dakpathar Barrage- Uttarakhand
- Ichari Dam- Uttarakhand
- Lakhwar Dam- Uttarakhand
- Gandhi Sagar Dam- (Chambal River) Madhya Pradesh
- Gokul barrage- Mathura district, Uttar Pradesh
- Hathni Kund Barrage- Haryana
- ITO barrage- Delhi
- Masani barrage- (Sahibi river) Haryana
- Okhla barrage and New Okhla Barrage- Delhi
- Pathrala barrage- Haryana
- Rana Pratap Sagar Dam- (Chambal river) Rajasthan
- Tajewala Barrage- (Now decommissioned) Haryana
- Wazirabad barrage- Delhi

Read the rocks to improve India's geological literacy

Sub: Geography

Sec: Geomorphology

India's Geological Diversity and Heritage:

- **India** showcases a **diverse morphology** with landscapes ranging from the **world's greatest peaks to low-lying coastal plains**.
- The country features a variety of **rocks, minerals,** and **distinctive fossil** assemblages that tell the **geological history of India.**
- These geological features are part of **India's non-cultural heritage** and serve as educational spaces for geological literacy.

Scant Traction in Geological Conservation:

- **Geological conservation in India aims** to preserve the best examples of geological features for future generations.
- Despite **international progress, geo-conservation** has not gained much traction in **India**.
- Many **fossil-bearing sites** have been destroyed due to development, **real estate growth,** and **destructive stone mining activities**.
- The **magnitude of stone-mining operations** covers more than **10%** of I**ndia's total area.**
- Important geological sites, like the **Dhala meteoritic impact crater (Shivpuri, Madhya Pradesh)** and the **Lonar crater (Buldhana district of Maharashtra),** are not widely known or protected.

Importance of Shared Geological Heritage:

- The importance of **shared geological heritage** was **first recognized in 1991** at a **UNESCO-sponsored event 'First International Symposium on the Conservation of our Geological Heritage'** in **Digne, France**.
- The event endorsed the concept of a shared legacy and foresaw the establishment of **geo-parks** to commemorate **unique geological features and educate the public.**

Development of Geo-heritage Sites Worldwide:

- Countries like **Canada, China, Spain, the United States,** and **the United Kingdom** have developed **geo-heritage sites** as **national parks**.
- **UNESCO** has prepared guidelines for the development of **geo-parks.**
- Many countries have legislation to protect and designate **geo-parks,** with **Europe** celebrating its **geological heritage** across **73 zones.**
- **Japan, Thailand,** and **Vietnam** have implemented laws to conserve their **geological** and **natural heritage**.
- Although **India** is a **signatory**, it lacks legislation or policy for **geo-heritage conservation**.

Need for Sustainable Conservation Approaches:

- **India** has formulated approaches to protect **biodiversity**, such as the **Biological Diversity Act of 2002,** resulting in **18 notified biosphere reserves.**
- The **Geological Survey of India (GSI)** has **notified 34 geological monuments** but lacks regulatory powers for preservation.
- An example is the **cliff** in **Varkala, in Thiruvananthapuram district, Kerala**, declared a **geological heritage site** but partially demolished due to landslide hazards.

Half-hearted Measures and the Way Forward:

- The **Government of India** attempted to address these concerns by proposing a **National Commission for Heritage Sites in 2009**, but the Bill was withdrawn.
- In **2022**, the **Ministry of Mines** prepared a draft Bill for **preservation** and **maintenance**, but no progress has been made.
- **India** needs to create an inventory of prospective **geo-sites, frame geo-conservation legislation,** and establish a **National Geo-Conservation Authority**.
- The new authority should avoid red tape and respect the autonomy of researchers and private collectors.

Geo-Heritage Site/National Geological Monuments:

- **Geoheritage** refers to **sites or areas with significant scientific, educational, cultural, or aesthetic value** due to their **geological features.**
- These sites may have **unique rock formations, fossils, or landscapes** that are important for education, research, cultural significance, or visual appeal. They can also contribute to local and regional economies as tourist destinations.
- **GSI** or the **respective State governments** take necessary measures to protect these sites.
- The **Geological Survey of India (GSI)** declares **geo-heritage sites/national geological monuments for protection and maintenance.**
- **GSI** is a **scientific agency** that was founded in **1851** to find **coal deposits** for the Railways. The **GSI** is headquartered in **Kolkata** and is an attached office to the **Ministry of Mines**. Its **main functions** include **creating and updating national geoscientific information and assessing mineral resources.**

List of 34 Geo-Heritage sites in India:

No.	Geo-Heritage Site	Location	Description
1	**Western Ghats**	Multiple states	UNESCO World Heritage Site is known for its biodiversity and unique geological features.
2	**Hampi**	Karnataka	Ancient ruins and geological formations amidst the Deccan Plateau.
3	**Ellora and Ajanta Caves**	Maharashtra	Rock-cut architecture and geological formations dating back to ancient times.

4	**Valley of Flowers**	Uttarakhand	Diverse flora, stunning landscapes, and unique geological features.
5	**Lonar Lake**	Maharashtra	Saline soda lake formed by a meteorite impact, surrounded by ancient temples and rock formations.
6	**Nanda Devi and Valley of Flowers**	Uttarakhand	UNESCO World Heritage Sites known for biodiversity and geological significance.
7	**St. Mary's Island**	Karnataka	Unique basalt rock formations and hexagonal columns.
8	**Great Rann of Kutch**	Gujarat	Vast salt marsh with unique geological formations and desert landscapes.
9	**Bhimbetka Rock Shelters**	Madhya Pradesh	Prehistoric rock paintings and geological formations dating back thousands of years.
10	**Western Coastal Plain**	Maharashtra	Coastal landforms, including beaches, cliffs, and estuaries.
11	**Pachmarhi Biosphere Reserve**	Madhya Pradesh	UNESCO Biosphere Reserve known for its biodiversity and geological formations.
12	**Ladakh Range**	Jammu and Kashmir	High-altitude mountain range with unique geological formations and landscapes.
13	**Keoladeo National Park**	Rajasthan	Wetland ecosystem with diverse flora, fauna, and unique geological features.
14	**Dholavira**	Gujarat	Harappan archaeological site with ancient ruins and geological formations.
15	**Narmada River Valley**	Madhya Pradesh	Geological formations along the Narmada River, including marble rocks and waterfalls.
16	**Sundarbans Delta**	West Bengal	UNESCO World Heritage Site known for its mangrove forests and unique geological features.
17	**Chilika Lake**	Odisha	Brackish water lagoon with diverse ecosystems and unique geological formations.
18	**Sariska National Park**	Rajasthan	Wildlife sanctuary with diverse flora, fauna, and unique geological formations.
19	**Bhuj Earthquake Memorial Park**	Gujarat	Memorial park commemorating the devastating earthquake of 2001, showcasing geological aspects and disaster management.
20	**Lonavala-Khandala Caves**	Maharashtra	Ancient Buddhist rock-cut caves with intricate carvings and geological formations.
21	**Kaas Plateau**	Maharashtra	UNESCO World Heritage Site known for its unique flora, including endemic species and colorful wildflowers.
22	**Khajjiar**	Himachal Pradesh	Known as the "Mini Switzerland of India," with lush meadows, dense forests, and unique geological features.
23	**Bhangarh Fort**	Rajasthan	Haunted fort surrounded by rugged hills and mysterious geological formations.
24	**Jogimara Caves**	Chhattisgarh	Ancient rock-cut caves with historical and archaeological significance.
25	**Rohtang Pass**	Himachal Pradesh	High mountain pass with breathtaking landscapes, snow-capped peaks, and unique geological features.

26	**Karla and Bhaja Caves**	Maharashtra	Ancient Buddhist rock-cut caves with intricate sculptures and geological formations.
27	**Hogenakkal Falls**	Tamil Nadu	"Niagara Falls of India" with cascading waterfalls, rocky cliffs, and unique geological formations.
28	**Deodar Forest**	Himachal Pradesh	Dense forest of Deodar trees, nestled amidst the Himalayan range, with unique geological features.
29	**Dzukou Valley**	Nagaland	Lush valley known for its biodiversity, pristine landscapes, and unique geological formations.
30	**Araku Valley**	Andhra Pradesh	Picturesque valley surrounded by hills, waterfalls, and coffee plantations, with unique geological features.
31	**Vembanad Lake**	Kerala	Largest lake in Kerala, surrounded by backwaters, wetlands, and unique geological formations.
32	**Sunderbans Delta**	West Bengal	UNESCO World Heritage Site known for its mangrove forests and unique geological features.
33	**Chilika Lake**	Odisha	Brackish water lagoon with diverse ecosystems and unique geological formations.
34	**Dudhsagar Falls**	Goa	Majestic waterfall surrounded by lush forests and rocky cliffs, creating a spectacular natural landscape.

UNESCO's State of Ocean Report highlights key knowledge gaps in research & data on spiking oceanic warming

Sub: Geography

Sec: Oceanography

Context:

- The **UNESCO State of Ocean Report 2024** highlights critical issues concerning the **ocean's role in climate regulation** and the **insufficient understanding and data** needed to address multiple ocean crises and validate **new carbon dioxide removal technologies.**

Key points from the report include:

1. **Inadequate Data and Research**:
    - The report emphasizes a **lack of adequate and aggregated data** necessary for comprehensive ocean observations and research.
    - There is a pressing need for **regular data** to **monitor ocean warming** and its impacts, supporting the challenge for healthy and resilient oceans.
2. **Ocean Warming**:
    - From **1960** to **2023,** the **upper 2,000 meters of oceans warmed** at a rate of **32 ± 0.03 W/m², ** which has accelerated to **0.66 ± 0.10 W/m²** in the past two decades.
    - This warming trend is expected to continue, causing irreversible changes over centennial to millennial timescales.
3. **Energy Imbalance and Heat Content**:
    - Oceans absorb about **90%** of the **Earth's energy imbalance (EEI),** leading to **increased ocean heat content (OHC)** in the **upper 2,000 meters.**
    - **Increased OHC** inhibits **ocean layer mixing,** causing **deoxygenation**, which **negatively impacts** marine ecosystems and coastal communities reliant on oceans.
4. **Ocean Acidification**:

- The report identifies a **mean global increase** in **ocean acidification across all ocean basins**.
- There has been a **continuous decline** in open ocean pH levels, with a drop of **017-0.027 pH units per decade** since the late **1980s**.
- Current monitoring is limited, with only **638 stations recording ocean pH**, and more extensive, long-term data sets are needed.

5. **Sea Level Rise**:
   - From **1993** to **2023,** the **global mean sea level** rose at a rate of **4 ± 0.3 mm/year.**
   - Enhanced monitoring systems are needed to track sea level rise at various scales.
6. **Marine Carbon Dioxide Removal (mCDR)**:
   - The report notes a growing interest in **mCDR technologies** since **2020,** driven by scientific research, start-up initiatives, and significant funding from the U.S. and EU.
   - **mCDR techniques** include **altering seawater chemistry** and **adding nutrients to promote plankton growth,** but they pose various challenges and uncertainties regarding their **efficacy** and **potential unintended consequences**.
7. **Coastal Blue Carbon Habitats**:
   - There is **increased interest** in **restoring coastal blue carbon habitats** like **mangroves, seagrasses,** and **tidal marshes** to **enhance carbon sequestration**.
   - The **effectiveness of these habitats** in **sequestering carbon** remains uncertain.

Important terms:

- **Carbon sequestration-** the process of capturing carbon dioxide from the atmosphere, measured as a rate of carbon uptake per year.
- **Carbon storage-** the long-term confinement of carbon in plant materials or sediment, measured as the total weight of carbon stored.

Carbon Dioxide Removal (CDR):

- It is using technologies, practices, and approaches to remove carbon dioxide from our atmosphere through deliberate and intentional human actions.
- This includes traditional methods like afforestation, as well as more sophisticated technologies like direct air carbon capture and storage (DACCS).

Different CDR methods:

- **Biochar:**
  - It is the substance produced by **burning organic waste** from **agricultural lands and forests** in a **controlled process** called **pyrolysis.**
  - Although it **resembles common charcoal** in appearance, the production of **biochar** reduces contamination and is a method to safely store carbon.
  - **Pyrolysis** involves the burning of wood chips, leaves, dead plants, etc. with very little oxygen, and the process releases a significantly small quantity of fumes.
  - **Biochar** is a stable form of carbon that cannot easily escape into the atmosphere.
- **Bioenergy with carbon capture and storage (BECCS)**
  - It involves **bioenergy production** often through combustion to generate electricity or heat.
  - The resulting **CO2 emissions** from this combustion are captured and stored underground, preventing them from contributing to the greenhouse effect.
  - It **sequesters photosynthetically fixed carbon** as **post-combustion CO2.**
- **Direct air carbon capture and storage (DACCS)**
  - It **extracts CO2 directly** from the atmosphere at any location.
  - This **captured CO2** is then permanently stored in deep geological formations or used for other applications.

- It uses **electricity** to **remove CO2** from the air.

- **Enhanced rock weathering**
  - It involves **pulverising silicate rocks** to bypass the conventionally slow weathering action.
  - The resultant product, usually a powder, has a higher reactive surface area, which is then spread on agricultural lands for further chemical reactions.
- **Ocean alkalinity enhancement**
  - It involves adding alkaline substances to seawater to accelerate this natural sink.

Understand the Indian Ocean and you'll understand much about Earth

Sub: Geography

Sec: Oceanography

Context:

- On **World Oceans Day** (June 8), the **Indian Ocean** is highlighted for its **rapid warming** and significant influence on **global oceanic systems**.
- Understanding the **Indian Ocean** is crucial for comprehending the Earth's overall oceanic response to **greenhouse gases** and **global warming**.

Indian Ocean- Home to Deadly Storms:

- Known for **dramatic monsoon winds** and **heavy rains,** crucial for **over a billion people** in terms of **water supply, fisheries, food, and energy.**
- Experiences **rapid warming** in summer, especially in the **Arabian Sea, Bay of Bengal,** and **southern tropical regions.**
- The region faces **pre-monsoon cyclones,** which, though **fewer in number** compared to the **Pacific** and **Atlantic**, are **deadly** due to **rapid intensification** and impact on developing countries in **South Asia, East Africa,** and **West Asia.**
- **Unique Geographical Configuration**:
  - **Northern boundary** closed by the **Asian landmass** with small connections to the **Persian Gulf** and the **Red Sea**.
  - **Southern boundary** features oceanic tunnels connecting it to the **Pacific** and **Southern Oceans**.
    - **Indonesian Throughflow**: Transports significant **water** and **heat** from the **Pacific** into the **eastern Indian Ocean,** affecting circulation, temperature, and salinity.
    - **Southern Ocean Connection**: Allows **colder, saltier waters** to flow into the **Indian Ocean below 1 km depth,** mixing with Pacific waters and exiting southwards.
- **Marine Life and Tourism**:
  - Supports **diverse fisheries** including **anchovies, mackerel, sardines,** and **tuna**.
  - Attracts tourists for its **dolphins,** occasional whale sightings, popular beaches, and **coral reefs** from **Lakshadweep** to the **Andaman-Nicobar Islands** and **Reunion Island**.
- **Role in Global Warming**:
  - Despite heat from underwater tunnels, heavily influenced by **atmospheric circulation** from the **Pacific**.
  - **Gains** and must **shed heat** via waters moving south, with **global warming** adding **extra heat** from the **Pacific** and **less cold water** from the **Southern Ocean.**
  - **Fastest warming ocean**, affecting **heat waves, extreme rain, corals,** and **fisheries.**
  - **Influences wind circulation,** affecting the **Pacific Ocean's heat absorption** and thus **global warming** control.
  - Helps **accelerate heat sinking** in the **North Atlantic**, modulating global warming.
- **Historical Impact on Human Evolution**:

- Three million years ago, the **northward drift of Australia** and **New Guinea** separated the **Indian** and **Pacific Oceans,** changing **East Africa's climate** from **rainforest** to **savannah**.
- Hypothesized to have **influenced human ancestors** to **develop bipedal movement** for more efficient travel across distances.

Key facts about the Indian Ocean:

- **Third-largest** of the world's five oceanic divisions, covering approx. **20%** of the water on Earth's surface.
- Bounded by **Asia** to the north, **Africa** to the west and **Australia** to the east.
- To the south, it is bounded by the **Southern Ocean, or Antarctica**, depending on the definition in use.
- Along its **core**, the Indian Ocean has **large marginal, or regional seas,** such as the **Andaman Sea, the Arabian Sea, the Bay of Bengal**, and the **Laccadive Sea.**
- It is **named** after **India**, which protrudes into it, and has been known by its current name since at least 1515.
- Previously, it was called the **Eastern Ocean.**
- It has an **average depth** of **3,741 m. All of the Indian Ocean is in the Eastern Hemisphere.**
- Deepest point in the Indian Ocean: **Sunda trench (Java trench)**

Year after Titan's fatal dive, explorers vow to pursue ocean mysteries

Sub: Geography

Sec: Oceanography

Context:

- **June 18** marks one year since the **Titan** vanished on its way to the **historic wreckage site** in the **North Atlantic Ocean (off the coast of Newfoundland, Canada).** After a five-day search that captured attention around the world, authorities said the vessel had been destroyed and all five people on board had died.

Details:

- Concerns have been raised about whether the **Titan** was destined for **disaster** because of its **unconventional design** and its **creator's refusal** to submit to independent checks that are standard in the industry.
- The **deep-sea exploration** continues. The **Georgia-based company** that owns the **salvage rights** to the **Titanic** plans to visit the **sunken ocean liner** in July using **remotely operated vehicles**.

About the Titan:

- The Titan began deep-sea ventures related to the Titanic in **2021**.
- Titan, the missing vessel is a **submersible capable of taking five people** — one pilot and four crew members — to depths of **4,000 meters**, or more than **13,100 feet** — for **site survey and inspection, research and data collection, film and media production, and deep sea testing of hardware and software**.
- The titan was made of **titanium** and **carbon fibre,** it weighs about **21,000 pounds** and is listed as measuring **22 feet by 9.2 feet by 8.3 feet**, with **96 hours of "life support" for five people.**
- The Titan, one of three types of crewed submersibles operated by **OceanGate**, is **equipped with a platform similar to the dry dock of a ship** that launches and recovers the vessel.
  - The **platform** is used to launch and recover manned submersibles by flooding its flotation tanks with water for a controlled descent to a depth of 9.1 meters (30 feet) to avoid any surface turbulence.
  - Once submerged, the platform uses a patented motion-dampening flotation system to remain coupled to the surface yet still provide a stable underwater platform from which our manned submersibles lift off of and return to after each dive.

- At the conclusion of each dive, the sub lands on the submerged platform and the entire system is brought to the surface in approximately two minutes by filling the ballast tanks with air.

- As per the website of company, titan employs a system that can analyze how **pressure changes affect the vessel as it dives deeper,** providing **early warning detection** for the pilot with enough time to arrest the descent and safely return to the surface.

How did the submersible implode?

- The **Titan was made of carbon fiber and titanium, materials** thought to withstand the **pressure at depths of up to 4,000 meters**. The craft's hull was designed to protect the crew from the water pressure.
- The water pressure 3,800 meters down at the site of the Titanic wreck is roughly 400 atmospheres (6,000 PSI) — about the same as having 35 elephants on your shoulders.
- Titanium is elastic and can adapt to ranges of stresses and pressures without permanent strain on the material. Carbon fiber on the other hand is stiffer and non-elastic, often prone to cracking.

The last continent must remain a pristine wilderness

Sub: Geography

Sec: Mapping

Context:

46th Antarctic Treaty Consultative Meeting (ATCM-46):

- **Held at:** Kochi, Kerala
- **Focus:** Antarctic tourism and regulatory framework
- **Outcome:** No definitive solution; highlighted the complexity of managing tourism in a changing environment.
- **ATCM-46 Developments:**
  - Recognized the need for a comprehensive regulatory framework but failed to reach a consensus.
  - A new working group was established to develop regulations over the next year.

Growth of Antarctic Tourism:

- **Tourist Numbers:** Surged from a few thousand in the early 1990s to over 1,00,000 in the **2022-23 season.** Estimated 1,18,089 tourists in 2023-2024 by IAATO.
- **Tourist Demographics:** The United States and China account for over 40% of tourists.
- **Tourist Activities:** Multi-day expeditions on ships, larger cruises, fly-sail operations, wildlife observation, photography, mountain climbing, and skiing.
- **Benefits:**
  - Educational opportunities and Economic benefits
- **Environmental Concerns:**
  - Disruption of wildlife, Damage to fragile ecosystems, Introduction of invasive species, Ship traffic pollution, Increased carbon footprint, Climate change effects

Regulatory Framework Issues

- **Existing Framework:**
  - **Antarctic Treaty (1961):** Prioritizes peaceful use and scientific research.
  - **Madrid Protocol:** Broad environmental guidelines, lacks specific tourism regulations.
- **Current Management:** Largely self-regulated by the **International Association of Antarctica Tour Operators (IAATO)**.

- **IAATO** is an **international organization** comprised of **more than 100** respected companies and organizations from across the world.
- Their mission is to advocate, promote and practice safe and environmentally responsible private-sector tourism to the Antarctic.

India's Position and Actions:

- **ATCM 44 (2022):** Raised concerns about tourism's impact on research, conservation, and the environment.
- **Resolution 5 (2022):** Advised against building tourism-related structures with significant environmental impacts.
- **India's Actions:** Enacted its own **Antarctic Law in 2022** despite lack of international consensus.

About Antarctic Treaty

- It is an international agreement that governs activities in Antarctica. It was signed on December 1, 1959, and entered into force on June 23, 1961.
- **Purpose:** The treaty designates Antarctica as a scientific preserve and ensures that it remains exclusively for peaceful purposes.
- **Principles:** The Antarctic Treaty designates Antarctica as a neutral, demilitarized zone to be used solely for peaceful purposes.
- **Signatories:** It was initially signed by 12 countries. It now includes 56 countries, with India joining in 1983.
- **Key Provisions:**
  - Antarctica is strictly for peaceful activities; military activities, including fortification and weapon testing, are prohibited.
  - All activities, especially scientific research, are to be conducted freely with cooperation and data sharing among signatory nations.
  - Nuclear explosions and the disposal of radioactive waste are forbidden.

About the India's Antarctica Act of 2022:

- It is the **first domestic legislation** with regard to **Antarctica** in **India.**
- It seeks to **extend the application of domestic laws** to research stations set up by India in the Antarctic region.
- The Act now puts into place a **comprehensive list of regulations** related to Antarctica, for such scientific expeditions, as well as for individuals, companies and tourists
- The Act **prohibit** Indian expedition to Antarctica **without a permit or written authorisation** of another party to the Antarctic Treaty, provides for inspection by an officer appointed by the government and for penalty for contravention of certain provisions of the legislation.

- It also seeks to **constitute a fund for the welfare of Antarctic research work** and the protection of the environment of the icy continent.
- The Antarctic Act **extends the jurisdiction of Indian courts to Antarctica**, for crimes on the continent by Indian citizens, or foreign citizens who are a part of Indian expeditions.
- The Act **prohibits** an **extensive list of actions on the continent,** including **drilling, dredging, excavation or collection of mineral resources.**
    - An exception can be made if it is done for scientific research with a granted permit.
- It also **restricts** individuals from damaging the environment, including native plants, birds and seals.
- It **disallows** flying or landing helicopters or operating vessels that can disturb the native animals.
- It **prohibits** any activity that could harm the habitat of birds and animals, kill, injure or capture any bird or animal.
- Introducing any non-native animals, birds, plants of microscopic organisms is also **prohibited** under the Act.
- Violating any of the regulations prescribed by the Act will attract high penalties.
    - The lowest penalty comprises an imprisonment between one-two years and a penalty of Rs 10-50 lakh.
- Extraction of any species native to Antarctica, or introduction of an exotic species to the continent can draw imprisonment of seven years and a fine of Rs 50 lakh.

Pakistan delegation allowed access to Ratle power projects on Chenab river in J&K

SUB: Geography

SEC: Mapping

Context:

- A **five-member Pakistan delegation** and neutral experts from the **World Bank** visited the Ratle power project on the **Chenab River.**
- The **delegation** also plans to inspect the **1,000-MW Pakal Dul hydroelectric project** on the **Marusudar River (Marwah Valley),** a tributary of the **Chenab**.

Background and Technical Objections:

- **Pakistan** has raised technical objections to various power projects in **Jammu & Kashmir (J&K)** since **2006**.
- **Pakistan** previously raised objections to the **Kishanganga project** in the **Kashmir valley** in **2006**.

Rattle Hydroelectric dam:

- The **Ratle Hydroelectric Plant** is a **run-of-the-river hydroelectric power station,** with permitted pondage under the **Indus Water Treaty,** currently under construction on the **Chenab River,** downstream of the village near **Drabshalla** in **Kishtwar district** of the **Indian Union Territory of Jammu and Kashmir.**

Chenal river:

- The **Chenab River** is a major river that flows in **India** and **Pakistan,** and is **one of the 5 major rivers of the Punjab region.**
- It is **formed** by the **union of two headwaters, Chandra and Bhaga,** which rise in the upper Himalayas in the **Lahaul region** of **Himachal Pradesh, India**.
- The **Chenab** flows through the **Jammu region of Jammu and Kashmir, India,** into the plains of **Punjab, Pakistan,** before ultimately flowing into the **Indus River**.

About Indus Water Treaty (IWT):

- It is a **treaty** signed between **India** and **Pakistan** regulating the use and distribution of the **Indus River system.**

- It was signed by **then-Prime Minister Jawaharlal Nehru** and **former Pakistan President Ayub Khan** in **1960**.
- The treaty was brokered by the **World Bank,** which too is a **signatory** to the treaty.
- The pact sought to divide the water of the **Indus River** and its **tributaries (Sutlej, Beas, Ravi, Jhelum, and Chenab)** equitably among the two countries.
- Under the treaty, **water from three eastern rivers, Beas, Ravi, and Sutlej,** was allocated to **India**, and **water** from the **three western rivers – Chenab, Indus, and Jhelum** was allocated to **Pakistan**.
    - **Pakistan** roughly got **80%** of the water in the **Indus drainage system**.
- The treaty also permits both countries to use the other's rivers for certain purposes, such as **small hydroelectric projects** that require **little or no water storage**.
- The **treaty** is overseen by the **Permanent Indus Commission (PIC)**, a bilateral body with commissioners from both countries tasked with implementing and managing treaty provisions and resolving any questions, differences, or disputes that may arise.
- The **World Bank's** role is to **appoint a neutral expert** in case of **'technical' differences,** failing which the differences are escalated to a dispute for international arbitration.

Permanent Indus Commission (PIC):

- PIC is a **bilateral commission** of officials from **India** and **Pakistan,** created to implement and manage the goals of the **Indus Waters Treaty, of 1960**.
- The Commission according to the treaty must meet regularly at least once a year, alternately in **India** and **Pakistan**.

The functions of the Commission are:

- to study and report to the two Governments on any problem relating to the development on the waters of the rivers.
- to solve disputes arising over water sharing.
- to arrange technical visits to projects' sites and critical river head works.
- to undertake, once in every five years, a general tour of inspection of the Rivers for ascertaining the facts.
- to take necessary steps for the implementation of the provisions of the treaty.

India's 'heat trap' cities make summers worse, says government official

Sub: Geography

Sec: Climatology

Unbalanced Urban Growth:

- **Indian cities** are becoming **"heat traps"** due to **unbalanced growth, reducing water bodies,** and **increasing greenhouse gas emissions.**
- **Wetlands** and **water bodies** have diminished, and permeable spaces have decreased significantly.

Scorching Summer Impact:

- **India** faces an **intense summer,** with dozens of deaths reported.
- The **India Meteorological Department (IMD)** predicts **above-normal temperatures** for June in northwest and **central regions,** including **Delhi**, marking one of the longest heatwave spells.
- Delhi's daily temperatures have stayed above 40°C since May 12, with a forecasted drop below this mark only on June 26.
- On a recent day, Delhi recorded 44°C, but it felt like 49.2°C due to the heat index.
- **Climate change** and **urban development** are **key factors** in **rising temperatures**.

- Cities experience **heat retention,** making nights almost as hot as days.
- **Study Findings**
- A study by the **Centre for Science and Environment (CSE)** shows that **night temperatures in cities** cooled less between **2014-2023** compared to **2001-2010**, with a reduction in cooling by up to **7°C.**
- Hot nights pose significant **health risks** as they prevent recovery from daytime heat.

Heat Action Plans:

- To **manage and mitigate** the **impact of heatwaves,** which are **increasing** in **frequency** and **severity, India** employs **Heat Action Plans (HAPs).**
- These plans are **developed** at **state, district,** and **city levels** with the collaboration of the **National Disaster Management Authority** and the **IMD.**
- Currently, **23 states** are involved in **developing these plans,** though **no centralized database of HAPs exists.**
- Plans typically include a **heat profile of the region, historical data on heat waves**, and a **vulnerability assessment to identify high-risk areas.**
- They also **outline detailed response strategies** to be implemented before, during, and after **heatwave events** and define the roles of various governmental departments, such as **disaster management, labour departments**, and **police**, in **managing the heatwave response.**

What do the HAPs recommend?

- **Heat Action Plans (HAPs) recommend a multifaceted approach to manage and mitigate the effects of heat waves. Key recommendations include:**
    - **Early Warning and Communication**
    - **Public Education**
    - Establishing **heat shelters** and **cooling centers,** and ensuring the availability of **clean drinking water** to prevent dehydration.
    - **Healthcare Preparedness**
    - Implementing **long-term urban planning strategies** that include **tree planting, using heat-resistant building materials,** and **applying cool roofing technologies** to minimize the **urban heat island effect** and **reduce indoor temperatures.**

Source: TH

What are the findings of the 2024 Hindu Kush Himalayas snow update?

Sub: Geography

Sec: Climatology

Record Low Snow Persistence in the Ganga River Basin:

- The **Ganga River basin** recorded its **lowest snow persistence,** with similar **declines** in the **Brahmaputra** and **Indus basins**, threatening the water supply to millions. **T**his as a symptom of accelerating climate change.
- **Importance of Snow Persistence:**
- **Snow persistence** measures how long snow remains on the ground, crucial for the **water supply** in the **Hindu Kush Himalaya (HKH) region.**
- **Snowmelt** contributes **23%** of annual runoff to the **region's 12 major river basins,** providing water to a quarter of the world's population.
- **Impact on Water Supply:**
    - **Ganga Basin:** Snowmelt accounts for **10.3%** of its water.
    - In the **Brahmaputra** and the **Indus basins** as well, snowmelt brings **13.2%** and around **40%** of the water, respectively, versus **1.8%** and **5%** from **glaciers**.

2024 Report Findings:

- **Ganga Basin:** Snow persistence was **17% below the long-term average,** the lowest in **22 years**.
- **Brahmaputra Basin:** Snow persistence was **14.6% below normal.**
- **Indus Basin:** Snow persistence fell **23.3% below normal,** though lower altitude areas had excesses.
- **Other Basins: Amu Darya** (28.2% below normal) and **Helmand** (32% below normal) also saw record lows.

Causes of Lower Snow Persistence

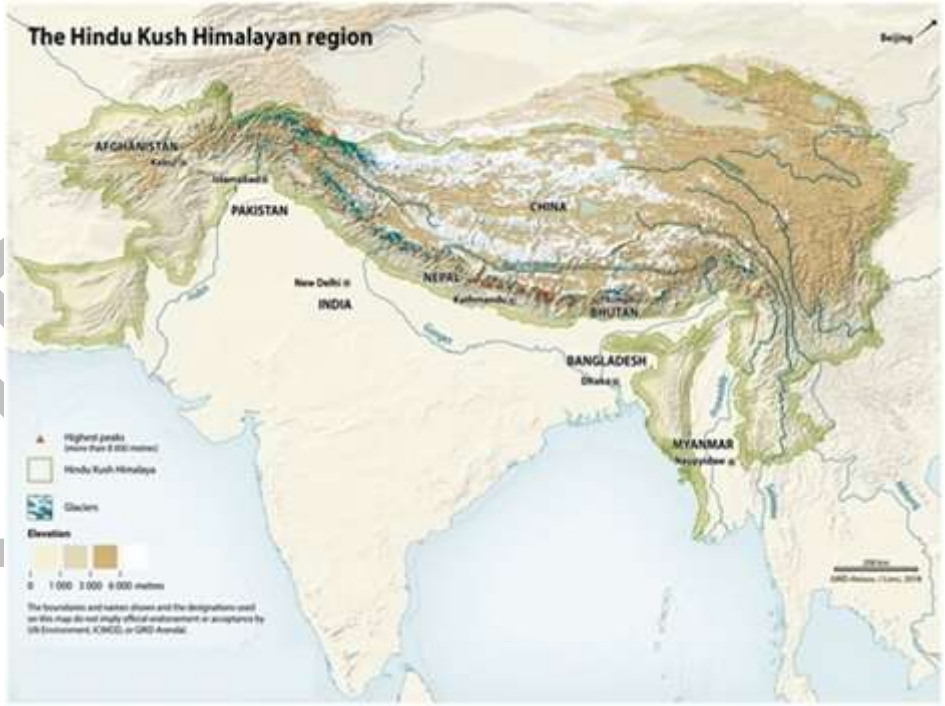
- **Reduced and delayed winter precipitation** due to high sea-surface temperatures and disrupted weather patterns.
- **Global warming** and **intensified La Niña–El Niño conditions** destabilize snow accumulation.
- **Higher Snow Persistence in Other Regions:**
- **Yellow River Basin: Snow persistence exceeded normal by 20.2%**, due to the East Asian winter monsoon bringing cold, dry air from **Siberia** and **Mongolia**.

Long-term Solutions:

- **Reforestation:** Planting native trees to help retain snow.
- **Weather Forecasting:** Improved forecasting and early warning systems.
- **Water Infrastructure:** Enhancing infrastructure and protecting snow-receiving areas.
- **Emission Reduction:** Reducing greenhouse gas emissions to mitigate rising temperatures.

Hindukush-Himalaya Region:

- Stretching over **3500 kilometres** and across **eight countries** – **Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar and Pakistan** – the **Hindu Kush Himalay**a is arguably the **world's most important 'water tower',** being the source of ten of Asia's largest rivers as well as the largest volume of ice and snow outside of the Arctic and Antarctica.
- Together these rivers support the drinking water, irrigation, energy, industry and sanitation needs of **1.3 billion people** living in the mountains and downstream.



Biodiversity of HKH region:

- The mountain ecosystems of the **Hindu Kush Himalaya (HKH)** are diverse with one of the **highest diversity of flora and fauna** providing varied ecosystem services to one fourth of humanity. With **four out of 36 global biodiversity hotspots** the **HKH** is a cradle for **35,000+ species of plants** and **200+ species of animals**.

- At least **353 new species—242 plants, 16 amphibians, 16 reptiles, 14 fish, two birds, and two mammals**, and **at least 61 invertebrates**—have been discovered in the Eastern Himalayas between 1998 and 2008, equating to an **average of 35 new species finds every year.**
- The **Hindu Kush Himalaya (HKH) region** is of global importance due to its unique biodiversity and is home to **4 of 34 global biodiversity hotspots, 6 UNESCO natural World Heritage sites, 30 Ramsar sites, 330 Important Bird Areas (IBAs)** and **53 Important Plant Areas (IPAs).**
- In total, there are **60 ecoregion types (6 per cent of the world total),** of which **30** are critical ecoregions.
- HKH countries have established roughly **488 protected areas** in the region with varying degrees of protection and status, covering **39 per cent of HKH terrestrial land.**

History

Archaeologists, Sanskrit scholars tie up to decipher Rigveda text

Sub: History

Sec: Ancient India

Context:

- In order to establish a relationship between the **Harappan civilisation and the people of the Vedic age**, a group of archeologists are now collaborating with Sanskrit scholars to decipher the text of the Rigveda.

More on news:

- According to scholars, a clear understanding of what is mentioned in the **Rigveda text is important in order to co-relate archaeological evidence** unearthed by his team in excavations of **Harappan settlements at Haryana's Rakhigarhi and Banawali**, at Kalibanga on the Haryana-Rajasthan border, and at Dholavira in Gujarat.

Key highlights:

NCERT new additions:

- The Harappan Civilisation', based on DNA evidence from the 4,600-year old remains of a woman, indicating that the Harappans were an indigenous people.

Evidence from Rakhigarhi:

- While excavating the site of Rakhigarhi,evidence of ritual platforms and fire altars are found.
- Parallely, fire worship is mentioned in Rig Vedic texts.

Saraswati: a common thread:

- The mention of the river is recorded at least 71 times in the Rigvedic text.
- During archaeological excavations, scholars discovered a majority of Harappan settlements along the banks of river Saraswati.
- Of the nearly 2,000 known Harappan settlements spread over the Indus basin, Saraswati, and in Gujarat, of which almost two-thirds, at least 1,200 are located along the basin of the river Saraswati.

Cities and Towns life:

- DNA evidence now suggests that cities and towns first came into existence during the Harappan times, dating 4,500 to 4,600 years ago.
- They again later came into existence 2,400 years ago, by which time proofs of use of iron also emerged.
- In the middle, there seems to be a decline, where humankind reverted back to rural life.
- The later settlements were not along the banks of river Saraswati.

- The Rigveda talks about river Saraswati, and we only have proof of dense Harappan settlements there, dating back to 4,600 years ago.
- Rigvedic texts do not mention the use of iron, so co-relation with early historic settlements which came much later and are 2,400 year old ones (near the Ganga Basin and the Deccan region) is not possible.

A debate on animal bones:

- Another point of reference which may link the Harappans with Vedic times is a set of animal bones found and studied by two archaeo-zoologists in the Surkotada region of Kutch, Gujarat.
- Some terracotta figurines of horse-like animals have been excavated from the Harappan sites of Lothal and Mohenjo Daro.

Linkage with Modern Humans:

- Studies wrt to DNA analysis from the blood samples of 3,000 modern south Asians from different linguistic and religious groups were carried out.
- It was found that most of them were from the Andaman and Nicobar islands to Ladakh and Kashmir, and from Afghanistan to Bengal and carried genetic similarities to the Harappan woman's skeleton.

About Harappan Civilisation:

- Indus Valley Civilization was the first major civilization in South Asia, which spread across a vast area of land in present-day India and Pakistan (around 12 lakh sq.km).
- The time period of mature Indus Valley Civilization is estimated between BC. 2700- BC.1900 ie. for 800 years.

Indus Valley Sites and Specialties:

Harappa

- Seals out of stones
- Citadel outside on banks of river Ravi

Mohenjodaro

- Great Bath, Great Granary, Dancing Girl, Man with Beard, Cotton, Assembly hall
- The term means " Mount of the dead"
- On the bank of river Indus
- Believed to have been destroyed by flood or invasion(Destruction was not gradual).

Chanhudaro

- Bank of Indus river. – discovered by Gopal Majumdar and Mackey (1931)
- Pre-Harappan culture – Jhangar Culture and Jhukar Culture.

Kalibangan

- At Rajasthan on the banks of river Ghaggar, discovered by A.Ghosh (1953)
- Fire Altars
- Bones of camel
- Evidence of furrows
- Horse remains (even though Indus valley people didn't use horses).
- Known as the third capital of the Indus Empire.

About Rig Vedic Age or Early Vedic Period (1500–1000 BCE):

- In the R**ig Vedic period, the Aryans were mostly confined to the Indus region.**
- It refers to Sapta Sindhu or the land of seven rivers.
- This includes the five rivers of **Punjab, namely Jhelum, Chenab, Ravi, Beas and Sutlej along with the Indus and Saraswati.**
- The Rigveda Samhita contains about 10552 Mantras, **classified into ten books called Mandalas.**
- Each Mandala is divided into several sections called **Anuvakas.**

- **Each Anuvaka consists of a number of hymns called Suktas and each Sukta is made up of a number of verses called riks**

About Saraswati River:

- The Saraswati is called the Ghaggar-Hakra river and flows only during the monsoon season.
- It originates from the Shivaliks, the foothills of the Himalayas, then flows through Punjab, Haryana, and a part of Rajasthan before entering what is now Pakistan.
- The Indian part of the river is named the Ghaggar, while the one in Pakistan is the Hakra

Gujarat govt orders restoration of Jain idols at Pavagadh

Sub: History

Sec: Ancient India

Context: Jain idols, centuries-old and revered by the community, were allegedly removed from their original places near the stairs leading to Kalika Mata temple on **Pavagadh hill** in Gujarat's Panchmahal district.

More in news

- Jain idols, centuries-old and revered by the community, were allegedly removed from their original places near the stairs leading to **Kalika Mata temple on Pavagadh hill** in Gujarat's Panchmahal district.
- Community members protested, alleging the removal was part of a temple renovation project.

About Pavagadh Jain temples

- **Overview of Pavagadh Jain Temples:**
  - Situated on Pavagadh Hill in Gujarat, part of the **UNESCO World Heritage Site of Champaner-Pavagadh Archaeological Park.**
  - Known as a significant **Jain pilgrimage** site due to its spiritual importance in Jainism, it is considered **one of the four sacred regions where moksha (liberation)** can be attained.
- **Historical Significance:**
  - The site's Jain history dates back to the **3rd century BC,** with continuous contributions and constructions over centuries.
  - It has been a center for Jain religious activities, marked by the consecration of important idols and temples by revered Jain monks and historical figures.
- **Key Events and Constructions:**
- **King Samprati (3rd century BC):**
  - Constructed and installed the idol of **Sambhavnatha,** a significant Jain Tirthankara, consecrated by **Acharya Suhastisuri.**
- **1055 AD:**
  - **Śvetāmbara** monk **Acharya Gunsagarsuri** reconstructed the temple of **Jirawala Parshvanath** and restored an ancient 52-shrine temple dedicated to
- **10th Century AD:**
  - **Acharya Aryakashitsuri** founded the **Achalgacch sect of Jainism** at Pavagadh after ascending the hill to perform **Sallekhana (a Jain practice of fasting unto death).**
  - He was inspired by a vision of **demi-goddess Mahakali,** who instructed him to reform **Jain practices and start a new order.**
  - This marked the **installation of Mahakali** as the protecting deity (adhishthayika) and the establishment of a new Jain sect.
- **12th Century AD:**
  - Minister **Tejpal** built the **"Sarvatobhadra" temple,** contributing to the architectural and religious landscape of Pavagadh.

- **1581 AD:**
    - **Acharya Vijaysensuri** consecrated a temple built by **Jayawant Seth,** further enriching the religious structures on Pavagadh Hill.
- **16th Century AD:**
    - Under the guidance of **Acharya Kalyansagarsuri,** significant reconstruction efforts were undertaken, including the restoration of the shrine of Mahakali, supported by devotees **Sheth Vardhaman and Sheth Padamshin.**
- **1689 AD:**
    - **Gani Shilvijay Maharaj** noted the existence of a temple dedicated to Neminatha, another revered Jain Tirthankara.
- **Late 18th Century AD:**
    - Jain monk **Dipvijay Kaviraaj** composed a detailed poem praising the temples of **Jirawala Parshvanatha** and describing the architectural and spiritual significance of the existing **Jain temples at Pavagadh.**
- **Cultural and Religious Contributions:**
    - Over the centuries, **Pavagadh has been a hub of religious and cultural activities for Jainism**, attracting pilgrims and monks who consecrated numerous temples and idols.
    - The shrines on **Pavagadh Hill were historically considered of equal rank** and importance to those at Palitana, according to Śvetāmbara scriptures, emphasizing their cultural and religious significance in Jainism.
- **Preservation Efforts:**
    - Court interventions have protected Pavagadh's Jain heritage from destruction, ensuring the preservation of historical facts and structures associated with Jainism. This legal protection has safeguarded the religious and cultural identity of Pavagadh as a significant Jain pilgrimage site.

Epigraphs shine light on Kashmir's rich cultural past

Sub: History

Sec: Art and Culture

Context:

- Epigraphs or inscriptions, including calligraphic works, from 40 heritage sites in Kashmir are on display at **Srinagar's Kashmir Arts Emporium.**

Key highlights:

- Epigraphs from the sixteenth to the nineteenth centuries, on display at a **Srinagar exhibition**, shine a light on **Kashmir's past.**
- It will tell about the **domination of the Persian language, local Hindus' praise for Sultan Sikander, and community wells constructed by the Mughals.**
- It maps architectural epigraphy from **early modern Kashmir and puts a spotlight on inscriptions on khanqahs, mosques, temples, shrines and mausoleums.**

What is Epigraphy?

- **Epigraphy in architecture is an important and essential part of what is defined as material culture.**
- **Epigraphs have the potential to even correct the errors which have crept into our textual histories.**
- Epigraphy is a primary tool of archaeology when dealing with literate cultures.
- The US Library of Congress classifies epigraphy as one of the auxiliary sciences of history.

Benefits of Epigraphs:

- These **epigraphs cover over four centuries of religious and literary writings, commencing with the establishment of Sultanate rule in Kashmir in the 14th century.**
- Deciphering some of the rarest texts written in **Persian, Arabic and Sanskrit, the exhibition borrows from translations, photographs and recreated drawings offering a comprehensive mapping of our past.**
- Epigraphs help in understanding the **'mizaj' or socio-religious milieu of the period.**
- An epigraph from Khanmoh in Sanskrit mentions a 'maath' foundation during the reign of **Zain-ul-Abidin.**
- It refers to his father as the illustrious **Sikander**.
- **Sikander is rather infamous as Butshikan (someone who destroyed Hindu statues).**
- Inscription from the Jamia Masjid in Srinagar highlights the reconstruction overseen by a native Kashmiri engineer, historian and administrator, Malik Haider of Chadoora area.
- The inscription is from the period when the mosque was burnt during Emperor Jahangir's time.
- The calligrapher was a Kashmiri master i.e. **Mulla Murad, famous as Shirin Kalam (Sweet pen).**
- **However, the engraver was a Hindu, Hari Ram, whose name is also recorded.**

Who is Sultan Sikander?

- **Sikandar was the seventh Sultan of Kashmir and a member of Shah Mir dynasty who ruled from 1389 until his death in 1413.**
- The only contemporaneous source that exists is the **Rajatarangini by Jonaraja.**
- Jonaraja was the Brahmin court-poet of Sikandar's successor Zain-ul-Abidin and was commissioned to continue Kalhana's Rajatarangini**.**

Vizag Port's Themed Cruises: Showcasing Andhra Pradesh's Heritage and Adventure

Sub: History

Sec: Art and Culture

Visakhapatnam Port Authority (VPA) is introducing themed cruises to highlight the rich heritage and diverse attractions of Andhra Pradesh. **These specialized cruises cater to wildlife enthusiasts, adventure sports lovers, and culinary tourists, aiming to position Vizag as a premier cruise destination.**

Wildlife Enthusiast Cruise

- **Attraction**: Guided visits to Andhra Pradesh's wildlife sanctuaries and national parks.
- **Activities**: Observation of diverse biodiversity, participation in conservation activities.

Adventure Sports Cruise

- **Water Sports**: Scuba diving and snorkeling in the Bay of Bengal.
- **Trekking and Rock Climbing**: Adventure activities in the Eastern Ghats.
- **River Rafting**: Thrilling experiences on the Godavari and Krishna rivers.

Culinary and Cultural Cruises

Local Cuisine: Tours designed for culinary tourists to explore regional food.

Heritage Sites: Visits to historical and cultural landmarks.

Strategic Initiatives

Bespoke Cruise Experiences: Tailored to leverage unique attractions of Andhra Pradesh.

Promotion Efforts: VPA is actively promoting these special interest cruises.

Economic Impact: Encouraging former crew members to establish local businesses to support the cruise sector.

Conclusion

Vizag's themed cruises offer a unique way to experience Andhra Pradesh's natural beauty, adventure sports, and cultural heritage. By fostering specialized tourism and supporting local businesses, VPA aims to boost the local economy and solidify Vizag's status as a top cruise destination.

India pushing to get yogasana recognised as Olympic sport

Sub: History

Sec: Art and culture

Context: India is working towards getting **yogasana recognised as an Olympic spor**t before India hosts the **games possibly in 2036.**

More in news

- India aims to have yogasana recognized as an **Olympic sport by 2036,** aligning potentially with hosting the games.
- The **Ayush ministry** is working with the Sports ministry to launch a **Yogasana Super League later this year.**
- Yogasana has been distinguished from **yoga's spiritual aspects** and recognized as a separate sport by the **Sports and Youth Affairs Ministry.**
- It has already been integrated into various national sports events **including Khelo India, university games, and school games.**
- The **Ayush ministry is developing an AI-based** system to ensure accurate assessment of yogasana performances.
- Efforts are ongoing to explore yogasana practices in space and understand their benefits for astronauts' **physical and mental well-being.**

Background of Yogasana Recognition:

- **Yogasana is deeply rooted in India's cultural** and **spiritual heritage**, focusing on physical **postures and breath control** for holistic health.
- **Formal recognition by the Ministry of Youth Affairs** and **Sports as a competitive sport** aims to modernize and **introduce Yogasana into mainstream sports.**

Inclusion in Khelo India and University Games:

- **Yogasana will be introduced** as a competitive discipline in **Khelo India,** a national sports development program.
- University games will also feature **Yogasana,** providing a platform for collegiate-level competition and talent scouting.

Events in Competitive Yogasana:

- **Competitive Yogasana** will **encompass various events: traditional, artistic, rhythmic, and free flow.**
- Traditional **Yogasana emphasizes precision in classic postures**, while artistic and rhythmic forms allow for creativity and synchronization.
- Free flow **Yogasana highlights dynamic transitions** between postures.

Benefits of Yogasana as a Competitive Sport:

- Encourages **youth participation in physical fitness and well-being**.
- Creates career opportunities in teaching, coaching, and sports therapy related to Yogasana.
- Potential international recognition could lead to inclusion in **global sporting events.**

Future Prospects of Yogasana Competitions:

- Development of **structured training programs** and standardized competition rules.
- Establishment of **national and state-level championships**.
- Accreditation system for **Yogasana institutes and promotion of research** and development in the field.

By focusing on these points, India aims to **elevate Yogasana** from a traditional practice to a respected and competitive sport on both national and international stages.

- **Yoga school**, founded by the **Sage Patanjali**, is one of the **orthodox schools** in Indian philosophy.
- It presents a method of **physical and mental discipline**. Yogic techniques control the body, mind, and sense organs, and are thus thought to be a means of achieving freedom or mukti. Yoga acknowledges God's existence as a teacher and guide.

Patanjali's Yoga-Sutras consist of four parts.

These are: i) Samadhipada ii) Sadhanapada iii) Vibhutipada iv) Kaivalyapada

The first part deals with the introduction to the nature and methods of yoga in its various forms. It describes the various modifications of the organs including citta which is an internal organ of human being.

The second part explains the causes of suffering and how to eradicate them. It talks about the law of karma and human bondage.

The third part elucidates the concept how to achieve the supra-normal powers and in which ways yoga helps it. The last or the final part describes the nature of liberation and spiritual union with the supreme soul/self.

Nalanda University | An ancient centre of learning

Sub: History

Sec: Art and Culture

About Nalanda University:

- Founded in the **5th century CE** by **Emperor Kumaragupta (Gupta Dynasty),** Nalanda University, originally known as **'Nalanda Mahavihara',** was the **world's first international residential school,** predating **Oxford University** by approximately **500 years.**

Features:

- It is a **large Buddhist monastery** in **India's ancient kingdom of Magadha** (modern-day Bihar).
- **Buddhist Foundations**: Linked to the times of the **Buddha**, it thrived for **700 years**, promoting diverse learning under esteemed scholars like **Nagarjuna, Aryabhatta, Asnaga, Vasubandhu** and **Dharmakirti.**
- Even though it taught about **all sects of Buddhism, Mahayana Buddhism** was the **primary subject of instruction,** although other secular disciplines like **grammar, logic, epistemology,** and **science** were also covered.
- The **University had ten temples, meditation centres,** and the **world's largest library**, which was divided into **three buildings: Ratnasagara** (nine-story building), **Ratnadadhi**, and **Ratnaranjaka**, and housed not only religious manuscripts but also a vast collection of books on **literature, astrology, philosophy, science, warfare,** and other subjects.

- **Famous scholars of Nalanda** are **Nagarjuna** (Madhyamika Shunyavad) and **Aryabhatta**, the astronomer.
- There were lively arguments and debates going on. **Harsha** is supposed to have invited a thousand educated Nalanda monks to attend the **Kanauj philosophical meeting.**
- During **King Harsha's** reign, **Chinese traveller Hiuen Tsang** visited **Nalanda University** and wrote a detailed account of the university. **Hiuen Tsang** attended university for **two years**.
- **I-Tsing,** a Chinese scholar, stated that Nalanda housed **2,000 students** and was supported by money from **200 villages.**
- A large number of students have come to study from **China, Mongolia, Tibet, Korea**, and other Asian countries.
- Archaeological evidence also indicates contact with the **Indonesian Shailendra dynasty**, one of whose kings built a monastery in the complex.
- In **1915**, systematic excavations began, revealing eleven monasteries and six brick temples neatly arranged on grounds measuring 12 hectares (30 acres).
- A treasure trove of sculptures, coins, seals, and inscriptions have also been discovered in the ruins, many of which are now on display at the nearby Nalanda Archaeological Museum.

About Ancient Nalanda University:

- **Foundation and Early Years (5th Century CE)**
    - **Establishment:** Founded during the **Gupta Dynasty in** the 5th century CE, under the patronage of Gupta emperor ***Kumaragupta I.***
    - **Initial Purpose:** Started as a Buddhist monastic center of learning.
    - **Evolution:** Transitioned into a residential university, one of the earliest examples of its kind.
- **Golden Era (5th to 12th Century CE)**
    - **Zenith under Pala Rule:** Reached its peak during the reigns of emperors like Harsha (606-647 CE) and the Pala kings, notably **Dharmapala and Devapala**.
    - **International Appeal:** Attracted scholars, monks, and students from across Asia, including **China, Korea, Japan, Tibet, Mongolia, Sri Lanka, and Southeast Asia.**
    - **Visiting Scholars:** Renowned figures like **Xuanzang and Yijing from China** visited and documented Nalanda's academic excellence and cultural richness.
    - **Size and Support:** Described by **Chinese pilgrim I-Tsing** in 670 CE as accommodating 2,000 students and supported by contributions from 200 villages.
- **Academic Structure and Contributions**
    - **Curriculum:** Offers a diverse curriculum including **Buddhist scriptures, Vedas, logic, grammar, medicine, mathematics, astronomy, and philosophy.**
    - **Specialization:** Particularly renowned for advanced studies in Buddhist philosophy, **Mahayana Buddhism,** and the teachings of Buddha.
- **Library and Manuscripts**
    - **Dharmaganja:** Had a famous library known as **Dharmaganja,** consisting of three main buildings: **Ratnasagara, Ratnadadhi, and Ratnaranjaka.**
    - **Collection:** Housed thousands of manuscripts covering various fields of knowledge, making it a hub of scholarship in ancient India.

- **Decline and Destruction**
    - **Initial Decline:** Began in the 12th century due to the weakening of the Pala Dynasty and the rise of regional powers.
    - **Destruction by Bakhtiyar Khilji (1193 CE):** Turkish Muslim invader **Bakhtiyar Khilji sacked Nalanda in 1193 CE.**
    - **Impact:** The library was burned, and many scholars and monks were killed, leading to the university's abandonment and gradual decay.

This structured outline provides a comprehensive overview of Nalanda University, highlighting its founding, peak, academic contributions, and eventual decline and destruction.

Rediscovery and Revival:

- The ruins were **rediscovered** in **1812** by **Francis Buchanan-Hamilton** and **officially identified** in **1861** by **Sir Alexander Cunningham**.
- Proposed by **former President Dr. A.P.J. Abdul Kalam** in **2006**, the revival gained momentum with support from the **Singapore government** and **East Asia Summit leaders.**
    - The **Nalanda University Act** was passed in **2010**, and the first batch of students enrolled in **2014.**

New Campus and Master Plan:

- **Prime Minister Narendra Modi** inaugurated the new campus on **June 19, 2024.**
- **17 countries** including **Australia, China, Singapore,** and **South Korea** have contributed to its establishment.
- The campus is designed by **B.V. Doshi's Vastu Shilpa Consultants**, the **₹1,800 crore ($210 million) campus** spans **485 acres** with sustainable features like **solar plants, water treatment, and recycling facilities.**
    - It includes extensive **green cover, water bodies, a Yoga Center, auditorium, library,** and **sports complex**.

Governance and Academic Programs:

- The **President of India** serves as the Visitor, with **Prof. Arvind Panagariya** as **Chancellor** and **Prof. Abhay Kumar Singh** as **Vice-Chancellor**.
- **Programs**: Offers postgraduate and Doctoral programs in **Buddhist studies, philosophy, literature, environmental studies, sustainable development,** and **international relations.** Students from over 20 countries are currently enrolled.

Challenges and Controversies:

- Initial controversies included the appointment of **Gopa Sabharwal** as **Vice-Chancellor** and the subsequent **resignation** of **Nobel laureate Amartya Sen** and his **successor George Yeo** over autonomy concerns.

- The **narrative** of its **decline** is debated; some argue it was **destroyed by Bakhtiyar Khilji**, while others claim it suffered from **long-term decline** due to **funding cuts** and **persecution by the Sena dynasty.**
- Disputes over **renaming Baktiyarpur Railway station,** near the university, have arisen, with Bihar Chief Minister Nitish Kumar opposing changes, citing his birthplace.

Satnamis and their History of Protests

Sub: History

Sec: Art and Culture

Context: A large group from the Satnami community in Chhattisgarh's Baloda Bazar district engaged in extensive vandalism, setting fire to numerous vehicles, throwing stones at police officers, and burning down the Superintendent of Police office.

- The unrest stemmed from dissatisfaction with the police's management of a case concerning the desecration of a 'Jaitkhamb', a sacred structure significant to the Satnami community, demanding instead a CBI investigation.

Who are Satnamis?

- Originally, they were a militant sect of Hindu Worshippers.
- Founded by a saint named "Birbhan" in 1657 in Narnaul in Haryana.
- The major religious activity of this sect is to chant and meditate on the true names (Sat-Nam) of God, specially Rama and Krishna.
- This sect is thought to be an offshoot of Ravidasi sect and comprised lower strata of the Hindu society, particularly, leather workers, sweepers, carpenters, Goldsmiths etc.
- The followers of this sect kept their heads shaven (thus called Mundiyas) and abstained from liquor and meat.
- The religious granth of the Satnamis is called Pothi.

Principles and Influence

The Satnamis emphasize three main principles:

- Adorning the attire of a Satnami devotee
- Earning money through proper means
- Not tolerating any injustice or oppression in any form

Satnami Revolt under Aurangzeb:

- Occurred in 1672 during Aurangzeb's reign.
- Triggered by a Mughal soldier killing a Satnami, leading to widespread revolt.
- Reasons included resentment against Aurangzeb's strict Islamic policies: revival of Jizya tax, banning music and art, and temple destruction.
- Initially successful in establishing their administration in Narnaul and advancing towards Shahjahanabad (Old Delhi).
- Suppressed by Aurangzeb personally commanding troops with artillery.

Revival and Leadership under Jagjivandas:

- Revived under Jagjivandas near Lucknow, emphasizing Nirguna worship (worship of an abstract form of God).
- Promoted worship through self-discipline but did not advocate for the elimination of caste, which remains central to Satnami beliefs.

Ghasidas and the Satnam Panth:

- In 1820, Ghasidas founded his own offshoot of the Satnami sect in Chhattisgarh.
- Advocated for social equality and provided a religious and social identity for lower-caste people.

- Defied derogatory treatment by upper-caste Hindus and exclusion from Hindu temple worship.

Jaitkhamb and Giraudpuri:

- Giraudpuri in Baloda Bazar district, Chhattisgarh, birthplace of Ghasidas, is a pilgrimage center.
- Guru Ghasidas Jaitkhamb, a 77-meter-high tower, is a significant landmark and pilgrimage site for Satnamis.
- Jaitkhamb symbolizes their distinct sectarian identity and is an object of worship.

Geographical Distribution and Influence:

- Presently, Satnamis primarily reside in Chhattisgarh, Delhi, and Uttar Pradesh.
- Became a permanent subdivision of Hindus in the Central Provinces during the British period.

Ahilyabai Holkar, an ideal of what a ruler should be, says Mohan Bhagwat

Sub: History

Sec: Medieval India

Tags: Ahilyabai Holkar

Context:

- RSS chief Mohan Bhagwat on May 30 described the late Holkar queen of Indore, Ahilyabai Holkari, as the ideal of what a ruler should be like, in a message marking the 299th birth anniversary of the queen.

About Ahilyabai Holkar:

- Ahilyabai was born into a **Marathi Hindu family to Mankoji Shinde and Sushila Shinde** in the Chaundi village (present-time Ahmednagar district) of Maharashtra, where her father, Mankoji Shinde, a scion of a respectable Dhangar (Gadariya) family, served as the Patil.
- Although women did not go to school back then, **Ahilyabai's father taught her to read and write.**
- **Ahilyabai Holkar (31 May 1725 – 13 August 1795) was the Rani of Indore, within the Maratha Confederacy.**
- She established **Maheshwar (in Madhya Pradesh) as the seat of the Holkar Dynasty.**
- After the demise of her husband Khande Rao Holkar and father-in-law Malhar Rao Holkar, Ahilyabai herself undertook the affairs of the Holkar dynasty.
- She defended the Malwa state against intruders and personally led armies into battle, with Tukoji Rao Holkar as her military commander.
- She was also known for the construction of various **Hindu temples and Dharmashalas across the Indian Subcontinent.**
- She was also known for breaking traditional **gender rules 18th Century in India.**
- **Ahilya Bai resurrected the jyotirlingas across the country as a tribute to Lord Shiva.**
- Renovations in **Somnath, Varanasi, Trambak, Gaya, Pushkar, Vrindavan, Nathdwara, Haridwar, Badrinath, Kedarnath and many other sacred sites were undertaken during her reign.**
- The beautiful Maheshwari saris that we wear today are also part of the queen's legacy.
- Ahilya Bai's rule serves as an example of **inclusive policymaking.**
- She worked to develop her state and uplift her subjects on various levels.

About Rashtriya Swayamsevak Sangh:

- **Rashtriya Swayamsevak Sangh (National Volunteer Organisation)** is an Indian right-wing, Hindu nationalist volunteer paramilitary organization.
- RSS was founded in **1925 by Keshav Baliram Hedgewar, a doctor in the city of Nagpur, British India.**

- The **initial impetus of the organization was to provide character training and instill "Hindu discipline"** in order to unite the Hindu community and establish a Hindu Rashtra (Hindu nation).

Santhal Hul

Sub: History

Sec: Modern India

Context: In Jharkhand, June 30 is observed as Hul Diwas, marking the anniversary of the 1855 Santal rebellion, led by Sido and Kanhu Murmu. Unfortunately, the Hul and its heroes have fallen in the "blindspot of historiography", especially when compared to the Munda uprising, some 45 years later, which got its due recognition

Santhal Rebellion

- The **Santhal rebellion or 'Hul' – literally, revolution – began in 1855**, two years before the uprising of 1857, often referred to as "the first war for Indian independence".
- The Santhal revolt (also known as the Hulrevolt) started on 30th June 1855 in *in the forested hills of Damin-i-koh (present-day eastern Jharkhand),* with the help of prominent leaders like **Sidhu, Kanhu, Chand, and Bhairav, and also their two sisters Phulo and Jhano.**
- The depressed and anguished Santhals engaged in guerrilla warfare against the Britishers and formed their own troops which included the farmers, villagers, and the women.
- In this quest, they were able to capture large parts of land including Rajmahal Hills, Bhagalpur district, and Birbhum.
- They militarized over 10000 Santhal people. The villagers put to fire the storehouses and the warehouses and all forms of communication lines were disrupted.
- It *was against exploitative moneylenders (mahajans)and landowners (zamindars), and their colonial masters. Unfortunately, the Hul has been rather ignored in public history, not only compared to uprisings elsewhere in India, but also compared to the Munda rebellion, some 45 years later.*
- The government applied all possible means to suppress the movement. In order to curb the rebellion, Britishers used heavy loaded weapons against bows and arrows used by the Santhals.
- The landlords were in the support of the government whereas the local people supported the Santhals in full vigour.
- Unfortunately, the duo brother Sidhu and Kanhu were arrested and the revolt had a brutal end.
- The Santhals were repressed and the movement came to an end in 1856.
- So powerful were their clarion calls that both the Santal Hul and the Munda Ulgulan (the 'Great Tumult') ushered in large-scale changes in the revenue administration and justice system.

How was the revolt, different From the Other Revolts?

- **Organized movement**
- The Santhal uprising was an organized movement with good leadership qualities. In a short period of time, it was successful in uniting about 60,000 people.
- If we look at the other spontaneous movement of that time, we find that none of the movements was that well-arranged as the Santhal revolt. The unity of the Santhals shook the nerve of the Britishers.

Use of weapons & Tactics

- Despite the Santhal using bows and arrows against the weapons and artillery used by the Britishers, the guerrilla tactics, which was a new occurrence for Bihar to fight against the Britishers, gave Santhals an upper hand.

Trained leadership

- The prominent leaders of the war, **Sidhu, and Kanhu** in a short span of time, were successful in mobilizing a huge number of people to fight against the cause.

Blow on British powers

- The Santhal rebellion was a blow on the British powers. It was such a fierce movement that Britishers had to implement martial law to quell the powers of Santhals

Growth of Revolutionary Nationalism

- The Santhal revolt fostered a sense of unity among the Santhal tribes.
- It was seen as the beginning of larger wars to free the people from the oppressive British rule.
- This movement resulted in a feeling of nationalism which helped to mobilize people for further wars, like the Revolt of 1857.

Identity of the tribal people

- The Santhal rebellion gave birth to the modern Santhal identity.
- It also promoted the tribal people to protect their culture and tradition from any kind of destruction and interference.

Successful movement

- It was seen that the Britishers did acknowledge their follies, despite the Santhals being defeated
- Further, after the end of the war, the **Santhal Paraganas Tenancy Act** was enacted which provided the tribes some protection against the oppressive British Rule.
- This was successful in inculcating nationalist feelings among the people

IR

India and the U.S. work out strategies to scale up collaboration on critical minerals under iCET

Sub: IR

Sec: Bilateral Relations

India-U.S. Cooperation on Critical Minerals

- **India** and the **U.S**. are aiming to quickly finalize a **bilateral agreement** to **enhance cooperation on critical minerals**.
- The focus is on **supply chains** for **graphite, gallium,** and **germanium**.
- **Key Objectives:**
    - Promote India's role in the **mineral security partnership**.
    - Co-invest in **lithium projects** in **South America** and **rare earth deposits** in **Africa** to diversify supply chains responsibly and sustainably.

India's Strategic Initiatives:

- In July 2023, **India** released a list of **30 critical minerals**.
- India-U.S. Initiative for **Critical and Emerging Technology (iCET)**.
- **Mines and Minerals (Development and Regulation) Amendment Act, 2023:** Amended the **Mines and Minerals (Development and Regulation) Act, 1957,** to facilitate **mineral exploration** and **acquisition**.
- **KABIL: India** has established **Khanij Bidesh India Ltd. (KABIL)**, a joint venture from **three Central Public Sector Enterprises**- National Aluminium Company Ltd, Hindustan Copper Ltd and Mineral Exploration and Consultancy Ltd- to acquire critical mineral assets abroad, focusing on **lithium** and **cobalt** in **Australia, Argentina,** and **Chile**.

Critical mineral list of India

1. Antimony	15. Nickel	iv. Neodymium	20. Rhenium
2. Beryllium	16. PGE	v. Promethium	21. Selenium
3. Bismuth	i. Platinum	vi. Samarium	22. Silicon
4. Cadmium	ii. Palladium	vii. Europium	23. Strontium
5. Cobalt	iii. Rhodium	viii. Gadolinium	24. Tantalum
6. Copper	iv. Ruthenium	ix. Terbium	25. Tellurium
7. Gallium	v. Iridium	x. Dysprosium	26. Tin
8. Germanium	vi. Osmium	xi. Holmium	27. Titanium
9. Graphite	17. Phosphorous	xii. Erbium	28. Tungsten
10. Hafnium	18. Potash	xiii. Thulium	29. Vanadium
11. Indium	19. REE	xiv. Ytterbium	30. Zirconium
12. Lithium	i. Lanthanum	xv. Lutetium	
13. Molybdenum	ii. Cerium	xvi. Scandium	
14. Niobium	iii. Praseodymium	xvii. Yttrium	

International Collaboration:

- **Mineral Security Partnership: India's Ministry of Mines** has joined this **U.S.-led partnership** to **secure critical mineral supply chains** through investments in **resource-rich countries**.
- **Advanced Materials R&D Forum:** A forum to foster collaboration between American and Indian universities, national laboratories, and private sector researchers.
- **Geological Surveys Collaboration:** Collaborative program between the **Geological Survey of India** and the **U.S. Geological Survey** to explore and evaluate rare earth elements and critical mineral deposits.

Research and Development:

- **Technological Collaboration:** Joint efforts in **neodymium-iron-boron metal, alloy,** and **magnet-making technologies.**
- **Research Studies:** Collaboration with **U.S**. entities for beneficiation of **critical minerals** like **lithium, titanium, gallium,** and **vanadium**.

Auction and Exploration

- **E-Auction of Mineral Blocks:** Launched the first tranche of **e-auction** for 20 blocks of critical minerals including **lithium, rare earth elements,** and **nickel**.
- **Exploration Challenges:** Emphasis on the difficulty of exploring and mining deep-seated minerals such as **cobalt, lithium**, and **nickel** compared to surface minerals.

Environmental Goals

- **Green Technologies:** Securing a steady supply of critical minerals is vital for India to scale up green technologies and reduce its carbon footprint.

About the U.S.-India initiative on Critical and Emerging Technology (iCET):

- It was launched by the US President and Indian Prime Minister on the sidelines of the Quad summit in May 2022.
- **Goal:** To **elevate and expand Indo-U.S. strategic technology partnership and defence industrial cooperation** between the governments, businesses, and academic institutions of the two countries.
- The initiative will be **spearheaded by the National Security Council Secretariat** in India and the **US National Security Council.**
- The initiative would help forge links between the government, academia, and industry in areas such as AI, quantum computing, 5G/6G, biotech, space, and semiconductors.
- Under iCET, the **two sides have identified six focus areas of co-development** and co-production:
    - strengthening innovation ecosystems;

- defence innovation and technology cooperation
- resilient semiconductor supply chains
- space
- STEM (science, technology, engineering, and math) talent
- next-generation telecom.

Zambia's Debt Restructuring: A Painful Test Case

Sub: IR

Sec: Int conventions

Duration: Over three-and-a-half years, since Zambia declared bankruptcy.

Restructuring Deal: $13.4 billion debt restructuring under the **G20-led Common Framework**.

Background:

- **Bankruptcy Declaration:** Zambia's formal bankruptcy declaration highlighted the challenges of the G20 Common Framework for debt relief.
- **Historic Achievement:** Recognized by international leaders as a significant moment for multilateral cooperation.

Challenges and Criticisms:

- **Prolonged Process:** The restructuring took nearly four years, causing significant delays and frustrations among all parties involved.
- **Complexity and Transparency:** The process was criticized for its complexity and lack of transparency, with complaints from officials and creditors in Zambia, Ghana, and Ethiopia.
- **Conflict Among Creditors:** Early conflicts arose, notably when China demanded multilateral development banks also incur losses, complicating negotiations.

Key Agreements and Terms:

- **Debt Reduction:** The restructuring will cut about $900 million from Zambia's debt and extend payment terms.
- **Creditor Agreements:** Official sector creditors will reschedule $6.3 billion of loans. Zambia's main bonds, worth $3 billion, will be consolidated with new payment terms.
- **Conditional Payments:** Clauses in the new deals mandate extra payments if Zambia's economic recovery accelerates, potentially risking future debt distress.

Lessons and Improvements:

- **Framework Adjustments:** Lessons from Zambia's experience have led to improvements in the framework, facilitating quicker agreements in other countries like Ghana.
- **Global Cooperation:** Enhanced understanding among creditors and continuous improvements through mechanisms like the Global Sovereign Debt Roundtable.

Differing Perspectives:

While some view Zambia's restructuring as a positive sign of progress, others, like bondholder committee member believe the issues are deeply rooted and complex, highlighting geopolitical tensions between Western nations and China.

Additional Context:

- **Current Crises:** Zambia faces further economic challenges, including a **severe drought,** which has delayed the review of its **IMF Extended Credit Facility** and added a $900 million funding gap.
- **Global Impact:** Zambia's experience serves as a critical test case for future debt restructuring under the Common Framework, with implications for other indebted countries.

Conclusion:

Zambia's arduous journey through debt restructuring under the G20 Common Framework reveals the complexities and necessary improvements in global debt relief mechanisms. While Zambia's case offers valuable lessons, it also underscores the ongoing challenges in managing international debt crises.

IMF Extended Credit Facility (ECF)

The **International Monetary Fund (IMF) Extended Credit Facility (ECF)** is one of the key financial assistance programs provided by the IMF to **support low-income countries facing prolonged balance of payments problems.**

Purpose and Objectives:

- **Financial Assistance:** The ECF provides medium-term financial support to low-income countries to help them stabilize their economies, restore sustainable growth, and reduce poverty.
- **Economic Reforms:** The facility is designed to support countries implementing economic reforms aimed at addressing structural issues, reducing vulnerabilities, and improving economic performance.

Benefits:

- **Stabilization:** Helps countries stabilize their economies by providing financial resources and policy advice.
- **Growth and Poverty Reduction:** Supports measures that promote economic growth and reduce poverty.
- **Confidence Building:** Builds confidence among investors and international donors, often catalyzing additional external financial support.

Challenges and Criticisms:

- **Conditionality:** The ECF often comes with stringent policy conditions, which can be politically and socially challenging to implement.
- **Impact on Social Spending:** Critics argue that fiscal austerity measures required by some IMF programs can negatively impact social spending and public services.

G20 Common Framework

The **G20 Common Framework for Debt Treatments beyond the Debt Service Suspension Initiative (DSSI)** is an international initiative designed to address and alleviate the debt burdens of poorer countries, particularly in the wake of the COVID-19 pandemic.

Purpose and Background:

- **Initiation:** Launched in November 2020 by the G20, in cooperation with the Paris Club, the Common Framework aims to provide a structured approach to debt relief for eligible countries.
- **Predecessor:** It follows the Debt Service Suspension Initiative (DSSI), which provided temporary debt service relief to the poorest countries to help them manage the economic impacts of the pandemic.

Objective: The framework seeks to **ensure fair and coordinated debt treatment among various creditors, including traditional Paris Club members and non-Paris Club creditors like China.**

India achieves an 'outstanding outcome' in FATF mutual evaluation 2023-24

Sub: IR

Sec: Int Conventions

Context:

- **India** achieved an **outstanding outcome** in the **Mutual Evaluation** by the **Financial Action Task Force (FATF) for 2023-24**, placing it in the **"regular follow-up" category,** shared by **only four other G-20 countries.** This marks a significant milestone in **combating money laundering (ML)** and **terrorist financing (TF).**

High Level of Compliance:

- The **FATF plenary** concluded that **India** had reached a **high level of technical compliance** with its requirements, achieving good results in **AML (anti-money laundering), CFT (countering the**

financing of terrorism), and **CPF (counter-proliferation financing) regimes,** including international cooperation and financial intelligence.

- However, **improvements** are needed in **non-financial sectors**, delays in **ML** and **TF prosecutions,** and **implementation of CFT measures** in the non-profit sector.
- The government highlighted that the **FATF recognition** is a testament to **India's rigorous and effective measures** over the last decade to safeguard its financial system.

Efforts made by India to safeguard its financial system:

- The **FATF recognised India's efforts** in mitigating risks from **ML** and **TF,** including **corruption, fraud,** and **organized crime.**
- Measures such as the implementation of the **JAM (Jan Dhan, Aadhaar, Mobile) Trinity** and **stringent regulations on cash transactions** have **increased financial inclusion** and **digital transactions**, making them more traceable.
- Since **2014**, **India** has **enacted legislative changes** and **bolstered enforcement efforts** to tackle **ML, TF,** and **black money,** bringing measures in line with **international standards.** These efforts have **effectively dismantled terror funding networks** and **stemmed the flow of black money and narcotics.**
- The **Department of Revenue** led **India's engagement** with the **FATF** during the **mutual evaluation process,** supported by a **multi-disciplinary team** from various ministries, the **NSCS, state authorities, judiciary, financial sector regulators, self-regulatory organizations, financial institutions,** and **businesses.**
- **India,** a member of the **FATF** since **2010** and part of its **Steering Group,** remains committed to strengthening its **AML/CFT framework** and collaborating with international partners to combat financial crimes.

Benefits of FATF Ratings

- The **high rating** sets a benchmark for the **region** and **enhances India's capacity** to lead the global effort against ML and TF.
- **India's good performance** in the **FATF Mutual Evaluation** enhances the **stability** and **integrity** of its **financial system,** leading to **better access to global financial markets**, **increased investor confidence,** and **support for the global expansion** of the **Unified Payments Interface (UPI)**.

About the Financial Action Task Force (FATF):

- **FATF** is an **intergovernmental organisation** founded in **1989**.
- It is an **initiative** of the **G7 countries** to develop policies to **combat money laundering.**
- In **2001,** its **mandate** was expanded to include **terrorism financing.**
- It has also started **dealing with virtual currencies.**
- It sets **international standards** that **aim** to prevent these **illegal activities** and the harm they cause to society.
- It is a **"policy-making body"** which works to generate the political will to bring about **national legislative** and **regulatory reforms** in **money laundering.**
- It monitors progress in implementing its recommendations through **"peer reviews"** ("mutual evaluations") of member countries.
- The **FATF Secretariat** is located in **Paris.**

Objectives of FATF:

- FATF sets standards and promotes effective implementation of:
- legal, regulatory and operational measures for combating money laundering.
- The FATF works to identify national-level vulnerabilities with the aim of protecting the international financial system from misuse.

Members of FATF:

- The FATF currently comprises 38 member jurisdictions and two regional organisations, representing most major financial centres in all parts of the globe.
- India became an Observer at FATF in 2006. In 2010, India was taken in as the 34th country member of FATF.

FATF's Mutual Evaluation Process:

- The **Mutual Evaluation Process** is a **comprehensive and rigorous assessment** conducted to **evaluate a country's compliance** with **international standards** for **combating money laundering (ML) and terrorist financing (TF).**
- **This process includes:**
    - **Evaluation Team:** A team of experts from FATF member countries conducts the evaluation, analysing the country's measures and their effectiveness in preventing ML and TF.
    - **Assessment Criteria:** The evaluation is based on FATF's 40 Recommendations, which cover a wide range of preventive measures, criminal justice, law enforcement, and international cooperation.
    - **Technical Compliance:** This aspect assesses whether the country's legal and institutional frameworks are in line with FATF standards. It examines the laws, regulations, and other measures in place to combat ML and TF.
    - **Effectiveness:** The evaluation also measures the effectiveness of these frameworks. This involves assessing how well the country implements and enforces its laws and regulations, and how effectively it achieves the desired outcomes in combating ML and TF.
    - **Country Reports:** The findings are compiled into a Mutual Evaluation Report, which provides a detailed analysis of the country's compliance and effectiveness. The report includes ratings and recommendations for improvement.
    - **Follow-Up:** After the evaluation, the country may be placed in follow-up processes to address any deficiencies. This involves periodic reporting to FATF on the progress made in implementing the recommended improvements.
    - **Public Disclosure:** The Mutual Evaluation Report is published, providing transparency and encouraging countries to enhance their AML/CFT (Anti-Money Laundering/Countering the Financing of Terrorism) regimes.

EU vote in closing stretch as far right eyes gains

Sub: IR

Sec: Int groupings

Context:

- The final stretch of **voting** for the **EU's next parliament** occurred on June 9, with early exit polls indicating **gains for far-right parties,** particularly in **Austria** and **Germany**, where it was a significant setback for **Chancellor Olaf Scholz.**

Details:

- The **election** involved over 360 million eligible voters across **27 EU nations**, occurring amidst various global challenges including **Russia's war in Ukraine, US-China trade tensions, climate change**, and the **potential return of Donald Trump** to the **US presidency.**
- There is a **noticeable rise** in **anti-immigrant sentiment** and **populist support** across the bloc.
- This election will influence the selection of the next **European Commission leader,** with **German conservative Ursula von der Leyen** seeking a second term.
- The **Hungarian Prime Minister Viktor Orban** framed the election as a choice between **"pro-peace or pro-war,"** amidst concerns of Russia's threat, particularly in eastern EU countries.

European Parliament:

- The **European Parliament** is an important forum for political debate and decision-making at the EU level.
- The Members of the European Parliament are **directly elected by voters** in all Member States to represent people's interests with regard to EU law-making and to make sure other EU institutions are working democratically.
- The European Parliament is made up of **705 Members** elected in the **27 Member States of the European Union**.
- **President of EP:**
    - The **President** is **elected** for a **renewable term of two and a half years,** i.e. **half the lifetime of a Parliament**.
    - The **President** represents the **European Parliament** vis-à-vis the outside world and in its relations with the other EU institutions.
- **Beside legislative work, MEPs (Members of European Parliament):**
    - oversee the work of the Commission and other EU institutions
    - scrutinise the implementation of EU policies
    - decide on the annual budget together with the Council, and monitor the use of EU funds
    - vote to elect the president of the Commission, and approve the whole line-up of commissioners.
    - have the right to dismiss the Commission.

Elections to European Parliament:

- Elections to the European Parliament take place **every five years** by **universal adult suffrage;** with more than 400 million people eligible to vote, they are the **second largest democratic elections in the world** after **India's**.

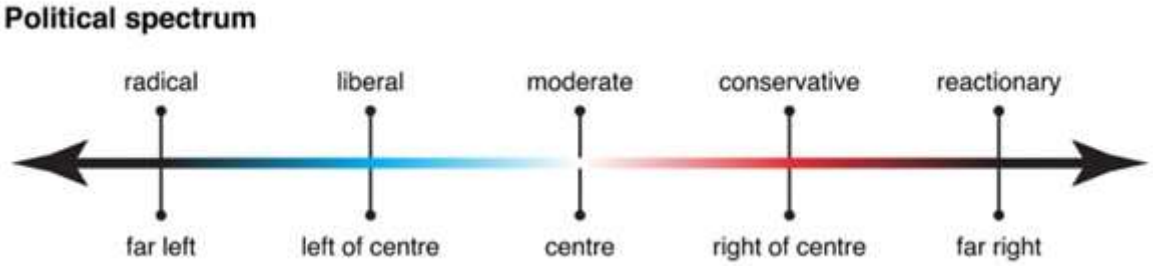
Emergence of far-right wing across Europe:

- In **France, Marine Le Pen**'s National Rally was predicted to secure around **30%** of the vote, significantly outperforming **President Emmanuel Macron**'s liberals.
- **Germany** saw its **highest voter turnout** since **1979** at **64%**, but **Scholz's Social Democrats** lagged behind both the **far-right Alternative for Germany** and the conservative **CDU-CSU bloc.**
- In **Austria**, the **far-right Freedom Party** led the vote count.
- In the **Netherlands**, the **Green-Labour coalition** outpaced the **far-right Freedom Party** of **Geert Wilders.**
- In **Italy,** the ruling **far-right Brothers of Italy party** was expected to come out on top.
- The **far-right's rise** is attributed to **increasing dissatisfaction** with **high living costs** and **immigration.**

Terms:

1. **Far-right politics:**
    - **Far-right politics** include "persons or groups who hold **extreme nationalist, xenophobic, racist, religious fundamentalist, or other reactionary views.**" While the term far right is typically applied to **fascists** and **neo-Nazis,** it has also been used to refer to those to the **right of mainstream right-wing politics**.
2. **Right-wing politics:**
    - It is the **range of political ideologies** that **view certain social orders** and **hierarchies** as **inevitable, natural, normal, or desirable,** typically supporting this position based on **natural law, economics, authority, property, religion, biology or tradition.**
    - **Hierarchy** and **inequality** may be seen as **natural results of traditional social differences** or **competition in market economies**.

3. **Left-wing politics:**
    - It describes the range of political ideologies that **support and seek to achieve social equality and egalitarianism,** often in **opposition to social hierarchy** as a whole or certain social hierarchies.
    - It involves a concern for those in society whom its adherents perceive as disadvantaged relative to others as well as a belief that there are unjustified inequalities that need to be reduced or abolished through radical means that change the nature of the society they are implemented in.
    - Supporters of left-wing politics "claim that human development flourishes when individuals engage in cooperative, mutually respectful relations that can thrive only when excessive differences in status, power, and wealth are eliminated.



Origin of these terms:

- **Left** and **Right** were **coined** during the **French Revolution,** referring to the **seating arrangement** in the **French National Assembly.**
- Those who sat on the **left** generally **opposed the Ancien Régime** and the **Bourbon monarchy** and **supported the Revolution,** the **creation of a democratic republic** and the **secularisation of society** while those on the **right** were supportive of the **traditional institutions of the Ancien Régime**.

India Welcomes Expansion of BRICS: Egypt, Iran, UAE, Saudi Arabia, and Ethiopia Join the Group

Sub: IR

Sec: Groupings

India has expressed strong support for the recent expansion of the BRICS group, which now includes **Egypt, Iran, UAE, Saudi Arabia, and Ethiopia**.

This significant development was marked by a **key meeting of the BRICS Foreign Ministers held in Nizhny Novgorod, Russia.**

Key Highlights of the Meeting:

1. **India's Commitment to Multilateralism**:

- The ministers reiterated their commitment to **multilateralism and upholding international law, emphasizing the importance of the United Nations** (UN) Charter.
- They supported a **comprehensive reform of the UN, including its Security Council, to make it more democratic, representative, effective, and efficient.**

2. **Objectives and Future Goals**:

- The expanded BRICS group aims to **enhance international cooperation to maintain peace and security, advance sustainable development, and promote democracy and human rights.**
- This expansion is expected to bolster BRICS' role in addressing global challenges and fostering a more inclusive international system.

Significance of the Expansion:

- **Geopolitical Impact**:
    - This move could **potentially shift the balance of power in international relations, offering a counterweight to Western-dominated global institutions**.
- **Economic and Developmental Cooperation**:

- The expanded BRICS group aims to **enhance economic cooperation among member countries, focusing on sustainable development** and addressing global challenges such as climate change and poverty.

- **Strategic Alliances**:
  - This can lead to more effective collective action in international forums and negotiations.

Conclusion:

The recent expansion of BRICS, warmly welcomed by India **signifies a major step towards enhancing the group's global influence and cooperation. By including Egypt, Iran, UAE, Saudi Arabia, and Ethiopia, BRICS aims to foster a more democratic, representative, and efficient international system** reinforcing its commitment to multilateralism and sustainable development. This strategic move has the potential to reshape global geopolitics and economic cooperation, positioning BRICS as a formidable force in the international arena.

Analysis-Industry fears EU carbon border tax will penalize British green energy

Sub: IR

Sec: Int Grouping

Context:

- **British wind and solar farms exporting power to continental Europe** could face CO2 fees from 2026 - even though they don't produce any emissions - unless the UK and European Union can agree changes around the EU's carbon border tax.

More on news:

- The charges, set out in a little-noticed clause of the **CO2 levy law, could hit revenues of renewable energy projects in the UK.**
- The extra cost of the charge could make it uneconomic to export excess clean power from Britain to Europe at certain times when demand is weaker, renewables generation is high, and power prices are low.

What is EU Carbon Border Tax:

- The **EU's Carbon Border Adjustment Mechanism (CBAM)** is the EU's tool to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries.
- The **carbon border tax is a levy** proposed by the European Union to protect its domestic industry from cheaper imports from countries where rules imposing low carbon production are not strict.
- The **EU** fears that while its industry would be at a disadvantage because European companies would have to comply with strict rules, those from other countries may not.

Where does India stand with respect to the G-7?

Sub: IR

Sec: Int groupings

The G-7 Summit 2024

Hosted by- Italy at **Borgo Egnazia** in the **city of Fasano** in **Apulia (Italy)**.

Participants:

- **G-7 Members**: U.S., Canada, Germany, France, Japan, U.K., Italy
- **Special Invitees**: India, Algeria, Argentina, Brazil, Jordan, Kenya, Mauritania, Tunisia, Türkiye, UAE
- **Organizations**: African Development Bank, IMF, OECD, UN, World Bank
- **Upcoming Summit**: Scheduled for **2025** in **Canada's Alberta region,** with potential changes in membership and leadership.

Summit Goals:

- Addressing differences between the Western nations and the rest of the world.
- Committing an **additional $50 billion**, utilizing **frozen Russian funds**.
- Hosting the **"Energy for Growth in Africa" summit** to promote clean energy investments.
- **Global Issues**: Tackling migration, climate change, and artificial intelligence challenges.
- **Trade Practices**: Condemning China's coercive trade behaviours.
- **Engagement with Global South**: Discussing concerns through the **"G-7 Outreach"** program.

Importance of India:

- India is a significant member of the **Global South** and has hosted the "**Voice of Global South"** conference since 2023. It is also a member of the **G-20 Troika**, along with **Brazil** and **South Africa**.

Historical Context and Evolution of G7:

- The **G7** originally began as the **Group of Six (G6)** in **1975**, consisting of the **United States, France, Italy, Japan, the United Kingdom,** and **West Germany.**
- **Purpose:** The primary aim was to address significant economic issues like inflation and the global recession that followed the Organisation of the Petroleum Exporting Countries (OPEC)'s oil embargo in **1973-74.**
- **Expansion:** Canada joined the group in 1976, leading to its transformation into the G7, and **Russia joined in 1997**, temporarily expanding it to the **G8**; however, it was **excluded in 2014** following its **annexation of Crimea**.
    - **Since 1981,** the **European Union** has been involved in **G7 meetings**, represented by the **Presidents of the European Council** and the **European Commission.**
    - The **EU participates** in the **group's work** but **does not hold the rotating presidency**.

Functioning of the G7:

- **Membership criteria:** No formal membership criteria exist, but the nations are typically wealthy democracies.
- **Structure:** The G7 lacks a formal institutional structure. It does not have a charter or a permanent secretariat.
- **Presidency:** The presidency of the G7 rotates annually among the member countries.
- The president of the country is responsible for setting the agenda of the summit and organising the meetings.
- **Sherpas:** These ministers or envoys prepare the groundwork for the summit through policy discussions and meetings.
    - Sherpas are responsible for overseeing the negotiations and drafting the Group's final communiqué.
    - The process incorporates contributions from various tracks, including Political Directors, Foreign Affairs Sous-Sherpa (FASS) and the Finance-Deputies.

Rise in Indian Coffee Exports in Response to EUDR

Sub: IR

Sec: Grouping

Context:

Indian coffee exporters have experienced a surge in demand from European buyers. This trend is attributed to the **upcoming European Union Deforestation Regulation (EUDR), which aims to minimize the importation of products linked to deforestation**.

EUDR Overview

- **Objective:** To **reduce deforestation by enforcing strict due diligence and traceability require**ments for commodities like **coffee.**

- **Implementation Deadline:** Businesses must comply with the EUDR requirements by December 30, 2024.
- **Products Covered: cattle, cocoa, coffee, oil palm, rubber, soya, and wood.**

Impact on Coffee Exports

- **Increase in Demand:** European buyers are building up their inventories ahead of the EUDR compliance deadline.
- **Shift in Strategy:** Traditionally, buyers followed a just-in-time strategy for procurement. Now, due to EUDR, they are shifting towards maintaining higher inventory levels.

Export Statistics

- **Overall Growth:** Coffee shipments from India increased by 16% to over 237,000 tonnes from January 1 to June 21 this year, compared to 204,000 tonnes in the same period last year.
- **Re-exports Growth:** Re-exports grew by 18.3% to 53,497 tonnes during this period, up from 45,213 tonnes last year.
- **India-grown Coffee:** Shipments of India-grown coffee increased by 15% to over 183,000 tonnes, compared to 159,000 tonnes a year ago.

Exporters' Perspective

- **Inventory Build-up:** Exporters report that European customers are front-loading coffee orders and preferring to hold more inventory due to the EUDR regulations.

Market Position

- **Global Standing:** India is the **seventh-largest producer and the fifth-largest exporter of coffee**, following **Brazil, Vietnam, Colombia, and Indonesia.**
- **European Market:** Over two-thirds of Indian coffee is exported, with about 60% destined for Europe. Italy, Germany, and Belgium are the major buyers.

Conclusion

The EUDR is driving a significant shift in the coffee export landscape, with European buyers moving away from just-in-time procurement to **building larger inventories to ensure compliance with upcoming regulations. Indian coffee exporters are benefiting from this increased demand but continue to face logistical challenges.**

European Union Deforestation Regulation (EUDR)

The EUDR aims to **remove deforestation from the supply chains of everyday items** in the EU. This regulation seeks to ensure that **products imported into the EU do not contribute to deforestation, promoting sustainable land use** and environmental protection.

Legislation

- **Adoption:** The legislation was adopted in Brussels in 2023.
- **Target Year:** The target year for full compliance is 2030.
- **Focus Areas:** Biofuels, palm oil, and deforestation are key areas under the Palm Oil Policy and Deforestation Legislation.

Key Requirements

- **Deforestation-Free Products:** Firms must ensure that products exported to the EU have been grown on land that has not been deforested after December 31, 2020.
- **Due Diligence and Traceability:** The regulation imposes strict due diligence and traceability requirements for commodities such as coffee, cocoa, soy, palm oil, rubber, wood, and cattle.
- **Administrative Burdens:** Palm oil exporters, in particular, face significant administrative burdens to meet the EUDR requirements.

Compatibility and Impact

- **WTO Compatibility:** The EUDR is not compatible with **World Trade Organization (WTO)** rules and is considered a non-tariff barrier.

- **Impact on Exporters:** Exporters, particularly from developing countries, face increased administrative and compliance costs to meet the stringent requirements of the EUDR.

PM congratulates H.E António Costa on being elected as President of the European Council

Sub: IR

Sec: Int groupings

President of EC:

- The **President of the European Council** is **elected** by its members through a **qualified majority vote** for a **once-renewable term** of **two and a half years.**
- **Article 15** of the **Treaty on European Union (TEU)** identifies his duties. It is the **Heads of State or Government** who vote for this office.

European Council:

- The **European Council** is the **EU** institution that defines the general political direction and priorities of the **European Union.**
- **Member:**
    - The members of the **European Council** are the **heads of state or government of the 27 EU member states,** the **European Council President** and the **President of the European Commission**.
- The **European Council** defines the **EU's** overall political direction and priorities, traditionally by adopting conclusions. It **does not negotiate** or **adopt EU laws**.
- While the **European Council** has **no legislative power,** it is a **strategic (and crisis-solving) body** that provides the **union** with **general political directions** and **priorities** and acts as a **collective presidency.**
- The **European Commission** remains the **sole initiator of legislation,** but the **European Council** provides a guide to legislative policy.
- The meetings of the **European Council,** still commonly referred to as **EU summits,** are chaired by its **president** and take place **at least twice every six months;** usually in the Europa building in **Brussels.** Decisions of the **European Council** are taken by consensus, except where the Treaties provide otherwise.

Creation of the European Council:

- Following the **Copenhagen summit** in **December 1973,** which made provision for summits to be held whenever necessary, the **Paris summit** of **December 1974**, hosted by **President Valéry Giscard d'Estaing,** created the **European Council.**
- It was created to establish an informal forum for discussion between **heads of state** or **government**.
- **Lisbon Treaty:**
    - The **Treaty of Lisbon** entered into force, reforming the **structure of the EU** and how it functions.
    - It extends the use of **qualified majority voting** at the **Council.**
    - The **European Council** becomes a **fully-fledged institution** with its own **President.**
        - Previously, the **European Council** had been an **informal body** and the **head of the European Council** was an **unofficial position**.
    - The role was held by the head of state or government of the member state holding the rotating presidency of the Council of the EU.

World Health Assembly defines pandemic emergency, pledges improved access to medical products & financing

Sub: IR

Sec: Int org

Context:

- Member countries of the **World Health Organization (WHO)** have adopted crucial **amendments** to the **International Health Regulations (IHR)** at the recently concluded **77th World Health Assembly.**
- These alterations include **defining** a **"pandemic emergency"** as well as pledging improved access to medical products and financing.

Details of Amendments to the International Health Regulations (IHR):

- **Definition of Pandemic Emergency**:
  - The **pandemic emergency** is being Defined to allow for more effective international collaboration in response to events that are on the verge of becoming, or have already become pandemics.
  - The **pandemic emergency definition** represents a **higher level of alarm** and builds on the **IHR's existing mechanisms,** such as the determination of a public health emergency of international concern.
- **Improved National Capacities**:
  - Enhancements aim to strengthen individual countries' abilities to detect and respond to future outbreaks.
  - Focus on better disease surveillance, information sharing, and response plans.
- **Global Health Threats and Equity**:
  - Emphasizes that health threats transcend national borders.
  - Prioritizes equitable access to resources for all countries to prepare and respond effectively.

Structural Changes:

- **States Parties Committee**:
  - Established to **ensure effective implementation** of the amended **IHR**.
  - Facilitates coordination among countries.
- **National IHR Authorities**:
  - Created to improve regulation implementation within and between countries.

Ongoing Initiatives

- **Pandemic Agreement**:
  - Member countries committed to working on a proposed agreement to enhance international coordination, collaboration, and equity in pandemic preparedness and response.
- **Intergovernmental Negotiating Body**:
  - The mandate was extended to finalize the **Pandemic Agreement** by the **World Health Assembly** in **2025**, with a potential special session in 2024 to expedite the process.

Current International Health Regulations (IHR):

- Came into existence in **2005**
- Adopted after the **2002/3 SARS outbreak**
- **Obligates** countries to **report public health events** with **potential cross-border impact** and includes measures on trade and travel.
- **Inadequacies:** Effective for **regional epidemics (**such as **Ebola)** but **insufficient for global pandemics (Eg.-** Covid-19**).**

Changes to Global Health Rules:

- **Recent update in the IHR:**
    - **New Alerts System:** Introduces **different risk levels** for outbreaks, including an **"early action alert"** and a **"pandemic emergency"** for severe threats.
        - Currently, the **WHO** has **only one level** of emergency – a **public health emergency of international concern (PHEIC)**. The new system envisages an **intermediary stage** called an **"early action alert"**.
    - **Strengthening Obligations:** Enhances state obligations to report public health events from **"may"** to **"should".**

UN to add Israel, Hamas to the global list of offenders that harm children

Sub: IR

Sec: Int Org

U.N. Secretary-General's Upcoming Report on Israel and Hamas:

- The **secretary-general annually** makes a **global list of states and militias** that are **menacing children and threatening them**.
- Parties on the list have ranged from the **Kachin Independence Army** in **Myanmar** to — last year — **Russia** during its war with Ukraine.
- Now **Israel** is set to join them.

Key Points

- Both **Israel** and **Hamas** are accused of **violating children's rights** during their ongoing conflict.
- **Security Council**: The list is sent to the **Security Council**, where action can be debated, though past actions against listed parties, like Russia, have seen no council intervention due to geopolitical dynamics.
- **Humanitarian Concerns**: U.N. agencies warn of worsening hunger and starvation in Gaza due to the conflict and restrictions on humanitarian aid.
- An analysis found a decline in the proportion of women and children killed in Gaza, contrary to public statements by the Gaza Health Ministry. This shift aligns with changes in Israeli battlefield tactics.

Reactions:

- **Israel's Response**:
    - Outrage from Israeli officials, including **U.N. Ambassador Gilad Erdan and Prime Minister Benjamin Netanyahu,** who **criticized the U.N.** decision.
    - Israel argues that the inclusion might embolden Hamas and prolong the conflict.
- **Palestinian Response**:
    - **Palestinian U.N. Ambassador Riyad Mansour** supported the inclusion as a step towards accountability for Israel's actions against Palestinian children.

UNSC endorses ceasefire resolution to end Gaza war

Sub: IR

Sec: Int Org

Context:

- The **UN Security Council** overwhelmingly approved its **first resolution** endorsing a **ceasefire plan** aimed at ending the eight-month war between **Israel and Hamas** in **Gaza Strip**.

Details:

- The **U.S.-sponsored resolution** welcomes a ceasefire proposal announced by President Joe Biden that the United States says Israel has accepted.
- It calls on the **militant Palestinian group Hamas** to accept the **three-phase plan**.

- The resolution — which was approved with 14 of the 15 Security Council members voting in favour and Russia abstaining — calls on **Israel** and **Hamas** "to fully implement its terms without delay and without condition."

What is the UNSC Gaza ceasefire resolution?

- **It divides the ceasefire into three phases:**

Phase one entails **six weeks of negotiations** and the release of Israeli captives held in Gaza in exchange for Palestinian prisoners in Israeli jails.

- **"An immediate, full and complete ceasefire"** would come into force during this phase.
- Additionally, Palestinian civilians would be able to return to their homes across Gaza, including the north. This phase would also focus on humanitarian aid for Palestinian civilians in need.
- Moreover, Israeli forces would withdraw from the **"populated areas"** of Gaza.
- If the negotiations exceed the six-week period, the ceasefire would continue.

Phase two calls for a **permanent end to hostilities,** the release of any remaining captives and a **"full withdrawal" of Israeli forces from Gaza**.

Phase three would involve the **reconstruction of Gaza** over multiple years and the return of the remains of any deceased captives still in Gaza.

- The **resolution rejects any demographic or territorial change in Gaza,** "including any actions that reduce the territory" of Palestine.
- A previous draft of the revolution specified that this included **"buffer zones"** in Gaza, but the language was amended.
- Palestinians and activists have expressed fears that Israel is planning to expel Palestinians from Gaza, similar to what happened during the **Nakba** in the **late 1940s** during the **creation of Israel**.

Visakhapatnam Port Makes it to Global Top 20 List Riding on Container Performance

Sub: IR

Sec: Int org

Key Highlights:

- **Significant Improvement**: Visakhapatnam Port leaped from **115th place in 2022 to 19th place in 2023** in the Container Port Performance Index (CPPI).
- **Top Performance Metrics**:
    - **Moves per Crane Hour**: 27.5
    - **Turnaround Time (TRT)**: 21.4 hours
    - **Minimal Berth Idle Time**

- **Strong Performance**: These metrics indicate high efficiency in handling container ships, significantly influencing customer preference.

Achievements:

- **India's Representation**: Nine Indian ports made it to the Global Top 100 in the CPPI 2023.
    - **Other Indian Ports in Top 100**:
        - **Pipavav (41)**
        - **Kamarajar (47)**
        - **Cochin (63)**
        - **Hazira (68)**
        - **Krishnapatnam (71)**
        - **Chennai (80)**
        - **Jawaharlal Nehru (96)**
        - **Mundra (27) (improved from 48 last year)**

Future Goals:

- **Expansion Plans**: Visakhapatnam Port aims to achieve **over a million TEUs** for FY 2025-26.
- **Collaboration**: Strong collaboration with stakeholders is key to future success.

Conclusion:

The **Container Port Performance Index (CPPI),** developed by the **World Bank** and **S&P Global Market** Intelligence, **measures the resilience, efficiency, and overall performance of ports. Visakhapatnam Port's dramatic rise in ranking showcases its operational excellence and strategic importance in global maritime trade.**

Container Port Performance Index (CPPI) Overview

- The Container Port Performance Index (CPPI) is a comprehensive benchmarking tool developed by the **World Bank** and **S&P Global Market Intelligence.**
- It assesses the efficiency, resilience, and overall performance of container ports worldwide.

Key Metrics Assessed:

- **Moves per Crane Hour**: This metric measures the productivity of port cranes in handling containers.
- **Turnaround Time (TRT)**: The average time a ship spends in port from arrival to departure, indicating the port's operational efficiency.
- **Berth Idle Time**: The time a berth remains unutilized, which affects the overall efficiency of the port.

Purpose and Significance:

- **Global Benchmarking**: Provides a global ranking of container ports, highlighting the top-performing ports in terms of operational efficiency.
- **Performance Improvement**: Ports use the CPPI to identify areas for improvement and enhance their operational practices.
- **Investment Decisions**: Investors and stakeholders use the CPPI for informed decision-making regarding port investments and development projects.
- **Competitiveness**: Helps ports enhance their competitiveness by aligning with global best practices and standards.

ICC issues arrest warrants for Russian army chief, former defence minister

SUB: IR

SEC: Int org

Context: The International Criminal Court on Tuesday said it had issued arrest warrants for Russia's Army chief and former Defence Minister over strikes on Ukrainian infrastructure that constituted alleged war crimes

- The International Criminal Court ("the ICC" or "the Court") is a **permanent international court established to investigate, prosecute and try individuals** accused of committing the most **serious crimes of concern to the international community** as a whole, namely the crime of **genocide, crimes against humanity, war crimes and the crime of aggression**
- On 17 July 1998, 120 States adopted the **Rome Statute of the International Criminal Court** establishing the
- The International Criminal Court **is not a substitute for national courts**. According to the Rome Statute, it is the **duty of every State to exercise its criminal jurisdiction over those responsible for international crimes**.
- The International Criminal Court **can only intervene where a State is unable or unwilling genuinely to carry out the investigation and prosecute the perpetrators**.
- The ICC is **an independent body** whose mission is to try individuals for crimes within its jurisdiction without the need for a special mandate from the United Nations.
- The International Criminal Court (ICC) investigates and, where warranted, tries individuals charged with the gravest crimes of concern to the international community: **genocide, war crimes, crimes against humanity and the crime of aggression.**
- The ICC, based in The Hague, does not have its own police force to enforce arrest warrants. It relies on the justice systems of its 124 members to carry them out. In theory, anyone under a warrant is prevented from travelling to an ICC member state for fear of arrest.

Sri Lanka's Debt Restructuring Deal

Sub: IR

Sec: Int org

Context:

- In the wake of an unprecedented financial crash in 2022, Sri Lanka faced a severe debt crisis, leading to a default on its external debt.

Recent Developments:

- **Debt Restructuring Agreement:** Sri Lanka announced a final agreement with the Official Creditor Committee (OCC) to **restructure $5.8 billion of its bilateral debt**. The OCC includes 17 countries such as India and members of the Paris Club, like Japan.
- **Significance:** The agreement aims to provide significant debt relief, allowing Sri Lanka to allocate funds to essential public services and secure concessional financing for development needs.

Private Creditors:

- **Pending Negotiations:** Sri Lanka is still in the process of reaching an agreement with its bondholders. The second round of direct talks to finalize the treatment of $12 billion owed to private creditors is scheduled this week. These creditors hold the largest portion of Sri Lanka's external debt through international sovereign bonds.

IMF's Role:

- The International Monetary Fund (IMF) emphasizes the necessity of timely debt restructuring as a critical component of Sri Lanka's economic recovery program.

Impact on Population:

- Despite ongoing negotiations and agreements, large sections of the Sri Lankan population continue to suffer from the effects of the financial crisis.

Conclusion

Sri Lanka's recent agreements with bilateral lenders, including India and China, mark significant steps toward addressing its debt crisis**. However, the country still faces substantial challenges in reaching agreements**

with private creditors and achieving economic stability. The involvement of the IMF underscores the importance of these restructuring efforts in Sri Lanka's broader economic recovery plan.

Official Creditor Committee (OCC)

- **Formation:** The OCC was formed in response to Sri Lanka's request for debt treatment during the economic crisis last year.
- **Co-Chairs:** The committee is co-chaired by India, Japan, and France (the chair of the Paris Club).
- **China's Participation:** Although China is Sri Lanka's largest bilateral creditor, it chose not to participate in the OCC but attended meetings as an observer.

India's Assistance to Sri Lanka

- **Financial Support:** India provided $4 billion in assistance under the 'Neighbourhood First' policy, using credit lines and currency support.
- **IMF Financing Assurance:** India was the first bilateral creditor to convey financing assurance to the IMF, facilitating a formalized program for Sri Lanka.
- **Vision Document for Economic Partnership:** India released a comprehensive vision document outlining specific areas of cooperation for sustainable economic development and prosperity in Sri Lanka.
- **Special Grant Package:** During President Ranil Wickremesinghe's visit to India, a special grant package of SLR 3 billion was announced for multi-faceted projects in the Indian Ocean Territory (IOT) community.

Paris Club

What is it?

1. **Informal Group of Creditor Countries:** The Paris Club is an informal group of creditor countries whose role is to find coordinated and sustainable solutions to the payment difficulties experienced by debtor countries.
2. **History:** It was gradually created starting in 1956, when the first negotiation between Argentina and its public creditors took place in Paris.

Member Countries

1. **Permanent Members:** The Paris Club currently has 22 permanent members: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Japan, Netherlands, Norway, Russia, South Korea, Spain, Sweden, Switzerland, the United Kingdom, and the United States.
2. **OECD Membership:** All member countries are also members of the Organisation for Economic Co-operation and Development (OECD).
3. **India's Status:** India is not a member of the Paris Club.

Key Features

1. **Principles of Consensus and Solidarity:** The Paris Club operates on the principles of consensus and solidarity. Any agreement reached with the debtor country applies equally to all its Paris Club creditors.
2. **Basis for Bilateral Arrangements:** The outcome of the negotiation is not a legally binding agreement but forms the basis for legally binding bilateral arrangements between the debtor country and its Paris Club creditor countries.

Russia approves draft logistics agreement to be signed with India

Sub: IR

Sec: Msc

India-Russia Mutual Logistics Agreement:

- The **India-Russia mutual logistics agreement**, delayed for several years, is now ready for conclusion with **Russia** approving the draft agreement.

- The agreement will **simplify military-to-military exchanges for exercises, training, port calls,** and **Humanitarian Assistance and Disaster Relief (HADR)** efforts.

Agreement Features:

- Known as the **Reciprocal Exchange of Logistics Agreement (RELOS),** it will be **valid for five years** and **renew automatically unless terminated by either party.**
- **Defence cooperation** between **India** and **Russia** includes interaction between troops and the development and supply of military equipment, guided by a military-technical cooperation agreement for **2021-2031**.
- **Strategic Importance**:
    - The agreement will provide **India** access to **Russian facilities** in the **Arctic region,** crucial as **new shipping routes** open and **India**'s investments in **Russia's eastern regions** increase.

Comparison and Mutual Benefits:

- **India** has signed **similar logistics agreements** with countries including **the U.S., France, Singapore, South Korea,** and **Vietnam.**
- These agreements facilitate access to military facilities for fuel and provisions, enhancing logistical support and operational turnaround.
- The **Indian Navy** has significantly benefited from such agreements, improving interoperability and operational efficiency.
- The agreements with **the U.S., Australia,** and **Japan** have been particularly advantageous due to **common military platforms**.
- The **U.K.** has also leveraged its **logistics agreement** with **India** to **expand maritime cooperation,** benefiting **Royal Navy** and **Royal Air Force operations** in the region.

Russia:

- **Bordering countries:** Along the **20,139-kilometre land frontier, Russia** has boundaries with **14 countries:** Poland and Lithuania (both via Kaliningrad Oblast), Norway, Finland, Estonia, Latvia, Belarus, Ukraine, Georgia, Azerbaijan, Kazakhstan, China, Mongolia, and North Korea.
- Approximately two-thirds of the frontier is bounded by seawater.

India joins U.S.'s Red Flag air and RIMPAC naval exercises

Sub: IR

Sec: Places in news

Exercise Red Flag:

- **Multinational air exercise Red Flag, Alaska (USA)**, May 30 - June 13, 2024.
- **Indian Air Force (IAF)** will participate.
- **Deployment**:
    - **Aircraft**: 8 Rafale fighters, 3 C-17 transport aircraft, 2 IL-78 mid-air refuelling aircraft.

- **Transit**: Staging halts in **Greece** and **Portugal**.

- **Objective**: To integrate aircrews in a multinational environment and provide advanced aerial combat training.
- **Participants**: Approximately 3,100 service members and over 100 aircraft from 4 nations.
- **Operations**: Conducted over the **Joint Pacific Alaska Range Complex,** the **largest combat training range** in the world.
- **IAF History**: Previous participation included **SU-30MKI fighter jets.**

Exercise RIMPAC:

- **Event**: **Rim of the Pacific (RIMPAC), Hawaii,** June 25 - August 2, 2024.
- **Indian Navy** will participate.
- **Deployment**: Indigenous stealth frigate **INS Shivalik.**
- **Objective**: Enhance interoperability with the **Japan Maritime Self-Defense Force (JMSDF), US Navy,** and **other partner navies.**
- **Participants**: 29 nations, 40 surface ships, 3 submarines, 14 national land forces, over 150 aircraft, and more than 25,000 personnel.
    - This year's participants in **RIMPAC** include forces from Australia, Belgium, Brazil, Brunei, Canada, Chile, Colombia, Denmark, Ecuador, France, Germany, India, Indonesia, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Peru, the Republic of Korea, the Republic of the Philippines, Singapore, Sri Lanka, Thailand, Tonga, U.K. and the U.S.
- **Scope**: The world's largest international maritime exercise, held **biennially** since **1971**.

Japan-India maritime exercise JIMEX-24:

- **Indian Navy** said that **INS Shivalik,** mission deployed to the **South China Sea** and **Pacific Ocean**, departed **Singapore** on May 30 for onward passage to **Yokosuka, Japan** to participate in **Japan-India maritime exercise JIMEX-24** scheduled to be held mid-June and then onward to **RIMPAC-24**.

Israel prepared for Lebanon border operation: Netanyahu

Sub: IR

Sec: Places in news

Context:

- Prime Minister Netanyahu stated that **Israel** is ready for a **very intense operation** along the **Lebanon border.**

Details:

- **Israeli troops** and **Hezbollah fighters** have exchanged near-daily fire.
- Hezbollah reported multiple attacks on Israeli positions, including a guided missile strike on an **Iron Dome platform**.

Who is Hezbollah and how was the group founded:

- Hezbollah means **'Party of God'**, is a **Shiite Islamic militant organization** in **Lebanon**, and is known as one of the **world's most heavily armed non-state actors**.
- Emerging during the **Lebanese Civil War,** it formed partly in response to the Palestinian presence and Israeli invasions in southern Lebanon.
- Inspired by **Iran's theocratic government,** Hezbollah received financial support and training from **Iran's Islamic Revolutionary Guard Corps** (IRGC).
- This underscores the regional rivalry **between Sunni-dominated Saudi Arabia and Shia-dominated Iran.**
- The group is estimated to receive s**ignificant funding** from Iran and possesses a diverse arsenal of weaponry, including rockets and missiles.

What are Hezbollah's aims:

- Hezbollah **opposes Israel and Western influence** in West Asia.
- It **supports the Syrian government** and holds political influence in Lebanon.

Some facts about Lebanon:

- It is a **Western Asian nation,** sharing borders with **Syria to the north and east** and **Israel to the south, with Cyprus** situated to its **west across the Mediterranean Sea.**
- Its location is at the **crossroads of the Mediterranean Basin and the Arabian hinterland**.
- **Beirut** is the capital of Lebanon.
- The border with the **Israeli-occupied Golan Heights** is disputed by Lebanon in a small area called **Shebaa Farms.**

What to know about Russia's growing footprint in Africa

Sub: IR

Sec: Places in news

Russia's Influence Expansion in Sub-Saharan Africa:

- Russia is increasing its influence in **Africa,** particularly in the **sub-Saharan Sahel region**, through **military assistance** and **security partnerships,** primarily **displacing traditional Western allies** like **France** and the **United States**.

Sab Saharan Africa:

- **Sub-Saharan Africa, Sub Sahara**, or **Non-Mediterranean Africa** is the area and regions of the **continent of Africa** that **lie south of the Sahara.**
- These include **Central Africa, East Africa, Southern Africa, and West Africa.**

Sahel region:

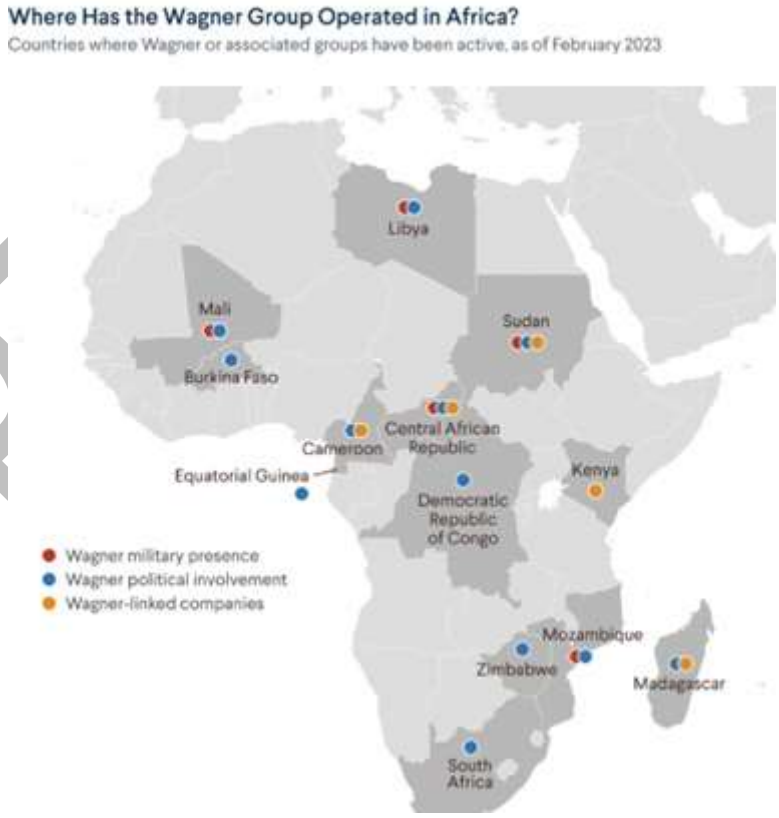
- The **Sahel region** or **Sahelian acacia savanna** is a **biogeographical region** in Africa.
- It is the **transition zone** between the **more humid Sudanian savannas** to its **south** and the **drier Sahara to the north.**
- The Sahel has a **hot semi-arid climate** and stretches across the **southernmost latitudes of North Africa** between the **Atlantic Ocean** and the **Red Sea.**
- Although geographically located in the **tropics,** the **Sahel does not have a tropical climate.**

Recent Diplomatic Efforts:

- Russian Foreign Minister Sergey Lavrov toured **Guinea, the Republic of Congo, Burkina Faso,** and **Chad.**
- Lavrov's visits signify **Moscow**'s intention to **strengthen military cooperation with African nations**.
- **Military Cooperation:**
    - Russia uses private security companies like **Wagner** and its potential successor, **Africa Corps,** to provide military support.
    - Russian mercenaries assist in **protecting African leaders** and **combating extremist groups.**
    - The **Polish Institute of International Affairs** highlighted **Russia's creation of the Africa Corps** to assertively expand its military presence in Africa.
- **Political Dynamics:**
    - **Russia** seeks **political support** or **neutrality** from **African nations** regarding its **invasion of Ukraine.**
    - **African nations,** forming the **largest voting bloc at the United Nations,** have shown **divided stances** on **resolutions condemning Russia's actions in Ukraine.**
    - **Russian-linked entities** have been **spreading disinformation** to undermine **African ties with the West,** as documented by the **Africa Centre for Strategic Studies.**

Reasons for African Nations Turning to Russia:

- **Political unrest** and **dissatisfaction with former colonial powers,** especially **France,** have led some African countries to seek new alliances.
- **Military coups** in **Mali, Niger,** and **Burkina Faso** ousted pro-Western governments, turning to **Russia** for **non-interfering security assistance.**
- Moscow exchanges military support for **access to mineral resources**.



Resources and Economic Interests:

- **Africa's rich mineral resources,** including **cobalt, lithium, gold, diamonds,** and **oil,** are **central** to **global economic and national security.**

- **Russia** has secured **mining deals** in **countries with limited governance,** such as **gold and diamonds** in the **Central African Republic, cobalt in Congo,** and **uranium in Namibia.**
- Despite its growing role in the **oil and mining sectors, Russia** remains a **minor trading partner for Africa,** with **less than 1% of Africa's exports going to Russia** compared to **33% to the European Union.**

Russian Mercenary Operations in Africa:

- **Wagner's** presence in Africa began in **2017** in **Sudan,** supporting then-President Omar al-Bashir in **exchange for gold mining concessions.**
- Russian contractors supported **Libyan commander Khalifa Hifter** and provided **security** in the **Central African Republic** in exchange for **access to gold and diamond mines.**
- **Military juntas** in **Mali, Burkina Faso,** and **Niger,** critical of the West, have expelled Western forces and invited Russian military support.
- **Niger's junta** recently ordered the **US to withdraw** its troops and close a significant military base, leading to the arrival of Russian trainers and new defence equipment.

The 80th anniversary of D-Day

Sub: IR

Sec: Places in news

Context:

- Events are taking place around the world to commemorate the **80th anniversary of the D-Day landings** in **Normandy, France**.

Details:

- On **June 6, 1944**, tens of thousands of **Allied troops** landed on **five stretches** of the **Normandy coastline**, codenamed **Utah, Omaha, Gold, Juno** and **Sword.**
- It was the **largest amphibious invasion in history** and launched a campaign that laid the **foundations for the Allied defeat of Nazi Germany in World War II.**

Normandy Landings:

- **Date:** 6 June 1944
- **Codename: Operation Neptune,** commonly known as **D-Day**
- **Context:** Part of **Operation Overlord** during **World War II**
- **Significance:** Largest seaborne invasion in history; began the liberation of France and Western Europe, contributing to Allied victory on the Western Front.

Planning and Deception:

- **Planning Initiation:** 1943
- **Operation Bodyguard** aimed to **mislead Germans** about the invasion date and location.
- The invasion was **delayed by 24 hours** due to **poor weather;** a further delay would have postponed the operation by at least two weeks due to specific requirements for the moon phase, tides, and time of day.

Commanders:

- **German Forces: Field Marshal Erwin Rommel,** under **Adolf Hitler's** command, fortified the **Atlantic Wall.**
- **Allied Forces: Major General Dwight D. Eisenhower,** appointed by **U.S. President Franklin D. Roosevelt.**

Invasion Details:

- **Initial Assault:** Extensive aerial and naval bombardment, followed by the landing of 24,000 American, British, and Canadian airborne troops.
- **Amphibious Landings:** Began around 06:30 on a 50-mile (80 km) stretch of the **Normandy coast,** divided into **five sectors: Utah, Omaha, Gold, Juno, and Sword.**
- **Challenges:** Strong winds displaced landing crafts, and troops faced heavy fire, mines, and obstacles such as wooden stakes, metal tripods, and barbed wire.

Beach Sectors and Outcomes:

- **Utah and Omaha:** Landing crafts were significantly displaced eastward.
- **Omaha:** Highest casualties due to high cliffs and heavy fortifications.
- **Gold, Juno, and Sword:** Fortified towns were cleared with house-to-house fighting; specialised tanks disabled major gun emplacements at Gold.

First-Day Goals and Casualties:

- **Unachieved Goals:** Key towns (Carentan, Saint-Lô, Bayeux) and the major objective Caen (captured on 21 July) remained in German hands.
- **Beachhead Connection:** Only Juno and Gold linked on the first day; all five connected by 12 June.
- **Casualties:** German casualties estimated at 4,000 to 9,000; Allied casualties documented at least 10,000, with 4,414 confirmed dead.

Outcome:

- Despite not achieving major objectives on the first day, the operation established a foothold that the Allies expanded in the following months.

Thousands rally in Armenia against PM

Sub: IR

Sec: Places in news

Context:

- Thousands of Armenians protested in **Yerevan** against **Prime Minister Nikol Pashinyan**'s decision to **return territory to Azerbaijan,** a move seen as a concession to the long-time rival.

Details:

- The controversy follows **Armenia**'s recent **return of four border villages to Azerbaijan,** a decision defended by Pashinyan as a peace effort following two wars over the **Nagorno-Karabakh region**.

Armenia- Azerbaijan conflict:

- **Nagorno-Karabakh,** known as **Artsakh** by **Armenians**, is a **landlocked mountainous area** in the **Caucasus region** (the **transcontinental region** between the **Black Sea** and the **Caspian Sea**).
    - It is **internationally** recognised as part of **Azerbaijan** but its **inhabitants** are predominantly **ethnic Armenians**.

- They have their own government which has enjoyed close links to **Armenia**'s but has not been officially recognised by Armenia or any other country.

- The **conflict** dates back to the late **1980s** when the region declared its independence from Azerbaijan as the Soviet Union collapsed.
  - The **first war** erupted between **Armenia** and **Azerbaijan** over the territory, which ended with a **ceasefire in 1994**, leaving **Nagorno-Karabakh** and some surrounding areas under **Armenian control.**
  - The ceasefire was frequently violated by both sides, and several attempts to negotiate a peaceful settlement failed.
- In **2020, Azerbaijan** launched the **Second Karabakh War,** winning a resounding victory and retaking seven surrounding districts and about **a third of Nagorno-Karabakh.**
  - **Russia** brokered a **peace deal** after the **Second Karabakh War** in **2020** and provided for up to **1,960 Russian peacekeepers** stationed in the region.

Azerbaijan:

- Azerbaijan is a country in Asia that is **bordered** by Russia, Georgia, Armenia, and Iran.
  - The east of the country is **bordered by** the **Caspian Sea.**
  - Much of the north and west is covered by the **Caucasus Mountains**.
- Capital city: **Baku**.
- Azerbaijan is **abundant in oil and natural gas.**
- **Yanar Dag,** a famous site in **Azerbaijan**, has a **natural eternal fire** fueled by seeping natural gases, burning for over 65 years along the **Caspian Sea**. This unique phenomenon aligns with **Azerbaijan's nickname, "The Land of Fire."**

Armenia

- A **landlocked** country in the **Caucasus** with **Turkey** to the west, **Georgia** to the north, and **Azerbaijan** to the east.
- Capital: **Yerevan**.
- Armenia is a **mountainous country.**
  - Highest Peak: **Mount Ararat**.

Migrants left stranded as Tunisia tries to keep them from reaching Europe

Sub: IR

Sec: Places in news

Context:

- Migrants stranded in **Tunisia**, near the **Mediterranean coast**, face dire conditions as they seek to reach Europe.
- Tunisia's coast guard has ramped up efforts to **prevent crossings** with European support.

Details:

- Encampments like **Kilometer-19,** notorious for violence, have grown as police push migrants out of cities.
- **Tunisia**'s measures, bolstered by a **1 billion euro deal** with **the EU**, have significantly **reduced the number of migrants** reaching **Italy.**
- However, the **increased migrant presence in Tunisia** has led to local backlash, xenophobic rhetoric, and calls for expulsions.
- The EU's focus on limiting migration continues to clash with the humanitarian crisis unfolding on Tunisia's coastline.

EU- Tunisia Deal:

- This **financial support from the EU** comes under the **Memorandum of Understanding on a strategic and global partnership** (MoU) concluded between the **European Union and Tunisia** in Tunis on 16 July 2023.
- The MoU is based on **five pillars:** macroeconomic stability, economy and trade, the green energy transition, people-to-people contacts, and **migration and mobility**.
- Under this deal, **Tunisia** agreed to **tighten border controls** in exchange for aid.

Tunisia:

- Tunisia is the **northernmost country in Africa.** It is a part of the **Maghreb region** of **North Africa**, bordered by **Algeria** to the west and southwest, **Libya** to the southeast, and the **Mediterranean Sea** to the north and east. **Tunisia** also shares **maritime borders** with **Italy** through the **islands of Sicily** and **Sardinia** to the north and **Malta** to the east.
- Tunisia is home to **Africa's northernmost point**, **Cape Angela.**
- **Capital and largest city: Tunis, located on its northeastern coast.**
- Tunisia was inhabited by the **indigenous Berbers.**
- It is a **member of the United Nations, La Francophonie, the Arab League, the OIC, the African Union, the Non-Aligned Movement, the International Criminal Court, and the Group of 77, among others.**
- It maintains **close economic and political relations with some European countries, particularly with France, and Italy, which geographically lie very close to it.**
- Tunisia also has an **association agreement with the European Union and has also attained the status of a major non-NATO ally of the United States.**

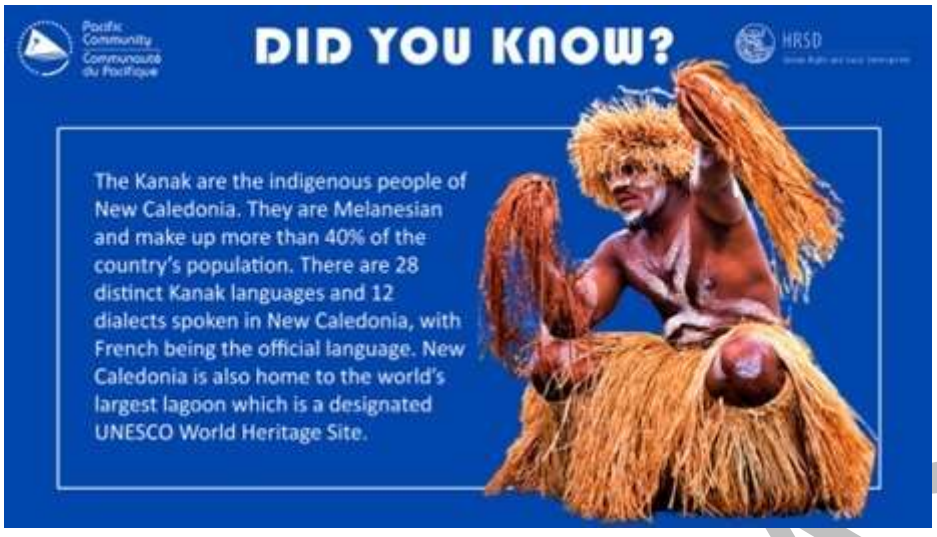
What is happening in the French territory of New Caledonia?

Sub: IR

Sec: Places in news

New Caledonia's Electoral Reform and Independence Movement:

- **Current Situation**:
  - On June 3, the **Socialist Kanak National Liberation Front (FLNKS)** of **New Caledonia** called for **French President Emmanuel Macron** to abandon plans to modify the electoral reform.
  - Widespread protests and riots erupted due to the **French parliament's decision to amend the voters' list,** allowing citizens born or living in the territory for at least 10 years to vote.
  - The **indigenous Kanak community opposed the amendment**, claiming it **dilutes their electoral power** and **undermines their efforts towards decolonisation**.
- **Demographic Breakdown**:
  - **Kanaks** make up **43%** of **New Caledonia**'s 145,000 population.
  - Europeans (French loyalists), Wallisians, and Futunians comprise **37%**.
- **Historical Context**:
  - **Kanaks** are the **original inhabitants;** France took control in **1853**.
  - **Post-World War II, Kanaks** were granted **French citizenship.**
  - Increased migration from France in the **1960s** made **Kanaks** a **minority**.
  - The **independence movement,** led by **FLNKS**, emerged in **1984** due to deteriorating socio-economic status and lack of political involvement.
  - Tensions between **Kanaks** and **loyalists** from **1984** to **1988** ended with the **Matignon Agreements** in **1988** and the **Nouméa Accord** in **1998**, transferring powers from **Paris** to **local authorities** and allowing **three referendums on independence**.



- **Independence Referendums**:
    - **Referendums** in **2018** and **2020** favoured remaining with France.
    - In **2021, Kanaks** requested to postpone the **third referendum** due to COVID-19, but France refused, leading to a **low turnout** and **96% voting against independence,** further infuriating the **Kanaks**.
- **Reasons for Kanak Independence**:
    - **Post-WWII migration** led to **"settler colonialism,"** widening social inequalities.
    - **Indigenous Kanaks** remained **labourers** in the **mining sector,** while **non-indigenous people benefited economically and politically**.
    - Despite France's promises, the **2019 census** showed a **32.5% poverty rate** among **Kanaks**, compared to **9% among non-Kanaks**.
    - The vote to alter the electoral composition is seen as a move to end **Kanak's independence**.
- **French Objectives**:
    - Achieving tactical peace to avoid violence and protect overseas French citizens, maintaining Macron's party reputation.
    - Integration is crucial for France's Indo-Pacific strategy, as its overseas territories make it the **second largest Exclusive Economic Zone (EEZ)**.
    - **New Caledonia** represents a **strategic position** for **France** in the **Indo-Pacific,** particularly against **China**, making integration necessary despite Kanak's demands for independence.

New Caledonia:

- **New Caledonia** is a **sui generis collectively of overseas France** in the **southwest Pacific Ocean, south of Vanuatu,** about 1,210 km (750 mi) east of **Australia**, and 17,000 km (11,000 mi) from **Metropolitan France.**
- Capital- **Nouméa.**
- The **archipelago**, part of the **Melanesia subregion,** includes the **main island of Grande Terre, the Loyalty Islands, the Chesterfield Islands, the Belep archipelago, the Isle of Pines,** and a few remote islets.
- The **Chesterfield Islands** are in the **Coral Sea**.

Nord Stream leaks: Thousands of tonnes of methane may have dissolved in Baltic seawater; marine life impacts unclear

Sub: IR

Sec: Places in news

Context:

- A new study has shed light on the fate of **methane** released from the **September 2022 explosions** damaging the **Nord Stream pipelines** in the **Baltic Sea.**

Environmental Impact:

- While a **significant amount of methane escaped**, **10,000** to **50,000 tonnes** of it likely **dissolved** in the surrounding water after the blasts.
- While the **immediate environmental impact** remains unclear, the research highlighted potential consequences for the **marine ecosystem.**
- The **environmental implications of excess methane**- a potent greenhouse gas- include **local impacts on water carbon budgets** and **changes to the composition of microbial organisms**.
- The incident is **one of the largest known methane leaks,** surpassing previous smaller leakage sites.
- **Nord Stream pipelines** transport a **massive amount of natural gas** from **Russia** to **northern Germany.**
- **Methane Estimates:**
    - **European Space Agency** observed **79 tonnes of methane per hour** reaching the atmosphere.
    - Researchers estimated **40,000 tonnes** were released into the atmosphere over seven days.
    - Another study suggested **220,000 metric tonnes** emissions.

Scientific Expedition:

- **Objective:** To measure **dissolved methane** and its impact on the **marine ecosystem**.
- **Methodology:** Collected water samples from various depths and measured atmospheric methane concentrations.
- **Findings:** Estimated dissolved methane between **10,000** and **55,000 metric tonnes**, potentially underestimated.

Biological Impact:

- **Microbial Changes:** High methane concentration may **promote growth of methanotrophic bacteria**, affecting the **Baltic Sea microbial food web**.
- **Plankton Studies:** Ongoing analysis of **plankton samples** collected during the expedition.

What is the Nord Stream Pipeline?

- Nordstream consists of **two pipelines**, which have **two lines each**.
- **Nord Stream 1** was completed in **2011** and runs from **Vyborg** in **Leningrad** to **Lubmin** near **Greifswald, Germany**.
- **Nord Stream 2** which runs from **Ust-Luga** in **Leningrad** to **Lubmin** was completed in **September 2021** and has the capacity to handle **55 billion cubic meters** of **gas per year** once it becomes operational.
- The **twin pipelines** together can transport a combined total of **110 billion cubic metres (bcm) of gas a year** to Europe for at least 50 years.
- The **Nord Stream** crosses the **Exclusive Economic Zones (EEZs)** of several countries including **Russia, Finland, Sweden, Denmark and Germany,** and the **territorial waters of Russia, Denmark, and Germany.**
- In **Germany,** the pipeline connects to the **OPAL (Baltic Sea Pipeline)** and **NEL (North European Pipeline)** which further connects to the European grid.

Methane emission-

- **Methane** is a **short-lived climate forcer (SLCF),** a compound that warms or cools the Earth's climate over **shorter time scales** – from days to years – than **greenhouse gases** like **carbon dioxide**, whose climatic effect lasts for decades, centuries or more.
- **Methane** has a **lifetime** in the atmosphere of about **ten years.** But per molecule, it's a much more potent greenhouse gas over that period.

- So it's responsible for a large part of the warming that we're experiencing today.
- The **Global Methane Assessment 2021** states that the atmospheric concentration of methane has **more than doubled** since pre-industrial times.
- **Methane is second only to carbon dioxide (CO_2)** in driving climate change.
- Limiting warming to **1.50C** or likely **20C** requires **deep, rapid, sustained reductions** of other greenhouse gases, such as **methane,** alongside rapid reductions of **carbon dioxide emissions to net zero.**

Armenia becomes the latest nation to recognise Palestine

Sub: IR

Sec: Places in news

Context:

- Armenia announced it was **recognising the State of Palestine**.

Details:

- Armenia is the latest country to do so during the war in Gaza, saying it was against "violence towards civilian populations."
- In late May, **Spain, Ireland,** and **Norway** officially **recognised** the **State of Palestine**, stating they saw the move as a step towards peace in the region.

Recognition of Palestine:

- As of June 2024, the **State of Palestine** is **recognised** as a **sovereign state** by **145** of the **193** member states of the **United Nations**.
- It has been a **non-member observer state** of the **United Nations General Assembly** since November 2012.

Armenia:

- Armenia is a **landlocked country** in the **Armenian Highlands of West Asia**.
- It is a part of the **Caucasus region** and is **bordered** by **Turkey** to the **west, Georgia** to the **north** and **Azerbaijan** to the **east,** and **Iran** and the **Azerbaijani exclave of Nakhchivan** to the **south**.
- **Yerevan** is the **capital**, **largest city** and **financial centre**.

Hawaii settles climate case with young litigants: what was the lawsuit — and the settlement?

Sub: IR

Sec: Places in news

Hawaii Lawsuit Settlement on Transportation and Climate Change:

- **Hawaii** settled a lawsuit with **13 young plaintiffs, agreeing to decarbonize the state's transportation system over the next 21 years.**
- The lawsuit, filed in **2022**, was the **first youth-led constitutional climate case** targeting **transportation sector emissions**.

Lawsuit Background:

- **Navahine v. Hawaii Department of Transportation** argued the state violated the **constitutional right to a clean environment** by **prioritizing fossil fuel-based transportation infrastructure**.
- **Hawaii's transportation sector** is projected to contribute **60%** of the **state's emissions by 2030**.
- **Fossil fuel burning** leads to **greenhouse gas emissions**, causing **global warming** and **extreme weather events**, affecting **agriculture** and other sectors in **Hawaii.**
- **Settlement Requirements**:
    - **Achieve zero greenhouse gas emissions** across **all transportation modes** by **2045**.
    - Publish a **greenhouse gas reduction plan** within a year.
    - Complete **pedestrian, bicycle**, and **transit networks within five years.**
    - Allocate at least **$40 million** to expand the public electric vehicle charging network by **2030**.
    - The state will be accountable to a judge for enforcing the agreement.
- **Challenges**:
    - The **Department of Transport** oversees airports and harbours, where current technologies rely heavily on fossil fuels, making the net-zero goal difficult to achieve.
    -

Why is Julian Assange flying to the remote Pacific Island of Saipan?

SUB: IR

SEC: Places in news

Context:

- **Julian Assange** is expected to plead guilty to a single criminal charge in a plea deal, leading to his release and return to **Australia**.
- The plea deal involves a **62-month sentence**, which he has already served.
- If the plea deal is approved, Assange will return to Australia after the court hearing.

Saipan island:

- **Saipan** is the **capital** of the **Northern Mariana Islands (NMI),** a **US commonwealth** in the **western Pacific,** located about **70 km north of Guam**.
- Residents are **US citizens** but **cannot vote in presidential elections**. The **NMI** has a **non-voting delegate** in **the US House of Representatives**.
- **US District Court**: **Saipan** hosts a **US district court,** which will handle Assange's case.

Reason for Choosing Saipan:

- **Assange** sought a court close to **Australia** but within **US territory. Saipan** is roughly **3,000 km south of Australia** and closer than other US territories like **Hawaii**.

Historical Context:

- **Colonial History**: **Saipan** was **controlled by Spain, Germany,** and **Japan** before the **US took control during World War II.**
- **US Commonwealth**: In **1975**, residents voted to join the **US** as a territory.

Tourism and Economy:

- **Saipan** is a popular tourist destination, known for its **beaches, golf courses,** and **World War II memorials** and wrecks.
- It is unique in allowing **Chinese citizens to enter without a visa,** a policy that has raised concerns about espionage risks in the US Congress.

Territories East of the Mahakali River including Kalapani belongs to Nepal, says PM Prachanda

SUB: IR

SEC: Places in news

Context:

- **Nepal Prime Minister Pushpa Kamal Dahal 'Prachanda'** asserted that **territories east of the Mahakali River,** including **Limpiyadhura, Kalapani,** and **Lipu Pass,** belong to **Nepal**.
- He cited the **Sugauli Treaty of 1816** with the **East India Company** as the basis for these claims.
- **Nepal's political map,** updated in **May 2020** under **K P Sharma Oli's government,** includes these territories and was unanimously endorsed by Parliament.

Details of the border dispute:

- In the early **1960s**, **king Mahendra** gave consent to **Indian Prime Minister Jawaharlal Nehru** to continue the use of the **Lipulekh-Kalapani area.**
- In **1961, Mahendra** signed a **boundary treaty with China,** which says, 'The boundary line starts from the point where the **watershed** between the **Kali River** and the **Tinkar River** meet the **watershed** between the **tributaries of the Mapchu (Karnali) River** on the one hand and the **Tinkar River on the other hand'.** This treaty makes **Tinkar,** about 10 kilometres south of **Lipulekh**—the **tri-junction** where the **China-India-Nepal borders meet**—and **supports India's current position**.
- In **1991**, **Nepal** formally raised the **border issue with India,** and a **technical committee** was formed to resolve it.
- The panel identified several areas with contested claims and resolved 90 percent of them. But, according to Nepali sources, India repeatedly baulked at Nepal's request for talks on **Limpiyadhura-Kalapani-Lipulekh.**
- Since the **Sugauli Treaty** states that the **area east of the Kali is Nepal,** fixing the source of the river should resolve the dispute.
- Under the **international convention,** the **tributary** with the **largest water volume** or with the **longest course carries the name of the main river.**
- This would make **Limpiyadhura** the **source** of the **Kali,** but **no border issue** has been resolved on technical arguments alone.

India's Response:

- **India** criticized Nepal's new map, labeling it a **"unilateral act"** and **"artificial enlargement"** of territorial claims, asserting that these areas belong to India.
- Despite India's objections, Nepal has adopted the new map in official documents.

India- Nepal Border relations:

- **Nepal** shares an **1,850-km border** with **five Indian states: Sikkim, West Bengal, Bihar, Uttar Pradesh,** and **Uttarakhand.**

- During **Prachanda**'s recent visit to **India,** discussions were held to **revise existing treaties,** including the **1950 India-Nepal Treaty of Peace and Friendship,** and resolve border issues through diplomatic channels.
- A letter has been sent to India to convene the seventh meeting of the **Border Working Group** to address remaining border issues, as per the commitments from the **Nepal-India Joint Commission meeting**.

Border Relations with China:

- **Nepal** resolves border issues with **China** through **bilateral talks and consensus**.
- In **March 2022, Nepal** and **China** agreed to advance **joint border monitoring activities** through **mutual consultation**.

Treaty of Sugauli 1816:

- Signed between the **Gurkha chiefs of Nepal** and the **British Indian government** that ended the **Anglo-Nepalese (Gurkha) War (1814–16)**.
- The **1816 Treaty of Sugauli** defined **Gandaki River** as the **international boundary** between **India** and **Nepal.**
- The **right bank of the river** was under **Nepal's control** while the **left bank** was under **India's control.**

Mahakali river (or Sharda river):

- The **Sharda River** is the **downstream** of **Kali River** (or **Mahakali River**) that **originates** in the **northern Uttarakhand state of India** in the **Great Himalayas** on the **eastern slopes of Nanda Devi massif,** at an elevation of 3,600 m (11,800 ft) in the **Pithoragarh district.**
- It then flows between the **Nepal** and **India border.**
- Descending, it enters the **Indo-Gangetic Plain** at **Brahmadev Mandi** in **Nepal,** where it expands above the **Sharda Barrage.** From that point onward, it is known as the **Sharda River.**
- The river proceeds southeastward into India through **northern Uttar Pradesh** before merging with the **Ghaghara River southwest of Bahraich,** covering a **distance of approximately 300 miles (480 km)**.

Why China plans to run trains from Kunming all the way to Singapore

Sub: IR

Sec: Places in news

Context:

- During his visit to **Malaysia, Chinese** Premier **Li Qiang** expressed **China**'s willingness to **connect its railway projects** in **Malaysia, Laos,** and **Thailand** to enhance **regional connectivity**.
- Li attended the groundbreaking ceremony for **Malaysia's East Coast Rail Link (ECRL) Gombak Integrated Terminal Station** with **Malaysian Prime Minister Anwar Ibrahim.**

ECRL Project Overview:

- The **ECRL project** is a nearly **$10 billion investment** connecting **Kota Bharu** on **Malaysia's northeastern coast** with **Port Klang** on the **west coast.**
- Expected to bring **significant economic benefits** through **improved connectivity, freight movement, and tourism**.
- Described as the **biggest economic and trade cooperation project** between **China** and **Malaysia** by Chinese state media.

ECRL Project Challenges and Progress:

- Initiated in **2017** but stalled due to funding constraints, now expected to be completed by **2027**.
- **Former Malaysian Prime Minister Mahathir Mohamad** suspended the **project** in **2018** due to **high costs.**

- Domestic politics, including the embezzlement scandal involving Mahathir's predecessor Najib Razak, also impacted the project.
- Resumed in 2020 after a new deal with China at a lower cost.

Pan-Asian Rail Network Concept:

- Proposed **infrastructure projects** to **link Southeast Asian countries,** dating back to European colonial rule.
- The **pan-Asian rail network** includes **three main links** from **Kunming via Myanmar, Laos,** and **Vietnam,** connecting to **Thailand, Malaysia,** and **Singapore.**
- **Aims** to enhance regional economic growth and cooperation.

Current Status of the Pan-Asian Railway Project:

- **Operational section: Laos-China section** since **2021**, connecting north and south Laos with Kunming.
- **Thailand's segment** faces **high costs** and government reluctance for Chinese assistance, with potential delays.
- **Economic benefits** and **demand for the project** are questioned; variations in railway track widths and preferences for air travel and maritime shipping are challenges.

China's Interest in Regional Connectivity:

- The **pan-Asian railway** plans predate **Xi Jinping's Belt and Road Initiative (BRI).**
- China has significant influence in **Southeast Asia** due to **geography** and **economic ties,** with trade volume between **China** and **ASEAN** reaching **USD 911.7 billion in 2023.**
- BRI aims to strengthen these ties, despite concerns about the terms of financing and accusations of **"debt trap diplomacy."**
- **China** seeks to leverage economic ties through infrastructure investments to build goodwill and trust, amid regional apprehensions over its territorial claims in the South China Sea.

What's next after Kenya withdraws finance bill amid protests?

Sub: IR

Sec: Places in news

Protests in Kenya Over Finance Bill:

- Protesters demanded **President William Ruto's resignation,** even after he withdrew a **tax hike bill.**
- The **bill aimed** to **raise $2.7 billion** in **additional taxes** to **reduce the budget deficit** and **borrowing,** addressing **Kenya's public debt of 68% of GDP.**

The Finance Bill:

- Presented before the start of the financial year, the bill outlines the government's fiscal plans.

- The **2024/25 bill proposed tax increases** on **basic commodities** (bread, vegetable oil, sugar) and **new levies** (motor vehicle circulation tax, eco levy). Exemptions included **sanitary towels and diapers.**
- Intended to **fund development programs** and **cut public debt,** but faced backlash for potentially increasing the cost of living.

Withdrawal of the Finance Bill:

- **President Ruto** withdrew the **bill** due to pressure from protests.
- Plans to **cut the budget deficit** through **austerity measures**, including cuts to the **presidency's budget** and **operational expenditures** (travel, vehicle purchases, renovations).
- **S&P Global Ratings** stated **Kenya** might not achieve its **fiscal targets** without the **tax hikes.**
- The finance ministry warned that concessions on tax hikes would create a $1.55 billion deficit in the 2024/25 budget, necessitating spending cuts.

IMF loan to Kenya:

- In **2021, Kenya** signed a **four-year loan agreement** with the **IMF** for **$2.34 billion**, and with **another deal** signed in **May 2023**, its **loan volume** rose to **$3.6 billion.** But **IMF money** for **developing countries** comes in **tranches**, and with conditions.

Unwritten Mandate of IMF:

- The **IMF** is **theoretically designed to aid economic development** and **promote monetary cooperation and stability.**
- In practice, it **integrates newly independent former colonies** into a **global economic order** favouring **American capital**.
- **Voting rights** at the **IMF** are **quota-driven**, based on **dollar contributions**, not democratic principles.
- The **U.S. holds a 16.5% voting share;** the **G-7 countries together command over 40%**, surpassing the combined voting power of all African and Latin American nations.
- As of March 2024, 31 of Africa's 54 countries had outstanding loans with the IMF but lacked significant influence in the institution's operations.
- UN Secretary-General Antonio Guterres highlighted this bias, noting the IMF framework reflects 1945 power relations.

Impact of Structural Adjustment Programs (SAPs):

- **SAPs,** adopted by the **IMF** from **1986**, require **cuts in public spending, privatization of state enterprises, reduction of import duties,** and other measures promoting export-led growth.
- These policies often result in extreme inequality.
- **A 2002 World Bank-funded study reported four main negative impacts of SAPs:**
    - Demise of domestic manufacturing and loss of employment for small producers.
    - Agricultural, trade, and mining reforms harming small farms and rural communities.
    - Triggering job losses.
    - Reduced state role in providing essential services, increasing poverty.
- Despite the backlash, the IMF continues to impose SAP-like requirements.

Recent Adjustments and Continuing Influence:

- The IMF introduced **'social spending floors'** to protect spending on **education, health, and social protection.**
- An Oxfam analysis found that for **every $1 encouraged for public services,** the **IMF** recommended **cutting six times more through austerity measures.**
- In **1994,** the **New York Times** labelled the **IMF** and **World Bank** as the **"overlords of Africa."**
- This influence persists, with economic policies in **low and middle-income nations** still heavily influenced by IMF decisions made in Washington.

Climate change forces Panama islanders to relocate: What happened — and how sea level rise is affecting the world

Sub: IR

Sec: Places in news

Relocation of Guna Families Due to Rising Sea Levels:

- Around 300 families from **Gardi Sugdub** in **Panama's Guna Yala province** were relocated to **Nuevo Cartí** on the **mainland** due to **rising sea levels.**
- **Community**: **Gardi Sugdub** is home to approximately **1,300 members** of the **indigenous Guna community.**
- **Reason for relocation**: Annual flooding, particularly in November and December, has made the island increasingly uninhabitable.

Sea Level Rise and Global Impact:

- **Current Trends**: The **Caribbean sea level rises** about **3-4 mm per year,** expected to accelerate to **1 cm per year by 2100** due to **global temperature increases**.
- **Affected Regions**: **Small island developing states (SIDS)** like **Tuvalu, the Marshall Islands,** and **Kiribati** face severe threats from **rising sea levels**, impacting **land, culture,** and **economies.**
- Such rising levels, combined with **storm surges** and **'king tides'** (the **highest high tide** of the year at a **coastal location**), are causing **coastal erosion, salinisation of freshwater resources,** and **increased vulnerability to extreme weather events.**
- **Global Sea Level Rise Data:**
    - **Historical Rise**: Since **1880**, global sea levels have risen by 21–24 cm, with an accelerating rate in recent decades.
    - **Causes**: **Global warming**, driven by the **thermal expansion of seawater** and **melting land-based ice,** significantly contributes to **rising sea levels.**

Cultural and Environmental Impact:

- **Guna Traditions**: The relocation disrupts the **cultural practices** of the **Guna people, known for their intricate molas textiles.**
- **Broader Implications**: The plight of **Gardi Sugdub** exemplifies the broader human and cultural costs of climate change on small island communities.

Polity

Kerala Assembly passes resolution to rename State as 'Keralam'

Sub: Polity

Sec: Constitution

Context:

- The **Kerala Legislative Assembly unanimously passed a resolution** on June 24 to **amend the Constitution** and **change the state's name** from **'Kerala'** to **'Keralam'.**

Details:

- Chief Minister Pinarayi Vijayan moved the resolution, invoking **Article 3** of the **Indian Constitution** to **update the First Schedule**.
- This effort follows a previous attempt from last year, which was **returned** by the **Central government** due to procedural issues.
- Initially, the state **aimed** to amend the names in all languages listed in the Eighth Schedule of the Constitution to **'Keralam'.**

- However, upon advice from the Union Home Ministry, the focus shifted to **only amending the First Schedule,** leading to a revised resolution passed on August 9, 2023. The change is intended to align the official name with the Malayalam pronunciation.

The procedure of renaming the state can be initiated by either the Parliament or the State Legislator and the procedure is as follows:

- The **renaming of a state** requires **Parliamentary approval** under **Articles 3** and **4** of the Constitution.
- A bill for renaming a state may be introduced in the **Parliament** on the **recommendation of the President.**
- Before the introduction of the bill, the **President** shall send the bill to the respective state assembly for expressing their views within a stipulated time. The views of the state assembly are not binding, neither on the President nor on the Parliament.
- On the expiry of the period, the bill will be sent to the Parliament for deliberation. The bill in order to take the force of a law must be passed by a simple majority.
- The bill is sent for approval to the President. After the approval of the said bill, the bill becomes a law and the name of the state stands modified.

Article 3 of the constitution:

- Formation of new States and alteration of areas, boundaries or names of existing States:
- **Parliament may by law:**
    - Form a new State by separation of territory from any State or by uniting two or more States or parts of States or by uniting any territory to a part of any State
    - Increase the area of any State
    - Diminish the area of any State
    - Alter the boundaries of any State
    - Alter the name of any State
- According to **Article 4** which deals with Laws made under **articles 2 and 3** to provide for the amendment of the First and the Fourth Schedules and supplemental, incidental and consequential matters provides that law made under **Article 2 and 3** shall not be deemed to be an amendment of this Constitution for the purposes of **article 368**.

Why Keralam

- Kerala is the English word for the Malyali Keralam. There are several theories regarding its etymological roots. The earliest mention of the word can be found in Emperor Ashoka's Rock Edict II, dated to 257 BCE. The edict reads: "Everywhere in the dominions of King Priyadarsin, Beloved of the gods, as well as those of his frontier sovereigns, such as the Chodas, Pandyas, Satiyaputra, Ketalaputra [Keralaputra]…" (translated by epigraphist D R Bhandarkar).
- Keralaputra, literally "son of Kerala" in Sanskrit, refers to the dynasty of the Cheras, one of the three main kingdoms of southern India. German linguist Dr Herman Gundert noted that the word 'keram' is Canarese (or Kannada) for 'cheram', which is used to refer to the coastal land between Gokarna (in Karnataka) and Kanyakumari (Tamil Nadu, India's southern tip). The origin of the term could possibly be from 'cher', which means to join in Old Tamil.

Story of statehood

- The demand for a united Malayalam-speaking state first gathered momentum in the 1920s, and aimed to integrate the princely states of Travancore and Cochin, and the Malabar district of the Madras Presidency.
- After independence, on July 1, 1949 the two Malayalam-speaking princely states were integrated to form the state of Travancore-Cochin. The state of Kerala was finally created after the State Reorganisation Commission's recommendation creating states on linguistic-bases. The Commission under **Syed Fazl Ali** recommended the inclusion of the district of Malabar and the taluk of Kasargod to the Malayalam-speaking people's state.

- It also recommended the exclusion of the four Southern taluks of Travancore viz Tovala, Agastheeswaram, Kalkulam and Vilayankode together with some parts of Shenkottai (all these taluks now part of Tamil Nadu).
- The state of Kerala came into being on November 1, 1956.

Human dignity versus religious practices

Sub: Polity

Sec: Constitution

Context:

- On May 17, the **Madurai Bench** of the **Madras High Court** allowed the resumption of **"annadhanam"** (offering free food) and **"angapradakshanam"** (circumambulation) at **Nerur Sathguru Sadasiva Brahmendral's final resting place** on the eve of his **Jeeva Samathi day**.
- The practice of **"angapradakshanam"** by rolling on plantain leaves left by devotees after eating was **halted by a 2015 Division Bench order** in a **public interest litigation (PIL) petition**.

Madras HC's Ruling:

- **Justice G.R. Swaminathan reinstated** the practice by invoking **Article 25(1)** of the Constitution, which guarantees the **right to freely profess, practice, and propagate religion**.
- He linked the belief in deriving spiritual benefits from the practice to the **right to privacy**, a **fundamental right under the Constitution**, equating **"spiritual orientation"** with **"gender and sexual orientation."**
- The judge argued that actions should not affect the rights and freedoms of others and are protected as long as they do not cross this boundary.
- He sums it up by holding that the **customary practice** is **protected** as a **fundamental right** under **Articles 14, 19(1)(a), 19(1)(d), 21** and **25(1)** of the Constitution.

Division Bench's 2015 Order and Criticism:

- The **2015 Division Bench order stopped the practice**, citing **violations of human dignity** and the **rights to equality and life** under **Articles 14** and **21** of the Constitution.
- The Division Bench relied on a similar case from Karnataka pending in the Supreme Court, where a similar practice at the **Kukke Subramanya temple** was **stayed** in **December 2014**.

State's Duty

- The State has a **duty to change religious and customary practices** that are **unhealthy, harmful,** and **undermine human dignity.**
- Instead of outright rejection, the State could **educate believers through reason and rational discussions** to foster a community inclined towards inquiry and humanism.

About Article 25 of Indian Constitution:

- **Article 25** says that all persons are equally entitled to freedom of conscience and the right to freely profess, practice, and propagate religion. The implications of these are:
- Freedom of conscience: Inner freedom of an individual to mould his relation with God or Creatures in whatever way he desires.
    - **Right to profess:** Declaration of one's religious beliefs and faith openly and freely.
    - **Right to practice:** Performance of religious worship, rituals, ceremonies, and exhibition of beliefs and ideas.
    - **Right to propagate:** Transmission and dissemination of one's religious beliefs to others or exposition of the tenets of one's religion. But it does not include the right to convert another person to one's own religion. Forcible conversions impinge on the 'freedom of conscience' guaranteed to all the persons alike.
- Thus, **Article 25** covers not only religious beliefs (doctrines) but also religious practices (rituals).
- Moreover, these rights are available to all persons–citizens as well as non-citizens.

- However, these rights are subject to public order, morality, health, and other provisions relating to fundamental rights.

SC likely to hear plea on EC's move to relax postal ballot norms

Sub: Polity

Sec: Elections

Context:

- The **YSR Congress Party (YSRCP)** urgently approached the **Supreme Court** to contest the **Election Commission's (EC) validation** of **approximately five lakh postal ballots cast** in **Andhra Pradesh.**

Details:

- The YSRCP's petition challenges the **State High Court's dismissal** of their **plea against the relaxation of postal ballot norms by the EC.**
- The High Court had dismissed the plea and asked to file an **election petition.** The petition noted that **postal ballots account for 1.5% of the total votes.**

Election Commission's relaxation in the rules:

- It underscored the **prescribed procedures** for **casting, verifying,** and **counting postal ballots** as per the **Conduct of Election Rules 1961** and **specific instructions** issued by the **EC** on July 19 of the previous year.
- The **rules** require that **Form 13A,** containing the **voter's declaration,** must be **signed and attested by an authorized officer,** with **any unsigned or unattested forms being rejected**.
- The YSRCP contended that an **EC** circular issued on May 30, 2024, **relaxed these norms, allowing ballots to be accepted with just the attesting officer's signature.**
- The party argued that this circular, which **applied only to Andhra Pradesh** and was issued 17 days after the elections, was suspicious and potentially motivated by ulterior motives.

What is Postal Ballot (or Postal voting)?

- **Postal Ballot,** also known as **absentee voting,** is a method of voting in which **electors cast their ballots** by **mail** rather than **in person** at a polling station.
- This method is particularly useful for individuals who are unable to vote in person due to various reasons.
- **E.g.,** being away from their home constituency, having a disability, or being engaged in essential services on election day.

Eligibility:

- **Service voters:**
  - Members of the armed forces, paramilitary forces, and other government employees deployed on election duty far from their home constituencies.
- **Absentee voters:**

- Individuals who are unable to vote in person due to reasons such as being away from their home constituency for work, illness, or disability.

- **Electors on election duty:**
  - Government officials and polling staff who are assigned duties at polling stations other than their own.
- **Electors under preventive detention:**
  - Individuals who are detained under preventive custody orders during the election period.
- **Senior citizens** (citizens above 85 years of age) and **Persons with Disability (PwD)**.
  - The government, in consultation with the **Election Commission**, amended the **Conduct of Election Rules (1961)** to **raise the minimum age for senior citizens,** eligible for **voting by postal ballot**, to **85 years** from **80 years.**

Significance:

- Postal ballots play a crucial role in ensuring that eligible voters exercise their franchise, even when they are unable to vote in person.
- They expand the accessibility of the electoral process and contribute to a more inclusive and representative democracy.

Issues associated with postal ballot:

- **Vote buying**
  - There is a chance that someone else is casting the vote on behalf of the voter because the voter chooses to sell his or her vote.
- **Freedom of voting & secrecy might be affected**
  - As the voter will have to vote on a printed ballot from their respective home, someone might observe the voter casting her/his vote.
  - This might lead to coercion or forcing the voter to make a particular choice.
- **Reliability and delay of postal services**
  - While the reliability and delay of postal services in one's own country are well known to the election commission, conditions might be worse in other countries.
  - Consequently, the postal voting process must start early enough to take into account any unforeseeable conditions.

Exit polls and the rules governing it in India: All your questions answered

Sub: Polity

Sec: Elections

Context:

- Recently, the Lok Sabha Election 2024 Exit Poll Results 2024 were out on 1 June 2024.

More on news:

- Recently, the Lok Sabha Election 2024 was held in the country to elect a new Prime Minister and formation of a new central government.
- These general elections are conducted in seven phases to elect members from all the 543 seats of the Lok Sabha.

What are exit polls?

- **An election exit poll is a poll of voters taken immediately after they have exited the polling stations.**
- A similar poll conducted before **actual voters have voted is called an entrance poll.**
- Exit poll is a post-voting poll, which is conducted just after a voter walks out after casting his or her vote.

- Such polls aim at predicting the actual result on the basis of the information collected from voters.
- The **inception of exit polls in India traces back to 1957, during the second Lok Sabha elections, with the pioneering initiative led by the Indian Institute of Public Opinion.**
- Exit polls are conducted after the culmination of the last phase of voting, in accordance with the guidelines set by the Election Commission of India.
- Distinguished from opinion polls, which precede elections, exit polls entail surveys administered to voters as they exit polling stations post casting their ballots.
- These surveys encompass a spectrum of inquiries, delving into voter motivations and party preferences.
- Exit polls entail the collection of samples, representing diverse demographics and geographical regions, to gauge public sentiment towards political parties and their performance.

Regulatory framework surrounding exit polls in India:

- The **Representation of the People's Act, 1951, under Section 126A, stipulates that exit polls cannot be conducted or disseminated until the final phase of voting concludes.**
- No person shall conduct any exit poll and publish or publicize by means of the print or electronic media or disseminate in any other manner, whatsoever, the result of an exit poll during such period as may be notified by the Election Commission in this regard.
- **Section 126A also stipulates that any person who contravenes the provisions of this section shall be punishable with imprisonment for a term which may extend to two years or with fine or with both.**
- In previous electoral cycles, **the Election Commission specified that television or radio broadcasts should refrain from discussing election-related matters until such results are formally announced by the Election Commission of India**, unless such results are carried with clear disclaimer that they are unofficial or incomplete or partial results or projections which should not be taken as final results.

What are Opinion Polls?

- **Opinion polls are survey research to determine voter preference** among the candidates running for office and predict the outcome of elections.
- **An opinion poll, sometimes simply referred to as a poll, is a kind of voter behavior survey conducted to gauge the public opinion** before voting takes place, while an exit poll happens right after voting.

No party wins majority: What does a coalition government mean for economic reforms in India?

Sub: Polity

Sec: Executive

Context:

- The NDA has returned to power for a historic third straight term at the Centre, but the BJP itself has fallen short of the majority mark of 272.

Key Highlights:

- Since 1991, when India was forced to open up its economy and give up on the planned economy model, all governments were coalitions of the sort where even the lead party was quite far from the **majority mark of 272.**
- The process can be aptly described in terms of **Montek Singh Ahluwalia (former Deputy Chairman of the erstwhile Planning Commission) as creating a strong consensus for weak reforms.**

What is a Coalition Government?

- **A coalition government, or coalition cabinet**, is a government where political parties enter a power-sharing arrangement of the executive.

- **Coalition governments usually occur when no single party has achieved an absolute majority after an election.**
- A party not having a majority is common under proportional representation, but not in nations with majoritarian electoral systems.
- The first time that Independent India saw parties stitching up a coalition government at the Centre was in 1977, right after the Emergency.
- The first successful coalition government in India which completed a whole five-year term was the Bharatiya Janata Party (BJP)-led National Democratic Alliance with Atal Bihari Vajpayee as Prime Minister from 1999 to 2004.
- **About the earlier regimes of Modi government:**
- Modi's first two terms saw several reforms such as the introduction of the **Goods and Services Tax (GST) and the creation of the Insolvency and Bankruptcy Code.**
- The Modi government failed to bring about reform of land acquisition.
- During the second term, the Modi government could not convince farmers about the farm reforms and was forced to repeal them.

What were the notable reforms brought by the previous coalition governments?

P V Narasimha Rao government:

- The biggest example is the whole host of reforms during the **P V Narasimha Rao-led government, which was essentially a minority government.**
- It discarded centralized planning and opened the Indian economy to global completion by removing th**e license-permit raj.**
- The country also became a member of the **World Trade Organisation.**

Deve Gowda government:

- The **Minister P Chidambaram** came out with what is still referred to as the **"dream budget".**
- It placed faith in the **Indian taxpayers and cut tax rates** — both personal income tax, corporate taxes, and customs duties.

Atal Bihari Vajpayee-led National Democratic Alliance (NDA) government:

- India framed the **Fiscal Responsibility & Budget Management (FRBM)** law for fiscal rectitude, and limited the government's ability to borrow within prudential limits.
- The **Vajpayee-led coalition further advanced the push towards disinvestment of loss-making Public Sector Undertakings (PSUs)** and focused on boosting rural infrastructure and connectivity through the PM Gram Sadak Yojana.
- The very first NDA also brought in the **Information Technology Act, in 2000**, that laid the foundation for the bustling e-commerce giant that India is today.

Manmohan Singh-led United Progressive Alliance (UPA):

- One of the initiatives in the educational sector is **Sarva Shiksha Abhiyan to initiate the Right to Education Act.**
- **Right to Information Act, which boosted transparency** in India's democracy, and the Right to Food, which ensured that no Indian should go hungry.
- The UPA brought in the **Mahatma Gandhi National Rural Employment Guarantee Act (MG-NREGA)**, which provided minimum employment to the rural poor.

What are Cabinet committees, and why is the CCS the most important of them all?

Sub: Polity

Sec: Executive

Context:

While the allocation of portfolios is likely to be known soon, it is expected that the BJP — with 240 seats in Lok Sabha — will not cede the four big portfolios of Home, Defence, Finance, and External Affairs to its alliance partners, so it is able to retain its hold on the Cabinet Committee on Security (CCS).

Cabinet Committees

- They are **extra-constitutional** in emergence.
- In other words, they are **not mentioned in the Constitution**. However, the **Rules of Business** provide for their establishment.

Background:

- Exercising powers vested by virtue of **Article 77, the President** has made the "**The Government of India (Allocation of Business) Rules**". The Rules stipulate that the business of the Government of India shall be transacted in the Ministries, Departments, Secretariats and Offices specified in the First Schedule to these rules (all of which are hereinafter referred to as "departments"). The distribution of subjects among the departments shall be as specified in the Second Schedule to these Rules. The manner in which the officers are required to help the Minister in discharge of his/her executive functions is governed by the Government of India (Transaction of Business) Rules. The Rules provide that all business allotted to a Department shall be disposed of by, or under general or special directions of, the Minister-in-charge, subject to certain limitations where consultation is required with other departments or where cases have to be submitted to the Prime Minister, the Cabinet and its Committees or the President. These Rules also provide for the constitution of the following Standing Committees of the Cabinet and each Standing Committee shall consist of such Ministers as the Prime Minister may, from time to time, specify. As of now, these Committees are
- There are **8 cabinet committees** –
    - **Appointments Committee of the Cabinet.**
    - **Cabinet Committee on Accommodation.**
    - **Cabinet Committee on Economic Affairs.**
    - **Cabinet Committee on Parliamentary Affairs.**
    - **Cabinet Committee on Political Affairs.**
    - **Cabinet Committee on Security.**
    - **Cabinet Committee on Investment and Growth.**
    - **Cabinet Committee on Employment & Skill Development.**

The Rules also provide for appointment of ad hoc Committees of Ministers for investigating and reporting to the Cabinet, and, if so authorized, for taking decisions on such matters. The Rules also stipulate that it shall be the responsibility of the Departmental Secretary, who shall be the administrative head thereof, to ensure observance of these Rules in the Department

The **Prime Minister constitutes Standing Committees of the Cabinet** and sets out the specific functions assigned to them. He can add or reduce the number of committees.

- In addition to cabinet committees, several **Groups of Ministers (GoMs**) are constituted to look into different issues/subjects.
- All committees **except Cabinet Committee on Accommodation** and **Cabinet Committee on Parliamentary Affairs** are **headed by the Prime Minister**.
- The committee is responsible for **debates, discussions and appointments** of/in the **national security bodies**.
- Major decisions with respect to the significant appointments, issues of national security, **defence expenditure** of India are taken by the **Cabinet Committee on Security (CCS).**
- CCS is **chaired by the Prime Minister of India.**
- The following are the members of the CCS:
    - Prime Minister

- Minister of Defence
- Minister of Home Affairs
- Minister of Finance & Corporate Affairs
- Minister of External Affairs.

Why is CCS so important?

- With the **Prime Minister helming** it, the CCS has the ministers for **Finance, Defence, Home Affairs and External Affair**s as its members. It is responsible for debates, discussions and appointments of/ in the national security bodies. Major decisions with respect to the significant appointments, issues of national security, defence expenditure of India are taken by CCS.
- Besides dealing with defence related issues, the CCS also brainstorms on issues relating to law and order and internal security, and policy matters concerning foreign affairs on security-related issues. It also considers matters relating to atomic energy.
- The great importance of the CCS is the reason why it is expected that the BJP will resist the pressure from allies, including from crucial ones such as TDP and JDU, to cede any of these important portfolios.

Special Category Question

Sub: Polity

Sec: Federalism

Special Category Status (SCS)

- **SCS** was introduced in **1969** by the **Fifth Finance Commission** to assist states with historical economic or geographical disadvantages.
- **Criteria for SCS**: It was granted based on the **Gadgil formula.** The parameters were:
  - Hilly Terrain;
  - Low Population Density And/or Sizeable Share of Tribal Population;
  - Strategic Location along Borders with Neighbouring Countries;
  - Economic and Infrastructure Backwardness; and
  - Non-viable Nature of State Finances.
- The **14th Finance Commission** recommended **scrapping SCS,** suggesting an **increase in state tax devolution** from **32%** to **42%.**
- **States with SCS**: It was initially granted to **only three states:** Jammu and Kashmir, Nagaland, and Assam.
  - At present accorded to **11 states,** including **the seven states of Northeast, Sikkim, J&K, Himachal Pradesh,** and **Uttarakhand.**
  - **AP, Bihar,** and **Odisha** have also demanded SCS.

Significance of Special Category Status:

- The **Centre** pays **90%** of the funds required in a **centrally-sponsored scheme** to **special category status states** as against **60%** or **75%** in case of other states, while the remaining funds are provided by the state governments.
- **Unspent money does not lapse** and is carried forward.
- Significant concessions are provided to these states in excise and customs duties, income tax and corporate tax.
- Preferential treatment in getting central funds.
- Concession on excise duty to attract industries to the state.

- **30 per cent** of the **Centre's gross budget** also **goes to special category states.**
- These states can avail the **benefit of debt-swapping** and **debt-relief schemes.**
- **Industrial Incentives**: Includes tax exemptions, duty waivers, and lower state and central taxes, crucial for industrialization and employment opportunities.

Concerns:

- The **SCS** puts an **additional economic burden** when the **increased devolution** is already flowing to the State as recommended by the **15th FC**.
- It affects the centre state financial relations and hinders competitive federalism among the states.

AP's Demand for SCS:

- **Bifurcation Impact**: The **AP Reorganisation Act, 2014,** promised **SCS** to **AP** to compensate for the **loss of Hyderabad** and **revenue.**
- **Financial Strain**: Post-devolution revenue deficit estimated at **Rs 22,113 crore** for **2015-20** was actually **Rs 66,362 crore.** AP's debt soared from **Rs 2,58,928 crore** in **2018-19** to over **Rs 3.5 lakh crore.**
- **Economic Disparities**: **AP** inherited **59%** of the **population, debt,** and **liabilities** but **only 47% of revenues** from the **undivided state**. **Hyderabad**, now in **Telangana,** accounted for **Rs 56,500 crore** of the **Rs 57,000 crore software exports** in **2013-14.**
- **Agrarian Economy**: AP's economic buoyancy is low, with **per capita revenue significantly lower than Telangana's**.

Feasibility of SCS for AP:

- Accommodating **AP's** demand could set a precedent for **other states** like **Bihar** and **Odisha.** The **14th Finance Commission's** stance on **SCS** as a central resource burden complicates the issue.
- NDA might offer a **limited period SCS** or other developmental projects and financial aid, potentially **halting the privatisation of the Vizag steel plant** and **setting up SEZs in AP.**

Manipur conflict a 'law and order problem', says Tribal Affairs Minister Jual Oram

Sub: Polity

Sec: Federalism

Context:

- **Union Tribal Affairs Minister Jual Oram** said on Wednesday the ethnic conflict raging in Manipur for more than a year now is a "law and order situation" that is being dealt with by the Union Ministry of Home Affairs (MHA).

More on news:

- This is the **first time a Union Tribal Affairs Minister** has spoken about the conflict between the valley-based Meitei people and the hills-based Scheduled Tribe Kuki-Zo that has killed over 220 people.
- The ethnic conflict in Manipur recently flared up after a spate of violence escalated tensions in Jiribam, a district known to have maintained relative peace throughout last year.
- The country's first Tribal Affairs Minister after the Ministry was created in 1999, also held the portfolio between 2014 and 2019 in the first Narendra Modi-led Union Cabinet.
- "Police' and 'Public order' are State subjects under the Seventh Schedule to the Constitution of India. The responsibilities to maintain law and order, protection of life and property of the citizens including crime against women are with the respective State Governments.

About Manipur Conflict:

- The **conflict in Manipur began on May 3, 2023, after a State-wide protest march was held by all tribal communities**, including **Naga tribes**, of the State against an order of the Manipur High Court that directed the State government to consider the inclusion of the Meitei community in the Scheduled Tribes list.

- The **process of inclusion of communities in the ST list requires any recommendation to originate from the concerned State government but the Union Tribal Affairs Ministry** takes the process forward – coordinating with the National Commission for Scheduled Tribes and the Office of the Registrar General of India – before bringing it before the Cabinet.

Communities in news:

Kukis:

- The Kuki people are an ethnic group in the Northeastern Indian states of Manipur, Nagaland, Assam, Meghalaya, Tripura and Mizoram, as well as the neighboring countries of Bangladesh and Myanmar.
- The Kukis form one of the largest hill tribe communities in this region.

Meities:

- The Meitei people, Meetei, Manipuri people are an ethnic group native to Manipur.
- They form the largest and dominant ethnic group of Manipur in Northeast India.
- They speak the Meitei language, one of the 22 official languages of the Indian Republic and the sole official language of the Government of Manipur.

Act that punishes organized cheating in government exams comes into effect

Sub: Polity

Sec: Legislation in news

Context:

- The Union Government has notified that the Public Examinations (Prevention of Unfair Means) Act, 2024 will come into operation with effect from June 21.

More on news:

- The University Grants Commission-National Eligibility Test 2024 (UGC-NET) examination that was cancelled on June 19 on grounds of being compromised and is being investigated by the Central Bureau of Investigation will however not be covered by the newly enacted law.

About Public Examinations (Prevention of Unfair Means) Act, 2024:

- The Public Examinations (Prevention of Unfair Means) Bill, 2024 that has provision for up to five years' imprisonment and a fine of up to ₹1 crore for malpractices and organized cheating in government recruitment exams was notified by the Union government to come into effect from June 21.

List of offenses:

- The Act mentions punishments for
- leakage of question paper or answer key,
- directly or indirectly assisting the candidate in any manner unauthorisedly in the public examination,
- tampering with the computer network or a computer resource or a computer system

as offenses done by a person, group of persons or institutions.

- Besides these, **creation of fake website to cheat or for monetary gain, conduct of fake examination, issuance of fake admits cards or offer letters to cheat or for monetary gain and manipulation in seating arrangements, allocation of dates and shifts for the candidates to facilitate adopting unfair means in examinations are also among the offenses punishable under the law.**
- **Unfair means, as per the Act includes:**
    - **unauthorized access or leakage of question paper or answer key,**
    - **assisting a candidate during a public examination,**
    - **tampering with computer network or resources,**
    - **tampering with documents for shortlisting or finalizing of merit list or rank, and**

- **conducting fake examinations, issuing fake admit cards or offering letters to cheat, for monetary gain.**

- Any person or persons resorting to unfair means and offenses under this Act shall be punished with imprisonment for a term not less than three years but which may extend to five years and with fine up to ₹10 lakh.

Service provider:

- A service provider, **engaged by the public examination authority for conduct of examinations, shall also be liable to be punished with imposition of a fine up to ₹1 crore and proportionate cost of examination shall also be recovered from it.**
- Such service providers shall also be barred from being assigned with any responsibility for the conduct of any public examination for a period of four years.
- The Act defines service provider as any agency, organization, body, association of persons, business entity, company, partnership or single proprietorship firm, including its associates, sub-contractors and provider of support of any computer resource or any material, by whatever name it may be called, which is engaged by the public examination authority for conduct of public examination.

Bail in money laundering cases, and the 'twin test' under PMLA

Sub: Polity

Sec: Legislation in news

Context:

- A day after a trial court granted bail to Delhi Chief Minister Arvind Kejriwal who is in jail on charges under the **Prevention of Money Laundering Act (PMLA),** the Delhi High Court stayed the order.

More on news:

- A Bench headed by Justice Sudhir Kumar Jain on Friday heard an urgent plea by the Enforcement Directorate seeking a stay on the bail, and reserved its order until next week.
- The ED challenged the trial court's order on the ground that the court had failed to apply the 'twin test' for granting bail under PMLA.

What is the twin test, and why is bail under PMLA so contentious?

Section 45 and twin test:

- Section 45 of the PMLA, which deals with bail, first states that no court can grant bail for offenses under this law, and then proceeds to mention a few exceptions.
- The negative language in the provision itself shows that bail is not the rule but the exception under PMLA.
- The provision makes it mandatory to hear the public prosecutor in all bail applications, and when the prosecutor opposes bail, the court is required to apply a twin test.
- **These two conditions are:**
- (i) that there are reasonable grounds for believing that [the accused] is not guilty of such offense and
- (ii) that he is not likely to commit any offense while on bail.
- There are similar provisions in several other laws that deal with serious offenses — for example, **Section 36AC of The Drugs and Cosmetics Act, 1940, Section 37 of The Narcotic Drugs and Psychotropic Substances Act, 1985, and Section 43D(5) of the Unlawful Activities Prevention Act, 1967.**
- The provision in the UAPA, for example, states that no person accused of an offense punishable under Chapters IV (Punishment for Terrorist Activities) and VI (Terrorist Organisations) of this Act shall be released on bail or on his own bond unless the Public Prosecutor has been given an opportunity of being heard, or if the court is of the opinion that there are reasonable grounds for believing that the accusation is prima facie true.

Legal challenges to twin test:

- The first blow to the constitutional validity of the twin test came in a 2017 ruling, Nikesh Tarachand Shah v Union of India.
- A two-judge Bench comprising Justices Rohinton Nariman and Sanjay Kishan Kaul struck down the bail provision as unconstitutional on the ground that the onerous conditions were not a reasonable classification.
- 'Reasonable classification' is a feature of the right to equality, which is a fundamental right.
- By a subsequent amendment, Parliament put these provisions back in the law through the Finance Act, 2018.
- This re-insertion was challenged before various High Courts and eventually before the Supreme Court, culminating in a batch of petitions that were heard in 2022 as Vijay Madanlal Choudhary v Union of India.

Current position in law

- One key aspect of the challenge to the amendment on bail conditions still remains open even after the Vijay Madanlal Choudhary ruling: the passing of these amendments through the Money Bill route.
- A separate larger Bench challenge is pending before the SC on whether certain laws, such as the Aadhaar Act, service conditions of Tribunal members, etc. can be passed as a Money Bill.
- A Bench is yet to be constituted on that issue.
- Although the Supreme Court has agreed to review its Vijay Madanlal Choudhary ruling itself, it is still valid law since no stay is operating on the judgment.
- As per the ruling, the twin test has to be rigorously applied by all courts — special courts trying money laundering offenses as well as constitutional courts. It would also apply in the same way for both regular bail and anticipatory bail.
- An accused can still get the benefit available under Section 436A of the Code of Criminal Procedure (CrPC), under which he is entitled to bail after serving half of the maximum sentence as an undertrial.
- This means that in most money laundering cases, if the Enforcement Directorate is not able to finish the trial within three and a half years, the accused is entitled to bail, irrespective of the twin test.

The Telecommunications Act 2023

Sub: Polity

Sec: Legislation in news

Context:

- The Union Government on 21.06.2024, issued Gazette Notification for enforcing sections 1, 2, 10 to 30, 42 to 44, 46, 47, 50 to 58, 61 and 62 of the Telecommunications Act, 2023.

The Telecommunications Act, 2023:

- The Telecommunications Act, 2023 aims to amend and consolidate the law relating to development, expansion and operation of telecommunication services and telecommunication networks; assignment of spectrum and for matters connected therewith.
- The Telecommunications Act, 2023 also seeks to repeal existing legislative frameworks like Indian Telegraph Act,1885 and Indian Wireless Telegraph Act, 1933 owing to huge technical advancements in the telecom sector and technologies.
- Guided by the principles of Samavesh (Inclusion), Suraksha (Security), Vriddhi (Growth), and Tvarit (Responsiveness), the Act aims to achieve the vision of Viksit Bharat (Developed India).
- The Telecommunications Act, 2023, was passed by the Parliament in December 2023, received the assent of the President of India on 24.12.2023 and was published in the official Gazette on 24.12.2023.

Salient Features of the Act:

- The salient features of the sections that have been brought into force with effect from 26.06.2024:

Definitions:

- The Telecommunications Act **clearly defines various terminologies related to the implementation of the Act** thereby

	reducing uncertainties and improving investor confidence and is a step towards ease of doing business
RoW framework:	• Right of Way provides for an effective RoW framework, **both on public and private property.** • The definition of public entities has been broadened to include government agencies, local bodies and PPP projects like airports, seaports, and highways. • Public entities shall be **obligated to provide right of way** except in special circumstances. • **The fee for right of way** would be **subject to a ceiling**. • The Act provides a complete framework for RoW in respect of private property based on mutual agreement. • The Act also provides that the RoW shall be non-discriminatory and as far as practicable on a non-exclusive basis. • It also provides that telecommunication infrastructure shall be distinct from the property it is installed on.
Common ducts:	• In line with **PM Gati Shakti vision,** the law provides for the **Central Government** to establish **common ducts and cable corridors.**
Telecommunication standards:	• Telecom is a global industry. • To ensure national security and promote India's technology developers, the Act lays down powers to set standards and conformity assessment measures for telecommunication services, telecommunication networks, telecommunication security, etc.
National Security and Public safety:	• The Act provides strong provisions to take necessary measures for **national security and public safety.**
Inclusive service delivery, Innovation and technology development:	• The Act expands the scope of **Universal Service Obligation Fund** to include supporting universal services in underserved rural, remote, and urban areas; supporting research and development of telecommunication services, technologies, products and pilot projects. • The Act also provides a **legal framework for Regulatory Sandbox** to facilitate innovation, and deployment of new technology.
Protection of users:	• Telecommunication is a powerful tool for the empowerment of masses. • The Act provides measures for protection of users from unsolicited commercial communication and creates a grievance redressal mechanism.
Digital by design:	• The Act provides that the implementation shall be digital by design bringing **online dispute resolution** and other framework.

How the PESA has boosted forest conservation in India

Sub: Polity

Sec: Legislation in news

Policy Approach to Conservation in India:

- **India** faces **conflicts** between **conservation** and r**esource extraction** by local communities, and **conservation** versus **economic development**.
- The **state's approach** has been **inconsistent,** often favouring **big capital** over **local communities** due to **centralised political power**.
- **Conservation efforts** tend to be **top-down,** leading to **loss of access to traditional forest lands for local communities**.

Proposed Policy Solution:

- **Mandated political representation** for **marginalised communities** boosts both **forest conservation** and their **economic interests**.
- There should be a **combination of decentralisation and democratisation**, where **local communities** have **actual decision-making power** in **resource management**.

Methodology:

- The study draws on the **Panchayat (Extension to Scheduled Areas) Act (PESA),** passed in **1996**, which **mandates representation for Scheduled Tribes (ST)** in **local government councils** in **Scheduled Areas**.
- The authors use a **"difference-in-differences" framework,** comparing **villages** with and without **mandated ST representation** and **tracking forest cover changes** using **remote-sensing data from 2001-17.**
- This paper uses "**remote-sensing microdata** that has recently become available from satellites such as **LANDSAT, Sentinel,** and **DMSP.**"
- They use **two such datasets** — the **MEaSURES Vegetation Continuous Fields (VCF),** and the **Global Forest Cover (GFC) dataset** for **2001-17**.

What is the PESA Act 1996, and why was it enacted?

- The **Panchayats Extension to Scheduled Areas (PESA) Act 1996** was brought in as a response to the **long-standing demands of the tribal communities in India** for **greater autonomy and control over their own affairs**.
- Enacted on **24 December 1996** to enable **tribal self-rule** in **fifth schedule areas.** The Act **extended** the **provisions of Panchayats to the tribal areas** of **Fifth Schedule states**.
- The PESA Act drew inspiration from the provisions of the **73rd** and **74th amendments** of the Indian constitution.
- It **aimed** to provide **greater autonomy** to the **Scheduled areas,** which are predominantly **tribal** in nature, and protect their **rights over land and forest**.
- The **PESA Act** gives **special powers** to the **Gram Sabhas** in **Scheduled Areas,** especially for **managing natural resources.**

What are the significant provisions of the PESA Act?

- **Gram Sabha:** The PESA Act establishes the **Gram Sabha**, a forum for the participation of the community in the development process. The **Gram Sabha** is responsible for the identification of development projects, the preparation of development plans, and the implementation of these plans.
- **Village-level institutions:** The Act provides for establishing village-level institutions to carry out development activities and provide basic services to the community. These institutions include the **Gram Panchayat, the Gram Sabha,** and the **Panchayat Samiti.**
- **Powers and functions:** The PESA legislation gives the **Gram Sabha** and the **Gram Panchayat** significant **powers** and **functions** in relation to the **management of natural resources, the protection of the environment,** and the **regulation of economic activities.**
- **Consultation:** According to the Act requires that the Gram Sabha be consulted before any development projects or activities are undertaken in the Scheduled Areas.

- **Funds:** The Act allows **transferring funds to the Gram Sabha and the Gram Panchayat** to enable them to perform their functions.
- **Land:** The Act provides for the **protection of the land rights of the tribal communities** in the **Scheduled Areas** and requires that their consent be obtained before any land is acquired or transferred.
- **Cultural and social practices:** The Act protects the cultural and social practices of the tribal communities in the Scheduled Areas and prohibits any interference in these practices.

I&B Ministry to Regulate Social Media Content: Implications and Concerns

Sub: Polity

Sec: Msc

Key Points of the Proposal:

- **Inclusion of Social Media:**
  - The new Broadcasting Bill aims to **regulate user-generated content** on the Internet produced by **"professional" creators**, similar to how news platforms are currently regulated.
- **Expansion of the Bill's Scope:**
  - Initially, the draft Bill proposed regulating **online news and current affairs content creators** to the same extent as OTT streaming services. The latest proposal explicitly targets **"professional" content creators** without clearly defining the term.
- **Engagement with Internet Companies:**
  - The I&B Ministry has reached out to major **internet and streaming companies** to discuss the new regulatory framework, indicating the government's intention to bring these entities under its purview.

Implications of the Proposal:

- **Impact on Content Creators:**
  - Professional content creators might face **stringent regulations** similar to those imposed on traditional media. This could include adherence to specific **content guidelines**, **censorship**, and potential **penalties for non-compliance**.
- **Challenges in Definition:**
  - The lack of a **clear definition** of "professional" content creators creates **ambiguity**. Without specifying criteria such as **monetization thresholds** or **audience size**, it's uncertain who will fall under this regulation.
- **Censorship Concerns:**
  - The proposal raises concerns about **freedom of expression** and **censorship**. Regulating user-generated content could lead to increased control over what can be posted online, impacting the **diversity of viewpoints** and **critical discourse**.
- **Operational Burden on Platforms:**
  - Internet and streaming companies might face increased **operational burdens** to comply with the new regulations. This includes **monitoring content more closely** and implementing additional mechanisms to ensure compliance.
- **Potential Impact on Innovation:**
  - Strict regulations could **stifle innovation** in the digital content space. Content creators might be discouraged from experimenting with new formats or topics due to fear of **regulatory repercussions**.

Moving Forward: Key Considerations:

- **Stakeholder Engagement:**

- Engaging with all stakeholders, including content creators, platforms, and users, is crucial to ensure that the regulations are balanced and do not unduly stifle creativity or **freedom of expression**.

- **Clear Definitions and Guidelines:**
  - The I&B Ministry needs to provide **clear definitions** and guidelines regarding what constitutes a "professional" content creator. Transparent criteria will help avoid confusion and ensure **fair implementation**.
- **Safeguarding Free Speech:**
  - It is vital to strike a balance between regulation and **safeguarding free speech**. The regulatory framework should protect against harmful content without imposing **excessive censorship**.
- **Review and Feedback Mechanisms:**
  - Regular **review and feedback mechanisms** should be established to assess the impact of the regulations and make necessary adjustments. This will ensure that the framework remains **relevant and effective**.

Conclusion:

The proposal by the I&B Ministry to regulate social media and user-generated content marks a significant shift in India's approach to digital content regulation. While it aims to bring more **accountability** to online content, it also raises several concerns regarding **freedom of expression**, **operational challenges**, and the potential impact on **innovation**. Clear guidelines, stakeholder engagement, and a balanced approach will be essential in implementing this proposal effectively.

Remove claim of '100% fruit juice' from label and ads, FSSAI directs food businesses

Sub: Polity

Sec: National Body

FSSAI's directive to Food Business Operators (FBOs):

- The **Food Safety and Standards Authority of India (FSSAI)** has issued a **directive mandating all Food Business Operators (FBOs)** to **remove** any claim of **'100% fruit juice'** from the labels and advertisements of **reconstituted fruit juices** with immediate effect.

Details of the directive:

- **All the FBOs** have also been instructed to **exhaust all existing pre-printed packaging materials** before **September 1**.
- **FBOs** have been told to **comply with the standards** for **fruit juices** as specified under **sub-regulation 2.3.6** of the **Food Safety and Standards (Food Products Standards & Food Additives) Regulation, 2011**.
  - This regulation states that products covered by this standard **must be labelled** in accordance with the **Food Safety and Standards (Labelling and Display) Regulations, 2020.**
  - Specifically, in the **ingredient list,** the word **"reconstituted" must be mentioned** against the name of the juice that is reconstituted from the concentrate.
  - Additionally, if **added nutritive sweeteners exceed 15 gm/kg,** the product must be labelled as **'Sweetened juice'**.
- **Cause for issuing directives:**
  - **FSSAI** has noticed that several FBOs have been **inaccurately marketing** various types of **reconstituted fruit juices** by claiming them to be **100 per cent fruit juices.**
  - Upon thorough examination, **FSSAI** has concluded that according to the **Food Safety and Standards (Advertising and Claims) Regulations, 2018,** there is **no provision** for making a **'100%' claim.**

- Such claims are **misleading**, particularly under conditions where the **major ingredient of the fruit juice is water** and the **primary ingredient**, for which the claim is made, is **present only in limited concentrations,** or when the **fruit juice** is **reconstituted** using **water** and **fruit concentrates or pulp.**

Reconstituted fruit juice:

- Reconstituted fruit juices are those products in which a fruit juice concentrate is mixed with water to create the final product. A large number of commercially available fruit juices fall in this category.

About FSSAI:

- It is an **autonomous body** established under the **Ministry of Health and Family Welfare,** Government of India.
- The **FSSAI** was **established** under the **Food Safety and Standards Act, 2006,** which is a consolidating statute related to food safety and regulation in India.
- **Vision:** Build a new India by enabling citizens to have safe and nutritious food, prevent diseases, and lead a healthy and happy life.
- **Mission:** Set globally benchmarked standards for food, encourage and ensure that food businesses adhere to these standards, adopt good manufacturing and hygiene practices, and ultimately enable citizens to access safe and right food.
- **Functions of FSSAI:**
  - **FSSAI** is responsible for **protecting and promoting public health** through the **regulation and supervision of food safety.**
  - It lays down **standards** and **guidelines** in relation to articles of food and provides for licensing, registration, and accreditation for food business operators.
  - Anyone selling or importing food in India needs a food licence issued by FSSAI.
  - FSSAI also directly monitors compliance of food regulations, especially in the area of food imports to India.
  - FSSAI officers carry out food import controls and ensure that the contain no harmful ingredients. To do this, they send selected test products from the import to accredited laboratories for inspection.
  - The FSSAI is also responsible for the accreditation of food testing laboratories throughout India.
  - The FSSAI is responsible for the Food Certification in India.
  - It is mandated to specify systems for enforcing its standards, for accreditation of certification systems, and for certification of food safety management systems for food businesses.

3. Structure of FSSAI

- **Composition:** Comprises a **Chairperson and 22 members**, with one-third being women.
- **Appointment:** The Chairperson is appointed by the Central Government.
- **Support Structure:** Assisted by Scientific Committees, Panels, and the Central Advisory Committee.
- **Enforcement:** Primarily enforced by State Food Safety Commissioners.

Initiatives by FSSAI

- **Heart Attack Rewind:** Campaign to eliminate trans-fat in India by 2022.
- **FSSAI-CHIFSS:** Collaboration for food safety between industry, scientific community, and academia.
- **State Food Safety Index (SFSI):** Measures state performance on food safety parameters.
- **Eat Right India Movement:** Aims to transform India's food system for safe, healthy, and sustainable food.
- **Eat Right Station Certification:** Certification for railway stations providing safe and wholesome food.

Who Will Get Lok Sabha Speaker Post? Big Question After Modi 3.0 Signs In

Sub: Polity

Sec: Parliament

Context: Multiple reports have claimed that kingmakers TDP and JDU are looking at the Lok Sabha Speaker's post

How Speaker Is Elected?

- According to the Constitution, the Speaker's post falls vacant just before the new Lok Sabha meets for the first time.
- A pro-tem Speaker appointed by the President administers the oath of office to the new MPs.
- Subsequently, a Lok Sabha Speaker is elected by a simple majority.
- While there is no specific criteria to be elected as a Lok Sabha Speaker, an understanding of the Constitution and parliamentary rules is an advantage. In the last two Lok Sabhas, in which the BJP enjoyed a majority, Sumitra Mahajan and Om Birla were the Speakers.

About Speaker:

- The speaker of Lok Sabha is the **chair person or presiding officer.**
- The members of Lok Sabha elect speaker and deputy speaker from among its members after elections or when vacancy exists.
- To maintain independence of the office of speaker his salary on the consolidated Fund of India and the same is not subject to vote of Parliament.
- He is **sixth in the Order of Precedence of Government of India.**
- The speaker decides the agenda of discussions and has a casting vote (vote not in first place, but, only if tie exist).
- The Committees of the House function under the overall direction of the Speaker. He nominates the chairpersons of the committee.
- Committees like the Business Advisory Committee, the General Purposes Committee and the Rules Committee work directly under her Chairmanship
- The speaker has the power to adjourn or suspend the house/meetings if the quorum is not met. The Speaker ensures the discipline and decorum of the house. If the speaker finds the behaviour and a Member of Parliament is not good, he/she can punish the unruly members by suspending.
- The Speaker of Lok Sabha does not leave the office just after dissolution of the assembly. He continues to be in the office till the newly formed assembly takes its first meeting and elects the new Speaker.
- The final power to decide whether a particular bill is a Money Bill or not is vested in the Speaker of the Lok Sabha.
- The Speaker of Lok Sabha presides over the joint sitting of both the Houses.

Removal from office:

- If no more a member of house; resigns by writing to deputy speaker; he is of unsound mind declared so by the court of law; if he is declared undischarged insolvent; if he is no longer the citizen of India;
- He is removed from the post of Speaker by passing a resolution by majority of the members of Lok Sabha. This is to note that during resolution for removal of Speaker, the Speaker is not in position to cast his vote even if there is tie.

Bhartruhari Mahtab appointed pro tem Speaker

Sub: Polity

Sec: Parliament and legislation

Context:

- Seven-term parliamentarian and BJP leader Bhartruhari Mahtab was on June 20 appointed pro-tem Speaker of the Lok Sabha.

More on news:

- Congress accuses Modi government of bypassing convention by ignoring senior-most MP K. Suresh for the post
- The primary job of the pro-tem Speaker is to administer the oath to the newly- elected members of the 18th Lok Sabha and preside over the Lower House till the election of the Speaker.
- The **first session of the 18th Lok Sabha** will begin on June 24, with newly elected members taking oath/affirmation until June 25.
- The **election of Speaker is scheduled to take place on June 26.**

About Pro term speaker:

- The President is pleased to appoint Shri Bhartruhari Mahtab, Member, Lok Sabha as Speaker Pro term under **Article 95(1) of the Constitution to perform the duties of Speaker till election of the Speaker.**
- The **President of India appoints the Protem Speaker.**
- The **first meeting after the election when the Speaker and the Deputy Speaker** are selected by members of the Parliament is held under the pro tem Speaker.
- The newly elected **members of the 18th Lok Sabha** will make oath or affirmation before the pro tem Speaker.
- As per convention, **the MP who has served the maximum terms** is appointed pro tem Speaker for the first two days when oath is administered to all newly elected MPs.

What are the duties of a speaker?

Sub: Polity

Sec: Parliament

Context:

- The President has appointed seven-time MP Bhartruhari Mahtab as the **'Speaker pro tem'** of the 18th Lok Sabha.

More on news:

- The election of the full-time Speaker is scheduled for June 26.
- There are also reports of the Deputy Speaker being offered to one of the allies of the ruling National Democratic Alliance (NDA), a post that has been held by the Opposition since the 10th Lok Sabha (1991).
- In the 18th Lok Sabha, Bhartruhari Mahtab of the Bharatiya Janata Party (BJP) has been appointed as **Speaker pro tem.**

Who is Speaker pro tem?

- **Article 94** of the Constitution states that the Speaker of the Lok Sabha shall not vacate his/her office until immediately before the first meeting of the Lok Sabha after its dissolution. This is to ensure that the office of the Speaker is never left vacant.
- **Article 95(1)** of the Constitution provides that when the post of Speaker and Deputy Speaker is vacant, the President shall appoint a member of the Lok Sabha to perform the duties of the Speaker.
- This would be the situation when the first meeting of a new Lok Sabha commences.
- The President appoints '**Speaker pro tem'** under this provision till the full-time Speaker is elected. The term '**pro tem'** means '**for the time being' or 'temporary'.**
- The President is pleased to appoint Shri Bhartruhari Mahtab, Member, Lok Sabha as Speaker Pro term under **Article 95(1)** of the Constitution to perform the duties of Speaker till election of the Speaker.

- **The President** of India appoints the **Protem Speaker.**
- The first meeting after the election when the Speaker and the Deputy Speaker are selected by members of the Parliament is held under the pro tem Speaker.
- The newly elected members of the 18th Lok Sabha will make oath or affirmation before the pro tem Speaker.
- As per convention, the MP who has served the maximum terms is appointed pro tem Speaker for the first two days when oath is administered to all newly elected MPs.
- This term is not found in the Constitution or rules of Lok Sabha but is a conventional term which finds mention in the 'Handbook on the working of Ministry of Parliamentary affairs.'
- As per tradition, **one of the senior-most members of the Lok Sabha** is selected by the government, who is then administered oath by the President.
- The Speaker pro tem administers oath of office to other MPs and presides over the election of full-time Speaker.

How are the Speaker and Deputy Speaker elected?

- **Article 93** of the Constitution states that the Lok Sabha shall choose two members to be its Speaker and Deputy Speaker.
- The election of the Speaker is held on a date fixed by the President.
- All the Speakers in independent India have been elected unopposed.
- The election of Deputy Speaker is held on a date fixed by the Speaker.

What is the importance of the Speaker?

- Apart from the conduct of business, the Speakers perform two important constitutional functions of certifying a Bill to be a Money Bill (over which the Rajya Sabha has limited role), and deciding on disqualification under the Tenth Schedule for defection.
- In discharging these roles in the past, the Speakers have invariably favoured the ruling dispensation, something that should be avoided.
- The Lok Sabha rules provide the Speaker with the powers of referral of Bills introduced to Standing Committees and suspension of members for grave disorder up to a maximum of five days.
- Referral of Bills to committees have declined from 71% during 2009-14 to 16% during 2019-24.
- With the return of a coalition government, it is expected that the Speaker would refer important Bills to Standing committees for scrutiny.
- There were also large-scale suspensions of Opposition MPs during the winter session of 2023.

What are the conventions?

- In Britain, the **Speaker once elected to his/her office, resigns from the political party** to which he/she belonged.
- In subsequent elections to the House of Commons, he/she seeks election not as a member of any political party but as '**The Speaker seeking re-election'.**
- While the **Tenth Schedule allows a Speaker to resign from their political party on being elected** to their office, it has never been done by any Speaker till date.
- Resignation from their political parties on being elected as Speaker could be a first step towards demonstrating independence.
- The Deputy Speaker is an important constitutional officer who steps in during the vacancy or absence of the Speaker.
- The convention of offering the post of Deputy Speaker to the Opposition started in the year 1991.
- Till the 16th Lok Sabha this has been followed without a break.
- It was a travesty of the Constitution that no **Deputy Speaker was elected in the 17th Lok Sabha.**

18th Lok Sabha session begins today: How do MPs take oath? What happens if an MP is in jail?

Sub: Polity

Sec: Parliament

Context:

- THE FIRST session of the **18th Lok Sabha** starts today (24 June 2024). Before the House can begin its legislative functioning, the newly elected members will have to take the oath of Members of Parliament (MP), which is provided in the Constitution.

First Session of the 18th Lok Sabha and Parliamentary Oath:

- **Commencement and Oath-Taking**:
  - **Newly elected MPs must take the constitutional oath** before legislative work begins.
  - **Bhartruhari Mahtab (**elected for the **seventh consecutive time** from **Cuttack, Odisha)** will be the **first to take the oath** in front of **President Droupadi Murmu**.
  - **Mahtab** will act as **Speaker pro tem (under Article 95(1) of the Constitution)** until a **new Speaker is elected**.
- **Term of an MP**:
  - An **MP's five-year term** begins when the **Election Commission of India (ECI) declares results**, according to **Section 73** of the **Representation of the People Act, 1951**.
  - MPs start receiving salary and allowances from the date of ECI notification, which was **June 6** after the **2024 general elections**.
  - If **MPs change their party allegiance after this date**, their political party can request the Speaker to disqualify them under the anti-defection law.
- **Significance of Parliamentary Oath**:
  - Winning the **election** and starting the term does not automatically allow an MP to participate in House proceedings.
  - To **debate** and **vote** in **Lok Sabha**, an **MP must take the prescribed oath or affirmation** under **Article 99** of the Constitution.
  - **Participating** or **voting without taking the oath** incurs a **financial penalty of Rs 500 under Article 104.**
  - **Ministers can participate** but **not vote** in House proceedings for **up to six months** without being elected to Parliament.
- **Parliamentary Oath Text**:
  - Found in the **third schedule** of the **Constitution:** "I, A.B., having been elected (or nominated) a member of the Council of States (or the House of the People), do swear in the name of God / solemnly affirm that I will bear true faith and allegiance to the Constitution of India as by law established, that I will uphold the sovereignty and integrity of India and that I will faithfully discharge the duty upon which I am about to enter."
- **Evolution of the Oath**:
  - The original draft Constitution **did not include God in the oaths**.
  - Amendments by **K.T. Shah** and **Mahavir Tyagi** added **God** to the oath, providing liberty for those who do not believe in God to solemnly affirm instead.
  - **Dr. B.R. Ambedkar** supported these amendments.
  - The **Constitution (Sixteenth Amendment) Act, 1963**, added a **pledge** to **uphold India's sovereignty and integrity,** based on recommendations from the **National Integration Council**.
- **Oath Taking Process**:

- MPs must submit their **election certificate to Lok Sabha staff** before taking the oath.
- Parliament added this safeguard after an incident in **1957** when a **mentally unsound individual posed as an MP.**
- **MPs** can take the oath in **any of the 22 languages** specified in the Constitution.
- Roughly **half the MPs** take their oath in **Hindi or English; Sanskrit** has also been popular in recent Lok Sabhas.
- **MPs** must use the name on their election certificate and adhere to the text of the oath. Deviations are corrected by the presiding officer.

- **Special Cases**:
  - **MPs in jail** can be **allowed by courts to take the oath** to avoid vacating their seat due to **non-attendance** under constitutional provisions.
  - **Example:** Atul Kumar Singh, allowed to take the oath in January 2020 while in jail.
- The session begins with these procedures to **ensure all MPs are formally inducted and eligible to participate in legislative duties**.

Rahul Gandhi as Leader of Opposition

Sub: Polity

Sec: Legislature

Who can serve as Leader of Opposition in Lok Sabha and Rajya Sabha?

The position of Leader of Opposition was officially described in **The Salary and Allowances of Leaders of Opposition in Parliament Act, 1977.**

The Act describes the Leader of Opposition as a "**member of the Council of States or the House of the People, as the case may be, who is, for the time being, the Leader in that House of the party in opposition to the Government having the greatest numerical strength and recognised as such by the Chairman of the Council of States or the Speaker of the House of the People**".

What position does the Leader of Opposition have in the House?

- The Leader of Opposition sits in the front row to the left of the Chair, and enjoys certain privileges on ceremonial occasions like escorting the Speaker-elect to the rostrum.
- The Leader of Opposition is also entitled to a seat in the front row during the Address by the President to both Houses of Parliament.
- The main duty of the Leader of Opposition is to serve as the voice of the opposition in the House.
- An official booklet on Parliament published in 2012 says the Leader of Opposition in Lok Sabha "is considered as a **shadow Prime Minister** with **a shadow Cabinet**, ready to take over the administration if the Government resigns or is defeated on the floor of the House".
- Since the parliamentary system is based on "**mutual forbearance**", the Leader of Opposition lets the Prime Minister govern and is, in turn, permitted to oppose.
- His/ her proactive role in facilitating smooth functioning of the business of the House is as important as that of the Government," the booklet says.

What is the role and responsibility does the Leader of Opposition have?

- Most importantly, the Leader of Opposition is the opposition's representative in the high-powered committees headed by the Prime Minister for appointment to key posts such as the **Director of CBI, the Central Vigilance Commissioner and Chief Information Commissioner, the Chairperson and Members of the National Human Rights Commission, and the Lokpal.**
- As the Leader of the Congress in Lok Sabha from 2014 to 2019, Kharge had alleged that the government repeatedly tried to keep the opposition out of the selection of the Lokpal on the ground that there was no Leader of Opposition.

- In order of precedence, the Leaders of Opposition in Lok Sabha and Rajya Sabha come at No. 7, along with Union Cabinet Ministers, the National Security Advisor, the Principal Secretary to the PM, the Vice-Chairperson of the NITI Aayog, former PMs, and Chief Ministers.

AAP MP's suspension revoked, six new members take oath in Rajya Sabha

Sub: Polity

Sec: Parliament and legislation

Context:

- **Six newly-elected members of Parliament** from Bihar, Jharkhand and Madhya Pradesh took oath as members of the Rajya Sabha on June 27.

More on news:

- R**ajya Sabha Chairperson Jagdeep Dhankhar** also announced the revocation of suspension of Aam Aadmi Party (AAP) member Sanjay Singh.
- Rajya Sabha Committee on Privileges had presented the 77th and 78th Reports on the pending matters.
- The committee while holding Sanjay Singh guilty of breach of privilege of the Council in all the cases, recommended that the member has already suffered sufficient punishment for the transgression.

Suspension of MP in Rajya Sabha:

- **Under Rule 255 ('Withdrawal of member') of the General Rules of Procedure of the Rajya Sabha**, **The Chairman may direct any member** whose conduct is in his opinion grossly disorderly to withdraw immediately from the Council and any member so ordered to withdraw shall do so forthwith and shall absent himself during the remainder of the day's meeting.

Procedure to be followed for suspension of Rajya Sabha MPs:

- The **Chairman may name a member who disregards the authority of the Chair** or abuses the rules of the Council by persistently and wilfully obstructing business.
- In such a situation, **the House may adopt a motion suspending the Member** from the service of the House for a period not exceeding the remainder of the session.
- The **House may, by another motion, terminate the suspension.**
- In 2001, the **Lok Sabha rule was amended to give the Speaker one additional power.**
- A new rule, 374A, empowers the Speaker to automatically suspend an MP for a maximum of five days for disrupting the business of the House.

Revocation of suspension of MP in Rajya Sabha:

- The House by **motion terminates the suspension.**
- **Rules 202 and 266 of the Rules of Procedure and Conduct of Business in the Council of States (Rajya Sabha).**

Revocation of suspension of MP in Lok Sabha:

- The **Speaker has the authority to suspend a Member**, but the power to lift this suspension is not within her jurisdiction.
- **The House, (if it wishes) decides through a motion to** revoke the suspension.

Schemes

What is the National Health Claim Exchange?

Sub: Schemes

Sec: Health

National Health Claim Exchange (NHCX) Initiative:

- **Objective**: To provide patients with **swift access to quality healthcare** and **reduce out-of-pocket expenses**.
- **Collaboration**: Joint effort by the **Health Ministry** and the **Insurance Regulatory and Development Authority of India (IRDAI)**.
- Aligns with **IRDAI's objective,** facilitating a **centralized hub** for health claims.
- **Functionality**
    - **Platform**: Digital platform that integrates insurance companies, healthcare providers, and government insurance scheme administrators.
    - **Purpose**: Facilitates the exchange of claims-related information, enhancing interoperability, efficiency, and transparency in health claims processing.
    - **Integration and Implementation**
- **Integration**: Twelve insurance companies and one TPA (Third Party Administrator) have integrated with the NHCX.
    - **Goals**: Streamlined interactions between hospitals and insurers, creation of a seamless, paperless, and secure contractual framework.
    - **Adoption**: Over 30 insurance companies are on board, with ongoing efforts to include hospitals.
- **Cashless Claims Processing:**
    - **Timeline**: All cashless claims must be **processed within three hours of discharge authorization** from hospitals.
    - **Deadline**: Insurance providers **must implement the required systems and processes by July 31**.

Digital Health Incentive Scheme (DHIS):

- **National Health Authority** announced **financial incentives** under the **Digital Health Incentive Scheme (DHIS)** from January 2023
- Financial incentives are offered to hospitals for **digital health transactions**.
- **₹500 per insurance claim transaction** or **10% of the claim amount**, whichever is lower.

Significance for NHCX:

- **Healthcare Coverage**: Address **high out-of-pocket expenditures** and provide better healthcare services.
- **Data Exchange**: Standardization and seamless exchange of data between payers and providers.
- **Efficiency and Transparency**: Enhanced claims processing, reduced operational costs, and standardization of healthcare pricing.

Challenges

- **IT Upgrades and Training**: Hospitals and insurance companies need to upgrade IT systems and train staff.
- **Operational Issues**: Addressing discharge delays and miscommunication.
- **Trust Building**: Ensuring efficient services to build trust among policyholders.
- **Data Security**: Mitigating risks of data breaches.

PM to visit Varanasi, release 17th PM-Kisan instalment

Sub: Schemes

Context:

- Prime Minister Narendra Modi will visit Varanasi and he will release the **17th instalment of the PM-Kisan Samman Nidhi,** distributing over **₹20,000 crore** to **92.6 million farmers.**
- The event will be held at Mehndiganj, Sevapuri, where Modi will also award certificates to over **30,000 'Krishi Sakhis,' self-help group members** trained to assist other farmers.

PM- Kisan Samman Nidhi:

- **PM Kisan Samman Nidhi (PM KISAN Yojana)** is a **Central Sector Scheme** which **aims** at providing **financial assistance** to **all cultivable land holding farmer families** across the country, subject to certain exclusion criteria.
- It is a **Central Sector Direct Benefit Transfer (DBT)** Scheme.
- **Objectives of PM Kisan Samman Nidhi**
    - **To Boost Small and Marginal Farmers' Income:** In the ongoing fiscal year, the government has introduced a new Central Sector Scheme designed to enhance the income of Small and Marginal Farmers (SMFs).
    - **To address financial inclusion:** The PM KISAN scheme is geared towards addressing the financial requirements of SMFs, facilitating the procurement of essential inputs for optimal crop health and yields.
    - **Ensuring Sustainable Farming Income:** The primary objective of PM KISAN is to safeguard SMFs from resorting to moneylenders to meet agricultural expenses, thereby ensuring their sustained engagement in farming activities.

Features of PM KISAN Samman Nidhi

- **Scope and Scale-** The **PM Kisan Samman Nidhi Yojana** is poised to benefit a substantial **12 crore small and marginal farmers.** The program boasts an impressive annual budgetary allocation of **Rs 75,000 crore**.
- **Direct benefit transfer to individuals-** Each **PM KISAN beneficiary** is entitled to receive the allocated amount directly into their bank account. The disbursement is structured in three tranches, with each tranche amounting to **Rs 2,000.** Direct transfer eliminates discrepancies and middleman.
- **Ensured Income-** The prime **aim** of **PM KISAN** is to ensure that farmers receive a minimum income. Eligible farming families get **Rs. 6,000** in three equal parts every four months.
- **Utlization of funds as per their requirement-** Beneficiaries of **PM KISAN** have the freedom to use the money they receive from the scheme. They can use it for various needs. There is full autonomy in their spending decisions.
- **All funds from the Central Government-** All the funds for the **PM KISAN program** come from the central government. Initially, the program was allocated a reserve of **Rs. 75,000 crore per year,** with direct transfers made through **Direct Benefit Transfer (DBT)** to the bank accounts of beneficiaries.
- **Participation of States-** Identifying the beneficiaries is the responsibility of the State and Union Territory administrations, while the Government of India takes charge of providing the necessary funding.
    - To qualify for the program, a farmer family should include a husband, wife, and minor child or children, as determined by these governments.
- **Mandatory Aadhaar Requirement-** To avail the benefit of this scheme, it is essential to provide Aadhaar data as a compulsory prerequisite beneficiaries who don't have AADHAR data can enroll themselves from nearest CSC centre.
- **Self-Registration Mechanism-** Beneficiaries can use PM KISAN mobile App a mobile app and can register themselves in Common Service Centers, the scheme introduces a convenient self-registration mechanism for beneficiaries.
- **Centralized Call Center Support-** A dedicated centralized call center has been set up to assist beneficiaries, addressing issues encountered during registration or any other grievances they may have.
- **Annual Physical Verification Requirement-** Ensuring scheme authenticity, a mandatory annual physical verification is conducted for 5% of beneficiaries, contributing to the robustness of the verification process.

According to Guidelines of PM KISAN Scheme Following Category of Persons Are Not Eligible to Avail Benefit If Scheme.

- Person holding or retired from the constitutional posts.
- Former and present Ministers/State Ministers.
- Former or present members of Lok Sabha/ Rajya Sabha/ State Legislative Assemblies/ State Legislative Councils
- Former and present Mayors of Municipal Corporations
- Former and present Chairpersons of District Panchayats.
- Any serving or retired officers as well as employees under the Central/ State Government Ministries / Offices / Departments.
- All retired pensioners who get a monthly pension of Rs.10,000/-or more and belong to the above category.
- Any individual who paid their income tax in the last assessment year is not eligible under this scheme.
- Professionals like Doctors, Engineers, Lawyers, Chartered Accountants, and Architects registered with Professional bodies.

The government enhances allocation for the Fertilizer Sector under the SIGHT Programme of the National Green Hydrogen Mission (NGHM)

Sub: Schemes

Sec: Sci

Context:

- Allocation for the **fertilizer sector increased** from **5.5 lakh tonnes per annum** to **7.5 lakh tonnes per annum** of **Green Ammonia**.

National Green Hydrogen Mission (NGHM):

- The **National Green Hydrogen Mission (NGHM)** aims to achieve a **production capacity of 5 million tonnes per annum** of **Green Hydrogen** by **2030**.
- Initiated on January 4, 2023, with a budget of **Rs. 19,744 crores**, the mission aligns with **India's Aatmanirbhar (self-reliant) vision** and **global Clean Energy Transition goals**.

Strategic Interventions for Green Hydrogen Transition (SIGHT) Programme:

- **Aim of the programme:**
  - **Component I:** It aims at providing electrolyzer manufacturing incentives with a total outlay of INR 4440 crore
  - **Component II:** It focuses on green hydrogen production with a financial outlay of INR 13050 crore.
- **Implementing agency:** The **Solar Energy Corporation of India (SECI)** would be the implementing agency responsible for the scheme's execution.
- Under the **NGHM**, the **Ministry of New & Renewable Energy (MNRE)** issued guidelines for the **SIGHT Programme**, specifically **Component II: Incentive for Procurement of Green Ammonia Production** (Mode 2A) on January 16, 2024. This component targets the **fertilizer sector.**
- **Bidding Process**: The **Solar Energy Corporation of India (SECI)** released a **Request for Selection (RfS)** to choose **Green Ammonia producers** through a cost-based competitive bidding process.

Increased Demand and Amendment:

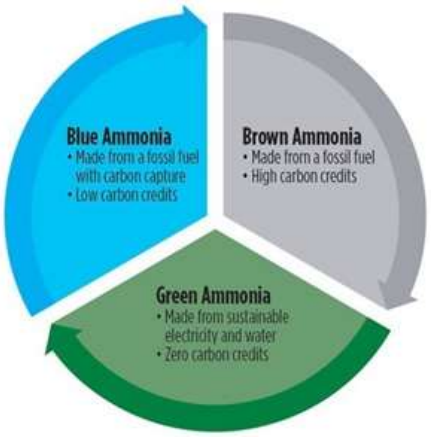
- Due to the growing demand for **Green Hydrogen** and its **derivatives**, particularly **Green Ammonia** in the **fertilizer sector, MNRE** has **increased** the allocation under **Mode 2A by 2 lakh tonnes per annum.**

Significance:

- **Decarbonization**: The mission **aims** to significantly **decarbonize the economy** and **reduce dependence on fossil fuel imports**.
- It positions **India** as a leader in **Green Hydrogen technology and market**, inspiring global clean energy initiatives.

About Green Ammonia:

- It is produced by using **hydrogen** from **water electrolysis** and **nitrogen** separated from the **air**.
- These are then fed into the **Haber process** (also known as **Haber-Bosch**) which is powered by **sustainable electricity**.
- In the **Haber process, hydrogen** and **nitrogen** are **reacted together** at **high temperatures** and **pressures** to **produce ammonia, NH3.**
- **Green ammonia production** is where the **process of making ammonia is 100% renewable and carbon-free**.
- **It can be used in:**
    - Fuel for engines such as locomotives and shipping, replacing diesel and marine fuel oil
    - Fuel source for electricity and power generation
    - Building block to make fertilisers for use in agriculture;
    - Feedstock for industrial and manufacturing applications ranging from water purification through to pharmaceuticals



How well is India tapping its rooftop solar potential?

Sub: Schemes

Sec: Renewable energy

Context:

- The country's **installed RTS capacity** increased by 2.99 GW in 2023-2024, the highest growth reported in a year.

Statistics regarding RTS:

- As of March 31 this year, the total installed RTS capacity in India was 11.87 GW, per the **Ministry of New and Renewable Energy.**
- In 2015, the government revised this target to 100 GW by 2022, including a 4**0 GW RTS component, with specific yearly targets for each State and Union Territory.**
- In December 2022, India achieved an installed RTS capacity of about 7.5 GW.
- It extended the deadline for the 40 GW target to 2026.

What is the RTS programme?

- The **Indian government launched the Jawaharlal Nehru National Solar Mission in January 2010.**
- It was the first major initiative to promote the growth of solar energy.

- The main objective was to produce 20 GW of solar energy (including RTS) in three phases: 2010-2013, 2013-2017, and 2017-2022.
- **Rooftop solar (RTS) has the potential to revolutionize India's energy landscape, offering a sustainable, decentralized, and affordable solution to meet the country's growing electricity needs and making consumers self-reliant.**
- Based on the **RTS capacities calculated as of March 31, 2024, Gujarat, Maharashtra, and Rajasthan have taken big strides.**
- **India's first solar-powered village, is in Gujarat and has 1,300 RTS systems of 1 kW each.**
- Maharashtra, with an RTS capacity of 2,072 MW, is one of the top performing states owing to its robust solar policies and conducive regulatory environment.
- **Rajasthan being the largest state by area** and with a high solar irradiance, boasts of the highest RTS potential in the country, with a capacity of 1,154 MW.

Various schemes regarding solar rooftop:

The 'Pradhan Mantri Surya Ghar:

- **Muft Bijli Yojana' is a flagship initiative to fit 1 crore households with RTS systems and help them get up to 300 units of free electricity every month.**
- The scheme **Surya Ghar Muft Bijli Yojana**, with an investment of over Rs. 75,000 crores, aims to light up 1 crore households by providing up to 300 units of free electricity every month.
- The scheme aims to incentivise the adoption of solar energy among residential consumers, promoting sustainability and reducing reliance on conventional energy sources.
- It is a **grid connected rooftop solar PV system**, where the DC power generated from a solar panel converted to AC power using a power conditioning unit/Inverter and is fed to the grid.
- An average system size of 2 kW for the targeted households will result in a total RTS capacity addition of 20 GW.
- Under the **'Suryamitra' (solar PV technician) training programme initiated in 2015, more than 51,000 technicians had been trained as of December 2022.**
- As the implementation of the 'Muft Bijli Yojana' goes into full swing, RTS policies including net-metering regulations, grid-integration standards, and building codes should be reviewed and updated.
- The virtual net-metering and group net-metering options need to be fast-tracked for consumers with inadequate roof space for RTS installations.

Union Ministers of State for Health and Family Welfare unveiled three initiatives at the **आयुष्मान भारत, गुणवत्त स्वास्थ्य** event

Sub: Schemes

Sec: Health

Context:

- Union Ministers of State for Health and Family Welfare, Shri Prataprao Ganpatrao Jadhav and Smt. Anupriya Singh Patel unveiled three initiatives at the **आयुष्मान भारत, गुणवत्त स्वास्थ्य** event.

More on news:

- The initiatives will play a major role in improving the quality of **healthcare services and promoting the ease of doing business in India.**

Initiatives launched:

Virtual Assessment for Ayushman Arogya Mandir:

- The Union Ministers have launched a virtual **National Quality Assurance Standards (NQAS) assessment for Ayushman Arogya Mandirs (AAM).**

- It will act as a dashboard which will help **national, state and district health institutions** and facilities in quickly monitoring compliance with respect to **Indian Public Health Standards (IPHS)** and taking actions accordingly and a spot food license and registration initiative for food vendors.
- Led by **Community Health Officers**, the **primary healthcare teams at AAM** are trained to manage initial care, triage, and refer patients to appropriate facilities for further treatment.
- This approach reduces the burden on secondary and tertiary care facilities by providing primary care services closer to the community with adequate referral linkages.
- The early identification and management of health issues help prevent disease progression, necessitating advanced care.
- **National Quality Assurance Standards (NQAS)** were developed for **District Hospitals, Community Health Centres, Rural and Urban Primary Healthcare Centres, and Ayushman Arogya Mandirs (Sub Centres) with the goal of full compliance by 2026.**

NQAS for Integrated Public Health Laboratories (IPHL):

- By establishing **Integrated Public Health Laboratories (IPHL) the Ministry of Health and Welfare**, Government of India, has strengthened laboratory systems under the **PM-Ayushman Bharat Health Infrastructure Mission (PM-ABHIM).**
- These laboratories ensure accessibility, efficiency, and quality in diagnostic services, which are fundamental to effective healthcare delivery.
- The Standards will improve the quality and competence of management and testing systems in IPHLs which will positively impact the reliability of test results and help gain the trust of clinicians, patients and the public regarding lab outputs.
- Revised guidelines for **Kayakalp were also released.**

Launch of the IPHS Dashboard for Real-time monitoring of Public Health Facilities:

- The launch of the **IPHS Compliance Dashboard** represents a revolutionary strategy in India's healthcare development.
- The IPHS Dashboard is a pioneering digital platform for real-time monitoring of public health facilities that provides a comprehensive overview of the assessment and compliance status of public health facilities, including District Hospitals, Sub-District Hospitals, Community Health Centers, Primary Health Centers, and Ayushman Arogya Mandirs.

FoSCoS:

- **FoSCoS is a state-of-the-art, Pan-India IT platform** designed to address all food safety regulatory needs.
- This innovative system simplifies the licensing and registration processes, offering an enhanced user experience.
- Beyond licensing and registrations, **FoSCoS facilitates self-compliance** through online return filings, hygiene ratings for food service establishments, third-party audits for safety parameters and more.
- Integrated with other IT platforms of the **Food Safety and Standards Authority of India (FSSAI), FoSCoS provides a comprehensive solution for food business operators.**
- Instant issuance of licenses without the intervention of a licensing authority will be available for select categories such as wholesalers, distributors, retailers, transporters, storage without atmospheric control + cold, importers, food vending agencies, direct sellers and merchant-exporters.

Science and tech

Gene therapy trial gives deaf children hearing in both ears

Sub: Science and tech

Sec: Biotechnology

Context:

- Five children who were born deaf now have **hearing in both ears after taking part in an "astounding" gene therapy trial that raises hopes for further treatments.**

More about the news:

- The **children were unable to hear** because of inherited genetic mutations that disrupt the body's ability to make a protein needed to ensure auditory signals pass seamlessly from the ear to the brain.
- Within weeks of receiving the therapy, the children had gained hearing, could locate the sources of sounds, and recognised speech in noisy environments.
- The **US-Chinese team reported improvements after treating the deaf children in one ear, but the intention was always to give hearing in both ears.**
- If they can hear in both ears, the children can work out where sounds are coming from, a capability important for everyday situations such as talking in groups and being aware of traffic when crossing the road.

Procedure of the gene therapy:

- The **gene therapy is injected** during a minimally invasive surgical procedure, so treating both ears doubles the time that patients spend in surgery.
- **Treating both ears also raises the risk of a stronger immune reaction, triggered when the body's defences react to the virus that delivers the therapy.**

What is Gene Therapy?

- **Gene therapy aims to fix a faulty gene** or **replace it with a healthy gene** to try to cure disease or make the **body better able to fight disease.**
- It holds promise as a treatment for a wide range of diseases, such as cancer, cystic fibrosis, heart disease, diabetes, haemophilia and AIDS.
- **Gene therapies are of two types, germ-line gene therapy (GGT)** and **somatic cell gene therapy (SCGT).** In **GGT, germ cells** are modified by introduction of correct/functional genes into their genome. It is heritable and is passed onto the next generation.

Ancient genomes reveal legacies of human sacrifice and medieval epidemics

Sub: Science and tech

Sec: Biotech

Context:

- In a recent scientific report published in Nature, a team of archaeologists and scientists from **Germany, Mexico, Spain, the U.K., and the U.S**. sequenced genetic material obtained from the human remains.

More on news:

- Scientists have used **archaeogenetics and evolutionary medicine** to bring to light some of the inner lives and beliefs of the Mayan people.
- **People's practice of burying human remains throughout modern history** echoes diverse cultural, spiritual, and social beliefs, and is often considered to be a line in the sands of time between modern and ancient humans.
- They read the results along with **bio-archaeological evidence** collected at the site to launch an extensive investigation of the remains of 64 sub-adults from the Sacred Cenote and compared them to modern-day individuals of Mayan origin.

Key findings of the study:

- Their studies revealed that all sub-adults in the cenote were genetically male and closely related to each other.
- The findings go **against 20th century colonial accounts that claimed young women had been sacrificed here.**

- The study also identified **two pairs of monozygotic twins among the remains.**
- Twins held significance in **Mayan spiritual life and were linked to the underworld.**
- The researchers also used **isotopic studies to establish that all the related individuals in the cenote had similar diets, suggesting they all belonged to the same household.**
- The similarities also suggested they were selected for a specific purpose.
- It is widely believed the Mayans organized ritual sacrifices to ensure the bountiful growth of maize and to appease rain gods.

Benefits of the study:

- By comparing the ancient and the modern genomes from Mexico, the researchers found evidence of positive selection in genes related to immunity, especially those associated with resistance to enteric fever caused by Salmonella enterica Paratyphi C, a pathogen serotype previously identified with the 16th century cocoliztli epidemic in Mexico.
- The study of the ancient genomes and their modern counterparts allows us to resolve old mysteries, dispel old hypotheses, and gain new insights from the past to light the way for the future.

Practice of Burying:

- Researchers have recorded the practice of **burying since the time of our now-extinct Neanderthal ancestors.**
- The oldest intentional **modern human burial dates to more than 100,000 years ago, in a cave in Israel.**
- This timeline overlaps with the discovery of the skeletal remains of a roughly three-year-old child buried in Kenya some 80,000 years ago.
- Burial practices evolved with advancing human civilisations, with the construction of elaborate mausoleums.
- The pyramids of Egypt were monumental tombs for the pharaohs; the Mughal emperor Shah Jahan commissioned the Taj Mahal in Agra as a mausoleum for his wife.
- These structures reflect an enduring human desire to honor the dead and remember them.

Ancient Mayan genomes:

- **Chichén Itzá is an ancient Mayan city located in modern-day Mexico.**
- It is known for its grand **architecture and iconic ceremonial temples, built around 800-1000 AD.**
- The temples are also infamous for having been the site of human sacrifices made as ritual offerings, and have been under constant archaeological investigation for more than a century.
- The offerings were deposited in an enormous sinkhole or a **subterranean cistern called the 'Sacred Cenote'.**
- In **Mayan culture, these subterranean features** were often associated with water and rain.
- The Sacred Cenote in Chichén Itzá holds the skeletal remains of more than 200 ritually sacrificed individuals, many of them children or adolescents.

'Multi-omics' is changing how India spots and treats TB, cancers

Sub: Science and tech

Sec: Biotech

Context:

- In January 2024, the Department of Biotechnology said it had completed sequencing 10,000 genomes from 99 ethnic groups under its 'Genome India' project.

More on news:

- In October 2020, the Council for Scientific and Industrial Research (CSIR) had reportedly sequenced the entire genomes of 1,008 individuals in India representing diverse ethnic groups in six months.

- This effort was part of a mission called **'IndiGen'** aimed to create a pilot dataset with which researchers could analyze the epidemiology of genetic diseases and help develop affordable screening approaches, optimize treatment, and minimize adverse events for them.
- Researchers have also been able to extract more value from these using artificial intelligence and machine learning, and by combining their contents with other extensive datasets on **proteins (proteomics), gene expression in cells (transcriptomics), and chemical changes that regulate gene expression (epigenomics) to develop a 'multi-omics' approach to tackle diseases.**

What is the Genome India Project?

- Genome India Project is a research initiative led by the Bangalore-based **Indian Institute of Science's Centre for Brain Research** and involves over 20 universities across the country in an effort to gather samples, compile data, conduct research, and create an '**Indian reference genome' grid.**
- This national initiative **aims to develop a reference genome for Indian people, which will help design genome-wide and disease-specific 'genetic chips' for low-cost diagnostics and research.**

What are Multiomics?

- **Multi Omics is a new approach** where the data sets of different omic groups are combined during analysis.
- The different **omic strategies employed during multi omics are genome, proteome, transcriptome, epigenome, and microbiome.**

Treatment for Tuberculosis:

- The **Indian Tuberculosis Genomic Surveillance Consortium (InTGS)** comprises 10 Report India sites covering eight states for tuberculosis, with the goal of sequencing around 32,000 tuberculosis clinical strains from active patients, and developing a centralized biological repository of clinical Mycobacterium tuberculosis strains in India.
- Other major objectives vis-à-vis tuberculosis include mapping the genetic diversity of pulmonary and extra-pulmonary isolates of the tuberculosis bacterium from newly reported active cases in India.
- The project's ultimate goal is to validate identified mutations to develop a sequence-based method to determine drug resistance.

Rare genetic disorders:

- India has also launched a **pan-country mission for Pediatric Rare Genetic Disorders (PRaGeD),** which, despite their rarity, have become a common public health concern.
- **Mission PRaGeD is planning to create awareness, perform genetic diagnosis**, discover and characterize new genes or variants, provide counselling, and develop new therapies for rare genetic diseases that afflict India's children.
- The mission will incorporate IndiGen data in its in-house bioinformatic pipelines it will use to analyze the parts of a genome that code for proteins (exome).

Cancers:

- Several Indian institutions have **established the ICGC-like genomic data repositories to facilitate cancer research** and precision medicine initiatives that cater to the genetic makeup of Indian people.
- Indian Cancer Genome Atlas project, a not-for-profit public-private-philanthropic initiative that is trying to create a comprehensive catalog of genomic alterations across various cancer types prevalent in India.

Antimicrobial resistance:

- Genomics and metagenomics are coming in handy to **analyze antimicrobial resistance and understand the possibility of rapid spread of any antibiotic resistance** functions between bacterial species.

AI, ML, and multi-omics:

- Artificial intelligence (AI) and machine learning (ML) algorithms are lending a helping hand to genomics in analyzing the extensive datasets.

- Multiomics (multiple 'omics) provides a more complete way to understand the contribution of genetic variants to biology, disease and their mechanism of action.

ED arrests dark web drug 'vendor' who operated international syndicate

Sub: Science and tech

Sec: Awareness in IT & Computer

Tags: **dark web**

Context:

- The **Enforcement Directorate (ED)** has arrested a resident of Uttarakhand for allegedly operating an international drug trafficking group, following a request from the U.S. authorities.

Key Highlights:

- Accused has been booked under the **Prevention of Money Laundering Act.**
- It is alleged that he, along with his brother and others, had been operating the drug trafficking syndicate.
- Accused had operated a **global dark web** enterprise to send **fentanyl** and other deadly and dangerous drugs to communities across America – in all 50 States — as well as Canada, Europe, and the Caribbean.
- He created vendor marketing sites on dark web marketplaces to sell **controlled substances, including fentanyl, LSD, ecstasy, xanax, ketamine, and tramadol.**
- The accused persons used the **moniker "Liston"** on a variety of dark web markets, **including Silk Road 1, Alpha Bay, and Hansa.**

What is the Dark Web?

- **The dark net or dark web is an overlay network within the Internet which is not accessible through search engines, and where anonymous activities are carried out.**

Internet consists of three layers:

- **Surface Web:**
  - The **first layer is public (Surface Web), consisting of sites that one uses frequently such as Facebook, Twitter, Amazon and LinkedIn.**
  - This layer makes up only 4% of the entire internet.
- **Deep Web:**
  - The second layer, **the deep web, is a network where data is stored in inaccessible databases (i.e., cannot be accessed through traditional search engines like Google).**
  - It is used to provide access to a specific group of people.
  - The data is **generally sensitive and private (government private data, bank data, cloud data etc), so kept out of reach.**
- **Dark Net:**
  - **The third layer is the darknet** which is also known as a part of the 'Deep Web'. It is a network built over the internet which is encrypted.
  - It is basically a layer of the Internet accessible only by using special software like Tor (The Onion Router), or I2P, which stands for Invisible Internet Project.
  - Anything **present on the dark web will not be pulled up in internet searches, thereby offering a high degree of anonymity.**

About ED:

- It is a **Multi-Disciplinary Organization mandated with the task of enforcing the provisions of two special fiscal laws – Foreign Exchange Management Act, 1999 (FEMA) and Prevention of Money Laundering Act, 2002 (PMLA).**
- The origin of this Directorate goes back to **1st May, 1956, when an 'Enforcement Unit Was** formed, in Department of Economic Affairs, for handling **Exchange Control Laws violations under Foreign Exchange Regulation Act, 1947 (FERA, 1947).**
- In the year 1957, this Unit was renamed as 'Enforcement Directorate'.
- The administrative control of the Directorate was transferred from the **Department of Economic Affairs to the Department of Revenue in 1960.**
- **The ED** has its headquarters **in New Delhi** and has many regional offices all over the country.
- **The Directorate enforces two laws;**
    - **FEMA, a Civil Law having quasi-judicial powers, for investigating suspected contraventions of the Exchange Control Laws and Regulations with the powers to impose penalties on those adjudged guilty.**
    - **PMLA, a Criminal Law, whereby the Officers are empowered to conduct enquiries to locate, provisionally attach/confiscate assets derived from acts of Schedules Offenses besides arresting and prosecuting the Money Launderers.**

The International Year of Quantum Science and Technology

Sub: Science and tech

Sec: Awareness in IT and Computer

The United Nations has proclaimed 2025 as the "**International Year of Quantum Science and Technology**."

This initiative **aims to increase public awareness and understanding of quantum science and its applications through year-long, worldwide activities**. The resolution was spearheaded by Mexico and later supported by numerous countries and international scientific unions.

Significance of the Proclamation

- **Historical Context:** 2025 marks a century since Werner Heisenberg published his seminal paper that laid the groundwork for quantum mechanics. This recognition underscores the **importance of quantum science in shaping modern physics**.
- **Global Endorsement:** The resolution has received widespread support, with over 70 countries backing it, highlighting the global significance of quantum science.
- **Scientific and Educational Impact:** The year-long celebration will involve various activities aimed at engaging the public, educational institutions, and policymakers, fostering a deeper understanding of quantum technologies.

These organizations have endorsed the proclamation, **indicating a broad consensus in the scientific community about the importance of quantum science.**

Quantum Science and Technologies

- **Quantum Computing:** Quantum computers, though not fully operational yet, promise revolutionary advances in computing power, potentially transforming fields like cryptography, materials science, and complex system simulations.
- **Quantum Communication:** Secure communication methods, such as quantum key distribution, leverage the principles of quantum mechanics to provide unprecedented security.
- **Quantum Sensing and Metrology:** Quantum sensors and measurement technologies offer ultra-precise detection capabilities, impacting areas like navigation, medical imaging, and fundamental physics research.
- **Quantum Materials and Devices:** Development of new materials with quantum properties can lead to **innovations in electronics, superconductivity, and energy storage.**

National Initiatives

- **India's National Quantum Mission:** Launched in April 2023, this **mission aims to advance quantum technologies in computing, communication, sensing, and materials, with a budget of Rs 6,000 crore over eight years.**

Conclusion

The designation of 2025 as the International Year of Quantum Science and Technology by the United Nations signifies a pivotal moment for global scientific collaboration and public engagement. This **initiative aims to elevate the understanding and application of quantum science, paving the way for technological advancements and fostering international cooperation in this transformative field.**

National Quantum Mission (NQM)

About:

- The National Quantum Mission (NQM) will be implemented by the **Department of Science & Technology (DST)** under the **Ministry of Science & Technology**.
- The mission is planned for **2023-2031** and aims to seed, nurture, and scale up scientific and industrial R&D, creating a vibrant and innovative ecosystem in Quantum Technology (QT).
- With the launch of this mission, **India will become the seventh country** to have a dedicated quantum mission, following the US, Austria, Finland, France, Canada, and China.

Salient Features of NQM:

- **Development of Quantum Computers:**
    - Target: Develop **intermediate-scale quantum computers** with **50-100 physical qubits** in 5 years and **50-1000 physical qubits** in 8 years.
    - Qubits, or quantum bits, are the basic units by which quantum computers process information, similar to how bits (1 and 0) are used in classical computers.
- **Magnetometers and Precision Timing:**
    - Development of **magnetometers with high sensitivity** for precision timing (atomic clocks), communications, and navigation.
- **Quantum Materials:**
    - Support design and synthesis of quantum materials such as **superconductors**, novel **semiconductor structures**, and **topological materials** for the fabrication of quantum devices.
- **Quantum Communications:**
    - Development of **satellite-based secure quantum communications** between ground stations over a range of **2000 km within India**.
    - **Long-distance secure quantum communications** with other countries.
    - **Inter-city quantum key distribution** over **2000 km**.
    - Creation of a **multi-node quantum network** with quantum memories.
- **Thematic Hubs (T-Hubs):**
- Establishment of **four Thematic Hubs** in top academic and National R&D institutes focusing on:

1. **Quantum computation**
2. **Quantum communication**
3. **Quantum Sensing & Metrology**
4. **Quantum Materials & Devices**

What is Quantum Technology?

- **Field of Science and Engineering:** Deals with the principles of quantum mechanics, which studies the behavior of matter and energy at the smallest scales.
- **Quantum Mechanics:** Branch of physics that describes the behavior of matter and energy at the atomic and subatomic levels.

Advantages of Quantum Technology:

- **Increased Computing Power:** Quantum computers are significantly faster and capable of solving complex problems beyond the reach of classical computers.
- **Improved Security:** Quantum encryption techniques are much more secure than traditional methods due to the principles of quantum mechanics.
- **Faster Communication:** Quantum communication networks can transmit information faster and more securely, with potential for completely unhackable communication.
- **Enhanced AI:** Quantum machine learning algorithms can enable more efficient and accurate training of AI models.
- **Better Sensing and Measurement:** Quantum sensors can detect extremely small environmental changes, useful in medical diagnostics, environmental monitoring, and geological exploration.

Disadvantages of Quantum Technology:

- **Expensive:** Requires specialized equipment and materials, making it costlier than traditional technologies.
- **Limited Applications:** Currently useful for specific applications like cryptography, quantum computing, and quantum communication.
- **Sensitivity to Environment:** Highly sensitive to environmental interference (temperature changes, magnetic fields, vibrations) which can disrupt qubits and cause calculation errors.
- **Limited Control:** Difficult to control and manipulate quantum systems, which can lead to unintended consequences in quantum-powered AI systems.

European Union's New AI Rules Ignite Battle Over Data Transparency

Sub: Science and tech

Sec: Awareness in IT and Computer

Overview:

- **New AI Laws:** The European Union (EU) has introduced a **new set of laws governing the use of artificial intelligence (AI), aimed at increasing transparency about the data** used to train AI systems.
- **Implementation:** These laws, part of the EU's recently passed AI Act, will be rolled out over the next two years.
- **Transparency Requirement:** One key provision requires organizations deploying general-purpose AI models, such as ChatGPT, to provide "detailed summaries" of the content used for training these models.

Key Points:

- **Industry Response:** AI companies are resistant to these transparency requirements, viewing the data used to train their models as trade secrets.

- **Potential Impact:** The level of detail required in transparency reports will significantly impact both small AI startups and large tech companies like Google and Meta.

Legal and Regulatory Context:

- **Copyright Issues:** The new rules come **amid ongoing lawsuits and debates about whether AI companies are improperly using copyrighted content,** such as bestselling books and Hollywood movies, to train their models without permission.
- **US Response:** While the US has focused on AI security risks, copyright issues remain unresolved. There is bipartisan support in Congress for requiring tech companies to pay rights holders for data.

Industry Developments:

- **Content-Licensing Deals:** In response to scrutiny, several tech companies have signed licensing deals with media outlets. For example:
    - **OpenAI:** Deals with the Financial Times and The Atlantic.
    - **Google:** Agreements with NewsCorp and Reddit.
- **Controversies:** Despite these efforts, **companies like OpenAI continue to face backlash for not disclosing whether specific content, such as YouTube videos, was used for training their models.**

Government Stances:

- **Balancing Act:** The AI Act aims to balance protecting trade secrets with enabling copyright holders to exercise their rights.
- **French Government Position:** Under President Emmanuel Macron, France has opposed rules that could hinder European AI startups' competitiveness and emphasizes the need for Europe to innovate before regulating to avoid stifling technology development.

Conclusion:

The EU's new AI regulations **represent a significant shift towards greater transparency in the AI industry.** However, the detailed implementation and its impact on competitiveness, innovation, and intellectual property rights remain contentious and will continue to be debated as the rules are phased in.

European Union's Artificial Intelligence Act: An Overview

The European Union's Artificial Intelligence Act (EU AI Act) is a groundbreaking piece of legislation designed to **regulate the development and use of artificial intelligence within the EU.**

It represents the world's first comprehensive legal framework for AI, **aiming to ensure that AI technologies are developed and used in ways that respect fundamental rights and democratic values.**

Key Features of the EU AI Act

- **Comprehensive Scope**:
    - The act **applies to all sectors and takes a horizontal, risk-based approach** to regulation.
    - It classifies AI systems into four categories based on the level of risk they pose: **Prohibited, high-risk, limited-risk, and minimal-risk.**
- **Risk Classification and Requirements**:
    - **Prohibited AI Systems**:
        - These include systems that **pose a threat to human rights, such as those used for social scoring or mass surveillance.** These systems are banned outright.
    - **High-Risk AI Systems**:
        - Systems that significantly impact people's lives and rights (e.g., biometric identification, healthcare, education, law enforcement) fall into this category.
        - These systems must meet stringent requirements, including human oversight, security measures, and conformity assessments before being marketed.
    - **Limited-Risk AI Systems**:

        - Systems that involve user interaction, such as chatbots and image-generation programs, must inform users that they are interacting with AI and offer the option to opt out.
    - **Minimal-Risk AI Systems**:
        - These include widely used systems that pose negligible risk, like spam filters and smart appliances. They are exempt from specific AI regulations but must comply with existing laws.
    - **Consumer Rights and Protections**:
        - The act enshrines the right of consumers to make complaints about inappropriate AI use by businesses.
        - Consumers are entitled to receive meaningful explanations for AI-driven decisions that affect their rights.
    - **Applicability and Penalties**:
        - The law applies to any companies doing business within the EU, regardless of where they are based.
        - Penalties for non-compliance can be severe, with fines of up to 7% of global turnover or €35 million, whichever is higher.
    - **Regulatory Framework**:
        - The EU AI Act establishes rules and guidelines for specific risks associated with AI, particularly in areas like biometric authentication, facial recognition, and deep fakes.

Implications and Goals

The **EU AI Act aims to balance the promotion of AI innovation with the protection of fundamental rights and safety**.

By creating clear rules and standards, the act seeks to foster trust in AI technologies and ensure they are used responsibly. **The legislation reflects the EU's commitment to being a global leader in AI regulation, setting a precedent that could influence AI governance worldwide.**

How diapers use quantum physics to attend to nature's call

Sub: Science and tech

Sec: Awareness in IT and computer

What is Quantum Physics?

- **Quantum computing is a multidisciplinary field comprising aspects** of computer science, physics, and mathematics that utilizes quantum mechanics to solve complex problems faster than on classical computers.
- The field of quantum computing includes hardware research and application development.
- **Quantum computers are able to solve certain types** of problems faster than classical computers by taking advantage of quantum mechanical effects, such as superposition and quantum interference.

The case of cotton:

- Whether something **absorbs or repels water** has to do with **microscopic forces** and the nature of a material.
- Its smallest constituent is a molecule made of two hydrogen atoms and one oxygen atom.
- While every atom here is charge neutral — i.e. it has an equal number of positively charged protons and negatively charged electrons — something funny happens.
- Two electrons, one each from every hydrogen atom, decide to shift a bit towards the larger oxygen atom.
- The oxygen atoms become more negatively charged and the hydrogen atoms become more positively charged.

- When you place your cotton handkerchief on the water you accidently spilled on the table, the water molecules meet the molecules of the cotton fibers.
- These **fibers are big networks of molecules** called polymers, and they have a bunch of slightly positive and negatively charged ions sitting everywhere.
- So as soon as you place the cotton on the water, the water molecules see this big network like a bunch of hungry monkeys meeting a jungle of dense trees.
- The **water molecules now experience forces leading them to rush to the ions, climbing over various molecules of cott**on.
- In the **process the water is soaked up and your handkerchief becomes wet.**
- This also means that whether some material will soak or not soak water depends on the kind of ions it is made of.
- Cotton absorbs water quite well and therefore it is no wonder you see it everywhere, including as cotton balls in the handy medical kit.

Working of a diaper:

- Cotton works great when you need to absorb small amounts of water, but when you need to absorb the liters of fluids your baby is producing overnight, clearly something more remarkable is required. This magic material is called a super-absorbent polymer (SAP).
- The molecular structure of this compound again resembles the complicated mesh of a tree.
- As soon as it comes in contact with water, water molecules flow through and sit inside.
- The oxygen atoms in particular are attracted to the mesh due to the presence of an important ion in SAP called sodium — the same sodium that is in your salt and often goes off the charts if you don't hydrate yourself properly in the summer.
- **Sodium and water** have some unspeakable love for each other that they remain stuck together when given a chance.
- This is the same reason salt in the form of a compound of sodium and chlorine dissolves in water. Sodium ions leave the chlorine ions for water molecules, and in the process the salt dissolves.
- Because of the oxygen, the water molecules go and attach themselves to the sodium ions in the SAP trees.
- They start to hold each other and form a strong network that can no longer move, i.e. it is rigid.
- The whole network swells, trapping the water molecules within, to form what is called a gel.
- **SAP is a magical compound that can absorb a large amount of water, at times more than its own weight.**

Quantum physics in the fray:

- The reason why sodium and oxygen atoms want to come closer is that they wish to share an electron.
- The electron is really a wave, and it can be shared by two atoms at the same time thanks to the rules of quantum physics.
- Nature prefers this arrangement to have the electron to live in the shared world of oxygen + sodium and this is what drives water molecules towards the sodium ions in a diaper.

How will AlphaFold 3 change life sciences research?

Sub: Science and tech

Sec: Awareness in IT and computer

Context:

- In a Nature paper published in May 2024, scientists at **DeepMind led by John Jumper** introduced AlphaFold 3, building on its predecessors with even more transformative capabilities.

More on news:

- **AlphaFold uses machine learning and artificial intelligence (AI)** to accurately predict protein structures from an amino acid sequence, seemingly solving the protein-folding problem without learning any of the deeper physical principles that drive this biological process.

What are proteins?

- **Proteins** are one of the most important molecules of life, with almost every biological function from birth to death being regulated by them in some way.
- Each protein is made up of a string of smaller building blocks called amino acids, which contain all the information to transform proteins — from a single sequence to a folded, functional 3D structure.

About AlphaFold:

- **AlphaFold is an artificial intelligence (AI)** program developed by DeepMind, a subsidiary of Alphabet, which performs predictions of protein structure.
- The program is designed as a deep learning system.
- **AlphaFold software has had three major versions.**
- A team of researchers that used AlphaFold 1 (2018) placed first in the overall rankings of the 13th Critical Assessment of Structure Prediction (CASP) in December 2018.

About AlphaFold 2:

- AlphaFold 2 predicts the structure of proteins with revolutionary levels of accuracy.But it was limited to proteins only.

About AlphaFold 3:

- AlphaFold 3 is more accurate than AlphaFold 2 for predicting the structure of proteins.
- It can also predict the structure of DNA, RNA, and all the other molecular components that make up biology. The interaction of all these biomolecules is what makes up the processes of life, so it is important to be able to predict the structure of these interactions.
- The new AlphaFold is also more usable by scientists who aren't experts in machine learning.
- AlphaFold 3 predicts protein structures and interactions better than other models used right now.
- Academics and companies can potentially use it to find drug candidates that can bind to proteins and help cure diseases.
- DeepMind's spin-off company Isomorphic Labs is using AlphaFold 3 for this very purpose: drug discovery.

Application of AlphaFold 3:

- **Drug Discovery:**
  - AlphaFold 3 can drastically reduce drug discovery time by simulating and predicting the action of substances on proteins.
- **Genomics:**
  - Genomics can be revolutionized if all genes' DNA and RNA structure is predicted. Such insights can also be used to treat, develop drugs for genetic diseases, or create individualized medicine.
- **Test a wider range of molecules:**
  - Test more molecules: more RNA molecules can be tested.

What is Claude 3.5 Sonnet and how is it better than GPT-4o and Gemini-1.5 Pro?

Sub: Science and tech

Sec: Awareness in IT and Computer

Context:

- Anthropic, **OpenAI's biggest rival**, has launched its latest AI model called Claude 3.5 Sonnet — the company's first release in the upcoming Claude 3.5 AI model series.

More on news:

- **Anthropic has claimed that its latest offering outperforms** its peers such as **OpenAI's GPT-4o, Google's Gemini-1.5 Pro, Meta's Llama-400b**, and even the company's proprietary models — **Claude 3 Haiku and Claude 3 Opus.**
- **Claude 3.5 Sonnet** operates at twice the speed of Claude 3 Opus.
- This performance boost, combined with cost-effective pricing, makes Claude 3.5 Sonnet ideal for complex tasks such as context-sensitive customer support and orchestrating multi-step workflows.

What is Claude 3.5 Sonnet?

- **Claude 3.5 Sonnet is a large language model (LLM), and is part of the family of LLMs which is being developed by Anthropic.**
- These models are known as **generative pre-trained transformers, which means they have been pre-trained to predict the next word in large amounts of text.**
- **Claude 3.5 Sonnet** is the predecessor to the Claude 3 Sonnet introduced in March of this year.

How does Claude 3.5 Sonnet perform?

- According to Anthropic, Claude 3.5 Sonnet sets some new industry benchmarks in capabilities such as coding proficiency **(HumanEval), graduate-level reasoning (GPQA), and undergraduate-level knowledge (MMLU).**
- The company claims that the new model has also shown significant **improvement in grasping nuance, humor, and complex instructions.**
- **Claude 3.5 Sonnet** is exceptional at writing high-quality content with a natural and relatable tone, according to Anthropic.
- Based on the benchmark scores shared by **Anthropic on its official website, Claude 3.5 Sonnet seems outstanding.**
- It has outdone **GPT-4o, Gemini 1.5 Pro, and Meta's Llama 3 400B** in seven out of eight overall benchmarks.

Claude 3.5 Sonnet's vision capabilities:

- **Anthropic claims that Claude 3.5 Sonnet** is its strongest vision model.
- A vision model in **AI is a model capable of interpreting and analyzing visual data** such as images and videos.
- According to the company, **the improvements in Claude 3.5 Sonnet** are most noticeable for tasks that require visual reasoning such as decoding charts and graphs.
- This ability to transcribe is what makes **Claude 3.5 Sonnet beneficial for retail, logistics, and financial services**, where AI may rely more on insights from an image, graphic, or illustration than from text.

Is the EU's Chat Control law undermining online privacy?

Sub: Science and tech

Sec: Awareness in IT and computer

EU's Proposed "Chat Control" Law:

- The **law**, proposed in **May 2022** by **European Commissioner Ylva Johansson, aims** to **combat online child sexual abuse** but has been **criticized** and termed **"Chat Control."**
- **France, Germany,** and **Poland** oppose the clause allowing **mass scanning of private messages,** fearing it breaks **end-to-end encryption**.
- Tech companies, trade associations, and privacy experts also oppose the regulation.
- **Spain** and **Ireland's Interior Ministers** support the proposal, while **children's rights advocates** criticize EU leaders for not effectively tackling **online child sexual abuse**.

Concerns Against the Proposal:

- **Scanning end-to-end encrypted messages** is controversial due to the creation of backdoors that third parties could exploit, **compromising privacy**.
- **Apple** faced backlash in **2021** for its **NeuralHash feature** designed to scan **iCloud photos** for **child sexual abuse material (CSAM)**, leading to its abandonment in **2022** due to **privacy concerns** and **potential misuse by authoritarian governments**.
- **UK's** similar attempt through the **Online Safety Bill** faced pushback from messaging app owners like **WhatsApp** and **Signal**, leading to the postponement of the proposal.

Status of EU's Chat Control Law:

- A new draft, to be reviewed on June 30, **omits scanning text messages and audio**, focusing instead on **photos, videos, and URLs.**
- The proposal includes a **controversial consent mechanism** where **users refusing scanning would be blocked from sending/receiving images, videos, and links.**
- The **European Commission** proposed a **temporary derogation** of the **E-Privacy Directive**, allowing specific service providers to scan messages for CSAM, set to expire in early August, with plans for extension stalled.
- Concerns about **government surveillance** are echoed, noting the potential impact on democracies and autocracies alike.

WikiLeaks | The enemy of the deep state

SUB: Science and tech

SEC: Awareness in IT and Computer

Context:

- The slow but sure process of extraditing Julian Assange, co-founder of the whistleblowing website WikiLeaks from the U.K. to the U.S. took a firm step on Friday when the British Home Secretary, Priti Patel, gave the go-ahead to the move.

More on news:

- Mr. Assange is wanted in the U.S. for criminal charges, including breaking the Espionage Act for WikiLeaks' actions of leaking thousands of secret U.S. files in 2010.
- He could face punishment ranging up to 175 years in prison for violations of the Espionage Act.

What is Wikileaks?

- On its website, **WikiLeaks says it is a multinational media organization** that specializes in analyzing and publishing databases of censored or otherwise restricted materials involving wars, spying and corruption.
- It was founded by **Assange in 2006** and lists several international media organizations among its co-publishers, research partners and funders.
- It is a **not-for-profit organization** that is funded through public donations.
- WikiLeaks is a giant library of the world's most persecuted documents.
- The most controversial leaks by **WikiLeaks featured classified U.S. military documents and videos** from the war it waged in Iraq and Afghanistan in the early to mid-2000s that it said highlighted issues such as abuse of prisoners in U.S. custody, human rights violations and civilian deaths.
- While initially the website began as a disclosure portal on the lines of the Wikipedia model, with anonymous submissions being put up and edited by volunteers, it soon became a repository of anonymously sourced material.
- News and classified information could be uploaded on it using the anonymity software Tor, which protects the uploader's identity from being eavesdropped on any network and even by WikiLeaks itself.

- One of the earliest revelations by Wikileaks was on how the U.S. government had been deploying practices at the Guantanamo Bay facility holding terror suspects that were in violation of the Geneva Convention protocols.

Union Minister Dr. Jitendra Singh launches 'Bhuvan Panchayat (Ver. 4.0)" portal for rural land record

Sub: Science and tech

Sec: IT

Context:

- Union Minister Dr. Jitendra Singh today launched **two Geoportals namely 'Bhuvan Panchayat (Ver. 4.0)" portal for rural land record and "National Database for Emergency Management (NDEM Ver. 5.0)"** developed by **Indian Space research Organization (ISRO)**, here today at Prithvi Bhavan.

More on news:

- These latest geospatial tools are meant for visualization and planning to **provide high resolution satellite imagery of 1:10K scale** for different locations across the entire country.

About the portals:

- **Bhuvan Panchayat Portal** aims to support space based **Information Support for Decentralized Planning (SISDP) and empower the citizens at the grass root level in Panchayats.**
- **National Database for Emergency Management (NDEM Ver. 5.0)** aims to provide space-based inputs on natural disasters and aid in disaster risk reduction In India as well as neighbouring countries.
- **National Database for Emergency Management (NDEM Ver. 5.0)** will provide space-based inputs on natural disasters and aid in disaster risk reduction In India as well as neighbouring countries.
- It aims to put in place an effective early warning system so that the administration can proactively prevent the disasters and inform us regarding the **Land use Land change (LULC).**

India to host its first multinational air exercise Tarang Shakti in August

Sub: Science and tech

Sec: Defence

Ex- Tarang Shakti- 2024:

- The **Indian Air Force (IAF)** will host its **first multinational air exercise, Tarang Shakti-2024,** in August, featuring participants from **ten countries** and several observers.
    - Following the experience of the **Red Flag exercise** in the **U.S.**, the **IAF** anticipates engaging with friendly foreign countries with regular interactions and interoperability.
- Initially scheduled for late **2023**, **Tarang Shakti-2024** will now occur in **two phases:** the first in **southern India** in early August, and the **second** in the **western sector** from late August to mid-September.
    - Some countries will join both phases, while others will participate in one.
- Countries such as **Australia, France, Germany, Japan, Spain, UAE, UK,** and **the US** are expected to send contingents, with **Germany** showcasing an **A-400M transport aircraft,** a contender for an IAF tender.

Ex- Red Flag:

- The **Red Flag exercise,** which concluded recently in **Alaska,** included **IAF's participation** with **eight Rafale fighters** and other support aircraft.
- The exercise simulated air combat scenarios, enhancing interoperability with international forces, including those from **Singapore, the UK, Netherlands,** and **Germany.**

Defence Ministry signs 350th contract under iDEX for miniaturized satellite

SUB: Science and tech

SEC: Defence

Context:

- The 350th contract under the **Innovations for Defence Excellence (iDEX)** which is the flagship initiative of the **Ministry of Defence was signed with Space Pixel Technologies Pvt Ltd** for the design and development of a 'miniaturized satellite capable of carrying electro-optical, infrared, synthetic aperture radar, and hyperspectral payloads up to 150 kgs', is announced on Tuesday.

Key Highlights:

- This 350th iDEX contract enables innovation in space electronics, wherein many payloads earlier deployed on dedicated large satellites are now being miniaturized.
- The modular small satellite will integrate multiple miniaturized payloads as per requirement, providing advantages like faster and economical deployment, ease of manufacturing, scalability, adaptability, and less environmental impact.

About iDEX:

- **iDEX was established by the Defence Infrastructure Organisation(DIO)** under the **Department of Defence Production**.
- Recently it unveiled the **Acing Development of Innovative Technologies with iDEX (ADITI)** scheme to promote innovations in critical and strategic defense technologies.
- It was launched by the **Hon'ble Prime Minister in April 2018.**
- It will be funded and managed by a **Defence Innovation Organization (DIO).**
- It will function as the **executive arm of DIO, carrying out all the required activities while DIO will provide high level policy guidance to iDEX.**
- It aims at creation of an ecosystem to foster innovation and technology development in Defence and Aerospace.
- The iDEX was the recipient of the Prime Minister Award for Public Policy in Innovation Category in 2021 and is currently engaged with over 400 start-ups and MSMEs.

The objectives of iDEX are:

- Facilitate rapid development of new, indigenized, and innovative technologies for the Indian defense and aerospace sector, to meet needs for these sectors in shorter timelines;
- Create a culture of engagement with innovative startups, to encourage co-creation for defense and aerospace sectors; and
- Empower a culture of technology co-creation and co-innovation within the defense and aerospace sectors.

Defence Innovation Organisation (DIO)

- It is formed as a **"not for profit" company** as per Section 8 of the Companies Act 2013.
- Its primary objective is to fund and manage the Innovations for Defence Excellence (iDEX).
- It will provide high level policy guidance to iDEX.
- The CEO of iDEX will be selected and recruited by the DIO and will be a professional person of sound technical, scientific and engineering background.

India and U.S. in talks for Stryker infantry vehicles and Javelin missiles

Sub: Science and tech

Sec: Defence

India-U.S. Defence Collaboration:

- **India** is in early talks with **the U.S.** about co-producing **Stryker infantry vehicles** and **Javelin Anti-Tank Guided Missiles (ATGM)**.

Details:

- Deals for **MQ-9B Unmanned Aerial Vehicles** and **GE-414 jet engines** are progressing, along with defence collaborations under the **Critical and Emerging Technology (iCET) framework.**
- The **GE-414** engine licence manufacture by **Hindustan Aeronautics Limited (HAL)** for the **Light Combat Aircraft (LCA)-Mk1A** is in advanced stages, discussing facility separation from those involved with Russian hardware.

New Strategic Partnerships:

- **India** and **the U.S.** are launching a **strategic semiconductor partnership** between **General Atomics** and **3rd ITECH** to co-develop **semiconductor design and manufacturing for precision-guided ammunition** and other security electronics.

iCET Framework and Industry Engagement:

- The **iCET framework aims** to **blend government engagements** with **private sector participation,** broadening **engagement across societies**.
- **$90 million** for the **U.S.-India Global Challenges** Institute highlights **high-impact university research,** indicating India's growing role in tech supply chains and clean energy.

Defense Equipement	Description
Stryker 	• The **Stryker** is a family of **eight-wheeled armoured fighting vehicles** derived from the Canadian LAV III, itself derived from the **Swiss Mowag Piranha.** • Stryker vehicles are produced by **General Dynamics Land Systems-Canada (GDLS-C)** for the **United States Army** in a plant in **London, Ontario.** • It has **four-wheel drive (8×4)** and can be switched to all-wheel drive (8×8). • The **Stryker** was conceived as a family of vehicles forming the backbone of a new **medium-weight brigade combat team (BCT)** that was to strike a balance between **Armored brigade combat teams (heavy armor)** and **Infantry brigade combat teams.**
Javelin Anti-Tank Guided Missiles (ATGM) 	• The **FGM-148 Javelin,** or **Advanced Anti-Tank Weapon System-Medium (AAWS-M),** is an **American-made man-portable anti-tank system** in service since **1996** and continuously upgraded. • Its **fire-and-forget design** features **automatic infrared guidance,** allowing the user to seek cover immediately after launch, in contrast to wire-guided systems, like the system used by the **Dragon,** which requires a user to guide the weapon throughout the engagement. • The **Javelin's high-explosive anti-tank (HEAT)** warhead can defeat modern tanks by **top-down attack,** hitting them from above, where their armour is thinnest, and is also useful against fortifications in a direct attack flight. • The javelin uses a tandem charge warhead to circumvent an enemy tank's **explosive reactive armour (ERA)** which would normally make **HEAT** warheads ineffective.

MQ-9B Predator Drone

- The MQ-9B drone is a **variant of the MQ-9 "Reaper",** an unmanned aerial vehicle (UAV) capable of remotely controlled or autonomous flight operations.
- These are **high-altitude long-endurance** drones armed with strike missiles which can take out enemy targets with high accuracy.
- It was developed by **General Atomics Aeronautical Systems (GA-ASI),** primarily for the United States Air Force (USAF).
- The MQ-9B has **two variants — SkyGuardian and its sibling SeaGuardian.**
- The Indian Navy has been operating the MQ-9B Sea Guardian since 2020.

GE-414 engine

- The **turbo engine** has been in use by the **US Navy** for more than 30 years.
- The engines are in the **thrust class of 22,000 lb or 98 kN** and feature advanced technology such as **Full Authority Digital Electronic Control (FADEC)**– the latest aircraft ignition and engine control system that controls engine performance digitally-according to GE.
- The use of **advanced material** and **cooling techniques** improves performance and extends component life.
- **F414-powered jets:**
  - **Eight nations** have **F414-powered aircraft** in operation.
  - **F414-GE-400 engines** power the **US Navy's Boeing F/A-18E/F Super Hornet** and **EA18G Growler electric attack aircraft.**
  - **Saab's Gripen E/F fighters** use the **F414G,** the single-engine variant of the F414-GE-400.
  - As per the company, it can also power emerging platforms like **Korean KF-X.**

New method to generate virus-like particles, to help with developing antibodies against Nipah

Sub: Science and tech

Sec: Health

Context:

- **Scientists at the Institute of Advanced Virology (IAV), Thonnakkal, Thiruvananthapuram**, have developed a novel way of generating **non-infectious Nipah virus-like particles (VLPs)** in the laboratory, which mimic the wild type **Nipah virus (NiV).**

More on news:

- This new method offers an alternate, safe and effective platform for developing neutralizing antibodies against NiV in a **biosafety level-2 (BSL) laboratory.**
- The IAV team has thus come one step closer to its mandate for developing monoclonal antibodies and antivirals against NiV and similar pathogens.
- **Virus neutralization assays** are critical for the development and evaluation of vaccines and immunotherapeutics, as well as for conducting basic research into the immune response and pathogenesis of NiV.
- **Virus-like particles (VLPs) are molecules that closely resemble viruses, but are non-infectious because they contain no viral genetic material.**

About Nipah Virus:

- The **zoonotic virus Nipah is a highly pathogenic paramyxovirus,** with a fatality rate of up to 80% in affected humans.
- Nipah virus is a **highly contagious and often deadly virus that can infect both humans and animals.**
- **It belongs to the family Paramyxoviridae, genus Henipavirus.**
- Nipah virus was first identified in **Malaysia in 1998** when it caused an outbreak of severe respiratory and neurological illness in pigs and a subsequent outbreak in humans.
- **Transmission:** It spreads through contact with infected animals, contaminated food, or direct human-to-human contact.
- **Symptoms:** It causes fever, headache, and vomiting, and can lead to severe encephalitis with a high mortality rate.
- **Geographic Distribution:** Nipah virus outbreaks have occurred in South and Southeast Asia, primarily in Malaysia, Singapore, Bangladesh, and India.
- **Animal Reservoir:** Fruit bats, especially flying foxes, are natural carriers of the virus.

About VLPs:

- **VLPs carry most of the characteristics of the virus, except their ability to replicate (because it lacks the viral genome).**
- VLPs have long been recognised as **effective quantitative platforms** for studying viral binding and entry kinetics of the virus.
- The advent of **NanoBiT technology and "HiBiT-tagged" VLP** (HiBiT is an 11 amino acid peptide) makes it far more sophisticated.
- The genome of the NiV encodes six major proteins: **glycoprotein (G), fusion protein (F), matrix (M), nucleocapsid (N), long polymerase (L) and phosphoprotein (P).**
- IAV scientists generated **"HiBiT-tagged" Nipah virus-like particles (NiV-VLPs)** using plasmid-based expression systems, encoding the NiV structural proteins G, F, and M.
- The VLPs thus produced were morphologically and functionally identical to the native virus.
- The inclusion of a highly sensitive HiBiT tag on these VLPs accelerates their potential in antiviral drug screening and vaccine development.

Its advantages:

- The concept of generating **VLPs or tagged VLPs** is applicable to several other virulent pathogens but it is particularly advantageous to apply this methodology to BSL-3/BSL-4 level viruses, to enable studies in lower biocontainment levels.

ICMR seeks to provide oral formulation of hydroxyurea to treat sickle cell disease in children

Sub: Science and tech

Sec: Health

ICMR's Call for Expressions of Interest (EoI):

- **Purpose:** The **Indian Council of Medical Research (ICMR)** is seeking **Expressions of Interest (EoI**) from **eligible organisations** for the **joint development and commercialisation** of **low-dose** or **paediatric oral formulation** of **"hydroxyurea"** to treat **sickle cell disease (SCD)** in India.

Challenges in children's dosage of hydroxyurea:

- **Hydroxyurea** is an effective treatment for **SCD** and **thalassemia** but currently **only available in high doses**.
- Most pharmaceutical companies in India offer **hydroxyurea** in **500 mg capsules** or **200 mg tablets.**
- The prescribed dose for children is **10-15 mg per kilogram** of body weight after **two years of age.**

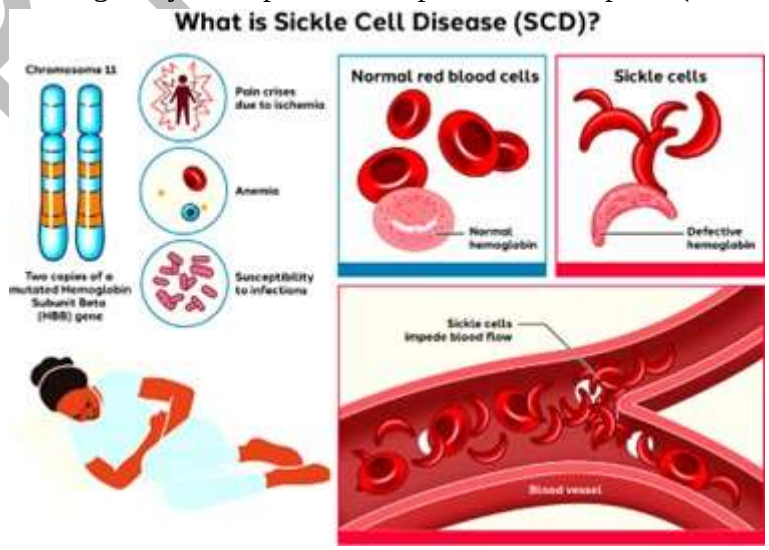
- There is a **lack of hydroxyurea** in suspension form, which is **critical for paediatric patients.**
- **Breaking down high-dose tablets** or capsules for **children's use** is cumbersome and risks inaccurate dosing, affecting treatment efficacy.
- Due to the **lack of paediatric doses** and **fear of toxicity,** healthcare providers only initiate **hydroxyurea therapy** for **symptomatic children** as per the **National Health Mission's guidelines**.

Proposed Solution:

- The availability of paediatric formulation would facilitate better dose titration and reduce dose-related side effects.
- ICMR is open to exclusive or non-exclusive agreements with manufacturing companies for the development and commercialisation of paediatric oral formulations of hydroxyurea for SCD.

Sickle cell disease (SCD):

- **Sickle Cell Disease (SCD)** is an **inherited haemoglobin disorder** characterised by a **genetic mutation** that **causes red blood cells (RBCs)** to assume a **sickle** or **crescent shape** rather than their **normal round shape**.
- This **abnormality** in **RBCs** results in **increased rigidity, impairing their ability to circulate effectively throughout the body.** Consequently, **individuals with SCD** often experience complications such as **anaemia, organ damage, recurrent and severe pain episodes**, and a **shortened lifespan**.
- **India** has the **highest prevalence** of **SCD** in **South Asia,** with over **20 million** affected individuals.
- As per the **Ministry of Health and Family Welfare, marginalised tribal populations** are **most vulnerable to SCD.**
- **Symptoms:** Symptoms of sickle cell disease can vary, but some common symptoms are-
    - Chronic anaemia which leads to fatigue, weakness, and paleness.
    - Painful episodes (also known as sickle cell crisis) cause sudden and intense pain in the bones, chest, back, arms, and legs.
    - Delayed growth and puberty.
- **Treatment Processes:**
    - **Blood Transfusions:** These can help relieve anaemia and reduce the risk of pain crises.
    - **Hydroxyurea:** This medication can help reduce the frequency of painful episodes and prevent some of the disease's long-term complications.
    - **Gene Therapy:** It can also be treated by bone marrow or stem cell transplantation by methods like Clustered regularly interspaced short palindromic repeats (CRISPR).



National Mission to Eliminate SCD 2047:

- There is a need for a **paediatric formulation of hydroxyurea** in line with the **National Mission to eliminate SCD** by **2047.**
- Under the **Sickle Cell Anaemia Mission,** the **Council of Scientific and Industrial Research (CSIR)** is developing **gene-editing therapies for SCD.**

'Green-beard' genes could explain how altruism arose in nature

Sub: Science and tech

Sec: Health

Context:

- Scientists have gained valuable new insights into natural altruism by studying the amoeba Dictyostelium discoideum.

What is Altruism in animals?

- **Altruism in animals describes a range of behaviors performed by animals that may be to their own disadvantage but which benefit others.**
- The costs and benefits are measured in terms of reproductive fitness, or expected number of offspring.
- Altruism is widespread in nature.
- **Worker honey bees** devote their entire life to foraging and caring for their sister, the queen, and her offspring, but do not themselves reproduce.
- **In widow spiders,** a male allows a female fertilized by him to eat him, and thus nourish herself and her offspring.
- **A meerkat, a mongoose found in Africa**, assumes the role of a sentinel, perching itself on a mound or rock, keeping a lookout for predators, instead of foraging for food, while the rest of the clan is feeding. If a predator is sighted, it alerts the others.

How can the emergence of altruism in all these diverse forms be explained?

- The question can be answered from the studies of a simpler organism that has been easier for researchers to study: the **social amoeba Dictyostelium discoideum.**
- Studies say that, if a gene makes a worker bee altruistic, it also helps the copy of the gene in the queen and her offspring to be passed on to the next generation, even if the worker herself does not reproduce.
- **'Green-beard' genes allow the individuals bearing them to recognise and preferentially cooperate with each other.**
- **A green-beard gene could provoke individuals to behave harmfully towards those carrying a different version of the gene.**
- Green-beard genes encode some kind of tag that helps the genome to know their identity (i.e. self-recognition).

About Dictyostelium discoideum:

- Dictyostelium discoideum is a free-living, fast-growing, unicellular amoeba. In the wild, it feeds on bacteria that grow on decaying vegetation.
- **Dictyostelium discoideum is a species of soil-dwelling amoeba** belonging to the phylum Amoebozoa, infraphylum Mycetozoa.
- Commonly referred to as slime mold, D. discoideum is a eukaryote that transitions from a collection of unicellular amoebae into a multicellular slug and then into a fruiting body within its lifetime.
- **About 20% of the amoebae in an aggregate altruistically sacrifice themselves to form the stalk.**
- **The remaining 80% become the spores.**

How does D. discoideum ensure that cheaters do not prosper?

- **Two genes in the D. discoideum genome called tgrB1 and tgrC1, displayed all the properties one would expect in a green-beard gene.**

- **The tgrB1 and tgrC1 genes are located next to each other in the D. discoideum genome, and are expressed together**
- They contain information for cells to make **two cell surface proteins called TgrB1 and TgrC1.**
- The **TgrB1 protein on one cell binds to the TgrC1 protein on another.**
- If the binding is strong, the **TgrB1 protein is activated, and confers altruistic behavior - manifesting as the amoeba's willingness to form the stalk.**
- The binding between the **TgrB1 and the TgrC1 proteins of cells of the same strain is strong, and leads to self-recognition and cell-cell cooperation.**
- The tgrB1 and tgrC1 genes are also **very polymorphic: within the same population of D. discoideum amoebae, they have multiple variants.**
- The researchers were able to correlate differences in the tgr gene sequences between two strains to the efficiency with which their cells segregated from each other in mixed aggregates and formed separate fruiting bodies.
- When the binding of **TgrB1 and TgrC1 proteins across the cells of diverged strains was weak, TgrB1 failed to be activated**, and the cells split away from each other instead of cooperating.
- When the researchers deleted the tgrB1 gene but left the tgrC1 gene intact, the amoeba did not cheat on 'non-self' amoebae that carried a different tgrC1.
- Instead, it cheated those with the same tgrC1 variant as itself — i.e. its kin. Every family has its black sheep!

Next-Generation Sequencing (NGS)

Sub: Science and tech

Sec: Health

Tag: Next-Generation Sequencing (NGS)

Context:

- The **World Health Organization (WHO)** reports that **approximately 33,000 new** incidences of brain cancer happen each year in India alone, while **Global Cancer Observatory 2020 estimates brain cancer as the 19th most common type of cancer.**

Key Highlights:

- A DNA **mutation can change how our cells grow and function**, sometimes leading to cancer.
- Research suggests that there are close to **3,000 such cancer-causing genes.**
- With each gene containing thousands of DNA codes, and each code potentially holding vital information about cancer development, the sheer volume of data analysis for a human can become quite overwhelming.
- Next-Generation Sequencing (NGS) which is a cutting-edge technology that is potentially transforming our ability to decipher the genetic code with speed and precision.
- **The Human Genome Project officially began in 1990 and was completed in 2003, taking about 13 years to finish, at a cost of about $3 billion.**

About Next-Generation Sequencing (NGS):

- **Next-Generation Sequencing (NGS) is a modern DNA sequencing technology** that has revolutionized genomic research by allowing the sequencing of DNA and RNA much more quickly and cheaply than the previously used Sanger sequencing.
- The concept of a liquid biopsy is a revolutionary technique that offers a less invasive alternative to surgery.

Advantages of NGS:

- **Speed:** Enables rapid sequencing of large amounts of DNA/RNA.

- **Cost-Effective:** Lower cost per base compared to traditional sequencing methods.
- **Comprehensive:** Can detect a wide range of genetic variations, including SNPs, insertions, deletions, and structural variations.
- **Scalability:** Can be scaled to fit a variety of experimental needs, from small targeted studies to large genome-wide analyses.

About Human Genome Project:

- **The Human Genome Project (HGP)** was an **international scientific research project** with the goal of determining the base pairs that make up human DNA, and of identifying, mapping and sequencing all of the genes of the human genome from both a physical and a functional standpoint.
- It started in **1990 and was completed in 2003.**
- It remains the **world's largest collaborative biological project.**

About DNA:

- **Deoxyribonucleic acid** is a polymer composed of two polynucleotide chains that coil around each other to form a double helix.
- The **polymer carries genetic instructions for the development, functioning, growth and reproduction of all known organisms and many viruses.**
- **DNA and ribonucleic acid (RNA) are nucleic acids.**
- Alongside proteins, lipids and complex carbohydrates (polysaccharides), nucleic acids are one of the four major types of macromolecules that are essential for all known forms of life.
- The **two DNA strands are known as polynucleotides as they are composed of simpler monomeric units called nucleotides.**
- Each nucleotide is composed of one of four nitrogen-containing nucleobases **(cytosine [C], guanine [G], adenine [A] or thymine [T]), a sugar called deoxyribose, and a phosphate group.**

Man in Mexico dies with first human case of H5N2 bird flu

Subject: Science and tech

Sec: Health

Context:

- A 59-year-old man in Mexico has died with a type of bird flu - H5N2 - never recorded in people before now.

What is bird flu?

- **Avian influenza (AI) is a highly contagious viral disease** affecting several species of food-producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds.
- Occasionally mammals, including humans, may contract **avian influenza.**
- **Influenza A viruses are classified into subtypes based on two surface proteins, Hemagglutinin (HA) and Neuraminidase (NA). For example, a virus that has an HA 7 protein and NA 9 protein is designated as subtype H7N9.**
- Avian influenza virus subtypes include **A(H5N1), A(H7N9), and A(H9N2).**
- **HPAI A(H5N1) virus** occurs mainly in birds and is highly contagious among them.
- **HPAI Asian H5N1 is especially deadly for poultry.**

Various strains of Bird Flu:

- **H5N2 belongs to a family of bird flu viruses called H5**, which primarily infects wild birds.
- There are a total of nine known subtypes of **H5 viruses, according to the Centers for Disease Control and Prevention.**
- **H5N1, which was detected in dairy cows in the U.S. in March, also belongs to this family.**
- There are many types or strains of avian or bird flu.

- As well as birds, some wild mammals - such as seals, otters, wild dogs and foxes - can catch them too.
- One type of bird flu, called H5N1, has been spreading for weeks among dairy cow herds in the US, with a small number of cases reported among humans.

Are scientists finally beating antimicrobial resistance?

Sub: Science and tech

Sec: Health

Context:

- Recently, researchers used AI to predict 800,000 potential antibiotic agents.

More on news:

- **Antimicrobial resistant infections** kill millions every year.
- They have the potential to take us back to the dark ages, when common infections like urinary tract infections (UTIs) or pneumonia were lethal and untreatable.

What is Antimicrobial Resistance?

- An antimicrobial is an agent that kills **microorganisms (microbicide) or stops their growth (bacteriostatic agent).**
- Antimicrobial medicines can be grouped according to the **microorganisms they act primarily against.**
- For example, **antibiotics are used against bacteria, and antifungals are used against fungi.**
- The use of **antimicrobial medicines to treat infection is known as antimicrobial chemotherapy, while the use of antimicrobial medicines to prevent infection is known as antimicrobial prophylaxis.**
- **Antimicrobials – including antibiotics, antivirals, antifungals, and antiparasitic – are medicines used to prevent and treat infectious diseases in humans, animals and plants.**
- **Antimicrobial Resistance (AMR)** occurs when **bacteria, viruses, fungi** and parasites no longer respond to antimicrobial medicines.

Using AI to discover new antibiotics:

- The study used machine learning to search for potential antibiotic agents in a huge database of microbes which live in environments such as soil, the ocean, and human and animal guts.

Peptide antibiotics effective against bacterial infections:

- To find out which of these peptides could be useful as **antibiotics, the researchers synthesized 100 peptides and tested them against 11 disease-causing bacterial strains in laboratory dishes.**
- They found that 79 peptides **disrupted bacterial membranes and 63 peptides** specifically targeted antibiotic-resistant bacteria, such as **Escherichia coli (E. coli) and Staphylococcus aureus.**
- The researchers also tested the compounds in mice with **infected skin abscesses, but only three of the peptides showed antimicrobial effects in vivo (in a living organism).**

Major cause of inflammatory bowel disease discovered

Sub: Science and tech

Sec: Health

Tags: **inflammatory bowel disease, Autoimmune Disorders**

Context:

- Researchers at the Francis Crick Institute, working with UCL and Imperial College London, have discovered a new biological pathway that is a principal driver of inflammatory bowel disease (IBD) and related conditions, and which can be targeted using existing drugs.

Key Highlights:

- About 5% of the world's population, and one in ten people in the UK1, are currently affected by an autoimmune disease, such as **IBD, the umbrella term for Crohn's disease and ulcerative colitis.**
- These diseases are also becoming more common, with over half a million people living with IBD in the UK as of 2022, nearly double the 300,000 previously estimated2.
- They found that this gene desert contains an **'enhancer', a section of DNA that is like a volume dial for nearby genes, able to crank up the amount of proteins they make.**
- The team discovered that this particular enhancer was only active in macrophages, a type of immune cell known to be important in IBD, and boosted a gene calle**d ETS2, with higher levels correlating with a higher risk of disease.**
- The scientists showed that ETS2 was essential for almost all inflammatory functions in macrophages, including several that directly contribute to tissue damage in IBD.

ETS2 as a treatment target:

- They found that MEK inhibitors, drugs already prescribed for other **non-inflammatory conditions, were predicted to switch off the inflammatory effects of ETS2.**
- As **MEK inhibitors** can have side effects in other organs, the researchers are now working with **LifeArc to find ways to deliver MEK inhibitors** directly to macrophages.

What is Crohn's disease?

- **Crohn's disease** is a type of inflammatory bowel disease (IBD) that may affect any segment of the gastrointestinal tract.
- Symptoms often include **abdominal pain, diarrhea, fever, abdominal distension, and weight loss.**
- Complications outside of the gastrointestinal tract may include anemia, skin rashes, arthritis, inflammation of the eye, and fatigue.
- The skin rashes may be due to infections as well as **pyoderma gangrenosum or erythema nodosum.**
- **Bowel obstruction** may occur as a complication of chronic inflammation, and those with the disease are at greater risk of colon cancer and small bowel cancer.

What are Autoimmune Disorders?

- An **autoimmune disease** is a condition that results from an anomalous response of the adaptive immune system, wherein it mistakenly targets and attacks healthy, functioning parts of the body as if they were foreign organisms.
- It is estimated that there are more than **80 recognized autoimmune diseases**, with recent scientific evidence suggesting the existence of potentially more than 100 distinct conditions.
- **Autoimmune diseases are a separate class from autoinflammatory diseases.**
- Both are characterized by an immune system malfunction which may cause **similar symptoms, such as rash, swelling, or fatigue, but the cardinal cause or mechanism of the diseases are different.**
- A key difference is a malfunction of the **innate immune system in autoinflammatory diseases, whereas in autoimmune diseases there is a malfunction of the adaptive immune system.**
- Some of the most common diseases that are generally categorized as **autoimmune include celiac disease, type 1 diabetes, Graves' disease, inflammatory bowel diseases (such as Crohn's disease and ulcerative colitis), multiple sclerosis, alopecia areata,Addison's disease, pernicious anemia, psoriasis, rheumatoid arthritis, and systemic lupus erythematosus.**
- Diagnosing autoimmune diseases can be challenging due to their diverse presentations and the transient nature of many symptoms.

Low-Cost MRI Machine: A Game Changer for Diagnostics in India

Sub: Science and tech

Sec: Health

Overview

A newly designed MRI machine offers a cost-effective and accessible solution for diagnostic imaging, potentially transforming healthcare in India. This innovation, developed by scientists at the University of Hong Kong, employs low-strength magnets and store-bought hardware to drastically reduce costs and improve portability.

What is Magnetic resonance imaging, or MRI?

It is **a non-invasive medical imaging test** that produces **detailed images of almost every internal structure** in the human body, including the organs, bones, muscles and blood vessels. MRI scanners create images of the body using a large magnet and radio waves. No ionizing radiation is produced during an MRI exam, unlike X-rays. These images give your physician important information in diagnosing your medical condition and planning a course of treatment.

How does an MRI scan work?

- The MRI machine is a large, cylindrical (tube-shaped) machine that creates a strong magnetic field around the patient and sends pulses of radio waves from a scanner. Some MRI machines look like narrow tunnels, while others are more open.
- The strong magnetic field created by the MRI scanner causes the atoms in your body to align in the same direction. Radio waves are then sent from the MRI machine and move these atoms out of the original position. As the radio waves are turned off, the atoms return to their original position and send back radio signals. These signals are received by a computer and converted into an image of the part of the body being examined. This image appears on a viewing monitor.
- MRI may be used instead of computed tomography (CT) when organs or soft tissue are being studied. MRI is better at telling the difference between types of soft tissues and between normal and abnormal soft tissues.
- Because ionizing radiation is not used, there is no risk of exposure to radiation during an MRI procedure

Key Features of new MRI?

Cost: Approximately ₹18.4 lakh ($22,000), **making it around 50 times cheaper than conventional MRI machines which cost between ₹9 crore and ₹13 crore.**

Portability: Lightweight and portable, this machine does not require specialized infrastructure such as shielded rooms or helium coolants.

Power Requirements: Can be plugged into standard wall sockets, eliminating the need for high-power sources.

Technological Innovations

Magnetic Field Strength: Uses 0.05 T magnets compared to the 1.5 T to 3 T magnets in conventional MRI machines.

Deep-Learning Algorithm: Enhances image quality by reducing background noise and sharpening images, compensating for the lower magnetic field strength.

Clinical Applications

Preliminary Diagnostics: Suitable for initial scans, especially in rural or remote areas where access to advanced medical facilities is limited.

Emergency Response: Ideal for use by doctors responding to accidents and emergencies, enabling quick assessment and decision-making on-site.

Pediatric Use: Less noisy operation makes it suitable for scanning children.

Metal Safety: Lower magnetic strength reduces the risk of pulling metal objects into the machine, **enhancing safety for patients with implants or prosthetics.**

Testing and Validation

Clinical Testing: Successfully tested on 30 healthy adult volunteers, producing clear images of various organs including the brain, spinal cord, liver, kidneys, spleen, lungs, heart, and knee structures.

Comparative Quality: The image quality, enhanced by AI, was found to be comparable to that of conventional 3-T MRI machines.

Potential Impact

Accessibility: By significantly lowering costs and reducing infrastructure requirements, this MRI machine could democratize access to advanced diagnostic imaging across India, particularly benefiting low- and middle-income populations.

Complementary Tool: While not a replacement for high-field MRI machines, it can serve as a complementary tool in radiology departments, especially for preliminary assessments and in settings where high-resolution imaging is not critical.

Conclusion

The introduction of a low-cost, portable MRI machine represents a significant advancement in medical technology, with the potential to greatly improve diagnostic access and healthcare outcomes in India. **By addressing cost and infrastructure barriers, this innovation promises to bring high-quality imaging to underserved regions and enhance emergency medical response capabilities.**

Four new studies report progress towards long-awaited HIV vaccine

Sub: Science and tech

Sec: Health

Discovery of AIDS:

- **1981**: Michael Gottlieb, an assistant professor at UCLA Medical Centre, aimed to teach immunology to a post-doctoral fellow. He published a paper on these cases in **"Morbidity and Mortality Weekly"** which was the first report of **acquired immunodeficiency syndrome (AIDS)**.

HIV:

- **HIV attacks CD4, a type of White Blood Cell (T cells)**in the body's immune system. T cells are those cells that move around the body detecting anomalies and infections in cells.
- After entering body, HIV multiplies itself and destroys CD4 cells, thus severely **damaging the human immune system**. Once this virus enters the body, it can never be removed.
- CD4 count of a person infected with HIV reduces significantly. In a healthy body, CD4 count is between 500- 1600, but in an infected body, it can go as low as 200.
- **Weak immune system makes a person prone to opportunistic infections and cancer.** It becomes difficult for a person infected with this virus to recover from even a minor injury or sickness.
- By receiving treatment, severe form of HIV can be prevented.

Transmission

- HIV is transmitted from person to person through bodily fluids including blood, semen, vaginal secretions, anal fluids and breast milk.
- To transmit HIV, bodily fluids must contain enough of the virus. A person with 'Undetectable HIV' cannot transfer HIV to another person even after transfer of fluids.
- 'Undetectable HIV' is when the amount of HIV in the body is so low that a blood test cannot detect it. Treatment can make this possible. But regular monitoring of the same through blood tests is also required.

Symptoms

- Around 80% of people infected with HIV develop a set of symptoms known as Acute Retroviral Syndrome, around 2-6 weeks after the virus enters into body.
- The early symptoms include fever, chills, joint pains, muscle aches, sore throat, sweats particularly at night, enlarged glands, a red rash, tiredness, weakness, unintentional weight loss and thrush.
- A person can carry HIV even without experiencing any symptoms for a long time. During this time, the virus continues to develop and causes immune system and organ damage.

Treatment

- **Anti-Retroviral Therapy:**
  - It is a combination of daily medications that stop the virus from reproducing.
  - The therapy helps in protecting CD4 cells thus keeping the immune system strong enough to fight off the disease.
  - It, besides reducing the risk of transmission of HIV, also helps in stopping its progression to AIDS (a spectrum of conditions caused by infection due to HIV).
- **Stem Cell Transplant:**
  - Under this, an infected person is treated with stem cell transplant from donors carrying a genetic mutation that prevents expression of an HIV receptor CCR5.
  - CCR5 is the most commonly used receptor by HIV-1. People who have mutated copies of CCR5 are resistant to HIV-1 virus strain.

Challenges in HIV Vaccine Development:

- Despite significant progress in tackling infectious diseases, **AIDS** remains without a vaccine or cure.
- HIV's replication process is highly error-prone, leading to numerous variants.
- HIV has more variants in a single patient than influenza generates globally in a year.

Immune System Response:

- The immune system produces antibodies specific to viral proteins through **B-cells**.
- Each **B-cell** produces a unique antibody that binds to a specific protein fragment on a virus.
- **Vaccines** aim to generate these antibodies in advance to neutralize the virus upon infection.

Table 13.1 Contrasting Properties of B Cells and T Cells

	B Cells	T Cells
Site of Maturation	Bone marrow	Thymus
Specific Surface Markers	Immunoglobulin	T-cell receptor Several CD molecules
Circulation in Blood	Low numbers	High numbers
Receptors for Antigen	B-cell receptor (immunoglobulin)	T-cell receptor
Distribution in Lymphatic Organs	Cortex (in follicles)	Paracortical sites (interior to the follicles)
Require Antigen Presented with MHC	No	Yes
Product of Antigenic Stimulation	Plasma and memory cells	Several types of activated cells
General Functions	Production of antibodies to inactivate, neutralize, target antigens	Cells activated to help other immune cells; suppress or kill abnormal cells; mediate hypersensitivity; synthesize cytokines

Broadly Neutralizing Antibodies (bNAbs):

- In the **early 1990s**, some **HIV-infected individuals** produced **bNAbs** that could neutralize many **HIV strains**.
  - Some of these **bNAbs** can **effectively neutralise** more than **90%** of circulating strains.
- **bNAbs** target critical viral protein regions that the virus cannot change without losing infectivity.
- Producing **bNAbs** takes years, by which time the virus may have evolved.

Germline Targeting Strategy:

- **Goal**: To induce the **immune system** to produce **bNAbs** quickly through a vaccine.
- **Three Steps**:

1. **Identify and Engage B-cells**: Increase the population of B-cells that can produce bNAbs.
2. **Booster Dose**: Guide these cells to generate stronger bNAbs.
3. **Refinement**: Enhance bNAbs to neutralize a wide range of HIV strains.

Recent Advances:

- Two promising **nanoparticle-based vaccines, N332-GT5** and **eOD-GT8**, have been developed.
- Scripps Research Institute and MIT demonstrated efficacy in mice and macaques.
- These vaccines are undergoing phase-1 clinical trials in humans.
- A protein fragment, **g28v2**, is being studied as a potential candidate for **step II of germline targeting**.

Cautious Optimism:

- Recent studies show potential in B-cell-based vaccines for HIV.
- Past failures remind us to remain cautious until proven effective in humans.
- The strategies may also benefit vaccines for other RNA viruses like influenza, coronaviruses, and hepatitis C.

Rapid Diagnostic Test for UTIs May Help Stem Superbug Crisis

Sub: Science and tech

Sec: Health

Overview:

- **Technology:** PA-100 AST System by Sysmex Astrego.
- **Recognition:** Winner of the £8 million Longitude Prize on Antimicrobial Resistance (AMR).

Key Points:

- **The PA-100 AST System:**
  - **Function:** Rapid, point-of-care test for **urinary tract infections (UTIs).**
  - **Mechanism:** Utilizes a phenotypic test to identify bacteria and perform antibiotic susceptibility testing (AST).
  - **Speed:** Delivers results in under 45 minutes.
  - **Device:** Single-use cartridge, about the size of a smartphone, and a reader instrument the size of a shoebox.
  - **Procedure:** Urine sample is added to the cartridge, which is then inserted into the reader for phase-contrast imaging of bacterial growth.
- **Current UTI Testing Methods:**
  - **Urine Dipstick Test:** Quick **but has only 50-60% accuracy** and does not identify specific antibiotics.
  - **Urine Culture Test:** Accurate but takes 2-3 days, leading to empirical antibiotic prescriptions and contributing to antibiotic resistance.
- **Impact of PA-100 AST System:**
  - **Accuracy:** Identifies the correct antibiotic, reducing the need for empirical prescribing.
  - **Speed:** Provides results quickly, aiding in timely and precise treatment.
  - **Accessibility:** Can be used in clinics, emergency departments, and pharmacies without needing to send samples to a laboratory.
  - **Potential:** May allow previously "retired" antibiotics to be used effectively again.
- **Global Significance:**

- **Antibiotic Resistance Crisis:** Antibiotic-resistant infections could cause 10 million deaths annually by 2050.
- **Economic Impact:** Potential loss of up to $100 trillion by 2050 due to the AMR crisis.
- **Health Improvement:** Rapid diagnostics like the PA-100 AST System can improve health outcomes and potentially save millions of lives.

Historical Context of the Longitude Prize:

- **Original Longitude Prize (1714):** Awarded for a solution to determine longitude at sea, won by John Harrison.
- **Modern Longitude Prize (2014):** Focused on tackling AMR, as voted by the public.

Conclusion: The PA-100 AST System, by providing a **rapid, accurate, and affordable diagnostic test for UTIs, represents a significant advancement in the fight against antimicrobial resistance.**

By enabling precise antibiotic prescribing at the point of care, this technology promises to revolutionize infection management and curb the spread of superbugs, potentially saving millions of lives worldwide.

Understanding Superbugs

Superbugs are **strains of bacteria, viruses, parasites, and fungi that have developed resistance to multiple antibiotics and other antimicrobial drugs**. This resistance makes infections caused by these pathogens particularly difficult to treat.

Causes of Antibiotic Resistance:

- **Overuse of Antibiotics:**
  - Prescribing antibiotics for viral infections, like the common cold, where they are ineffective.
  - Over-prescribing antibiotics for minor bacterial infections that might resolve on their own.
- **Misuse of Antibiotics:**
  - Not completing the full course of antibiotics, allowing some bacteria to survive and develop resistance.
  - Using leftover antibiotics without medical guidance.
- **Agricultural Practices:**
  - The widespread use of antibiotics in livestock to promote growth and prevent disease can lead to the development of resistant bacteria.
- **Poor Infection Control:**
  - Inadequate hygiene and sanitation in healthcare settings and communities can facilitate the spread of resistant bacteria.

Conclusion:

Superbugs represent a significant challenge to global health, requiring a coordinated and multifaceted approach to manage and mitigate their impact. Through responsible antibiotic use, stringent infection control measures, and continued research and innovation, it is possible to combat the threat of antibiotic-resistant infections and protect public health.

India-Made TB Diagnostics Tech Wins Acclaim at World Health Assembly

Sub: Science and tech

Sec: Health

Overview:

- **Technology:** The Truenat platform, a rapid molecular test for diagnosing pulmonary, extrapulmonary, and rifampicin-resistant tuberculosis (TB).
- **Developer:** Goa-based Molbio Diagnostics.
- **Recognition:** Acclaimed at the 77th World Health Assembly in Geneva.

Key Points:

About Truenat:

- **Launch Year:** 2017.
- **Technology:** Real-time quantitative micro-PCR system.
- **Features:** Portable, battery-operated machine.
- **Deployment:** Suitable for labs, health centers, and field use.
- **Efficiency:** Delivers results in less than an hour.
- **Versatility:** Can test for over 40 diseases.

Global Recognition:

- **Event:** 77th World Health Assembly.
- **Organization:** The Global Fund (in collaboration with WHO).
- **Appreciation:** India's commitment to TB elimination and use of digital technologies like Truenat.
- **Potential:** Truenat machines and handheld X-ray devices as global models.
- **Installations:** Around 10,000 installations worldwide.
- **Reports:** Significant improvements in TB case detection in countries using Truenat.

National TB Elimination Programme:

- **Implementation:** Over 7,000 primary and community health centers in India.
- **Private Sector:** Used in roughly 1,500 private labs across the country.

Global TB Statistics:

- **Annual Cases:** Over 10 million new TB cases globally each year.
- **India's Burden:** Accounts for 27% of the global TB burden.
- **Mortality:** TB kills an estimated 480,000 Indians annually, which translates to over 1,400 deaths per day.

Conclusion: The Truenat platform, developed by Molbio, is a groundbreaking tool in the fight against TB, offering rapid, reliable, and portable diagnostic capabilities. Its recognition at the World Health Assembly underscores its potential to significantly impact global health, particularly in TB-endemic regions.

Various Government Schemes –

1. **Pradhan Mantri TB Mukt Bharat Abhiyan**

Overview

Launched by the Indian government, the Pradhan Mantri TB Mukt Bharat Abhiyan is a comprehensive program **aimed at eliminating TB in India by 2025.** This ambitious goal is five years ahead of the global target set by the World Health Organization (WHO).

Objectives

- **Universal Access to TB Care**: Ensuring that every TB patient has access to the best possible diagnostic and treatment services.
- **Community Engagement**: Mobilizing community participation and awareness to support TB control and eradication efforts.
- **Private Sector Engagement**: Collaborating with private healthcare providers to ensure standardized TB care and reporting.
- **Innovative Solutions**: Implementing new technologies and approaches for TB diagnosis, treatment, and monitoring.

2. **National Strategic Plan (NSP) for Tuberculosis Elimination (2017-2025)**

Overview

The NSP for Tuberculosis Elimination outlines **India's strategy to eliminate TB by 2025, focusing on a multi-pronged approach to tackle the disease at all levels.**

Key Components

- **Early Diagnosis and Treatment**: Enhancing early diagnosis through improved laboratory capacity and rapid molecular tests like Truenat.
- **Patient Support Systems**: Strengthening patient support systems to ensure adherence to treatment regimens.
- **Health System Strengthening**: Improving the overall capacity of the healthcare system to manage TB cases efficiently.
- **Research and Innovation**: Promoting research to find new diagnostic tools, drugs, and vaccines.

3. **TB Harega Desh Jeetega Campaign**

Overview

The "TB Harega Desh Jeetega" (TB Will Lose, the Nation Will Win) campaign is a public awareness and mobilization campaign aimed at creating a mass movement to eliminate TB in India.

Objectives

- **Awareness and Advocacy**: Raising awareness about TB symptoms, treatment options, and the importance of completing treatment.
- **Community Participation**: Encouraging community leaders, influencers, and the general public to participate in TB eradication efforts.
- **Behavioral Change**: Promoting behavioral changes to reduce stigma associated with TB and encourage people to seek timely medical help.

4. **Nikshay Poshan Yojana**

Overview

Nikshay Poshan Yojana is a direct benefit transfer (DBT) scheme introduced by the Indian government to provide nutritional support to TB patients.

The scheme ensures that patients receive financial assistance to meet their nutritional needs during treatment.

Features

- **Nutritional Support**: Monthly financial support of ₹500 (around $6.80) is provided to TB patients for the duration of their treatment to help them purchase nutritious food.
- **Direct Benefit Transfer**: The funds are transferred directly to the bank accounts of the patients to ensure timely and efficient delivery.
- **Coverage**: The scheme covers all TB patients registered under the National Tuberculosis Elimination Program (NTEP).

Objectives

- **Improving Treatment Outcomes**: Ensuring that patients have access to adequate nutrition, which is crucial for effective TB treatment and recovery.
- **Reducing Treatment Default Rates**: Encouraging patients to complete their treatment by alleviating the financial burden associated with TB.

IRDAI's Initiatives to Improve Health Insurance Experience

Sub: Science and tech

Sec: Health

The Insurance Regulatory and Development Authority of India (IRDAI) has implemented several consumer-centric reforms in the health insurance sector, **aiming to enhance customer experience, streamline processes, and ensure timely and hassle-free claim settlements**.

Key Reforms by IRDAI

- **Simplified Claim Process**:
    - **Document Submission**: Claims cannot be rejected due to a lack of documents. Insurers must collect necessary documents at the time of underwriting.

    - **Policy Cancellation**: Customers can cancel their policy anytime and receive a refund for the unexpired policy period. Insurers can cancel policies only on fraud grounds.
- **Faster Claim Settlements**:
    - **Cashless Claims**: Claims must be settled within three hours, with decisions on cashless authorizations required within one hour of the claim request.
    - **Cashless Anywhere Directive**: Insurers must settle claims in a cashless mode, even in hospitals not in their network, minimizing the need for reimbursement claims.
- **Operational Enhancements**:
    - **Digital Pre-Authorization**: Insurers should provide digital pre-authorization to facilitate quicker claims processing.
    - **Help Desks**: Insurers are encouraged to set up help desks at hospitals to manage cashless claim requests efficiently.
- **Consumer-Centric Measures**:
    - **Immediate Processing in Case of Death**: If a policyholder dies during treatment, the insurer must process the claim request immediately to release the mortal remains from the hospital.
    - **Cost Coverage**: If claims are not settled within the stipulated time, any additional costs charged by the hospital will be borne by the insurer from the shareholder's fund.

Impact on the Insurance Sector

- **Enhanced Coordination**:
    - Improved coordination between insurers and hospitals is necessary for timely claim settlements. This includes the sharing of medical records and better operational processes.
- **Medical Record Digitization**:
    - Digitization through the **National Health Claims Exchange** will facilitate a more transparent and efficient exchange of information, aiding quicker decision-making by insurers.
- **Positive Industry Response**:
    - Insurers have shown a willingness to support these reforms, recognizing the potential **for faster payouts and improved customer satisfaction**.
- **Holistic Healthcare Ecosystem**:
    - These reforms require a collaborative effort from the entire healthcare ecosystem, **including hospitals and insurers, to ensure their successful implementation**.

Benefits to Policyholders

- **Timely Settlements**:
    - Faster claim settlements will provide financial relief to policyholders and reduce the stress associated with delayed reimbursements.
- **Increased Satisfaction**:
    - Streamlined processes and consumer-centric measures will enhance overall customer satisfaction, making health insurance more appealing and reliable.
- **Support During Tragedies**:
    - Immediate processing of claims in the event of a policyholder's death **will offer support to grieving families, ensuring they are not burdened with administrative delays during difficult times.**

Conclusion

The IRDAI's reforms are poised to revolutionize the health insurance landscape in India. By focusing on customer-centric policies, **simplifying the claims process, and ensuring faster settlements, these initiatives will significantly improve the insurance experience for policyholders.** This move towards a more inclusive and efficient health insurance system will likely lead to higher customer satisfaction and better healthcare outcomes.

Union Tribal Affairs Minister Shri Jual Oram to preside over the National Conclave on Awareness Generation on Sickle Cell Disease

Sub: Science and tech

Sec: Public Health

Context:

- On the occasion of **World Sickle Cell Day, Union Tribal Affairs Minister** Shri Jual Oram presided over the National Conclave on Awareness Generation on Sickle Cell Disease, in New Delhi.

More on news:

- On 29th August 2023, the **Union Minister of Tribal Affairs launched the 'Awareness Campaign and Training of Trainers' as part of the 'Mission for Elimination of Sickle Cell Anaemia'.**
- The programme envisages training of grassroot level functionaries so as to create awareness in this direction among the masses, especially in tribal regions.

What is Sickle cell Disease?

- **Sickle cell disease (SCD) is a chronic single gene disorder** causing a debilitating systemic syndrome characterized by chronic anaemia, acute painful episodes, organ infarction and chronic organ damage and by a significant reduction in life expectancy.
- It is **characterized by a modification in the shape of the red blood cell from a smooth, donut-shape into a crescent or half-moon shape.**
- These cells lack **plasticity and can block small blood vessels, impairing blood flow.**
- This condition leads to shortened red blood cell survival, and subsequent anemia, often called sickle-cell anaemia.
- SCD refers to a **group of inherited blood disorders, wherein a genetic mutation causes abnormal haemoglobin to clump together, causing the red blood cells to turn sickle shaped.**
- These sickle-shaped cells cause blockages in the blood flow, which can lead to anemia, pain, infections and other severe complications.
- Individuals with sickle cell trait carry only one defective gene and typically live normal lives, but they can pass the gene to their children.
- Therefore, it is advisable for all adults and newborns to undergo a medical screening for sickle cell disease and sickle cell trait.

National Sickle Cell Anaemia Elimination Mission:

- The **National Sickle Cell Anaemia Elimination Mission** is a sub mission of National Health Mission, wherein the Ministry of Tribal Affairs has a pivotal role to play in raising awareness and producing counselling material about this debilitating disease, with special emphasis on tribal areas.
- The **Government of India embarked on the 'Mission for Elimination of SCD by 2047', with Prime Minister Shri Narendra Modi launching the National Sickle Cell Anaemia Elimination Mission** from Shahdol, Madhya Pradesh on 1st July, 2023.
- The mission entails **awareness creation, universal screening of 7 crore people in the age group of 0-40 years in the affected tribal areas.**
- The programme is being carried out in a mission mode for screening, prevention, and management of sickle cell anemia in all tribal and other high prevalent areas States/UTs of India.
- The focus is on **tribal dominated districts of 17 states with higher prevalence of the disease.**
- About 1 in 86 births among Scheduled Tribe (ST) population have SCD, the prevalence being higher in Central, Western and Southern India.

- It is predominantly prevalent in **Jharkhand, Maharashtra, Madhya Pradesh, Chhattisgarh, western Odisha, eastern Gujarat and in pockets of the Nilgiri Hills in north Tamil Nadu and Kerala.**

US Supreme Court preserves access to abortion pill

Sub: Science and tech

Sec: Public Health

Context:

- The US Supreme Court on Thursday rejected a petition by anti-abortion groups seeking to undo the **Food and Drug Administration's (FDA)** approval of a commonly available abortion pill, called mifepristone.

More on news:

- In a unanimous ruling, authored by **Justice Brett M Kavanaugh** — the court held that as the petitioners lacked a direct stake in the dispute, they could not sue the FDA.
- The development has come nearly two years after the apex court of the US overturned Roe v. Wade, which effectively repealed a federal right to abortion.

What was the case?

- In 2022, **four pro-life medical associations, as well as several individual doctors, sued the FDA in the US District Court for the Northern District of Texas.**
- The petitioners had challenged the **FDA's approval** of mifepristone and the changes the federal agency made in the pill's conditions of use — **the modification broadened mifepristone's distribution through mail and telemedicine (the provision of remote clinical services).**
- In April 2023, federal court held that the **FDA's approval of the drug should be suspended, removing mifepristone from the market.**
- An appeals court in New Orleans overturned this ruling partially to the extent that it invalidated the FDA's approval of the pill.
- It also imposed restrictions on the pill's distribution, including prohibiting sending the medication by mail or being prescribed by telemedicine.

What is mifepristone?

- **Mifepristone is part of the two-drug regimen used for medical abortion.**
- A patient first takes **mifepristone to induce an abortion and then misoprostol to empty the uterus.**
- While **mifepristone blocks progesterone — a hormone that supports menstruation and maintaining a pregnancy — misoprostol triggers uterine contractions, causing the body to expel the pregnancy as in a miscarriage.**
- The regimen was approved for use up to 10 weeks of pregnancy by the FDA in 2000.
- Studies have found the pill to be safe, and years of research have shown that serious complications are rare.

What did the court rule?

- To reject the petition by the anti-abortion groups and individual doctors, the Supreme Court cited the **"personal stake requirement" laid down in one of its 1982 judgments.**
- The **personal stake requirement basically** means that the party seeking relief has to have a "personal stake in the outcome of the controversy.
- The **appellant should show that they have suffered or been threatened with some distinct and palpable injury.**
- There must also be some causal connection between the appellant's asserted injury and the defendant's challenged action.
- It said the plaintiffs could not show any harm suffered from mifepristone's availability.

Abortion law in India:

- **India's Medical Termination of Pregnancy Act 1971** allows abortion up to 24 weeks, post which termination is permitted only if a board of doctors attests that continued pregnancy presents a risk to the woman's life or if there are foetal abnormalities.
- In **'X v NCT case 2022' Supreme Court** declared that 'it is the woman alone who has the right over her body' and is the **'ultimate decision-maker**' in deciding if she wants an abortion.
- The court also said that "continuing with an unwanted pregnancy has an adverse impact on the pregnant woman's mental health and can be a ground for abortion".
- The **Court eventually decided that the mental health grounds for abortion did not extend beyond 24 weeks of gestation.**
- However in this case, **there is a conflict between foetal right to life against women's right to autonomy.**

Does H5N1 pose a threat for humans?

Sub: Science and tech

Sec: Public Health

Context:

- The **highly pathogenic avian influenza (HPAI) H5N1 strain** has been affecting cattle across several States in the U.S., and for the first time, three cases of human infection in dairy farm workers were also reported.

More on news:

- The districts of **Alappuzha, Kottayam and Pathanamthitta in Kerala**, where water bodies, migratory birds, fowls and integrated farms form part of the ecosystem, have reported H5N1 outbreaks in 19 places since April.
- The death of crows in large numbers in Alappuzha, and subsequent confirmation of the H5N1 virus in their carcasses have given rise to concerns that the virus could spread far and wide.
- According to the **WHO, between 2003 and April 1, 2024, close to 900 human infections of H5N1 have been reported from 23 countries, of which, more than half were fatal.**
- Even though the risk of human infections from H5N1 is still perceived to be low, this can change rapidly as the virus spreads to more animals, especially cows or domestic mice, which have closer contact with humans.
- In districts like Alappuzha where waterfowls, chicken, dairy cows and humans share the same environment, the opportunities for human infections should be perceived as high.

What is the H5N1 virus?

- **Influenza A virus subtype H5N1 (A/H5N1)** is a subtype of the influenza A virus, which causes influenza (flu), predominantly in birds.
- It is **enzootic (maintained in the population) in many bird populations, and also panzootic (affecting animals of many species over a wide area).**
- **A/H5N1 virus can also infect mammals (including humans) that have been exposed to infected birds; in these cases, symptoms are frequently severe or fatal.**
- Ever since it emerged in 1996, H5N1 has resulted in the mass killing of billions of wild birds as well as fowls.
- According to scientists, the virus lacks changes that would make it better adapted to transmit between people and therefore, the risk to human health remains low.
- The potential for influenza viruses to rapidly evolve and the wide geographic spread of H5N1 signals that more human infections should be expected.

What is the level of risk to humans?

- The virus seems to spread from birds/animals to humans who may be closely interacting with these, without adequate personal protection.

What are the symptoms of H5N1?

- The common symptoms of **H5N1 are similar to those of influenza-A illnesse**s, including respiratory difficulties, fever, cough, sore throat and pneumonia, all of which can potentially worsen, especially in those who are immunocompromised or have underlying conditions.
- In the **U.S, Conjunctivitis or pink eye** was the only symptom that was reported in one of the farm workers who was infected.
- As of now, in Kerala, as only the poultry has been found affected in all outbreaks, the strategy adopted for containment is the mass culling of birds within a certain radius of the reported infection.
- The incident of the **mass death of crows has now changed the equation**, as it is possible that the infection may have been taken by the crows beyond the current surveillance zone.

What are the necessary precautions?

- People should **avoid unprotected exposure to infected birds or animals or their contaminated environments.**
- If at all one has been exposed to a possible **H5N1-contaminated environment**, they should monitor themselves for new respiratory illness symptoms, including conjunctivitis for 10 days and seek proper medical advice.
- It would be better to ensure that people use only pasteurized milk and poultry meat and eggs should be well-cooked to prevent any possible food-borne transmission of H5N1.
- **Kerala has taken 'One Health'** beyond the conceptual framework and the project is currently being implemented as part of the World Bank-aided 'Rebuild Kerala' project in four districts — Alappuzha, Pathanamthitta, Kottayam, and Idukki.

What is One Health Approach?

- **One Health is a concept that promotes collaboration across various sectors to address health, productivity, and conservation challenges, particularly relevant to India due to its diverse wildlife, large livestock populations, and dense human population.**

India getting close to developing gene therapy for sickle cell disease, say officials

Sub: Science and tech

Sec: Health

Context:

- India is getting closer to developing a gene therapy for **sickle cell disease which is a genetic blood disorder with a high prevalence rate among the Scheduled Tribes.**

More on news:

- The National Conclave on Generating Awareness on Sickle Cell Disease was organized by the Tribal Affairs Ministry in collaboration with the Birsa Munda Centre at the AIIMS.
- Developing a gene therapy using CRISPR has been part of India's mission to eradicate sickle cell disease by 2047.
- A government dossier on the mission, which was launched by Prime Minister Narendra Modi in July 2023.
- Part of this mission is to also conduct over seven crore screenings among vulnerable tribal populations across **17 States and Union Territories.**

What is Sickle Cell Anemia?

- The **genetic error in sickle cell disease leads to red blood cells** assuming a crescent shape.
- Unlike the disc shaped normal cells, the sickle-like cells cannot move around easily in the vessels, resulting in blocked blood flow.

- This can lead to episodes of severe pain, life-threatening infections, anemia, or a stroke.
- An **estimated 30,000-40,000 children in India are born with the disorder every year.**
- The symptoms manifest in people who inherit a pair of damaged genes from both parents.
- Those who carry only one copy of the gene from one parent can lead a normal life.
- This is the same as thalassaemia, in which people who inherit a pair of genes from both parents experience symptoms like severe anemia.

About the CRISPR CAS9 technology:

- The CRISPR-Cas9 system consists of an enzyme that behaves like molecular scissors which can be directed to cut a piece of DNA at a precise location.
- This will then allow a guide RNA to insert a changed genetic code at the sites of the incision.
- While there are a few ways to effect such changes, the CRISPR system is believed to be fast and the most versatile of all.

Other efforts taken:

- Apart from the gene therapy being developed by India, the sickle cell disease eradication mission also includes developing two coded formulations — **AYUSH-RP and AYUSH-SC3 — for managing the disease through a systemic drug development process.**
- For this continued testing will be undertaken by the Central Council for Research in Ayurvedic Sciences in collaboration with the Indian Council of Medical Research.

Sickle cell patients need better access to modern medication

Sub: Science and tech

Sec: Health

What is Sickle Cell Anaemia (SCD)?

- **Sickle cell disease, a chronic condition, encompasses a g**roup of inherited disorders affecting haemoglobin, the protein responsible for oxygen transport in the body.
- **Red blood cells possess a disc-like shape and are flexible**, facilitating smooth movement through blood vessels.
- In **SCD, a genetic mutation causes these red blood cells to adopt a crescent or "sickle" shape.**
- These sickle-shaped RBCs lead to disruption of blood flow in small vessels and result in numerous complications.

Sickle cell Anaemia burden in India:

- SCD affects 20 million people worldwide.
- India grapples with a formidable challenge posed by SCD, with millions affected.
- According to an article by Forbes, India has the second-highest global prevalence of the disease, with 1 in 86 births positive for SCD.
- Patients with SCD suffer a broad spectrum of complications that contributes to their increased morbidity and mortality.
- From end-organ damage and increased infection susceptibility, to stroke and pulmonary complications, the challenges presented by SCD are diverse.

Treatment of the disease:

- After multiple decades where Hydroxyurea was the **only disease modifying therapy for SCD**, there are now multiple medications that are approved and available.
- After years of **symptom management as the treatment strategy**, we now can talk about a choice of disease-modifying therapies and disease control.

National Sickle Cell Anaemia Elimination Mission:

- The Indian government initiated the **National Sickle Cell Anaemia Elimination Mission in 2023**, aiming to eradicate SCD by 2047.
- This initiative entails **enhancing awareness, conducting universal screening** of approximately seven crore individuals aged 0-40 in affected tribal regions, and providing counselling through collaborative endeavors between central ministries and State governments.

'School in a box' for children in Assam flood relief camps

Sub: Science and tech

Sec: Health

Context:

- Flood-affected children are set to get a **"school in a box"** in model relief camps across Assam.

More on news:

- **Rainfall-induced landslides or landslides** have killed more people than floods across seven of the eight northeastern States over the last 30 days.

Child-friendly space (CFS) kit:

- Such a box or **child-friendly space (CFS) kit containing** learning materials and other items to ensure the continuity of education will be provided for each of the 167 model relief camps in the State where floods and rainfall-induced landslides have claimed at least 31 human lives since May.
- The kit designed by **UNICEF for Assam** has been around for some time, the new-look box caters to the educational needs of children and teenagers aged 6-18 years.
- These resources have at their core the protection of children from harm; the promotion of **psychosocial well-being**; and the **engagement of community and caregiver capacities.**
- This was done after assessing the psychological impact of displacement on children older than 6 years.
- The focus of **CHS earlier was on children up to 6 years old.**
- The **'school in a box' concept** covers older children and provides for them notebooks, drawing books, pencils and other learning materials to help them overcome the trauma of losing their homes or a parent or a family member.
- The **training is being conducted at the block and circle levels** to equip Anganwadi workers and other grassroots stakeholders with the skill to maintain the education continuity of children in the model relief camps.
- Officials are also being trained to run the relief camps smoothly through initiatives such as installing sanitary napkin vending machines with incinerators for women and adolescent girls in the relief camps.

About UNICEF:

- **UNICEF is a special program of the United Nations (UN)** devoted to aiding national efforts to improve the health, nutrition, education, and general welfare of children.
- **UNICEF** was created in 1946 as International Children's Emergency Fund (ICEF) by the UN relief **Rehabilitation Administration to help children affected by World War II.**
- **UNICEF** became a permanent part of the **United Nations in 1953.**
- The name was shortened to **United Nations Children Fund but it is still referred to as UNICEF.**
- It is mandated by the United Nations General Assembly to advocate for the protection of children's rights, to help meet their basic needs and to expand their opportunities to reach their full potential.
- **UNICEF is guided by the Convention on the Rights of the Child, 1989.**

Tamil Nadu hooch tragedy: Why spurious liquor can be deadly

Sub: Science and tech

Sec: Health

Context:

- At least 34 people have died, and around 100 others have been hospitalized after consuming hooch, or spurious liquor, in Tamil Nadu's Kallakurichi.

What is hooch?

- **Hooch is a commonly used term for poor quality alcohol, derived from Hoochinoo, a native Alaskan tribe that was known to produce very strong liquor.**
- Unlike branded liquor which is produced in factories with sophisticated equipment and rigorous quality control, hooch is made in much more crude settings.

How is hooch produced?

All alcohol is produced using two basic processes: fermentation and distillation.

Fermentation:

- When heated, yeast reacts with **sugar (from grain, fruits, sugarcane, etc.) to ferment and produce a mixture containing alcohol.**
- This is an **age-old process, used to create beverages like beer or wine. But it comes with a basic limitation.**
- As fermentation continues, and alcohol levels rise, conditions in the mixture become toxic for the yeast.
- Eventually, **no more fermentation can take place.**
- Thus, to make anything stronger (above 14-18% ABC), beverages need to be distilled.

Distillation:

- This is the **process of physically separating alcohol from a fermented mixture using evaporation and condensation.**
- Since different parts of the **mixture have different boiling points, heating it up to the correct temperature** makes it possible to separate only the alcohol from the water and other remnants. Distilled beverages, or spirits, are far more potent than any fermented beverage.
- **Hooch is produced using distillation of a fermented mixture, generally of locally available yeast, and sugar or fruit (often fruit waste).**
- Multiple rounds of distillation are carried out, to produce more potent alcohol.

Why can hooch be dangerous?

- There is an **inherent risk associated** with the crude methods of hooch production.
- The **fermented mixture** which is distilled contains more than just consumable alcohol (ethanol).
- It also contains **methanol, an industrial alcohol which is highly toxic for human beings.**
- **Non-distilled alcoholic beverages** like wine contain relatively harmless trace amounts of methanol.
- But during the distillation, both **ethanol and methanol are concentrated.**
- If done incorrectly, distillation can lead to an end product which contains high quantities of toxic methanol.
- Methanol has a boiling point of **64.7 °C, lower than that of ethanol 78.37 °C.**
- During distillation, when the mixture reaches 64.7 °C, the pot collecting concentrated alcohol begins to fill up with a highly toxic chemical.
- This must be discarded for the **end product to be safe.**
- It is crucial to maintain a temperature of above **78.37 °C but below 100°C** (the boiling point of water) to obtain safe-to-consume yet potent liquor.
- Commercial distillers have sophisticated equipment and multiple checks to maintain the accuracy of the process.
- However, **hooch-makers have no temperature control.**
- This means that the process of distillation lacks the accuracy that is crucial to make it safe and effective.

What other risks does hooch pose?

- Beyond the risk of improperly prepared alcohol lies the risk of adulteration.
- Given the issues with **conducting distillation without proper equipment, hooch-makers often err on the side of caution, producing an end-product that is safe, but watered down (the mixture is overboiled).**
- To compensate for this, adulterants are added.
- Some of the known ones include organic waste, battery acid, and industry grade methanol, all of which are highly toxic.
- Adding the wrong kinds of adulterants in the wrong quantities increases the risks associated with hooch.
- First, it can make **hooch far more intoxicating, producing effects such as blackouts, memory loss, and high drunkenness even on consumption of low quantities of liquor.**
- Second, in extreme cases, **when adulterants like methanol are present in high concentrations, the liquor is unfit to consume and can be deadly.**

How does hooch impact the body? How does treatment work?

- Methanol or methyl alcohol can cause impaired vision, high toxicity and metabolic acidosis, a condition in which the body produces excessive acid that cannot be flushed out by kidneys.
- The treatment for this is to intravenously administer Fomepizole and ethanol.
- Fomepizole can be expensive and unavailable in many parts of India.
- In such cases, doctors administer a mixture of ethanol and water (1:1 ratio).
- Ethanol inhibits methanol's conversion into toxins and helps in flushing it out of the body either naturally or through dialysis.

What is Methanol Poisoning?

- **Methanol toxicity (also methanol poisoning)** is poisoning from methanol, characteristically via ingestion.
- Symptoms may include a decreased level of consciousness, poor or no coordination, vomiting.
- Long-term outcomes may include blindness and kidney failure.
- Methanol poisoning most commonly occurs following the drinking of windshield washer fluid.

Chad eliminates sleeping sickness as a public health problem

Sub: Science and tech

Sec: Health

Context:

- **Chad** becomes the **first country** in **2024** and the **51st globally** to **eliminate** a **neglected tropical disease (NTD)** - the **gambiense** form of **human African trypanosomiasis (HAT)**, also known as **sleeping sickness**.
- To date, **WHO** has **validated** the **elimination** of the **gambiense form of HAT** in **seven countries: Togo** (2020), **Benin** (2021), **Ivory Coast** (2021), **Uganda** (2022), **Equatorial Guinea** (2022), **Ghana** (2023) and **Chad** (2024).
    - Additionally, the **rhodesiense form of the disease** has been **eliminated** as a **public health problem** in **Rwanda**.

About 'Sleeping sickness':

- **Scientific name:** Human African trypanosomiasis (HAT)
- **Cause:** HAT is caused by **protozoan parasites** spread via **infected tsetse flies**.
- **Impact:** Typically, **fatal** if untreated, causing fatigue, headaches, and in severe cases, coma.
- **Types of HAT:**

- **Trypanosoma brucei gambiense** (92% of cases)
- **Trypanosoma brucei rhodesiense** (8% of cases)

Chad's Effort to Eliminate Sleeping Sickness:

- Before **2002**, the **Mandoul region** faced a significant burden of sleeping sickness.
- **Chad** worked with **WHO** and other partners on a **comprehensive strategy**.
- **Key Focus Areas:**
  - **Early Diagnosis and Treatment:** Improved access to healthcare in remote areas and introduction of new, effective drugs.
  - **Tsetse Fly Control:** Implemented **targeted programmes** using **traps** and **insecticides** to **kill tsetse flies.**

Results and Verification:

- Case numbers dropped significantly, with no new infections in recent years.
- **WHO Assessment:** Rigorous verification of data on case surveillance, diagnostic testing, and vector control measures.
- **Chad** was **declared free of gambiense sleeping sickness** as a **public health problem** in **April 2024**.

Significance and Future Steps:

- **Chad's** achievement serves as an **inspiration** for other countries battling **NTDs**.
- Highlights the importance of targeted interventions, improved diagnostics, and community engagement.
- Ongoing surveillance and control measures are essential to prevent resurgence.
- Chad can now target other neglected tropical diseases prevalent in the country.
- **Global NTD Elimination Goal:** Aim to eliminate **at least 100 NTDs by 2030**.

Chad:

- **Chad** is an **independent state** at the crossroads of **North** and **Central Africa**.
- The **landlocked country** is **bordered** by **Libya** to the **north, Sudan** to the **east**, the **Central African Republic** to the **south, Cameroon** to the **southwest, Nigeria** to the **southwest** (at Lake Chad), and **Niger** to the **west**.

Cambridge study findings on Regulatory T cells hold promise for inflammatory disease treatment, organ transplants

Sub: Science and tech

Sec: health

Context:

- Scientists at Cambridge University have discovered a **new property of Regulatory T cells,** a type of **white blood cell**. It is a discovery that could have a **significant impact on the treatment of a wide range of diseases,** especially **inflammatory ones.**

Details:

- Researchers have revealed their **ability to move collectively throughout the body to repair damaged tissues**. This finding challenges the previous understanding that these cells are localized to specific regions.
- The discovery is expected to revolutionize treatments for a wide range of diseases, particularly **inflammatory conditions**, as nearly all diseases and injuries activate the immune system.

Significance of the discovery:

- The implications are significant for **treating inflammatory diseases** more effectively than current **anti-inflammatory drugs**, which affect the entire body rather than targeting specific areas needing repair.
- Researchers described this phenomenon as a **'Unified Repair Army',** capable of various repair functions, enhancing treatments from muscle repair to insulin response improvement and hair follicle regrowth.
- Moreover, based on this research, scientists have **developed a drug** that **increases** and **activates specific cells** to **suppress the immune system locally,** aiding in **organ transplants** and **autoimmune diseases management.**
- This breakthrough promises to **design drugs** that can **prevent organ rejection without compromising the overall immune system**, potentially leading to healthier lives for transplant patients. The researchers are seeking funding to establish a company for clinical trials shortly.

About T Cells:

- Cells also called **T lymphocyte, type of leukocyte (white blood cell)** that is an essential part of the immune system.
- T cells are **one of two primary types** of lymphocytes—**B cells being the second type**—that determine **the specificity of the immune response to antigens** (foreign substances) in the body.
- T cells **originate in the bone marrow and mature in the thymus**.
- In the **thymus**, **T cells multiply** and differentiate into helper, regulatory, or cytotoxic T cells or become memory T cells.
- They are then sent to peripheral tissues or circulate in the blood or lymphatic system.
- Once stimulated by the appropriate antigen, helper T cells secrete chemical messengers called cytokines, which stimulate the differentiation of B cells into plasma cells (antibody-producing cells).

T cell's role in controlling immunity:

- Regulatory T cells act to control immune reactions, hence their name.
- Cytotoxic T cells, which are activated by various cytokines, bind to and kill infected cells and cancer cells.
- Because the body contains millions of T and B cells, many of which carry unique receptors, it can respond to virtually any antigen.

Antibiotics under development insufficient to tackle antimicrobial resistance

Sub: Science and tech

Sec: health

WHO 2023 Report on Antibacterial Agents:

- The **World Health Organization (WHO)** has released its **latest report on antibacterial agents** in **preclinical** and **clinical development** as of December 2023.
- The report analyzes **traditional** and **non-traditional antibacterial agents** under development globally, addressing the current research and development (R&D) landscape to meet urgent medical needs.

Key Definitions:

- **Traditional Agents**: Directly target bacterial components to inhibit growth or kill pathogens.
- **Non-Traditional Agents**: Lack intrinsic antibacterial activity and work through alternative mechanisms.

Priority Pathogens:

- **Updated List**: The analysis aligns with the **updated 2024 WHO bacterial priority pathogen list (BPP)**.

- **Focus Areas**: Includes **drug-resistant Mycobacterium tuberculosis, Clostridioides difficile,** and **Helicobacter pylori.**

Clinical Pipeline

Current Data:

- **Total Agents**: 97 antibacterial agents/combinations.
- **Traditional Agents**: 57 (32 targeting WHO BPPs, 19 against M. tuberculosis, 5 against C. difficile, 1 against H. pylori).
- **Non-Traditional Agents**: 40 (30 targeting WHO BPPs, 9 against C. difficile, 1 against H. pylori).

Comparison to 2022:

- **Previous Data**: 80 antibacterial products (46 traditional, 34 non-traditional).
- **Changes**: An increase in both traditional and non-traditional agents in development.

Clinical Phases: Drugs are tested in three phases to assess safety, efficacy, dosing, and interactions.

Preclinical Pipeline

Current Data:

- **Total Products**: 244 products targeting WHO BPPs and C. difficile.
- **Increase from 2022**: Previously 217 products were in preclinical development.

Developer Demographics:

- **Small and Medium Enterprises**: 95% of developers are micro, small, and medium-sized entities.
- **Trend**: Large pharmaceutical companies have largely exited antibacterial discovery.

Investigational New Drug (IND) Phase:

- **Current Programmes**: 62 in the IND-enabling phase (significant increase from 34 in 2022).

Challenges and Insights:

- The report highlights the **worsening of AMR** and the slow pace of new antibacterial development.
- Despite some new product authorizations, there is a lack of innovative products and challenges in patient access across all income levels.
- Large pharmaceutical firms have mostly abandoned antibacterial discovery, leaving smaller entities to drive development.
- **Global Antibiotic Pipeline**: Described as weak and fragile, underscoring the need for robust development efforts.

Antimicrobial Resistance (AMR):

- AMR is the resistance acquired by any microorganism (bacteria, viruses, fungi, parasite, etc.) against antimicrobial drugs (such as antibiotics, antifungals, antivirals, antimalarials, and anthelmintics) that are used to treat infections.
- As a result, standard treatments become ineffective, infections persist and may spread to others.
- Microorganisms that develop antimicrobial resistance are sometimes referred to as “superbugs”.
- Antimicrobial resistance is now regarded as a major threat to public health across the globe.

Reasons for Spread of AMR

Antibiotic consumption in humans	• Unnecessary and injudicious use of antibiotic fixed dose combinations could lead to emergence of bacterial strains resistant to multiple antibiotics.
Social factors	• Include self-medication. • Access to antibiotics without prescription. • Lack of knowledge about when to use antibiotics.
Cultural Activities	• Mass bathing in rivers as part of religious mass gathering occasions. • Antibiotic Consumption in Food Animals

Pharmaceutical Industry Pollution	• Antibiotics which are critical to human health are commonly used for growth promotion in poultry. • The wastewater effluents from the antibiotic manufacturing units contain a substantial amount of antibiotics, leading to contamination of rivers and lakes.
Environmental Sanitation	• Untreated disposal of sewage water bodies – leading to contamination of rivers with antibiotic residues and antibiotic-resistant organisms. • Infection Control Practices in Healthcare Settings • A report on hand-washing practices of nurses and doctors found that only 31.8% of them washed hands after contact with patients.

Rotavirus vaccine: tortured data analyses raise false safety alarm

Sub: Science and tech

Sec: Health

Context:

- A recent study has revealed that Rotovac, an indigenous rotavirus vaccine by Bharat Biotech can lead to bowel complications.

More on news:

- According to the study, the vaccine which is a part of the government's immunization programme, has been associated with an increased risk of intussusception in infants.
- 0.5 billion doses of Rotovac have been used globally to date.

Bharat Biotech Reaction:

- Bharat Biotech dismissed the study and stated that the vaccine's safety had been rigorously evaluated.

Virologist Dr Gagandeep Kang study:

- The main objective was to monitor Bharat Biotech's rotavirus vaccine (Rotavac) for any increased risk of intussusception after any dose of the vaccine.
- Three doses of the vaccine are administered at 6, 10, and 14 weeks of age.
- The vaccine was introduced into the universal immunization programme in a few States in 2016 and across India in 2019.

About Rotavirus:

- Rotaviruses are the most common cause of diarrhoeal disease among infants and young children. Nearly every child in the world is infected with a rotavirus at least once by the age of five.
- Immunity develops with each infection, so subsequent infections are less severe.
- Adults are rarely affected.

About Rotavirus Vaccine:

- The rotavirus vaccine is a vaccine used to protect against rotavirus infections, which are the leading cause of severe diarrhea among young children.
- The vaccines prevent 15–34% of severe diarrhea in the developing world and 37–96% of the risk of death among young children due to severe diarrhea.
- Rotavirus vaccine is administered by putting drops in the child's mouth.
- Babies should get 2 or 3 doses of rotavirus vaccine, depending on the brand of vaccine used.
- The first dose must be administered before 15 weeks of age.
- The last dose must be administered by 8 months of age.

What is Intussusception?

- Intussusception is a serious condition where one part of the intestine slides into the next, potentially leading to bowel gangrene or even death without immediate treatment.

- Intussusception is a medical emergency involving obstruction of the intestine. It can be fatal if not treated.
- It occurs most often in children.
- Symptoms include sudden, loud crying that comes and goes every 15 to 20 minutes, vomiting, and stool mixed with blood and mucus.

New research heralds breast cancer diagnosis with just a drop of blood

Sub: Science and tech

Sec: Health

Context:

- The CSIR-Centre for Cellular and Molecular Biology (CCMB) scientists in association with clinicians of the Regional Cancer Centre (RCC) in Thiruvananthapuram (Kerala) have identified a potentially cost-effective and non-invasive method to detect various kinds of breast cancer from just a drop of blood.

Key Highlights of the Research:

- The researchers have analyzed microRNA signatures in hundreds of human cancer samples and identified 439 microRNAs (miRNAs) that are associated with invasive breast cancer, of which 107 qualified to be potential biomarkers for the stratification of different types, grades and stages of invasive ductal carcinoma.
- Most of the cellular processes in a body are regulated by miRNAs molecules which are 23-25 base small non-coding RNA molecules.
- The scientist explained that cancer cells shed DNA/RNA into the circulation called 'Circulating Nucleic Acids (CNAs) and tumor-specific genetic changes, including DNA, RNA, and proteins, which are detectable in plasma or other body fluids of cancer patients to identify the earlier stages of cancer development.
- Based on this principle, the identified biomarkers could be made into a liquid biopsy system that might prove to be a boon for developing countries, where cancer could be detected from one drop of blood.
- Nine international patents have already been granted for these biomarkers as a testimony to the application of results of this study, which got published recently in a prestigious journal called "Cell Communication and Signaling (CCS).

Benefits of the Diagnosis:

- Affordable, quick and robust early detection protocols for breast cancer diagnosis using miRNAs could strengthen the healthcare system majorly because breast cancer is a hidden epidemic in third world countries with most rural women in India and elsewhere reluctant to go for a physical examination.
- The discovery of biomarkers has become essential for early detection, classification, and monitoring of cancer.

What is "Circulating Nucleic Acids =CNA"?

- CNA refers to segments of DNA or RNA found in the bloodstream.
- CNAs offer a non-invasive approach to a wide range in diagnostics of clinical disorders that will allow the basic information necessary not only for use in predictive medicine but also for direct use in acute medicine.

How is methanol procured and used as liquor?

Sub: Science and tech

Sec: Health

Context:

- The Kallakurichi illicit liquor tragedy that has so far claimed more than 50 lives is entirely familiar in its cause, sequence of events, and aftermath.

- It is possible that methanol formed during the crude distillation process, adopted by the bootleggers at Kallakurichi, wasn't removed, leading to methanol poisoning.

Ethanol and its uses:

- Ethanol is legal liquor for consumption.
- It is produced biologically using edible material.
- Molasses, which are a by-product of the sugar making process, form the starting material of distilleries manufacturing ethanol.

Methanol and its uses:

- Methanol is produced from **fuels such as coal in India.**
- During ethanol production in responsible distilleries, methanol is also produced but is carefully removed since the processes are highly controlled.
- It is needed to produce a range of products that are highly useful.
- Methanol is **widely used in paint industries.**
- Most of the hooch tragedies in India occur due to **methanol contamination in liquor.**
- Potent poison that is methanol, if diluted enough, could provide the same effect as ordinary liquor — a state of intoxication or 'kick' for consumers.

Efforts taken:

- Various laws such as the Poisons Act that involve State governments can tighten the inter-State methanol supply chain.

Brains that don't see in greyscale first over-rely on colors: Project Prakash study

SUB: Science and tech

SEC: Human health

Context:

- In May, a team of Indian and U.S. researchers reported in the journal Science that this delay in developing color vision is actually important for overall vision development.

More on news:

- Project Prakash treats and rehabilitates blind children in India. These children helped the researchers shed light on how the brain learns to see.

Importance of color vision:

- Humans don't need color vision to recognise objects but colors can provide adaptation and survival advantages.
- Children often described objects around them with their color.
- Their reliance on colors is a little more than what normal children have.
- This observation gave the researchers an idea about how to show them some things without color.
- The children could recognise color images and discs quite well — even those who were barely two days out of eye surgery. But they had a tough time recognising black and white images.
- Children without any visual impairment had trouble neither with color nor grayscale images, on the other hand.

Mimicking visual development:

- Normally, a child first understands the world in grayscale.
- The first time the children at Project Prakash experienced normal vision, their eyes had developed enough to see colors as well, so they skipped the grayscale phase.
- Their brain processed black and white images differently as a result.

- To understand the effects of this issue, the researchers needed a proxy to the brain that they could tweak to learn in response to different visual stimuli.
- They set up a deep convolutional neural network (CNN) — a computer program that processes information the way neurons in the brain's visual cortex do.
- They trained four CNNs, one each on color and grayscale images in a particular order:
    - grey-grey ,color-color,color-grey, grey-color.
- They found the grey-CNN recognised both greyscale and color images better than any of the other models.
- The color-color model, which most mimicked visual development among Project Prakash's children — fared worse at identifying greyscale images.
- The researchers attributed this to the color-color model's overreliance on color cues when examining images because its training data was composed solely of color images.
- The grey-color model had learnt enough cues from the greyscale images and was thus better able to recognise color images.

Optimizing visual development:

- It's fascinating that the brain develops object recognition and color perception at different times.
- For example, children could also be made to experience a room deprived of color, simulating a black and white or a greyscale environment, for a few hours at a time.

What is a convolutional neural network?

- A convolutional neural network is a regularized type of feed-forward neural network that learns features by itself via filter optimization.
- Vanishing gradients and exploding gradients, seen during backpropagation in earlier neural networks, are prevented by using regularized weights over fewer connections.

Camouflaging as a dead enzyme VEGFR1 holds key to medical solutions for colon and renal cancers

Sub: Science and tech

Sec: Health

Context:

- Researchers have decoded the molecular mechanism in which a cell surface receptor belonging to the family of enzymes that bind growth factors, **regulate cell differentiation, proliferation, survival, metabolism, and migration, prevents cancers.**

More on news:

- Researchers at the **Indian Institute of Science Education and Research (IISER), Kolkata**, investigated one such RTK called **Vascular Endothelial Growth Factor Receptor (VEGFR).**
- The research carried out at the **Analytical Biology Facility at IISER Kolkata with its DST-FIST** supported ITC and stopped-flow fluorimeter.
- The research highlights the therapeutic potential of phosphatase modulators in regulating **VEGFR1-mediated pathological formation of new blood vessels** (angiogenesis) which takes place in cancer.
- The **VEGFR family** of receptors is the key regulator of the process of generating new blood vessels.

About the enzyme:

- The enzyme called **VEGFR1 withholds self-expression (autoinhibited)** in the absence of a ligand—for example hormones.
- The research can show the way for developing **medical solutions for colon and renal cancers by using molecules that preferentially stabilizes the inactive state of VEGFR1.**

- Cell surface receptors like **Receptor Tyrosine Kinases (RTK)** are crucial for converting extracellular signals (from chemical cues like growth factors, generally referred to as ligands) to tightly regulated cellular response.
- Ligand binding to extracellular receptors activates intracellular coupled enzymes (tyrosine kinases).
- The activated enzyme adds a **phosphate group to several tyrosine molecules** that function as an adaptor for assembling a signaling complex.
- The formation of the signaling complex regulates diverse cellular functions like **cell growth, development, and host immune response.**
- Spontaneous activation of RTKs, in the absence of ligands, is often linked to multiple human pathologies like cancers, diabetes, and autoimmune disorders.
- Researchers are exploring how a cell maintains an autoinhibited state of the enzyme and why such autoinhibition is breached during the progression of human pathology.

Intended Benefits:

- This process is essential for functions like embryonic development, wound healing, tissue regeneration, and tumor formation.
- Various malignant and non-malignant diseases can be treated by targeting VEGFRs.

Working of VEGFR 1 and VEGFR 2:

- The researchers were intrigued by the fact that two members of family **VEGFR 1 and VEGFR 2 behaved quite differently.**
- While **VEGFR 2, the primary receptor** regulating process of formation of new blood vessels, could be spontaneously activated, without its ligand, the other member of the family VEGFR 1 cannot be spontaneously activated even when overexpressed in cells.
- It **camouflages as a dead enzyme VEGFR1 and binds** with ten-fold higher affinity to its ligand **VEGF-A than VEGFR2.**
- This ligand binding induces a transient kinase (speeding up chemical reactions in the body by an enzyme) activation.
- Activation of VEGFR1 has been found to lead to cancer-associated pain, tumor cell survival in breast cancer, and migration of human colorectal cancer cells.

India lacks diagnostic tests for emerging infectious diseases

Sub: Science and tech

Sec: Health

Context:

- A recent case of **Zika virus infection in Pune** has renewed concerns about India's preparedness for diagnosing emerging infectious diseases.

More on news:

- This is **not the first time Zika has been identified in India.**
- Cases have been identified from multiple States in India in the past, with larger outbreaks occurring in Kerala and Uttar Pradesh as recently as 2021.

About Zika Virus:

- **Zika is a viral infection, which is spread by the Aedes aegypti mosquito**, which also spreads **dengue and chikungunya.**
- It is a **contagious disease** where infected people can transmit Zika virus **sexually.**
- **The incubation period (the time from exposure to symptoms) of Zika virus disease is estimated to be 3-14 days.**

- It was **first identified in Uganda in 1947 in monkeys, Zika was detected in humans five years later.**
- In India, Zika virus was first recorded in **1952-53**. The latest major outbreak was in 2018, when 80 cases were reported in Rajasthan.
- It results into microcephaly, especially when pregnant women are infected.

India's preparedness towards Zika other infectious diseases:

- India's lack of significant Zika surveillance means we might never fully understand its spread.
- In March 2023, **CDSCO, India's apex organization** for diagnostic approvals, confirmed that there is no approved diagnostic test for Zika.
- A case of avian influenza A/H5N1 was recently reported from Australia in a child who had travelled to India, hinting at more undetected infections.
- India has experienced several Nipah virus outbreaks, notably in **West Bengal (2001 and 2007) and Kerala (2018, 2021, and 2023).**
- Some cases of **Nipah** were indeed missed during initial admissions due to the lack of routine testing, largely because the diagnostic facilities are not readily available

About GISAID:

- **GISAID, the Global Initiative on Sharing All Influenza Data, previously the Global Initiative on Sharing Avian Influenza Data**, is a global science initiative established in 2008 to provide access to genomic data of influenza viruses.

About Nipah Virus:

- **Nipah virus infection** in humans causes a range of clinical presentations, from asymptomatic infection (subclinical) to acute respiratory infection and fatal encephalitis.
- Nipah virus can be transmitted to humans from animals (such as bats or pigs), or contaminated foods and can also be transmitted directly from human-to-human.
- **Fruit bats of the Pteropodidae family are the natural host of Nipah virus.**

About Influenza A virus subtype H5N1 (A/H5N1:

- **Influenza A virus subtype H5N1 (A/H5N1) is a subtype of the influenza A virus**, which causes influenza (flu), predominantly in birds. It is enzootic (maintained in the population) in many bird populations, and also panzootic (affecting animals of many species over a wide area).

inStem's fabric offers protection from pesticides

Sub: Science and tech

Sec: Health

Context:

- Researchers at the **Institute for Stem Cell Science and Regenerative Medicine (inStem)** developed an **anti-insecticide fabric** to **neutralize organophosphate-based pesticides**, building upon earlier work on topical gels for **pesticide detoxification**.

Details:

- The **fabric,** coated with **nucleophile small molecules covalently bonded to cellulose**, effectively **deactivates pesticides** on **contact through hydrolysis.**
- The **fabric attacks the pesticide molecule** and **breaks it into non-toxic products.** The **pesticide** is deactivated even before it reaches the skin surface.
- Developed in collaboration with Sepio Health Pvt Ltd, the **fabric** remains **durable** and **breathable** while **preventing pesticide-induced toxicity**.
- Developing a **universal nucleophile** capable of **deactivating various pesticides** and optimizing fabric attachment were critical steps in **fabric development,** ensuring practicality and effectiveness.

Mechanism of Action:

- **Organophosphate pesticides inhibit acetylcholinesterase (AChE)**, crucial for **neuromuscular function,** leading to various health issues.
- **Fabric-coated small molecules** hydrolytically deactivate **pesticides,** preventing **AChE (acetylcholinesterase) inhibition** (critical for neuromuscular function) and subsequent health problems.
- The fabric retains its **anti-insecticide properties** through **150 wash cycles,** offering a **long-term, cost-effective solution** for **farmers.**
- Unlike previous gels, the **fabric's reusability enhances affordability** and compliance among users.

Potential Impact on Agriculture:

- The fabric has potential to **prevent chronic toxicity in farmers** repeatedly **exposed to pesticides**, suggesting a **significant health benefit** and potential cost savings.

Birds of different feathers fly to the same beat

Sub: Science and tech

Sec: Msc

Universal Formula for Flapping Frequencies in Animals:

- Almost **all animals** that **fly** through the air and many that swim through water have evolved to flap their wings (or fins) at a frequency given by a simple formula, three scientists at **Roskilde University** in **Denmark** have found.
- **Discovery**: A simple formula relating the flapping frequency of wings or fins to the mass and wing area of the animal.

- **f** here is the wingbeat frequency, **m** the mass of the animal, **ρair** the atmosphere's density, and **A** the size of the wing. Et voila.

Formula Verification:

- **Applicability**: Validated across a wide range of species including **insects, birds, bats, penguins, whales,** and a **robotic bird (ornithopter)**.
- **Method**: Plotting calculated values against actual frequencies showed a nearly straight line, confirming the formula's accuracy.

Derivation Process:

- **Starting Point**: Newton's second law **F=ma** applied to **airborne animals**.
- **Considerations**:
  - Force (F) is generated by flapping wings to counteract gravity.
  - Momentum of air pushed by wing strokes.
  - Airflow velocity and atmospheric density.
- **Result**: A theoretical equation was derived and empirically validated.

Proportionality Constant (C):

- **Importance**: Represents **dimensionless quantities** related to wing shapes and flapping angles.
- **Implications**: Can provide deeper insights into the **efficiency of flight** and potential limitations for heavier birds.

Application to Swimming Animals:

- **Extension**: The formula also applies to **swimming animals** needing continuous motion to stay submerged.
- **Modification**: Replace **air density** with **water density** and adjust for buoyancy.

Empirical Testing:

- **Data Used**:
  - 176 insect data points (bees, moths, dragonflies, beetles, mosquitoes).
  - 212 bird data points (hummingbirds to swans).
  - 25 bat data points.
- **Limitations**: Formula assumes **high Reynolds number (Re) conditions** where fluid density is more critical than viscosity.

Future Work:

- **Low Reynolds Number**: Adjustments needed for animals operating in low Re conditions where viscosity is more significant.
- **Density Variations**: Simplification of the formula is constrained unless density varies significantly by an order of magnitude.

Patent filings credit Bharat Biotech as 'inventor' of Covaxin, omit ICMR

Sub: Science and tech

Sec: IPR

Context:

- In Rajya Sabha, Health Ministry had claimed that intellectual property over Covaxin is "jointly owned" by ICMR and Bharat Biotech

Key Highlights:

- India's first indigenously developed coronavirus vaccine, Covaxin, was a joint collaboration between the Indian Council of Medical Research (ICMR) and the Hyderabad-based Bharat Biotech International Limited (BBIL) with intellectual property (IP) rights jointly shared between the two organizations.
- Filings by the BBIL at patent offices in India, the United States and Europe suggest that only its scientists and personnel are credited as 'inventors' of the vaccine with no mention of ICMR scientists.
- The Minister's statement said the ICMR would provide a "well characterized" virus strain for vaccine development, the BBIL would develop the final vaccine formulation and be given a "non-exclusive" license granted to commercialize the product within two years.
- The ICMR would also receive as royalty 5% of net sales to be remitted half-yearly.
- It was explicitly mentioned that the ". intellectual property over the product would be jointly owned by the ICMR and the BBIL." The ICMR would also receive as royalty 5% of net sales to be remitted half-yearly.

Indian patent act 1970:

- The Patents Act, 1970 is the legislation that till date governs patents in India. It first came into force in 1972.
- The Patents Act has been repeatedly amended: 1999, 2002, 2005, 2006.
- These amendments were required to make the Patents Act TRIPS-compliant.
- The major amendment was in 2005, when product patents were extended to all fields of technology like food, drugs, chemicals and microorganisms.
- The Indian Patent Act, 1970 strikes a balance between the rights of the applicant and his obligation to the society granting the rights.

What can the Railways do to stop accidents?

Sub: Science and tech

Sec: Msc

Context:

- On June 17, a train accident killed 10 people and injured over 40 near New Jalpaiguri in West Bengal, about 600 km from Kolkata.

More on news:

- The mishap was caused when a goods train hit the 13174 Down Agartala Sealdah Kanchanjunga Express.
- The Railway Board initially said the prima facie cause of the accident was that the loco pilot of the GFCJ container train (goods train), disregarded the Railways' General and Subsidiary Rules (G&SR) and proceeded at normal speed which led to the collision with the Kanchanjunga Express.
- The much-touted anti-collision device, Kavach, was not installed on this route.

What is Signal Failure?

- Only 3% of the accidents in Indian Railways are due to "failure of equipment."
- The station master issues a TA-912 notice, which authorizes loco pilots to cross a signal in red during signal failures, and a 'line clear' ticket, under the G&SR.
- The combination empowers the loco pilot to move forward.
- In this situation, the rule book says that the driver shall proceed cautiously, so as to stop short at any obstruction.
- If there is no prior indication that a signal is defective and the loco pilot suddenly encounters a red signal (stop sign) when the train is on the move, the loco pilot has to stop at the defective signal for a minute during day time, and for two minutes during night time.
- After this, the loco pilot is expected to proceed with extreme caution at a speed of 15 kmph.
- This procedure is not applicable when a 'line clear' ticket has been issued.
- Trains are not detained at wayside stations till the signals are set right.
- The only rule is that there should be only one train between two block sections at any given point of time.
- Another train can enter only after this train has left that block section.

What is Kavach?

- The Kavach is an indigenously developed Automatic Train Protection (ATP) system by the Research Design and Standards Organisation (RDSO) in collaboration with the Indian industry.
- The trials were facilitated by the South Central Railway to achieve safety in train operations across Indian Railways.
- It is a state-of-the-art electronic system with Safety Integrity Level-4 (SIL-4) standards.
- Kavach would have slowed down the freight train (it was moving at 45 kmph at the time of accident) as the automatic braking system would have become operational.
- It is meant to provide protection by preventing trains to pass the signal at Red (which marks danger) and avoid collision.
- It activates the train's braking system automatically if the driver fails to control the train as per speed restrictions.
- According to the Railway Board, the Kavach system is operational in only 1,500 km. The entire Railways spans nearly 68,000 km.

What more needs to be done?

- One of the most important recommendations of the Kakodkar Committee is related to division of responsibilities.
- Three vital functions (rule-making, operations and the regulation) are all vested in the Railway Board. There is a need for an independent mechanism for safety regulation.
- The Committee recommends the creation of a statutory Railway Safety Authority with enough powers to have a safety oversight on the operational mode of Railways.

Patent filings credit Bharat Biotech as 'inventor' of Covaxin, omit ICMR

Sub: Science and tech

Sec: IPR

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Bharat Biotech and ICMR:

- Bharat Biotech is innovator of the process developed after procuring strain from the NIV through an agreed consideration between both the parties.
- The NIV was also responsible for testing for other variants.
- It is to be noted that while ICMR/NIV owns the animal challenge (clinical trials on animals) studies, Bharat Biotech owns the process development and new adjuvant added to the vaccine.

Patent laws in India:

- India's patent laws allow both product and process patents.
- Product patents grant an inventor a monopoly over, say, a drug.
- Process patents bar competitors from making a similar drug using the same sequence of steps.

Indian patent act 1970:

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- The major amendment was in 2005, when product patents were extended to all fields of technology like food, drugs, chemicals and microorganisms.
- The Indian Patent Act, 1970 strikes a balance between the rights of the applicant and his obligation to the society granting the rights.

What was the tussle over Covaxin IPR?

Sub: Science and tech

Sec: Intellectual Property Rights

Covaxin:

- **Covaxin** (development name, **BBV152**) is a **whole inactivated virus-based COVID-19 vaccine** developed by **Bharat Biotech** in collaboration with the **Indian Council of Medical Research - National Institute of Virology.**
- On 3 November 2021, the **World Health Organization (WHO)** validated the vaccine for emergency use, as the **first Indian-developed covid vaccine** to be approved.
- By 31 January 2022, Covaxin had been granted **emergency use approval** in **13 countries**.

Admission of Patent Filing Error by Bharat Biotech:

- **Bharat Biotech International Limited (BBIL)** admitted to an **error** in its **patent filings for Covaxin.**
- Scientists from the **Indian Council of Medical Research (ICMR)** were **not included** as **co-inventors.**
- **BBIL** is **one of India's leading biotechnology companies**.

Rights Governing Vaccine Patents:

- **India's patent laws** cover both **product** and **process patents.**
- **Product patents** grant a monopoly over a drug, while **process patents** prevent competitors from using the same production steps.
- **BBIL patented the process** of making **Covaxin** from virus strains provided by **ICMR-NIV (National Institute of Virology).**
- **Creating a vaccine** on an industrial scale requires specialized facilities beyond lab capabilities.
- **Covaxin** is an **inactivated coronavirus vaccine** with an **added adjuvant** to **increase potency.**
- Companies strive to protect their processes to maintain a temporary monopoly and profits.
- **Patents** are **only granted** after **regulatory authorities confirm** the **novelty** or **inventiveness** of the process.
- **BBIL** has not yet been granted these patents.

Roles of BBIL and ICMR:

- **BBIL** had collaborated with the **ICMR-NIV** for **all the steps** in **developing a vaccine.**
- An agreement outlining each entity's responsibilities, including **ICMR's role in testing and funding**.
    - Beyond transferring the strains and making vaccines, **ICMR** would also test these vaccines on animals and then on people to establish that the vaccine worked as intended.
- **ICMR funded clinical trials** and was to **receive 5% of royalties** from **Covaxin sales.**
- **Joint intellectual property rights** were expected, as stated in Parliament.
- **BBIL** initially distinguished between **rights over vaccine making** and **data from clinical trials.**
- **BBIL** later acknowledged the **mistake** and **committed to amending patent applications** to **include ICMR personnel.**

Importance of Being Cited as an Inventor:

- **Intellectual Property Rights (IPR)** cover various aspects of product invention.
- The development of **pharmaceutical products** often involves multiple entities.
- **BBIL** had a **technology licensing agreement** with **Virovax for the adjuvant.**
- Being listed as an **inventor** affects the **sharing of IPR, royalties,** and **product usage.**
- Omitting inventors in patent filings can lead to rejection of applications, particularly in the U.S.

Portable Optical Atomic Clock for Maritime Applications

Sub: Science and tech

Sec: Nuclear sector

A recent study published in *Nature* introduces a groundbreaking **portable optical atomic clock designed for use on ships**. This innovative clock, while trading some accuracy for portability and robustness, still surpasses existing vessel-borne timekeeping options in precision.

Importance of Atomic Clocks

- **GPS Backbone:** Atomic clocks are crucial for the Global Positioning System (GPS), essential for **navigation, emergency response, and military operations.**
- **Accuracy:** Traditional atomic clocks, such as those using caesium (Cs-133), **offer unparalleled accuracy, losing or gaining only a second over 1.4 million years.**

Advancements in Optical Atomic Clocks

- **Higher Precision:** Optical atomic clocks, operating at optical frequencies, are even more accurate, with stability enhanced by lasers and coherent light.
- **Smaller Increments:** Higher operating frequencies allow these clocks to measure smaller time increments more accurately.
- **Narrow Linewidths:** The narrow linewidths of optical transitions enable precise frequency tuning, further enhancing accuracy.

Portable Optical Atomic Clock Design

- **Miniaturization:** Researchers created a compact clock using molecular iodine as the frequency standard, fitting it into a standardized rack.
- **Components:** The clock's design includes a miniaturized spectrometer (2.5 liters), a laser system (1 liter), and a frequency comb (0.5 liters).
- **Autonomous Operation:** Equipped with software for autonomous initialization and operation, the clock monitors temperature, activates components, and maintains stability.

Performance and Testing

- **Laboratory Tests:** Initial tests at the U.S. National Institute of Standards and Technology (NIST) demonstrated superior performance compared to traditional hydrogen maser and rubidium atomic clocks.
- **Maritime Tests:** The clock was tested on a boat at **Pearl Harbor, Hawaii, maintaining stability despite environmental challenges like motion, temperature fluctuations, and humidity changes.**

Applications and Implications

- **Maritime Navigation and Communication:** The portable optical atomic clock can enhance precision in maritime navigation and communication systems.
- **Scientific Research:** Potential applications include monitoring underwater seismic and volcanic activity and conducting space-based experiments to test theories of relativity.
- **Reduced Satellite Costs:** Improved timekeeping accuracy could **reduce the cost and enhance the precision of satellite-based navigation.**

Conclusion

The development of a portable optical atomic clock represents a **significant advancement in timekeeping technology, offering improved accuracy and robustness for maritime and scientific applications**. This innovation paves the way for more precise and reliable navigation, communication, and research capabilities, both at sea and in space.

About Atomic Clocks

- An atomic clock is a highly accurate clock that functions by utilizing specific resonance frequencies of atoms, typically cesium or rubidium.
- **Invention:** Invented in 1955 by Louis Essen.
- **Precision:** Atomic clocks are so precise that they lose only one second approximately every 100 million years.

Types of Atomic Clocks:

1. **Cesium Atomic Beam:** Known for high accuracy and good long-term stability.
2. **Hydrogen Maser:** Best stability for periods of up to a few hours.
3. **Rubidium Gas Cell:** Commonly used type of atomic clock.

Nuclear study provides major update on plutonium isotope fission

Sub: Science and tech

Sec: Nuclear Energy

Context:

- On March 4, **India** advanced to the **second stage of its nuclear power programme** by starting **core-loading** of the **prototype fast breeder reactor (PFBR)** at **Madras Atomic Power Station, Kalpakkam**.

Details:

- The **first stage** used **uranium isotopes** in **heavy-water reactors** to produce **plutonium-239 (Pu-239)** and **energy**.
- The **second stage** focuses on **plutonium fission,** with **Pu-239** capturing **neutrons** and becoming **Pu-240** or **undergoing fission**.

Understanding Pu-240 Fission:

- When **Pu-240** captures a **neutron**, it can turn into **Pu-241** or **undergo fission**, but predicting the energy of **fission** products is complex.
- The **prompt fission neutron spectrum (PFNS)** measures **neutrons** emitted immediately after **neutron capture** by **Pu-240**.
- Only two studies have measured **PFNS** in **Pu-240**; the latest used **higher-energy neutrons** and found significant deviations from theoretical predictions.

Implications and Uses of New Findings:

- The **PFBR** uses **plutonium** from the **CANDU reactor spent fuel**, which contains **Pu-240**, making new data on **Pu-240** behaviour relevant.
- **Pu-240**, considered a **contaminant** in **weapons-grade plutonium,** is harder to separate from **Pu-239** and accumulates predictably.
- The recent study by researchers at **Los Alamos Neutron Science Centre** used a pure **Pu-240** sample to measure **neutron energies** and **fission products,** identifying higher-than-expected second-chance fission rates.
    - So far there has only been one study that attempted to study the **PFNS** of **induced fission** in **Pu-240**, where **neutrons** that **bombarded** the **Pu-240 nuclei** had an **energy of 0.85 mega-electron-volt (MeV).**

Impact on Nuclear Data Libraries:

- Discrepancies between **predicted** and **observed PFNS data** suggest updates are needed in **nuclear data libraries** like **ENDF, JEFF-3.3,** and **JENDL-5.0**.
- These libraries are crucial for reactor design, radiation shielding, nuclear medicine, and other applications.
- The study found that **only JENDL-5.0** included both **multi-chance fission** and **pre-equilibrium neutron emission processes,** highlighting areas for improvement in other libraries.

Important terms:

Prototype fast breeder reactor (PFBR)	• It operates on the **principle of using a breeder reactor mechanism,** where it **generates more fissile material** (plutonium-239, Pu-239) **than it consumes**. • In contrast to **Pressurised Heavy Water Reactors (PHWRs)** that utilize **natural or low-enriched uranium-238 (U-238)** and **produce Pu-239 as a**

	byproduct, the **PFBR** takes this produced **Pu-239** and **combines it with additional U-238** in a **mixed oxide form**. This **mixture** is then **loaded** into the **reactor's core along with a breeder blanket,** a layer that interacts with the fission products to create more **Pu-239.** • A **distinctive feature** of the **PFBR** is its use of **fast neutrons** (hence **"fast"** in the name), which are **not moderated or slowed down,** enabling certain **fission reactions** that contribute to the **breeding process.** • The reactor uses **liquid sodium** as a **coolant** in **two separate circuits for safety and efficiency**. The **primary circuit** carries the **coolant** through the **reactor core,** absorbing **heat and radioactivity**, and then **passes the heat** (but not the radioactivity) to a **secondary coolant circuit** through **heat exchangers.** • This **secondary circuit** then uses the **transferred heat to generate electricity.**
Pressurised Heavy Water Reactor (PHWR)	• A PHWR is a nuclear reactor that **uses heavy water** (deuterium oxide D2O) as its **coolant** and **neutron moderator.** • **PHWRs** frequently use **natural uranium as fuel**, but sometimes also use **very low enriched uranium.** • The heavy water coolant is kept under pressure to avoid boiling, allowing it to reach higher temperature (mostly) without forming steam bubbles, exactly as for a pressurized water reactor. • While heavy water is very expensive to isolate from ordinary water (often referred to as light water in contrast to heavy water), its low absorption of neutrons greatly increases the neutron economy of the reactor, avoiding the need for enriched fuel. • The **high cost of the heavy water** is offset by the **lowered cost of using natural uranium and/or alternative fuel cycles**. • As of the beginning of **2001, 31 PHWRs** were in operation, having a total capacity of 16.5 GW(e), representing roughly **7.76%** by number and **4.7%** by generating capacity of all current operating reactors. • Till now, the biggest reactor of indigenous design was the **540 MWe PHWR**, two of which have been deployed in **Tarapur, Maharashtra.**
CANDU Reactors	• The **CANDU (Canada Deuterium Uranium)** is a **Canadian pressurized heavy-water reactor** design used to generate electric power. • The acronym refers to its **deuterium oxide (heavy water) moderator** and its use of (originally, natural) **uranium fuel. CANDU reactors** were first developed in the late **1950s** and **1960s** by a partnership between **Atomic Energy of Canada Limited (AECL),** the **Hydro-Electric Power Commission of Ontario, Canadian General Electric,** and other companies. • By 2010, CANDU-based reactors were operational at the following sites of India: **Kaiga (3), Kakrapar (2), Madras (2), Narora (2), Rajasthan (6),** and **Tarapur (2).**

James Webb Space Telescope spots earliest-known galaxy: What a new study says

Sub : Science and tech

Sec: Space sector

Context:

- **NASA's James Webb Space Telescope (JWST)** has spotted the earliest-known galaxy called as **JADES-GS-z14-0.**

More on news:

- JWST, which by peering across vast cosmic distances is looking way back in time, observed the galaxy as it existed about 290 million years after the Big Bang event that initiated the universe roughly 13.8 billion years ago.
- This period spanning the universe's first few hundred million years is called cosmic dawn.

What do we know about the galaxy?

- **This galaxy, called JADES-GS-z14-0, measures about 1,700-light years across.**
- A light year is the distance light travels in a year, which is 9.5 trillion km.
- The galaxy has a mass equivalent to 500 million stars the size of our Sun and is rapidly forming new stars - about 20 every year.
- Until now, the earliest-known galaxy dated to about 320 million years after the Big Bang, as announced by the JADES team last year.
- The JADES team in the same study disclosed the discovery of the second oldest-known galaxy, from about 303 million years post-Big Bang.

Why is the galaxy so bright?

- Hypotheses that have been advanced to explain the luminosity of early galaxies are as follows:
- The first attributed it to supermassive black holes in these galaxies gobbling up material.
- These galaxies are populated by more stars than expected or by stars that are brighter than those around today.

About James Webb Space Telescope (JWST):

- The J**ames Webb Space Telescope (JWST or "Webb") is a joint NASA–ESA–CSA** space telescope that is planned to succeed the Hubble Space Telescope as NASA's flagship astrophysics mission.
- The **JWST will provide improved infrared resolution and sensitivity over Hubble**, and will enable a broad range of investigations across the fields of astronomy and cosmology, including observing some of the most distant events and objects in the universe, such as the formation of the first galaxies.
- **JWST will study various phases in the history of the universe, from the formation of solar systems to the evolution of our own Solar System.**
- The James Webb Space Telescope (sometimes called JWST or Webb) is an orbiting infrared observatory that will complement and extend the discoveries of the Hubble Space Telescope, with longer wavelength coverage and greatly improved sensitivity.

ISRO develops new PraVaHa software for aerodynamic design

Sub: Science and tech

Sec: Space sector

- The **Computational Fluid Dynamics (CFD) software** "**Parallel RANS Solver for Aerospace Vehicle Aero-thermo-dynamic Analysis" (PraVaHa)** is developed in **VSSC to simulate external and internal flows on launch vehicles, winged & nonwinged re-entry vehicles**.
- Initial aerodynamic design studies for launch vehicles demand evaluation of a large number of configurations.
- Any aerospace vehicle while moving through the earth's atmosphere during 'launch' or 'reentry' is **subjected to severe aerodynamic and aerothermal loads in terms of external pressure and heat flux.**
- Understanding the 'airflow' around aircraft, rocket bodies, or Crew Module [CM] during earth re-entry is essential to design the shape, structure, and Thermal Protection System [TPS] requirements for these bodies. The unsteady part of aerodynamics contributes to serious flow issues around such rocket bodies and creates significant acoustic noise during the mission. Computational Fluid Dynamics [CFD] is one

such tool to predict the aerodynamic and aerothermal loads which solve numerically the equations of conservation of mass, momentum, and energy along with the equation of state.

- Presently, CFD is matured enough in terms of its accurate prediction capability for complex aerodynamic flows, as well as faster simulation turnaround time on High-Performance Computing Clusters. This makes it handy for the design and characterization of many initial designs so that a few optimum configurations can be selected for detailed evaluation.
- PraVaHa has been used extensively in the **Gaganyaan program** for aerodynamic analysis of human-rated launch vehicles, viz, HLVM3, Crew Escape System [CES], and Crew Module [CM]. It is designed to make use of CPU as well as GPU architecture of available and upcoming supercomputing facilities. The software framework is quite flexible & secure enough, to have collaborative development with academic institutes and government labs.
- Currently, the PraVaHa code is operational to simulate airflow for Perfect Gas & Real Gas conditions. Validations of the code are underway for simulating the effect of chemical reactions that occur during air dissociation upon 'earth re-entry' and 'combustion' as in scramjet vehicles.
- PraVaHa soon will replace most of the CFD simulations for aero characterization, which is currently being carried out using commercial software. This indigenous software is going to help academia and other institutions, engaged in the design of missiles/aircraft/rockets, to find solutions to complex aerodynamic problems. By making this product available to larger sections of society, ISRO aspires to lend a helping hand, to move forward in achieving the stated goal of Atmanirbhar India.

With bad news from Cassini, is dark matter's main rival theory dead?

Sub: Science and tech

Sec: Space sector

What is the Cassini mission?

- **Cassini–Huygens, commonly called Cassini**, was a space-research mission by **NASA, the European Space Agency, and the Italian Space Agency** to send a space probe to study the planet Saturn and its system, including its rings and natural satellites.
- The **Flagship-class robotic spacecraft comprised both NASA's Cassini space probe and ESA's Huygens lander, which landed on Saturn's largest moon, Titan.**

What is Milgromian dynamics or MOND?

- In 1983, the **physicist Mordehai Milgrom initiated a new research program in cosmology, called MOND (for MOdified Newtonian Dynamics), or Milgromian dynamics.**
- In three papers, **Milgrom** proposed a set of postulates describing how Newton's laws of gravity and motion should be changed in regimes of very low acceleration.
- **Modified Newtonian dynamics (MOND) is a theory that proposes a modification of Newton's second law to account for observed properties of galaxies.**
- The main postulate of MOND is that gravity starts behaving differently to what Newton expected when it becomes very weak, as at the edges of galaxies.
- MOND is quite successful at predicting galaxy rotation without any dark matter, and it has a few other successes.
- Its primary motivation is to explain galaxy rotation curves without invoking dark matter, and is one of the most well-known theories of this class.
- It has not gained widespread acceptance, with the majority of astrophysicists supporting the **Lambda-CDM model as providing a better fit to observations.**
- MOND only changes the behavior of gravity at low accelerations, not at a specific distance from an object.

- This means that, **although MOND effects would typically kick in several thousand light years away from a galaxy, if we look at an individual star, the effects would become highly significant at a tenth of a light year.**

Bad news for CASSINI:

- **Cassini mission, which orbited Saturn** between 2004 and its final fiery crash into the planet in 2017. Saturn orbits the Sun at 10 AU.
- Due to a quirk of MOND, the gravity from the rest of our galaxy should cause Saturn's orbit to deviate from the Newtonian expectation in a subtle way.
- This can be tested by timing radio pulses between Earth and Cassini.
- Since Cassini was orbiting Saturn, this helped to measure the Earth-Saturn distance and allowed us to precisely track Saturn's orbit.
- But Cassini did not find any anomaly of the kind expected in MOND. Newton still works well for Saturn.

Bad news for MOND:

- MOND predicted that such stars should orbit around each other 20% faster than expected with Newton's laws.
- MOND also fails to explain small bodies in the distant outer Solar System.
- Comets coming in from out there have a much narrower distribution in energy than Mond predicts.
- Newtonian gravity is strongly preferred over MOND on length scales below about a light year.

China's far-side Moon mission begins journey back

Sub: Science and tech

Sec: Space sector

Context:

- **China** says its **lunar probe** has successfully taken off from the far side of the Moon to begin its journey back to Earth carrying the first samples ever collected from the region.

Key Highlights:

- State media says the **collecting module of the Chang'e-6 craft lifted off on Tuesday to begin the journey back.**
- The robot landed in a **giant crater close to the Moon's south pole** in a world-first feat celebrated by the international science community.
- **China became the first country** to reach the far side of the Moon with the landing of its Chang'e-4.
- **China is the only country** to have landed on the far side of the moon, having also done so before in 2019.
- The **Chinese National Space Administration (CNSA**) described the mission's landing and lift-off as an "unprecedented feat in human lunar exploration".
- China aims to be the first country to bring back rock and soil samples from the far side of the Moon, which scientists say could be very different from rock formations on the near side.

About Change mission:

- China's moon missions are called Chang'e, named for the goddess of the moon in Chinese mythology.
- **Chang'e 6 is a robotic lunar exploration mission by the China National Space Administration.**
- Like its predecessors in the Chinese Lunar Exploration Program, the spacecraft is named after the **Chinese Moon goddess Chang'e.**
- The mission began on 3 May 2024 when the probe was launched from **China's Hainan Island.**

- The **mission's lander landed on the far side of the Moon on 1 June 2024.**
- Chang'e-6 had spent two days gathering rocks and soil - using a mechanical arm and drill to collect about 2kg (4.4lb) of material.
- It has been based in the **South Pole-Aitken basin - a gigantic crater on the Moon's far side which is one of the largest known in the Solar System.**
- In 2020, its Chang'e-5 craft brought back 1.7kg of material from an area called Oceanus Procellarum on the Moon's near side.

ISRO's Aditya-L1 Solar Mission Captures Sun's Dynamic Activities

Sub: Science and tech

Sec: Space sector

The Indian Space Research Organisation (ISRO) has **released a series of images and observations from its Aditya-L1 mission, India's first solar mission,** highlighting significant solar activities. These observations were made by various payloads onboard the mission, particularly during a solar storm that occurred from May 8 to May 15.

Key Highlights:

Solar Activities Captured:

- The sun's active region AR13664 experienced **several X-class and M-class solar flares**, accompanied by coronal mass ejections (CMEs) on May 8 and 9.
- The **Solar Ultra Violet Imaging Telescope (SUIT) and Visible Emission Line Coronagraph (VELC) payloads**, which were initially in baking and calibration modes, started capturing images from May 14.

Released Images and Observations:

- ISRO released six images on June 10, taken by the SUIT payload at different wavelengths on May 17.
- These images are **crucial for studying solar flares, energy distribution, sunspots, space weather prediction, and UV radiation monitoring** across a wide wavelength range. They also contribute to the **study of long-term solar variations.**

Scientific and Practical Implications:

- **Understanding Solar Phenomena**:
  - The captured images and data help scientists **understand solar flares, energy distribution in the sun's atmosphere, and the dynamics of sunspots**. This knowledge is vital for predicting space weather, which can impact satellite operations, communications, and power grids on Earth.
- **Space Weather Prediction**:
  - By studying the **interactions of solar flares** and CMEs with the Earth's magnetic field, researchers can improve models for space weather forecasting. This can enhance the **preparedness for solar storms** that might affect technological infrastructure.
- **Long-Term Solar Monitoring**:
  - Continuous monitoring and analysis of the sun's activity over time will contribute to understanding long-term solar variations.
  - This information is crucial for **understanding the sun's influence on Earth's climate and space environment.**
- **Technological Advancements**:
  - The successful deployment and operation of the SUIT, VELC, SoLEXS, HEL1OS, ASPEX, and MAG payloads demonstrate India's growing capabilities in space technology and solar research.

The data collected by Aditya-L1's payloads during the solar storm in May **provide valuable insights into solar phenomena and reinforce the importance of continuous solar observation for scientific and practical applications.**

Aditya-L1 Mission

About:

- The ADITYA-L1 mission is dedicated to **studying the Sun and will fly approximately 1.5 million kilometers from Earth to the Lagrange point 1 (L1), one of the five favourable spots for observing the Sun.**
- The mission is expected to be launched **using a Polar Satellite Launch Vehicle (PSLV)** rocket.
- It will provide regular images and updates on the Sun's surface phenomena and space weather.

Features:

- **ADITYA-L1 will carry seven different payloads capable of studying various phenomena on the Sun** across the electromagnetic spectrum and solar wind. These payloads include:
    - Visible Emission Line Coronagraph (VELC)
    - Solar Ultraviolet Imaging Telescope (SUIT)
    - Solar Low Energy X-ray Spectrometer (SoLEXS)
    - Aditya Solar wind Particle Experiment (ASPEX)
    - High Energy L1 Orbiting X-ray Spectrometer (HEL1OS)
    - Plasma Analyser Package for Aditya (PAPA)
    - Advanced Tri-axial High-Resolution Digital Magnetometers

Lagrange Points:

- "L1" refers to the Lagrange point 1. **Lagrange points are specific points in space where the gravitational forces of two large bodies, such as the Sun and the Earth, balance the centrifugal force felt by a smaller body.**
- Lagrange points can be **used by spacecraft to reduce fuel consumption** needed to remain in position.

L1 Point:

- L1 is one of the five Lagrange points in the Sun-Earth system. **Of the five, three are unstable (L1, L2, and L3) and two are stable (L4 and L5).**
- The unstable Lagrange points (L1, L2, and L3) lie along the line connecting the two large masses.
- The stable Lagrange points (L4 and L5) form the apex of two equilateral triangles that have the large masses at their vertices. L4 leads the orbit of Earth, and L5 follows.
- **The L1 point of the Earth-Sun system provides an uninterrupted view of the sun and is currently home to the Solar** and Heliospheric Observatory Satellite.

The Aditya-L1 mission will be crucial for advancing our understanding of the Sun and improving our ability to predict and mitigate the impacts of solar activities on Earth.

About SUIT:

- SUIT aims to **study the Sun's ultraviolet (UV) emissions and capture high-resolution images of the Sun's atmosphere, known as the corona**, in various UV wavelengths.
- It will operate in the **far and near ultraviolet regions, covering wavelengths of 200-400 nanometers.**
- SUIT will observe the **hotter and more dynamic regions of the Sun's atmosphere**, such as the transition region and the corona.

Significance:

- The Sun is challenging to study due to its high emissions and radiation.
- SUIT will **enable scientists to unravel the secrets of the Sun and its impact on Earth and other planets.**

- It will measure UV radiation hazardous to human health, such as that which can cause skin cancer.
- SUIT will **monitor the Sun's activity and provide early warnings of potential solar flares and coronal mass ejections (CMEs), which can affect satellites, communication systems, power grids, and human health on Earth.**

What is VELC?

The Visible Emission Line Coronagraph (VELC) is the **largest payload on the Aditya-L1 mission. It is an internally occulted solar coronagraph capable of simultaneous imaging, spectroscopy, and spectro-polarimetry close to the solar limb**.

The VELC includes:

- **Coronagraph**: Blocks direct sunlight to observe the corona.
- **Spectrograph**: Analyzes light to identify elements and measure various physical conditions.
- **Polarimetry Module**: Measures the polarization of light to study magnetic fields.
- **Detectors and Auxiliary Optics**: Capture and process images and data.

VELC is built by the Indian Institute of Astrophysics (IIA) at its CREST (Centre for Research and Education in Science and Technology) campus in Hosakote, Karnataka.

Purpose:

- **Observe the Solar Corona**: The tenuous outermost layer of the solar atmosphere.
- **Analyze Coronal Conditions**: Temperature, plasma velocity, and density.
- **Study Coronal Mass Ejections (CMEs)**: Large expulsions of plasma and magnetic fields.
- **Examine Solar Wind**: The continuous flow of charged particles from the sun.

Coronal Mass Ejections (CMEs)

What are CMEs - Large expulsions of plasma and magnetic fields from the Sun's corona.

Composition: Particle radiation (mostly protons and electrons) and strong magnetic fields.

Speed: CMEs travel at very high speeds, often hundreds of kilometers per second.

Impact: CMEs can create shocks that **ripple through the solar system and potentially disrupt satellites, communication systems, and power grids on Earth.**

The Aditya-L1 mission, equipped with VELC and other payloads, **aims to provide unprecedented insights into solar phenomena such as CMEs, thereby enhancing our understanding of the Sun's impact on space weather and terrestrial technologies.**

Physical Research Laboratory Scientists Find Three New Craters on Mars Surface

Sub: Science and tech

Sec: Space sector

Key Points:

- **Discovery:**
  - Scientists from the Physical Research Laboratory (PRL) in Ahmedabad have discovered three new craters on Mars.
  - The craters are located in the Tharsis volcanic region on Mars.
- **Approval and Naming:**
  - The International Astronomical Union (IAU) Working Group for Planetary System Nomenclature approved the names for the three craters based on PRL's recommendation.
- **Details of the Craters:**
  - **Lal Crater:**
    - Named after Devendra Lal, a renowned Indian geophysicist and former Director of PRL (1972-1983).
    - Size: 65 km wide.

        - Coordinates: Centered at -20.98° and 209.34°.
    - **Mursan Crater:**
        - Named after a town in Uttar Pradesh.
        - Size: 10 km wide.
        - Location: Superimposed on the eastern side of the rim of the Lal Crater.
    - **Hilsa Crater:**
        - Named after a town in Bihar.
        - Size: 10 km wide.
        - Location: Superimposed on the western side of the rim of the Lal Crater.
- **Scientific Importance:**
    - **Lal Crater:**
        - Located in the Tharsis volcanic region, the entire area of the Lal Crater is covered with lava.
        - **Sedimentary Deposits:**
            - Geophysical evidence indicates the presence of materials other than lava, including a 45-meter-thick sedimentary deposit in the subsurface.
            - This provides compelling evidence of water movement, transporting large volumes of sediment into the Lal Crater.
        - **Significance:**
            - This discovery confirms that Mars was once wet, as water moved significant amounts of sediment, indicating past water activity on Mars.

Conclusion:

- The discovery of the three new craters and the evidence of past water activity in the Lal Crater enhances our understanding of Mars' geological history and its potential to have harboured life. This significant finding highlights the contributions of Indian scientists to planetary science and the study of Mars.

Physical Research Laboratory (PRL)

About:

- **Establishment:** The Physical Research Laboratory (PRL) was founded in 1947 by Dr. Vikram Sarabhai, who is considered the father of India's space program.
- **Location:** Ahmedabad, Gujarat, India.
- **Affiliation:** PRL operates under the Department of Space, Government of India.

Mission:

- PRL is dedicated to advanced research in space and allied sciences. It focuses on the fundamental aspects of physical sciences, including astronomy, space science, and atmospheric sciences.

Indirect evidence builds, yet the 'dark' universe remains murky

Sub: Science and tech

Sec: Space

General Theory of Relativity and Dark Universe

General Theory of Relativity:

- The general theory of relativity has excelled in explaining **gravity** and phenomena like **gravitational waves, lensing, redshift, black holes, and time dilation,** refining Newton's laws by describing gravity as a geometric property of spacetime.
- However, on a cosmic scale, space appears filled with **dark energy**, constituting about **70%** of the **universe's energy,** causing the universe to expand.

- This contrasts with **Newtonian gravity,** which **pulls objects together.**

Important terms:

Gravitational Waves	• These are waves of the intensity of gravity that are generated by the accelerated masses of binary stars and other motions of gravitating masses, and propagate as waves outward from their source at the speed of light. • They were first proposed by **Oliver Heaviside** in **1893** and then later by **Henri Poincaré** in **1905** as the **gravitational equivalent of electromagnetic waves**. • Gravitational waves are sometimes called **gravity waves,** but gravity waves typically refer to displacement waves in fluids. • In **1916 Albert Einstein** demonstrated that **gravitational waves** result from his general theory of relativity as ripples in spacetime.
Gravitational lensing	• A **gravitational lens** is matter, such as a cluster of galaxies or a point particle, that **bends light** from a distant source as it travels toward an observer. • The amount of gravitational lensing is described by Albert Einstein's general theory of relativity.
Redshift	• Scientists measure **cosmic distances** via **redshift**, the extent to which light is shifted towards the red (lower energy) part of the electromagnetic spectrum during its long journey across the universe. • The greater the distance, the higher the redshift.
Black hole	• **Black holes** are formed after the **supernova explosion** when the **core of a massive dying star more than 2.5 times the mass of the Sun** collapses until an infinite density where gravity is so high that even light cannot escape. • Predicted by **Einstein**, through his **general relativity theory** which says that a sufficiently compact mass can bend spacetime and create a black hole, its theoretical structure was prepared independently by **Tolman, Oppenheimer, Volkoff** and **S. Chandrasekhar.**
Time Dilation	• **Time dilation** is the **difference** in **elapsed time** as measured by **two clocks,** either because of a **relative velocity** between them (special relativity), or a **difference in gravitational potential** between their locations (general relativity). When unspecified, **"time dilation"** usually refers to the effect due to velocity.

Dark Energy:

- Observed at **cosmic scales, dark energy** permeates space, causing the universe's expansion.
- Comprises **70%** of the **universe's energy** from the **Big Bang**.
- Creates **negative pressure,** stretching spacetime and allowing stars and galaxies to drift apart.
- Dominates in empty **space**, whereas **gravity** prevails in matter-rich regions.

Dark Matter:

- Proposed based on **cosmological observations; first indirect evidence** published by Vera Rubin 44 years ago.
- Explains **unexpected galactic rotation rates**, suggesting invisible matter exerts additional gravitational force.
- Remains hypothetical; **no direct evidence yet**.

Scientific Debate:

- Not all scientists agree with dark matter and dark energy hypotheses.
- Some propose alternate gravity paradigms, but they don't fully explain observed phenomena like dark matter and dark energy do.

DESI and Lambda-CDM Model:

- **Broadband Search for Dark Photon Dark Matter (BREAD) search** and the **Dark Energy Spectroscopic Instrument (DESI)** aims to create a **detailed 3D map of the universe**.
    - By **mapping** the **position of thousands of galaxies** over many years, we can keep measuring how much the universe's expansion due to **dark energy** is accelerating.
    - But for now, we have no choice but to draw all our inferences about **dark matter** and **dark energy** from indirect evidence alone.
- Data supports the **Λ-CDM model,** with **Λ (lambda)** representing **dark energy's density**.
    - **Λ (lambda)** is the **cosmological constant:** it represents the **energy density of space** and is **closely associated with dark energy.**
    - It appears in equations of the general theory of relativity.
- Some studies suggest **dark energy might change over time**, challenging the Λ-CDM model.
- Modified theories like **MOND**, which don't require dark energy, face challenges, such as data from the Cassini mission not supporting its predictions.

Electromagnet: driven by current

Sub: Science and tech

Electromagnets:

- Invented by **William Sturgeon** in **1824, electromagnets** are crucial in various modern applications like **loudspeakers, motors, MRI machines, maglev trains,** and **particle accelerators.**
- They work by **creating a magnetic field** when an **electric current** flows through a **coiled wire**.
- This **magnetic field** is intensified if the **wire** is wrapped around a **magnetic core,** typically made of **ferromagnetic metals** like **iron**.
- **Iron cores** enhance the **magnetic field** because their **internal atomic magnetic fields** align with the **external field** produced by the **current,** amplifying the overall magnetic effect.
- The **magnetic field** exists as long as **current flows through the coil,** and some materials may **retain weak magnetism** even after the current stops.
- **Superconducting electromagnets**, used in **MRI machines**, utilize **superconducting wire coiled** around a **core** to generate **extremely strong magnetic fields** up to **30 tesla.**
- **Bitter electromagnets,** another type, can produce fields up to **40 tesla** by flowing current through wires coiled around a stack of electromagnets.

Uses of Electromagnets:

- Particle Accelerators
- Amplifiers
- Magnetic Separation
- Electric Motors and Generators
- MRI machines
- Control Switches in Relays
- Transportation
- Spacecraft Propulsion Systems
- Induction Heating
- Hard Drives

Disadvantages of Electromagnetism:

- They heat up very fast
- It consumes a lot of energy

- They can store huge amounts of energy in their magnetic field. If the electric current is interrupted, the energy will discharge

Pushpak, ISRO's reusable launch vehicle, clears test

Sub: Science and tech

Sec: Space sector

Context:

- The Indian Space Research Organisation (ISRO) completed the third Reusable Launch Vehicle (RLV) Landing Experiment (LEX) on June 23 at the Aeronautical Test Range (ATR) in Chitradurga, Karnataka.

More about the launch:

- This is the third and final test in the series of **LEX (03).**
- Following the success of the **RLV LEX-01** and **LEX-02** missions, **RLV LEX-03** re-demonstrated the autonomous landing capability of the RLV under more challenging release conditions (cross range of 500 m against 150 m for LEX-02) and more severe wind conditions.
- The winged vehicle, Pushpak, was released from an Indian Air Force Chinook Helicopter at an altitude of 4.5 km.
- ISRO said that from a release point 4.5 km away from the runway, Pushpak autonomously executed cross-range correction maneuvers, approached the runway and performed a precise horizontal landing at the runway centreline.
- This mission simulated the approach and landing interface and high-speed landing conditions for a vehicle returning from space, reaffirming ISRO's expertise in acquiring the most critical technologies required for the development of a Reusable Launch Vehicle (RLV).
- The advanced guidance algorithm catering to longitudinal and lateral plane error corrections, which is essential for the future Orbital Re-entry Mission, has been validated.
- The **RLV-LEX** uses multisensor fusion including sensors like the Inertial sensor, Radar altimeter, Flush air data system, Pseudolite system and **NavIC.**
- The **RLV-LEX-03** mission reused the winged body and flight systems as such without any modification, from the **LEX-02 mission,** demonstrating the robustness of ISRO's capability of design to reuse flight systems for multiple missions.

Meet the new Sino-French satellite, which will detect the most powerful explosions in the universe

SUB: Science and tech

SEC: Space sector

Context:

- A satellite jointly developed by China and France was launched into orbit from the Xichang Satellite Launch Centre in Sichuan province on June 22.

About the satellite:

- It is the most powerful satellite yet for studying **gamma-ray bursts (GRBs)** — they result from some of the universe's most explosive events such as the birth of black holes and neutron star collisions — according to Chinese state broadcaster CCTV.
- Known as **Space Variable Objects Monitor (SVOM),** the spacecraft is expected to play an important role in astronomical explorations.
- It is the first astronomy satellite jointly developed by China and France.

Why study gamma-ray bursts?

- GRBs are **bursts of highly energetic gamma rays,** which last from less than a second to several minutes. They are known to occur in distant realms of the universe, and can erupt with a quintillion (a 10 followed by 18 zeros) times the luminosity of the Sun.
- There are two types of GRBs, **short GRBs and long GRBs.** Short GRBs are a result of the collision of either two neutron stars or a neutron star and a black hole, resulting in a black hole.
- They last for **less than two seconds.**
- Sometimes, short GRBs are followed by kilonovas — blasts of electromagnetic radiation (or light) that are produced by the radioactive decay of chemical elements.
- The decay can lead to the generation of heavier elements like gold, silver, and platinum, NASA said.
- Long GRBs are produced due to the explosive deaths of massive stars.
- These can last for **two seconds or longer.**
- Scientists observe GRBs as they carry information pertaining to violent events such as the end of life of massive stars, the formation of black holes in distant galaxies, and how they shape the universe.

What will SVOM do?

- The **primary objective of SVOM** is to look for GRBs across the universe.
- Once found, the satellite will measure and study their electromagnetic radiation properties.
- It will also use the bursts to unlock mysteries regarding the evolution of the universe, and gravitational waves (scientists have observed that both gravitational waves and GRBs originate from the collision of neutron stars).
- The **SVOM satellite is capable of searching for kilonovas as well.**
- Such a detection would be of great significance to the study of stellar evolution, and to answering very interesting scientific questions such as where heavy elements like gold and silver come from in the universe.

What are the features of SVOM?

- **The 930-kg satellite consists of four payloads** — two developed by the French and two by the Chinese.
- The French have built the ECLAIRs and MXT telescopes, which will detect and capture the GRBs.
- The Gamma Ray Burst Monitor (GRB), built by the Chinese, will measure the spectrum of GRBs.
- The Visible Telescope (VT), also developed by the Chinese, will detect and observe visible emissions produced immediately after a GRB.

Chinese lunar probe returns to Earth with world's first samples from the far side of the moon

SUB: Science and tech

SEC: Space sector

Context:

- **China's Chang'e 6** probe returned to Earth on June 25 with rock and soil samples from the little-explored far side of the moon.

More on news:

- The probe landed in northern China on Tuesday afternoon in the **Inner Mongolian region.**
- Chinese scientists anticipate the returned samples will include **2.5-million-year-old volcanic rock** and other material that scientists hope will answer questions about geographic differences on the moon's two sides.
- While U.S. and Soviet missions have also collected samples from the moon's near side, the Chinese mission was the first that has collected samples from the far side.

What is the Near side and Far side of the Moon?

- The **near side** of the moon is what is **seen from Earth**, while the **far side** always **faces outer space**

- The **far side is also known to have mountains and impact craters,** contrasting with the relatively **flat expanses visible on the near side**.
- The probe left earth on May 3, and its journey lasted 53 days.
- The probe has drilled into the core and scooped rocks from the surface.

About the samples collected:

- The samples are expected to answer one of the most fundamental scientific questions in lunar science research: what geologic activity is responsible for the differences between the two sides.
- China in recent years has launched multiple successful missions to the moon, collecting samples from the moon's near side with the Chang'e 5 probe previously.
- Scientists are also hoping that the probe will return with material that bears traces of meteorite strikes from the moon's past.