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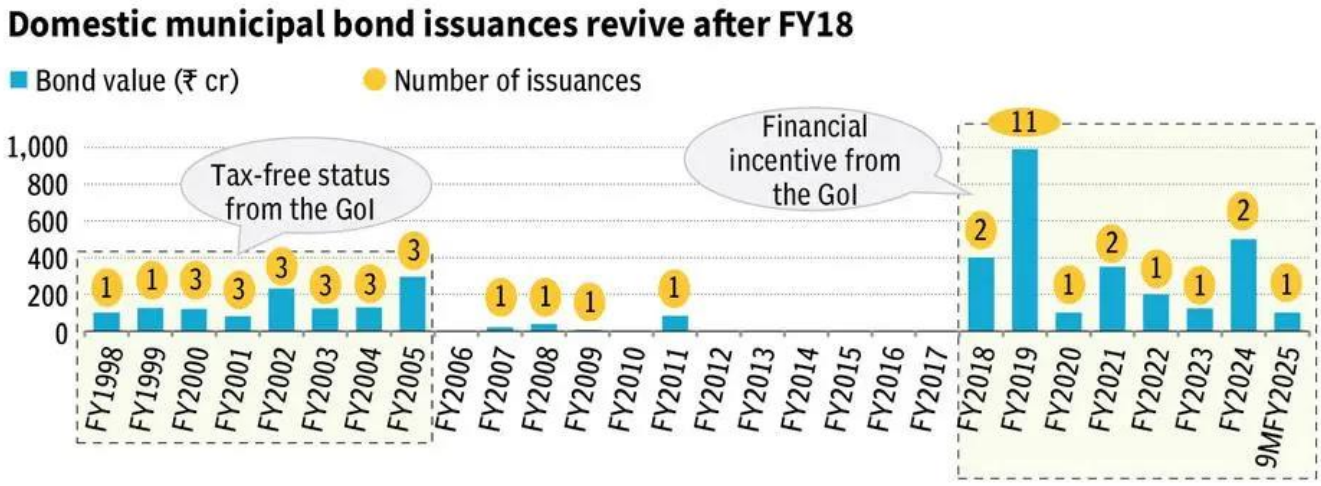
Economy

Financial Markets

Municipal Bonds

- Municipal bonds, an important source of funding for urban infrastructure, have not gained much popularity in India.
    - Bonds are debt instruments where investors lend money to issuers in exchange for periodic interest and principal repayment at maturity.
        - It includes Treasury, Municipal, Corporate, Floating Rate, Zero-Coupon, Convertible, Inflation-Protected Bonds etc.



- **Municipal Bonds:** Debt instruments issued by Urban Local Bodies (ULBs) to fund infrastructure and development projects.

Advantages

Urban India is growing rapidly, and cities need huge investments to upgrade their infrastructure. Traditional sources like state and central government **grants are often insufficient and irregular.**

- Reducing dependence on government funding
- Improving financial self-sufficiency of ULBs
- Attracting private sector investment (disclosure and credit rating norms set by SEBI)
- Allowing long-term infrastructure planning and financing

Challenges

Heavy Dependence on Grants:

- ULBs rely on **state and central grants** for nearly 38% of their revenue (as seen in FY 2023-24).
- This reduces their **motivation to raise funds independently** through bonds

Limited Participation:

- Only a handful of cities—like **Pune, Ahmedabad, Hyderabad, Surat, and Lucknow**—have issued bonds. Most other cities either **lack credit ratings**, have **weak financial management**, or **don't meet SEBI norms** for bond issuance.

Spending Pattern (FY18-FY25):
Most funds raised by municipalities through bonds were allocated to

- urban water supply and sewerage,
- followed by renewable energy and
- river development.

Way Forward

To make municipal bonds a mainstream tool for urban finance in India, several measures are needed:

- **Strengthen Financial Health of ULBs:**
  - Improve revenue collection
  - Increase financial accountability and transparency
  - Get credit ratings for more municipalities
- **Simplify Regulations:**
  - Make SEBI and RBI regulations more ULB-friendly
  - Provide templates and guidance for first-time issuers
- **Develop a Secondary Market:**
  - Currently, there is no active market to trade municipal bonds
  - A **secondary market** will boost liquidity and attract more investors
- **Tax Incentives:**
  - Exemptions on interest earned (like in the US) can encourage retail investors

Banking

IMF Report on India's Financial System

Why in News?

The **International Monetary Fund (IMF),** in its report titled "India Financial System Stability Assessment", has flagged concerns about the stress in **Non-Banking Financial Companies (NBFCs)** and its potential risks to India's financial system.

What are the Key Highlights of the IMF Report on India Financial System?

- **NBFC Stress and Systemic Risk:** 63% of power sector loans in FY 2024 were from the three largest **Infrastructure Financing NBFCs**, up from 55% in 2019-20.
  - 56% of NBFC lending is financed by market instruments (mutual funds, and corporate bond markets), with the remaining from bank borrowings.
  - State-owned NBFCs like Indian Renewable Energy Development Agency (IREDA) are at higher risk due to their exposure to the power sector which face delays, and financial stress. Without expected revenues, NBFCs **asset liability mismatches that hinder repayments.**
  - NBFCs can't accept demand deposits, lack deposit insurance, and have no direct **Reserve Bank of India (RBI)** liquidity access, making them vulnerable to financial stress.

- **Stagflation Risk and Impact on PSBs**: The report warns that **geopolitical risks and miscalculated monetary policies by major central banks** could lead to **rising interest rates and slow economic growth**, affecting both NBFCs and banks.
    - IMF stress tests indicate that **Public Sector Banks (PSBs)** may struggle to maintain the 9% **Capital Adequacy Ratio (CAR)** if stagflation occurs.
    - **RBI mandates 12%** CAR for PSBs and 9% for scheduled commercial banks.
- **Financial Inclusion Growth:** Nearly **80% of Indian adults** have financial accounts, supported by an extensive banking network and digital infrastructure like **Unified Payments Interface (UPI).**
    - The rapid rise of **retail investors in equities** has transformed India into one of **the world's largest equity options** trading markets.

Recommendations For Financial Stability

Instead of paying **dividends to the government**, PSBs should retain earnings to bolster their capital reserves and support economic recovery in case of downturns.

- Improve data sharing on NBFC credit and exposure to assess risks better.
    - IMF recommends **state-owned NBFCs should have the same regulatory burden as private sector NBFCs** to create a level playing field.
- IMF recommends **prioritizing financial stability** over aggressive lending for economic development.

Revised Priority Sector Lending Guidelines

Why in News?

The Reserve Bank of India (RBI) has issued revised Priority Sector Lending (PSL) guidelines under the Banking Regulation Act, 1949. These updates aim to enhance credit flow to priority sectors and promote inclusive growth.

What is Priority Sector Lending?

- **About**: PSL is an RBI-mandated requirement for banks to allocate a set portion of their loans to key priority sectors that face credit shortages but are crucial for inclusive economic growth.
    - Priority Sector Lending Certificates (PSLCs) are tradable certificates issued against priority sector loans.
- **Evolution of PSL:** Gadgil Committee (1969) proposed the 'Area Approach', leading to the Lead Bank Scheme (LBS) for regional credit planning.
    - The Nariman Committee (1969) supported the Gadgil Committee's recommendations and recommended that each Public Sector Bank should adopt certain districts as 'Lead Banks' to boost PSL.
    - PSL was formalized in 1972 based on the RBI's Informal Study Group's report (1971). Initially, no targets were set, but in 1974, banks were advised to raise PSL to 33.3% by 1979.

- Krishnaswamy Committee (1980) recommended a 40% PSL target by 1985, with sub-targets for agriculture and weaker sections.
- Usha Thorat Committee (2009) endorsed the continuation of the LBS for its role in the expansion of PSL
- Consequences for Banks Missing Targets: Banks failing to meet PSL targets must contribute to the Rural Infrastructure Development Fund (RIDF) and other designated funds at fixed interest rates, ensuring funds still reach priority sectors.
- Note: Foreign banks (with <20 branches in India) cannot buy PSLC General to meet their 8% target for non-export sectors but can purchase PSLCs for Agri, MSMEs, and Small and Marginal Farmers.

What are the Revised PSL Guidelines 2025?

- **Higher Loan Limits for Education:** The RBI has increased the loan limit under PSL for education from Rs 20 lakh to Rs 25 lakh per individual.
- **Renewable Energy Loans:** Loan limits for renewable energy projects like solar power, biomass, and micro-hydel plants raised from Rs 30 crore to Rs 35 crore per borrower.
  - Loans for individual households for renewable energy remain capped at Rs 10 lakh per borrower.
- PSL Targets for Urban Cooperative Banks (UCBs): Revised PSL target for UCBs reduced to 60% (from 75%)
- Housing sector: Loans limits are increased to boost affordable housing, particularly in Tier-III to Tier-VI cities.
- Expansion of the 'Weaker Sections' Category: The list of eligible borrowers under the 'Weaker Sections' category has been expanded, it now includes transgenders, promoting financial inclusion and better credit access for underprivileged groups.

Note: ANBC is the total net bank credit after making necessary deductions and adjustments, and CEOBE is the amount representing the credit risk exposure of off-balance sheet items such as guarantees and letters of credit.

What are the Challenges Regarding PSL?

- **Sectoral Imbalances:** Banks often prefer lending to MSMEs or housing sectors within PSL as they are commercially more viable.
  - Sectors like small and marginal farming remain underfunded, despite being a core PSL component.
- **High Non-Performing Assets (NPAs):** Banks face challenges in recovering PSL loans, especially in agriculture, leading to high NPAs and financial strain.
  - Studies show PSL contributes to higher defaults due to borrower vulnerability and political interference (with initiatives like loan waivers) further discourage lending

What Can Be Done to Enhance PSL?

- **Performance-Based Incentives:** Shift from quota-based lending to an impact-driven approach focused on poverty reduction, livelihood generation, and social outcomes.
  - Introduce performance measurement through social impact audits and development indicators instead of just credit disbursal figures.
- **Enhance Risk Mitigation:** Establishing dedicated credit guarantee schemes for high risk segments under PSL, such as the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE), can significantly mitigate the risk of NPAs.
- **Digital and Technological Integration**: Leverage Big Data to profile borrowers, predict risks, and personalize credit products. Use geotagging to assess farm output, enhancing agri-credit reliability.

BHIM 3.0

- The NPCI BHIM Services Limited (NBSL), a subsidiary of National Payments Corporation of India (NPCI) has launched Bharat Interface for Money (BHIM) 3.0 app.

BHIM 3.0: It is an upgraded version of BHIM.

- BHIM Unified Payment Interface (UPI) was launched in 2016 to provide a simple, fast, and secure method for cashless payments using UPI technology.
- It enabled users to send and receive money instantly through mobile phones, without requiring bank account details.

Key Features of BHIM 3.0

- BHIM 3.0 has enhanced accessibility and security with support for 15+ languages, low-internet optimization, and improved security features for safer transactions.
- For users, it offers Split Expenses, Spends Analytics, and an Action Needed Assistant (reminders for pending bills) for better expense tracking and financial management.
- For merchants, BHIM Vega offers a seamless in-app payment system, enabling seamless transactions without switching platforms.

NPCI: NPCI was founded in 2008 by the RBI and Indian Banks' Association under the Payment and Settlement Systems Act, 2007, to oversee and manage retail payments and settlement systems in India.

- NPCI International Payments Ltd. has expanded UPI to 7 countries, including Bhutan, Mauritius, Nepal, Singapore, Sri Lanka, and France with 20 apps like PhonePe, Paytm, and Google Pay supporting international transactions.

Infrastructure

Risk Of Quick Commerce In India

Why in News?

Quick commerce (Q-commerce) has transformed urban shopping habits by enabling **deliveries within minutes**.

- While it offers convenience and brand advantages, concerns over **predatory pricing, data privacy, and the displacement** of **traditional retailers** have sparked regulatory scrutiny.

What is Quick Commerce?

- **About**: Q-commerce, a subclass of **e-commerce**, is an on-demand delivery model where goods and services are delivered within 10 to 30 minutes of ordering.
  - It focuses on **smaller, high-demand** items like groceries, stationeries, and over-the-counter medicines.
- **Working Model:** Q-commerce platforms rely on dark stores (local warehouses designed solely for online fulfilment), strategically located in high-demand areas for faster dispatch.
  - Platforms use AI-driven analytics to forecast demand, optimize inventory, and personalize recommendations, while automated supply chains prevent stockouts.
    - Unlike **traditional retail** with a fixed **inventory-based model Q commerce** dynamically adjusts stock supply based on real-time consumer trends.
  - Delivery executives in high-density areas enable instant dispatch, with orders assigned via proximity-based route algorithms for efficiency.
  - Unlike traditional stores with fixed hours, **Q-commerce operates round the clock** to cater to immediate needs.
- **Impact on Consumers:** Consumers prefer Q-commerce for **urgent and impulse** purchases, particularly for food, beverages, and daily essentials.
  - The ability to order beyond traditional store hours (post 8 PM) has made these platforms indispensable for urban consumers.
  - Minimal cart values for free delivery, combined with aggressive discounts, further encourage adoption.
  - **A NeilsenIQ survey (2024)** found **that 12% of urban consumers now prefer quick commerce,** up from 5% two years ago.
- **Growth & Expansion in India:** The **Indian Q-commerce market is valued at USD 3.34** billion (FY 2024) and is projected to reach USD 9.95 billion by 2029, growing at 76% YoY.
  - Major players like **Flipkart, Ola, Blinkit, BigBasket, and Zepto** have aggressively expanded their Q-commerce presence, investing in AI-driven inventory management.
  - Q-commerce now contributes **35% of total e-commerce sales for large Fast Moving Consumer Goods (FMCG) brands.**

Note: In India, Foreign Direct Investment (FDI) is prohibited in inventory-based e commerce models. However, Q-commerce platforms operating under the marketplace model are eligible for 100% FDI under the automatic route.

Feature	Traditional E-commerce	Quick Commerce
Delivery Time	3-4 days or more	10-30 minutes
Order Type	Bulk & planned purchases	Small, frequent, impulse buys
Product Range	Extensive catalog	Limited, high-demand essentials
Storage	Large warehouses	Local micro-fulfillment centers
Operational Model	Logistics-driven	Hyperlocal & AI-driven

What are the Concerns Regarding Quick Commerce?

- **Predatory Pricing & Market Manipulation:** The **All-India Consumer Products Distribution Federation (AICPDF)** has accused Q-commerce platforms for **setting prices below landing costs** to drive traditional retailers out of business.
  - Once competition weakens, platforms **allegedly increase prices to recover initial losses, a practice known as "price gouging**."
- **Data Exploitation & Algorithmic Pricing**: Q-commerce platforms leverage big data and Artificial Intelligence (AI) - driven pricing models, which can result in differential pricing based on location (higher prices in affluent areas), device type (premium phone users might see higher prices) and shopping patterns (repeat buyers may get different pricing than new users).
- **Impact on Small Retailers & Employment:** Traditional retailers, especially small kirana shops, **struggle to compete** against the deep discounting offered by Q commerce platforms.
  - As these retailers **lose business**, concerns arise about **mass unemployment** in the sector.
  - Many distributors and small retailers argue that there must be a **"level playing field"** to ensure their survival alongside digital platforms
- **Gig Worker Exploitation:** Delivery agents face low wages, lack protective gear while driving, endure high-pressure delivery targets, and most of them have no social security.
- **Urban-Centric Growth:** Q-Commerce **thrives in Tier-1(especially metropolitan) cities but faces challenges in Tier-2 and Tier-3** due to lower digital adoption, weaker demand, and logistical constraints, **restricting its expansion beyond metropolitan hubs**.

How Can Q-Commerce Be Sustainable and Inclusive?

- Regulatory Oversight & Market Fairness: The Competition Commission of India (CCI) must regulate unfair pricing and monopolistic practices in Q-commerce.
    - **A National Q-Commerce Regulatory Authority** can be established under the **proposed National E-Commerce Policy** to oversee pricing, data privacy, and competition.
- **Coexistence with Traditional Retail:** Q-commerce platforms could partner with kirana stores, rather than competing against them.
    - Hybrid models like **"Kirana-powered dark stores"** could create a sustainable ecosystem where small retailers benefit from digital logistics, blending **hyperlocal expertise with tech-driven efficiency.**
    - Government policies may encourage collaborative retail frameworks to balance tech-driven commerce and traditional business sustainability.
- **Fair Wages & Social Security:** The Code on Social Security, 2020, must be fully implemented to ensure gig workers receive minimum wages, insurance, and accident coverage.
    - Non-essential goods should have **reasonable delivery** windows to prevent over-speeding and rider fatigue.
    - The **Motor Vehicles (Amendment) Act, 2019** should include safety norms for gig workers and categorize vehicles by **business or personal** use, ensuring targeted pollution control measures.
- **Sustainable Logistics:** Introduce mandates for recyclable and biodegradable packaging to reduce plastic waste, encourage electric vehicles for delivery under the Faster Adoption and Manufacturing of Electric Vehicles (FAME) Scheme.

Conclusion

- Q-commerce has reshaped urban retail, offering speed and convenience but raising concerns over fair competition. To ensure sustainable growth, regulatory frameworks, fair labor practices, and hybrid retail models must be adopted, balancing innovation with inclusivity

World Happiness Report 2025

- The Wellbeing Research Centre at the University of Oxford in partnership with Gallup, the UN Sustainable Development Solutions Network (UNSDSN) has published the World Happiness Report (WHR) 2025 on World Happiness Day (20th March).

Key Highlights of WHR 2025

- **Happiest Countries:** Finland (8th consecutive year), followed by Denmark, Iceland, and Sweden.
- India's Ranking: 118th (2025), 126th in 2024.

- South Asian Nations Ranking: Nepal (92nd), Pakistan (109th), Myanmar (126th), Sri Lanka (133th), Bangladesh (134th).

- **Bottom Countries:** Afghanistan (147th) (4th consecutive year). Others include Sierra Leone (146th), Lebanon (145th), Malawi (144th), and Zimbabwe (143rd)

About Methodology of WHR

- The rankings are based on a 3-year average of people's life evaluations in which respondents rate their current life on a ladder scale from 0 to 10.
- The happiness score is determined by 6 key indicators: GDP per capita, social support, healthy life expectancy, freedom, generosity, and perceptions of corruption.
- **Determinants of Happiness:** Trust, social connections, shared meals, and communal kindness play a crucial role in happiness, often outweighing wealth.

World Happiness Day

- **Origin & Initiative:** Initiated by Bhutan, which has prioritized Gross National Happiness (GNH) over GDP since the 1970s.
- **UN Recognition:** Adopted by the UN General Assembly in July 2012, designating 20th March as the World Happiness Day.
- Theme 2025: "Caring and Sharing"

Swadesh Darshan Scheme

Why in News?

- The Central Government, in collaboration with States, has approved 116 new tourist destinations for development under schemes like Swadesh Darshan 2.0 (SD2.0), Challenge Based Destination Development (CBDD), and Special Assistance to States for Capital Investment (SASCI)

Special Assistance to States for Capital Investment (SASCI) Scheme

- SASCI scheme, launched in 2020-21 amid the Covid-19 pandemic, aims to support state governments in capital investment projects, boosting capital expenditure and enhancing economic productivity.

What is the Swadesh Darshan Scheme (SDS)?

- **Swadesh Darshan Scheme:** It is a 100% centrally funded (Central Sector Scheme) launched by the Ministry of Tourism in 2015 to develop sustainable and responsible tourism in India.
  - It aims at the integrated development of theme-based tourist circuits across India such as Buddhist, Coastal, Desert, Eco, Heritage, Northeast etc.
  - It provides financial assistance to State Governments, UT Administrations, and Central Agencies for tourism infrastructure development.
  - Operation & Maintenance (O&M) of sanctioned projects is the responsibility of respective State/ UT governments.

- **Swadesh Darshan 2.0 (SD2.0):** SD2.0 adopts a holistic approach for development of sustainable and responsible tourism destinations, aligning with the 'Vocal for Local' and Aatmanirbhar Bharat vision,
    - It aims to increase private sector investment in tourism, hospitality and asset management marking a shift from circuit-based tourism to a destinationcentric model for long-term growth.
- **Challenge-Based Destination Development (CBDD):** CBDD is a sub-scheme under SD2.0 that adopts a competitive approach to develop tourism destinations with a focus on sustainability, digitalization, skill development, MSME support, and effective management.

Inflation

CPI for Agricultural and Rural Labourers

Context

- The Labour Bureau, Ministry of Labour & Employment has released the All-India Consumer Price Index for Agricultural Labourers (CPI-AL) and Rural Labourers (CPI-RL).
    - The CPI-AL and CPI-RL series is presently compiled monthly for 20 states and at the All-India level.

CPI (AL and RL)

- It recorded inflation rates of 4.61% and 4.73% in January 2025 respectively, marking a notable decline, indicating reduced price pressures on essential goods and services in rural India.
    - CPI-AL: It measures changes in cost-of-living for rural agricultural labourers and is used to adjust minimum wages for agricultural workers across different states.
    - CPI(AL) is a subset of CPI(RL).
    - CPI-RL: It measures the changes in the cost of living for rural labourers.

CPI

- The base year for both CPI-AL and CPI-RL is 1986-87.
- The base year is a reference point for comparing statistical changes over time. E.g., GDP, inflation etc.
- CPI: A measure of change in retail prices of goods and services which are consumed by defined population group in a given area with reference to a base year.
- The dearness allowance of Government employees and wage contracts between labour and employer is based on this index.
- The formula for calculating Consumer Price Index is Laspeyre's index.

Context

6 Groups of Items

Food & beverages

- Pan, tobacco & intoxicants
- Clothing & footwear
- Housing
- Fuel & light
- Miscellaneous

Group Code	Sub-group Code	Description	Rural			Urban			Combined		
			Weights	Jan. 25 Index (Final)	Feb. 25 Index (Prov.)	Weights	Jan. 25 Index (Final)	Feb. 25 Index (Prov.)	Weights	Jan. 25 Index (Final)	Feb. 25 Index (Prov.)
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
	1.1.01	Cereals and products	12.35	199.8	200.6	6.59	197.5	198.6	9.67	199.1	200.0
	1.1.02	Meat and fish	4.38	220.9	219.2	2.73	230.8	228.9	3.61	224.4	222.6
	1.1.03	Egg	0.49	206.0	194.8	0.36	210.8	200.0	0.43	207.9	196.8
	1.1.04	Milk and products	7.72	187.7	187.6	5.33	188.2	188.4	6.61	187.9	187.9
	1.1.05	Oils and fats	4.21	189.0	188.9	2.81	175.6	176.0	3.56	184.1	184.2
	1.1.06	Fruits	2.88	192.0	195.0	2.90	193.8	198.8	2.89	192.8	196.8
	1.1.07	Vegetables	7.46	203.5	181.3	4.41	245.6	217.0	6.04	217.8	193.4
	1.1.08	Pulses and products	2.95	207.7	200.2	1.73	213.0	205.2	2.38	209.5	201.9
	1.1.09	Sugar and Confectionery	1.70	129.6	131.4	0.97	132.4	133.8	1.36	130.5	132.2
	1.1.10	Spices	3.11	227.2	224.9	1.79	222.9	222.0	2.50	225.8	223.9
	1.2.11	Non-alcoholic beverages	1.37	187.7	188.3	1.13	176.6	177.2	1.26	183.1	183.7
	1.1.12	Prepared meals, snacks, sweets etc.	5.56	201.7	202.4	5.54	212.9	213.9	5.55	206.9	207.7
1		**Food and beverages**	54.18	198.8	195.4	36.29	204.6	201.3	45.86	200.9	197.6
2		**Pan, tobacco and intoxicants**	3.26	208.3	209.0	1.36	212.6	213.2	2.38	209.4	210.1
	3.1.01	Clothing	6.32	200.6	200.7	4.72	190.3	190.8	5.58	196.5	196.8
	3.1.02	Footwear	1.04	193.9	194.1	0.85	176.0	176.2	0.95	186.5	186.7
3		**Clothing and footwear**	7.36	199.7	199.8	5.57	188.1	188.6	6.53	195.1	195.4
4		**Housing**	-	-	-	21.67	182.6	183.7	10.07	182.6	183.7
5		**Fuel and light**	7.94	182.8	182.8	5.58	170.6	171.0	6.84	178.2	178.3
	6.1.01	Household goods and services	3.75	187.3	187.7	3.87	178.8	179.2	3.80	183.3	183.7
	6.1.02	Health	6.83	200.8	201.6	4.81	195.4	196.2	5.89	198.8	199.6
	6.1.03	Transport and communication	7.60	177.3	177.7	9.73	166.1	166.5	8.59	171.4	171.8
	6.1.04	Recreation and amusement	1.37	181.6	182.0	2.04	177.1	177.3	1.68	179.1	179.4
	6.1.05	Education	3.46	192.5	192.6	5.62	188.0	188.2	4.46	189.9	190.0
	6.1.06	Personal care and effects	4.25	208.4	214.1	3.47	210.3	216.3	3.89	209.2	215.0
6		**Miscellaneous**	27.26	191.5	192.8	29.53	182.7	183.7	28.32	187.2	188.4
General Index (All Groups)			100.00	195.9	194.5	100.00	190.6	190.1	100.00	193.4	192.5
Consumer Food Price Index (CFPI)			47.25	198.8	194.8	29.62	204.1	199.9	39.06	200.6	196.6

Who Computes CPI

- **Labour Bureau (Occupation specific & Place Specific):**
  - CPI (IW) + CPI (AL & RL)
- **National Statistical Organisation –**
  - CPI(Urban) and CPI(Rural)

World Consumer Rights Day 2025

Why in News?

- The Ministry of Consumer Affairs, Food and Public Distribution celebrated the World Consumer Rights Day with the theme "A Just Transition to Sustainable Lifestyles."

- India celebrates **24th December as National Consumer Day every year**, and the Consumer Protection Act, 2019 provides comprehensive legislation to strengthen consumer rights.

World Consumer Rights Day

- Instituted on 15th March 1983, the day (15th March) commemorates **President John F. Kennedy's** 1962 address to the US Congress, where he became the first global leader to formally recognize consumer rights.

What is the Consumer Protection Act, 2019?

About: It is a comprehensive legislation that replaced the Consumer Protection Act, 1986.

- It aims to strengthen consumer rights in India, addressing challenges from globalization, technology, and e-commerce.

Key Features:

- **Central Consumer Protection Authority (CCPA):** CCPA has been established to regulate matters related to unfair trade practices, misleading advertisements, and violations of consumer rights.
- **Consumer Rights:** The Act reinforces 6 consumer rights, including the right to be informed, the right to choose, and the right to seek redressal.
- **E-Commerce Regulation:** Brings e-commerce platforms under its purview, making them accountable for consumer grievances.
- **Product Liability:** Manufacturers, service providers, and sellers are held liable for defective products or services.
- **Simplified Dispute Resolution**: Provides for mediation, reducing the burden on consumer courts.
- **Enhanced Penalties**: Imposes strict penalties for false or misleading advertisements and unfair trade practices.
- **Fast Resolution:** According to Section 38(7) of the Act, consumer complaints should be resolved within 3 to 5 months, depending on the complexity of the case.

What are the Key Initiatives to Strengthen Consumer Grievance Redressal Mechanisms?

- **E-Dakhil Portal and e-Jagriti:** The E-Dakhil Portal (launched in 2020) enables consumers to file complaints online.
  - E-Jagriti (introduced in 2024) strengthens case tracking and management, using digital interventions for a more streamlined consumer grievance redressal process.
- **National Consumer Helpline (NCH) 2.0:** NCH 2.0 integrates AI-powered speech recognition, multilingual chatbots, and partnerships with 1,000+ companies to expedite grievance redressal. It supports 17 languages and is accessible via WhatsApp, SMS, Umang app, and other platforms for wider consumer outreach.
- **Jaago Grahak Jaago:** It is a part of the consumer awareness campaign which alerts users about fraudulent URLs, empowering them to make informed e-commerce decisions.

Challenges

- **Awareness**: Low consumer awareness about rights and redressal mechanisms.
- **Enforcement**: Consumer courts face delays in case resolution, and product liability provisions are inconsistently enforced, weakening consumer protection.
- **Digital Marketplace Issues:** Challenges related to e-commerce, data privacy, and online fraud.
- **Resource Constraints:** Limited resources allocated to consumer protection agencies.

Conclusion

- Need for a transparent and fair consumer ecosystem. While India is advancing through policy reforms and digital initiatives, challenges like delayed justice, digital fraud, and regulatory gaps persist.
- Strengthening institutions, enhancing awareness, and leveraging technology are key to ensuring consumer empowerment and economic fairness.

Environment

Environmental Pollution

World Air Quality Report 2024

- Context - Recently the *World Air Quality Report 2024* released by Swiss air quality technology firm IQAir.

Key Highlights

- Only 17% of global cities meet WHO air pollution guideline.
- Seven countries met the WHO annual average PM2.5 guideline of 5 µg/m3: Australia, Bahamas, Barbados, Estonia, Grenada, Iceland, and New Zealand.
- The five most polluted countries in 2024 were:
- Chad (91.8 µg/m3), Bangladesh (78.0 µg/m3),Pakistan (73.7 µg/m3), Democratic Republic of the Congo (58.2 µg/m3),India (50.6 µg/m3).

India

- India has been ranked as the fifth most polluted country in 2024, a slight improvement from its third-place position in 2023.
- Delhi continues to hold the title of the most polluted capital city globally.
- The 13 Indian cities featured in the global top 20 most polluted list include Byrnihat, Delhi, Mullanpur (Punjab), Faridabad, Loni, New Delhi, Gurugram, Ganganagar, Greater Noida, Bhiwadi, Muzaffarnagar, Hanumangarh, and Noida.

PM2.5

- Refers to fine particulate matter smaller than 2.5 microns, which can penetrate the lungs and bloodstream, leading to respiratory issues, cardiovascular diseases and even cancer.
- Major sources of PM2.5 include vehicle emissions, industrial pollution, and the burning of wood or agricultural waste.
- **PM2.5** is **more dangerous** than PM10 due to its **ability to reach the alveoli** in lungs and even the bloodstream.

IQAir

- It is a **Swiss-based air quality technology company** that specializes in **real-time air pollution monitoring**, air purifiers, and environmental data analytics.
- It operates a global **air quality monitoring platform** used by governments, researchers, and the public.

Way Forward

- While India has made strides in air quality monitoring, concrete action remains insufficient.
- Some solutions are straightforward, such as replacing biomass with LPG.
- India already has a scheme for this, but we must further subsidise additional cylinders.
- The first cylinder is free, but the poorest families, especially women, should receive higher subsidies.
- This would not only improve their health but also reduce outdoor air pollution.
- In urban areas, expanding public transport and imposing fines on high-emission vehicles could help mitigate pollution.
- A combination of incentives and penalties is essential.
- Industries and construction sites must comply with laws and install equipment to reduce emissions, rather than cutting corners.

Biodiversity

National Board for Wildlife (NBWL)

- **Context** - Recently Prime Minister chaired his first meeting of the National Board for Wildlife (NBWL) at the Gir National Park .
- This was the seventh meeting of the NBWL, the apex body on wildlife conservation and development. The last full-body NBWL meeting, with its 47 members including Chief of Army Staff, was held on September 5, 2012.

Announcements

- Starting the Asiatic Lion population estimation exercise in May, setting up a centre for effective management of human-wildlife conflict, and new conservation initiatives for gharials and Great Indian Bustards.
- Initiation of a new project on gharials for conservation.
- **Under Project Lion**, the government aims to increase the range of Asiatic Lions throughout the Saurashtra region. Population estimation of Asiatic Lions is carried out once every five years. The last such exercise was carried out in 2020.
- **Under Project Cheetah**, the wildlife board decided to expand introduction of cheetahs to Gandhisagar Sanctuary in Madhya Pradesh and Banni Grasslands in Gujarat.
- Establishment of a centre of excellence for effective management of human-wildlife conflict.
- The centre will be located at the **Wildlife Institute of India campus at Salim Ali Centre** for Ornithology and Natural History in Coimbatore.
- Laid the foundation stone of the **National Referral Centre for Wildlife at Junagadh**, which will function as the hub for coordination and governance of various aspects related to wildlife health and disease management.

National Board for Wildlife (NBWL)

- The National Board for Wildlife came into existence with the Gazette Notification dated 22nd September 2003.
- The National Board for Wildlife (NBWL) is a statutory body in India constituted under the Wildlife (Protection) Act, 1972
- It replaced the Indian Board for Wildlife, which was formed in 1952.

Composition:

- Chairperson: The PM is the ex-officio chairman of the **47-member** committee of NBWL.
- Vice Chairperson: Minister of Environment, Forests and Climate Change (MoEFCC)
- Standing committee - An independent body under NBWL. It is the standing committee of the NBWL, chaired by the Union Environment Minister, which has largely steered crucial decisions on wildlife policy and diversion of land in and around parks and sanctuaries.

Role

- Acts as the apex body for wildlife conservation and protection of habitats.
- Advises the Central Government on framing policies and measures for wildlife conservation.
- Approves projects that are located within or near protected areas (like national parks, wildlife sanctuaries).
- WLPA mandates that activities such as constructing tourist lodges, altering the boundaries of Protected Areas (PAs), destroying or diverting wildlife habitats, or de-notifying Tiger Reserves cannot be undertaken without the prior approval or recommendation of the National Board for Wildlife (NBWL).

Giloy

- **Context** - New Studies Reveal Promising Role of Giloy in Immunity & Clinical Research

Giloy

- *Tinospora cordifolia*, commonly known as Guduchi or Giloy, familiar as Amrita in Sanskrit, which translates to the 'herb of immortality', because of its abundant beneficial properties
- It has been used in therapeutics for a long time in Ayush systems
- The increasing number of clinical studies and laboratory research suggests that Giloy may have a significant role in cancer therapy, autoimmune disease management, and even inflammatory disorders.
- Recent research highlights its bioactive compounds and therapeutic benefits, including immune-boosting and anti-inflammatory properties.
- This growing interest positions Giloy as a promising candidate for future clinical applications in various medical fields."
- Researchers have identified four major classes of compounds in giloy : terpenoids, alkaloids , lignans, steroids
- Terpenoids are one of the largest classes of active compounds found in plants.

- They often contribute to plants' fragrance, taste, and color.
- Lab tests on terpenoid compounds show they have antimicrobial, antiviral, anticancer, and antidiabetic properties
- Alkaloids are compounds that give some plants their bitter taste.
- Plant alkaloids are used as a model to make many types of prescription medicines.
- Lignans are compounds found mostly in fibrous plants.
- They're known to prevent the growth of viruses, fungi, and other microbes
- Steroid compounds in plants may also have potential benefits for skin health, wound healing, cardiovascular health

Narwhals

- **Context** - Scientists have studied and captured footage of the iconic narwhals of the Arctic using their tusks to hunt.
- They also assessed how the toothed whales are living in a warming, changing Arctic.

Narwhals

- The narwhal (*Monodon monoceros*) lives in remote Arctic waters.
- Males are known for their long, spiral tusks, which is really an elongated tooth.
- It is believed that the tusk plays a role in competition for mates, including mating displays.
- It may have inspired myths such as the unicorn.
- But other uses of the tusk are not clear since few people have observed these elusive animals in the wild.
- Scientists found that narwhals used their tusks in the wild to investigate, manipulate and influence the behavior of Arctic char (*Salvelinus alpinus*), including delivering sufficient force with their tusks to stun and possibly kill the fish.

- The narwhals exhibited remarkable dexterity, precision and speed of movement of the tusk, and regularly made adjustments to track the moving target.
- The tusk, especially the tip of the tusk, was used to interrogate and manipulate the target by brief contacts, which typically elicited a response from the fish
- There was also a documentation of interactions between narwhal, fish and birds, including attempted kleptoparasitism, a "food thief" situation, among narwhals and glaucous gulls (*Larus hyperboreus*).

- Narwhals are known for their 'tusking' behavior, where two or more of them simultaneously raise their tusks almost vertically out of the water, crossing them in what may be a ritualistic behavior to assess a potential opponent's qualities or to display those qualities to potential mates
- **IUCN Status:** Least Concern

Uniyala keralensis

- Context - Researchers have named the new species, which is endemic to southwest India, *Uniyala keralensis* (family *Asteraceae*) after the State of Kerala.

Uniyala keralensis

- The specimen of this plant was first collected by researchers 27 years ago. Back then, the shrub was thought to be *Vernonia multibracteata.*
- Some years ago, the genus *Uniyala* was separated from *Vernonia* and classified as a new genus.
- A dense shrub with light purple flowers found in the Agasthyamala Biosphere Reserve in Kerala's Thiruvananthapuram district has been confirmed as a distinct species of the genus *Uniyala.*
- Physically, *Uniyala keralensis* is a "small to large shrub," growing up to one to three metres in height and sporting attractive light purple florets
- The new species is found in open areas of the western mountain slopes of the Agasthyamala Biosphere Reserve (ABR) at elevations ranging between 700 to 1,400 metres.
- The present population consists of nearly 5,000 individuals of various ages in four subpopulations occupying an area of 250 km2. Following the IUCN Red List Criteria (IUCN 2024), *Uniyala keralensis* is assessed as Data Deficient (DD)

Agasthyamala Biosphere Reserve

- It is located in the southern part of the Western Ghats in India, is a mesmerizing natural paradise. This pristine and enchanting reserve boasts a diverse array of flora and fauna, including some of the rarest species in the world.
- The name Agasthaymala, came from the great Hindu Sage Agasthya muni, whose statue is situated at the top of the peak and the sage, among Hindu Religion, is considered to be an perfect bachelor (brahmachari).

- It is now a popular pilgrim site, the air itself is said to have medicinal qualities.
- Agasthyamala is a natural habitat of rare medicinal herbs and place was added to UNESCO's list of 'World Network of Biosphere Reserves' in march 2016.
- Agasthyamala is a 1,868 meter tall peak within Neyyar Wildlife Sanctuary in the Western Ghats of South India.Agasthyamala lies inside Kerala near the border with Tamil Nadu.
- It encompasses the following wildlife sanctuaries: Shendurney Wildlife Sanctuary, Peppara Wildlife Sanctuary, Neyyar Wildlife Sanctuary, and Kalakkad Mundanthurai Tiger Reserve.
- ABR includes the Indian Ecoregions of tropical wet evergreen forests, South Western Ghats moist deciduous forests, South Western Ghats montane rain forests and Shola.
- It is the habitat for 2,000 varieties of medicinal plants, of which at least 50 are rare and endangered species.
- Animals include the Bengal tiger, Asian elephant, and Nilgiri tahr.
- Agastyamalai is also home to the Kanikaran, one of the oldest surviving ancient tribes in the world.

Killfish

- Context - A team of international scientists have discovered and described a new type of 'killifish' that is endemic to a Kenyan forest.
- But it is already critically endangered and may become extinct soon.

Killifish

- Killifish are oviparous or egg-laying fish that are mainly found in the fresh or brackish waters of the Americas, southern Europe, much of Africa, the Middle East and Asia.
- There are around 1,270 species of killifish.
- The fish was discovered in the ephemeral swamps of the Gongoni Forest in south-eastern coastal Kenya by the team of scientists who conducted expeditions in 2017 and 2018.

Ramadevara Betta Vulture Sanctuary

- **Context** - The recent sighting of the endangered Indian Long-Billed Vulture at the Ramadevara Betta Vulture Sanctuary underscores the success of protected area-based conservation strategies in reviving threatened species

Ramadevara Betta Vulture Sanctuary

- Nestled amidst the picturesque landscape of Ramanagara, Karnataka, Ramadevara Betta stands as a prominent hill that holds not only natural beauty but also a rich historical and spiritual significance.

- It served as a strategic vantage point for various rulers, including the mighty Vijayanagara Empire and the legendary chieftain Kempegowda.
- The hill is dotted with ancient temples dedicated to Lord Rama and Lakshmana, contributing to its name "Ramadevara Betta."
- Ramadevara Betta Hill is the only Vulture Sanctuary in India.
- The vulture sanctuary was officially set up in 2012, but the long-billed, Egyptian and white-backed vultures have been roosting in the hills of Ramanagara for several decades.
- These are the three species found in Ramanagara out of the nine found in India.

Indian Long-billed Vulture (*Gyps indicus*)

- A light brown, medium-sized vulture.
- It has whitish feathers on a dark head and neck, a pale bill, and a pale collar which is more prominent behind the neck.
- The juvenile has a dark bill, more white feathering on the head and neck, and browner plumage overall, with pale streaks on breast and belly.
- IUCN Status - Critically endangered

Madhav National Park

- Sakhya Sagar and Madhav Sagar are the two lakes in the southern part of the park, providing the aquatic biodiversity and lifeline for the terrestrial species.
- These lakes not only add to the natural beauty of the area, but also provide a permanent source of water to the wildlife, and a fine wetland habitat to the aquatic fauna including thousands of migratory waterfowls.
- Marsh Crocodiles are in abundance in Sakhya Sagar lake.
- Due to this, the lake looks like a "Crocodile Safari" and attracts special attention of tourists.
- Madikhera dam is situated in the North Western part of the Park.

Ecosystems & Ecology

Seagrass conservation

- **Context** - Recent studies shows that seagrass is declining worldwide due to human activities.

Key Highlights

- Seagrass has been declining at a rate of 1-2 per cent per year for the past century and nearly 5 per cent of species are now endangered.
- Safeguarding 30 per cent of seagrass by 2030 could protect over 750 fish species, store millions of tons of carbon and sustain coastal communities.

Seagrass

- Despite its name, seagrass isn't actually a true grass — in fact, seagrasses' closest terrestrial relatives are lilies and orchids.
- Most species of seagrass superficially resemble terrestrial grasses, in that they sometimes have long, narrow leaves and grow in meadows.

- However, seagrasses can have several different leaf shapes — including oval, fern and ribbon — and lengths that can range from the size of your fingernail to as long as 7 meters.
- The world's 72 species of seagrass are the only flowering plants, or "angiosperms," that can live underwater.
- Like other angiosperms, they produce flowers, seeds and pollen, with crabs and shrimp playing the role of the pollinators, as bees and other insects do on land.

Significance

- Seagrass meadows are one of the most important but least appreciated ecosystems on Earth.
- They are better than trees for capturing carbon and providing food for millions of people.
- These underwater plants can store carbon up to 35 times faster than tropical rainforests, locking it away for thousands of years.
- Yet, their importance is not recognised by more popular conservation narratives like blue carbon initiatives.
- Additionally, they protect marine life and coastlines.
- Seagrasses grow in shallow coastal waters and serve as nurseries for fish, turtles and dugongs.
- They provide shelter for 121 threatened marine species and nearly 750 fish species, contributing to over 20 per cent of global fishery landings.
- Beyond supporting marine life, seagrass also acts as a natural barrier, protecting coastal communities from storms and erosion.

Threats

- Pollution from cities, industries, and agriculture continues to degrade these meadows, while coastal development and tourism put additional pressure on fragile habitats.
- The shallow coastal areas that seagrasses typically occupy are often the same places that attract industrial and recreational activities.
- Water pollution, coastal development and unregulated land management are all culprits.
- Some impacts are incidental, like physical damage from fishing vessels.
- Others are deliberate, such as reclamation of areas for coastal development or removal of seagrasses to create clear, sandy lagoons and beaches that appeal to tourists.
- In addition, seagrasses are increasingly threatened by climate change.
- Higher water temperatures can cause physiological stress and death, while rising seas can limit the sunlight that seagrasses need to grow.

Efforts to conserve seagrass

- Some countries have successfully restored seagrass by improving water quality, establishing marine protected areas, and launching conservation projects.

- Currently, 23.9 per cent of known seagrass areas are in marine protected zones, and nearly 2,000 restoration projects have been initiated worldwide
- For example, in Virginia in the United States, a large-scale project has successfully restored approximately 1,700 hectares of Zostera marina, leading to the recovery of associated invertebrate populations.
- In India, notable restoration initiatives have been undertaken.
- Between 2011 and 2020, researchers restored 14 acres of degraded seagrass areas in the Gulf of Mannar and Palk Bay, achieving a success rate of 85-90 per cent.
- Additionally, the Organization for Marine Conservation, Awareness and Research has been actively involved in community-based
  seagrass restoration projects in Palk Bay, employing eco-friendly methods such as bamboo frames and coconut rope to transplant seagrass sprigs.

India

- India possesses a coastline that has been recalculated to span approximately 11,098 kilometers as of 2023-24, reflecting a 48 per cent increase from previous measurements.
- Despite this extensive coastline, it accounts for less than 0.25 per cent the world's total coastline.
- However, about 10 per cent of the world's coastal population resides along India's shores, underscoring the critical importance of these areas.
- India too has vast seagrass meadows, home to 16 species of seagrass with major concentrations in the Gulf of Mannar, Palk Bay, Andaman and Nicobar Islands, Lakshadweep Islands and the Gulf of Kutch.
- A 2022 study estimated that India's seagrass covers 516.59 square kilometres, with the ability to absorb 434.9 tonnes of carbon dioxide per sq km per year.
- This makes seagrass a powerful but underappreciated tool in climate action.

Seagrass Vs Seaweed

- Seagrass is oftentimes confused with seaweed, but there are many important differences between the two.
- Evolutionarily, seaweed is a relatively primitive group of marine photosynthetic organisms, whereas seagrasses are flowering plants that evolved from life in the ocean, to the land, and back to the sea about 100 million years ago.
- This land-to-sea evolution is what makes seagrasses the only true plants found in the ocean.
- Seagrass and seaweed also differ in the way they look, reproduce, and transport and exchange nutrients with their surrounding environment.
- There are around 72 species of seagrass, compared to 5,000-6,000 species of seaweed.

Conclusion

- Seagrass protection must become a national priority. It should be integrated into broader marine conservation policies with strict enforcement. Scientists, conservationists, policymakers and local communities must work together to safeguard these ecosystems for the future.

Climate Change

Carbon intensity

- **Context -** As countries move toward net-zero emissions, the concept of **Carbon Intensity** is gaining prominence in assessing progress toward sustainable development.

Carbon intensity

- Carbon intensity is a useful way to measure how much carbon a particular sector is emitting and how it has increased or decreased over time.
- Usually, sectors have their own ways to measure their progress.
- The steel sector may focus on the number of tonnes produced annually; the medical insurance sector may focus on the number of claims successfully fulfilled; and HR services may focus on how many hours of unproductive work they may have done away with.
- The government of a country may also measure its own development by tracking, say, the GDP per capita.
- In a world that is warming rapidly and desperately needs to reduce its greenhouse gas emissions, carbon intensity adjusts those existing metrics to include the amount of carbon dioxide produced.
- For example, the carbon intensity of the steel sector can be measured as the number of tonnes produced per tonne of carbon dioxide emitted.
- An entire country's carbon intensity can be understood by dividing the growth in GDP per capita by the amount of carbon dioxide emitted. And so on.

The relationship between absolute emissions and carbon intensity can be expressed as:

- **Carbon intensity = Total Carbon Emissions/Activity Level**
- This also means: **Total Emissions = Carbon Intensity x Activity Level**

Loss and Damage Fund

- **Context -**The US has withdrawn from the board of the recently-created Loss and Damage Fund.

- The US, in fact, is one of the very few countries to have already transferred its committed amount to the Fund. It happened before the Trump administration took charge in January this year. The fate of the transferred money was not immediately clear.

The Loss and Damage Fund

- It was created at the COP27 climate meeting in Egypt in 2022 after several years of protracted negotiations.
- Developing countries, particularly small island states that face the greatest threats from climate impacts, had been demanding financial assistance in case of climate-related disasters, arguing that they were having to suffer due to a problem created by rich and developed countries.
- About $750 million has so far been promised for the fund, of which the US has contributed $17.5 million.
- It is managed by a Governing Board, with the World Bank as its interim trustee.

Mycelium bricks

- **Context** - In light of climate change and the push for sustainable development, the construction industry is actively exploring methods to reduce its carbon footprint, particularly through alternatives to conventional materials like fired clay bricks.

Problem with Traditional Fired Clay Bricks

- Fired clay bricks have been a staple of construction for centuries due to their durability, strength, and availability.
- The manufacturing of fired clay bricks involves high-temperature kilns (about 1000°C) for prolonged periods.
- Fuel sources typically include coal, wood, agricultural waste, and diesel—all of which contribute to greenhouse gas (GHG) emissions.
- Fired clay bricks have been the mainstay of the construction industry but their production also emits nearly 300 million tonnes of carbon dioxide every year, which could increase with more urbanisation.

Mycelium Bricks

- Mycelia are the branching filaments of fungi that make up its vegetative part.
- Researchers have them harnessed to create biodegradable, fire-resistant, and insulative bricks.
- They are made by combining husk, sawdust, and fungal spores to create a fibrous network that solidifies into a lightweight material.
- Within a few days, these materials become a hardier structure.

Advantages

- Mycelium bricks have the potential to reduce the building sector's carbon footprint.
- They are relatively more lightweight and good insulators of heat.
- Aside from potential use as panelling material in interior designs, researchers believe mycelium-based components can be used in liquid filters, sports equipment, and printed circuit boards.

Challenges

- But before they can find wider use, mycelium materials need to improve in many ways.
- At present they can't bear heavier loads for longer periods.
- While mycelium composites have a high strength to weight ratio, it is two orders of magnitude lower than concrete.
- They are also susceptible to moisture, biodegrade in a few years, and can't be produced *en masse*.
- The cost of growing and treating fungi for construction purposes is currently higher due to lack of infrastructure
- Mycelium-based materials are not as strong as conventional materials like concrete or brick or steel.
- Due to mycelium being highly absorbent, it … vulnerable to moisture and fungal decay in India's climate
- While mycelium is naturally fire-resistant, prolonged exposure to heat could cause structural failure.
- Mycelium composites also absorb more moisture than synthetic foams and plywood, which is inimical for damp environments with leaking walls or roofs.
- They also don't resist termites.

Way Forward

- But these are problems to be solved rather than reasons to discard mycelium bricks.
- For example, Mycelium can be treated with non-toxic flame retardants that can enhance fire resistance, followed by a UV-protective coating that can prevent photo-degradation in outdoor applications.
- The biggest challenge is consumers' attitude, which will require more investment in research and development, to make mycelium bricks more competitive with clay bricks, and awareness campaigns to shift.
- The advent of concepts like high-performance buildings, interest is already growing in alternative and sustainable materials.
- This shift along with policy pushes can drive demand for sustainable alternatives and help in growing the market for mycelium

State of the Global Climate report

- **Context** - Recently World Meteorological Organisation released State of the Global Climate report

Key Highlights

- Long-term global warming is currently estimated to be between 1.34 and 1.41 degrees Celsius compared to pre-industrial levels.
- The concentration of atmospheric carbon-di-oxide recorded in 2023 was 420 parts per million (ppm), taking it to the highest levels in 8 lakh years
- Methane concentration reached 934ppb and nitrous oxide touched 336.9ppb.

- Anthropogenic activities alone have pushed upto 79 per cent increase in CO2 concentration over the past decade.
- During 2014 0 2023, nearly 48 per cent of the total emissions from anthropogenic activities remain trapped within the atmosphere, driving up the atmospheric concentration.
- Ocean carbon sink and the land carbon sink accounted for 26 per cent and 30 per cent, respectively.
- In 2024, the average global near-surface temperatures were 1.55 degrees Celsius above normal in 175 years.

World Meteorological Organisation

- WMO is the United Nations system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces and the resulting distribution of water resources.
- The Secretariat, headquartered in Geneva, is headed by the Secretary-General.
- The Organization plays a leading role in international efforts to monitor and protect the climate and the environment.
- In collaboration with other UN agencies and NMHSs, WMO supports the implementation of UNFCCC and a number of environmental conventions and is instrumental in providing advice and assessments to governments on related matters.

Carbon credit trading scheme (CCTS)

Context -The government proposes to implement its own version of a carbon credit trading scheme (CCTS) around mid-2026.

- Amending the Energy Conservation Act, 2021, made the setting up of a carbon market possible, and the scheme was notified in June 2023.
- It will replace Perform, Achieve, and Trade (PAT) scheme under the BEE.

Perform, Achieve, and Trade (PAT) scheme

- As of now, we have the Perform, Achieve, and Trade (PAT) scheme under the BEE.
- It has been in operation since 2012.
- The trading is of energy saving certificates (ESCerts), given to over-achievers and which under-achievers need to purchase, thus determining a market price.

Carbon credit trading scheme (CCTS)

- PAT will now be replaced by the CCTS, an emissions trading scheme (ETS), and there will be a shift in the metric that would be monitored — from per tonne of oil equivalent to per tonne of greenhouse gas (GHG) equivalent.
- The scheme will be implemented in stages, and it seems that to begin with it would cover a part of the industrial sector consisting of iron and steel, aluminium, chlor-alkali, cement, fertilisers, pulp and paper, petroleum, refineries, and textiles.

- The obligated entities shall comply with the prescribed GHG emission intensity targets in each compliance year.
- The obligated entities who reduce their GHG emission intensity below the target GHG emission intensity shall be eligible for issuance of Carbon Credit Certificates and the entities who are not able to achieve the target will be required to surrender/purchase equivalent number of certificates based on shortfall.
- Offset Mechanism - A voluntary project-based baseline and credit mechanism for the non-obligated entities where the non-obligated entities can register their projects for GHG emission reduction, removal, or avoidance against the baseline for the issuance of Carbon Credit Certificates (CCC).
- The non-obligated entities can register their projects for GHG emission reduction or removal or avoidance for issuance of carbon credit certificates upon fulfilment of the eligibility requirements as per detailed procedure published by Bureau of Energy Efficiency based on recommendations of NSCICM.
- According to the latest biennial update report for India (2024) submitted to the United Nations Framework Convention on Climate Change, these sectors together account for about 16% of India's GHG emissions.
- The power sector, which has a share of about 40% in India's GHG emission, will perhaps be added later.
- The CCTS is not aiming to reduce the absolute carbon emissions but to decrease the emissions intensity, i.e. emissions per unit of good produced.
- This is understandable since in India, being a developing economy, per capita consumption of several products is much below the world average.
- This will inevitably grow over time, leading to more absolute emissions.
- A number of organisations will be involved in implementing the CCTS, such as the Bureau of Energy Efficiency (BEE), the ministry of environment, forest and climate change, the Grid Controller of India, the Central Electricity Regulatory Commission, and electricity exchanges.
- There will also be a national steering committee to oversee the entire functioning of the CCTS.
- The **Bureau of Energy Efficiency (BEE)** will be the administrator for the Indian Carbon Market (ICM) and will be responsible for the development of the GHG emissions trajectory and the targets for the entities to be obligated under the notification.
- The **Grid Controller of India Limited** will be the designated agency for the maintenance of the ICM Registry and will register the obligated entities and maintain the record of the transactions among the obligated entities, among other functions.

- The **Central Electricity Regulatory Commission (CERC)** will be the regulator for the trading of carbon credit certificates. They will safeguard the interests of the buyers and the sellers, decide on the frequency of trading, and take action to prevent fraud or mistrust. The CERC will register the power exchanges to trade the carbon credit certificates and decide on and notify the rules of trading periodically.

Way Forward

While designing a carbon market, several issues must be kept in mind.

- **The first** is that the targets for reduction of emissions intensity must be ambitious. It should not be a case of excess supply of carbon credits leading to a very low carbon price. The PAT scheme has had a history of lenient targets, leading to ESCerts being traded at floor levels. Of course, the targets cannot be overambitious, as they will cause a high carbon price leading to an inflationary trend. So, a fine balance must be pursued, which is not easy to decide a priori.
- **Second**, there has been a delay in issuing ESCerts, and certificates for PAT IV onwards are yet to be issued, the target date being December 2021.
- **Third**, for the market to be effective, compliance must be ensured. Designated consumers (DCs) who fail to achieve targets necessarily must buy carbon certificates. In the case of PAT, more than 50% of the ESCerts which ought to have been purchased have not yet been, and unfortunately no penalty has been levied.
- **Fourth,** the scheme should be transparent and actual performance of each DC should be in the public domain. Under PAT, while the target of each DC is notified only those implementing the scheme know the actual performance.
- **Fifth,** there is the issue of monitoring and verification. One is not sure of the figures that are being generated from the PAT scheme. Monitoring and verification have also been problematic in the erstwhile scheme of Clean Development Mechanism, with fears of double counting of carbon credits.

Microlightning and origin of life

- **Context** - Recently Stanford study shows that electrical charges in sprays of water can cause chemical reactions that form organic molecules from inorganic materials.

Key Highlights

- The study shows that water sprayed into a mixture of gases thought to be present in Earth's early atmosphere can lead to the formation of organic molecules with carbon-nitrogen bonds, including uracil, one of the components of DNA and RNA.

- It adds evidence – and a new angle – to the much-disputed Miller-Urey hypothesis, which argues that life on the planet started from a lightning strike
- That theory is based on a 1952 experiment showing that organic compounds could form with application of electricity to a mixture of water and inorganic gases.
- In the current study, the researchers found that water spray, which produces small electrical charges, could do that work all by itself, no added electricity necessary.

Miller-Urey experiment

- For a couple billion years after its formation, Earth is believed to have had a swirl of chemicals but almost no organic molecules with carbon-nitrogen bonds, which are essential for proteins, enzymes, nucleic acids, chlorophyll, and other compounds that make up living things today.
- How these biological components came about has long puzzled scientists, and the Miller-Urey experiment provided one possible explanation: that lightning striking into the ocean and interacting with early planet gases like methane, ammonia, and hydrogen could create these organic molecules.
- Critics of that theory have pointed out that lightning is too infrequent and the ocean too large and dispersed for this to be a realistic cause.

Microlightning generation

- Study found that larger droplets often carried positive charges, while smaller ones were negative.
- When the oppositely charged droplets came close to each other, sparks jumped between them calls this "microlightning," since the process is related to the way energy is built up and discharged as lightning in clouds.
- The researchers argue that it was not necessarily lightning strikes, but the tiny sparks made by crashing waves or waterfalls that jump-started life on this planet.

Ethics

Ethics and Human Interface

Assisted Dying: Ethics & Debate

Daniel Kahneman being awarded the Medal of Freedom by US President Barack Obama at the White House on Nov. 20, 2013. (Gabriella Demczuk/The New York Times)

Context:

- The debate on assisted dying has intensified after Nobel laureate psychologist Daniel Kahneman opted for assisted suicide in Switzerland (March 2024). His choice reignited global discussions on ethical implications regarding assisted dying.

Understanding Assisted Dying:

- Assisted dying involves aiding terminally ill patients in ending their lives to reduce suffering.
- Legal in select countries like Switzerland.
- Reasons include unbearable pain, loss of dignity, autonomy over life decisions.
- Raises ethical questions balancing individual choice against societal obligations.

India's Position on Assisted Dying:

- **Passive Euthanasia Legalized (2018):** Supreme Court permits passive euthanasia, recognized within a "living will."
- **Article 21 Connection:** Passive euthanasia linked to constitutional right to life and personal liberty.

Ethical Debate on Assisted Dying:

Arguments For:

- Advocates emphasize autonomy, dignity, and compassion for terminally ill patients.
- Ethical to allow individuals control over their end-of-life choices, particularly in severe, incurable conditions.
- Prevents unnecessary prolonged suffering when medical recovery is impossible.

Arguments Against:

- Critics argue from moral, religious, and ethical perspectives valuing life as inherently sacred.
- Ethical duty to preserve life, highlighting possibilities of recovery, even when slim.
- Risk of coercion by family or societal pressures influencing vulnerable patients.
- Concerns regarding weakening commitment and investment in palliative and hospice care services.

Broader Ethical Considerations:

- Balancing individual rights and societal values regarding life and death.
- Necessity of stringent legal safeguards to prevent misuse or exploitation.
- Ethical responsibility of healthcare professionals in guiding end-of-life decisions.

- Continuous assessment of the psychological state and genuine consent of individuals choosing assisted dying.

Conclusion:

- The debate on assisted dying continues to challenge ethical perspectives, emphasizing the complexity of balancing personal autonomy with broader social and moral responsibilities.

Lohia's New Socialism and Social Justice Politics

Ram Manohar Lohia offered his vision of 'new socialism' to address the twin evils of poverty and inequality.

Context

- 115th birth anniversary tribute to Ram Manohar Lohia by Prime Minister Narendra Modi.
- Discussion on Lohia's vision of new Socialism focusing on decentralization and social justice.

About Ram Manohar Lohia

- Born on March 23, 1910, significant figure in India's freedom movement.
- Actively participated in various movements, including protests against Portuguese rule in Goa and farmers' agitations.
- Known for openly challenging established authorities.

Key Aspects of Lohia's New Socialism

- Fusion of Marxist economic ideas with Gandhian ethical values.
- Aims to simultaneously tackle poverty and inequality.
- Emphasized democratic decentralization and local governance.
- Advocated for decentralizing power through the "Four-Pillar State" (Village, District, Province, and Centre) to prevent power concentration.
- Proposed small-scale industries to prevent economic disparity caused by large-scale industrialization.

Lohia's Six-Point Plan for New Socialism

- Achieve maximum possible equality.
- Establish global living standards.
- Formation of a world government.
- Employ civil disobedience as a democratic instrument.
- Promote decentralized governance.
- Advance technological innovations beneficial to the masses.

Lohia's Sapta Kranti (Seven Revolutions)

- To attain comprehensive social justice, Lohia called for:
- Gender equality.
- Elimination of racial discrimination.
- Abolition of caste-based inequalities.
- True national freedom without foreign influence.
- Economic equality through higher production and equitable distribution.
- Protection of individual privacy from state intrusion.

- Restrictions on armament to ensure global peace.

Lohia's Socialism vs. Nehru's Socialism

- **Decentralization vs. Centralization**: Lohia supported decentralized grassroots governance; Nehru advocated for centralized state planning.
- **Industrial Model**: Lohia preferred small-scale industry; Nehru promoted large-scale, planned industrialization.
- **Caste Issue**: Lohia saw immediate caste eradication as crucial; Nehru believed in gradual social transformation through economic growth.
- **Role of State**: Lohia was wary of state power limiting individual freedom; Nehru saw the state as a transformative tool for social change.
- Lohia's socialism was explicitly tailored for India's immediate social issues, whereas Nehru borrowed from Fabian gradualism aiming for long-term economic and social transformation.

Influence on Party Politics

- Lohia's ideas on caste emancipation greatly influenced political leaders and parties emphasizing OBC empowerment, such as Mulayam Singh Yadav, Lalu Prasad Yadav, and Nitish Kumar.
- His strong support for Indian languages influenced linguistic politics.
- His decentralization philosophy remains foundational for the 73rd and 74th Constitutional Amendments (Panchayati Raj institutions and Urban Local Bodies).

Relevance of Lohia's Ideas

- Persistently relevant in contemporary politics through caste-based mobilizations, regional parties, decentralization debates, and advocacy for marginalized groups.
- Known for fostering a culture of critical thought and active dissent in democratic discourse.

Conclusion

- Despite substantial impact, Lohia's ideas were often misunderstood or underappreciated during his lifetime.
- Jayprakash Narayan notably remarked on Lohia's originality and his contemporaries' inability to fully grasp his vision.
- Nevertheless, Lohia's revolutionary ideas continue shaping India's political and social landscape significantly today.

Civil Service Values and Ethics in Public Administration

World Peace Centre in India

Context:

- India inaugurated its first World Peace Centre in Gurugram, Haryana, initiated by Ahimsa Vishwa Bharti under Jain Acharya Lokesh Muni's guidance.
- Prominent leaders like former President Ram Nath Kovind and several governors and spiritual leaders attended the inauguration, marking a significant step towards global peace and harmony.

About World Peace Centre:

Key Objectives:

- **Promotion of Non-Violence and Peace:** Disseminate teachings of Ahimsa to encourage peaceful living personally and professionally.
- **Spiritual and Moral Development:** Organize discourses, meditation, and workshops to revive spiritual consciousness and uphold moral values.
- **Global Unity – Vasudhaiva Kutumbakam:** Promote the philosophy "The World is One Family" to foster international cooperation and harmony.
- **Environmental and Ethical Responsibility:** Address contemporary global challenges such as climate change, advocate ethical leadership, and encourage social accountability.

Significance for India's Future:

The Centre aims to become a **globally influential institution promoting peace, spirituality, and interfaith dialogue.** Its strategic location in Delhi NCR (Gurugram) will:

- Host national and international peace conferences.
- Provide specialized training for spiritual leaders, diplomats, and social workers.
- Function as a research hub for peace studies and global ethical practices.
- Collaborate closely with international entities such as the UN and World Parliament of Religions.

What should world leaders know about ethics in International Relations?

Context:

- Recent meeting between former U.S. President Donald Trump and Ukraine's President Volodymyr Zelensky highlights ethical considerations in international diplomacy.

- Ethical behavior of leaders directly impacts global trust, stability, and peace.

Importance of Ethics in International Relations:

- **Credibility and Trust:** Ethical conduct builds trust between nations, facilitating cooperation and reducing conflicts.
- **Long-term Stability:** Decisions grounded in ethics promote sustainable and peaceful international relationships.
- **Global Image and Influence:** Ethical behavior enhances a country's global standing, influencing international support.

Key Ethical Principles World Leaders Must Uphold:

- **Honesty and Transparency:** Leaders should clearly communicate intentions and avoid misleading or manipulating allies and adversaries.
- **Respect for Sovereignty:** Nations must respect the autonomy and internal affairs of other countries.
- **Justice and Fairness:** Ensuring equitable and fair treatment of smaller or weaker nations.
- **Accountability:** Leaders must take responsibility for international commitments and agreements.
- **Human Rights and Humanitarian Values:** Prioritize protection of human rights in diplomacy and conflict resolution.
- **Non-exploitation and Integrity:** Avoid exploiting weaker nations through coercive diplomacy or economic pressures.

Ethical Challenges and Solutions:

- **Power Dynamics:** Powerful countries may be tempted to coerce or pressure smaller states.
- **Solution:** Adopt fair negotiation tactics; uphold equal respect regardless of nation's size or strength.
- **National Interest vs. Ethical Responsibility:** Leaders may face conflicts between national interests and moral obligations.
- **Solution:** Pursue diplomatic solutions that align both ethical responsibilities and national interests.
- **Transparency vs. Secrecy:** Balancing transparency with necessary diplomatic confidentiality.
- **Solution:** Clarify national positions transparently without compromising essential security considerations.

Lessons from Trump-Zelensky Meeting:

- Leaders must avoid using diplomatic relations for personal or domestic political gain.
- Diplomatic exchanges must reflect genuine international cooperation rather than transactional politics.
- Upholding ethics prevents diplomatic crises and international controversies, ensuring stable relations.

Conclusion:

- Ethical conduct in international relations is essential for sustainable peace, global trust, and stability.
- World leaders, including during interactions like Trump-Zelensky meetings, must prioritize ethics to ensure long-term benefits for global society and international harmony.

Geography

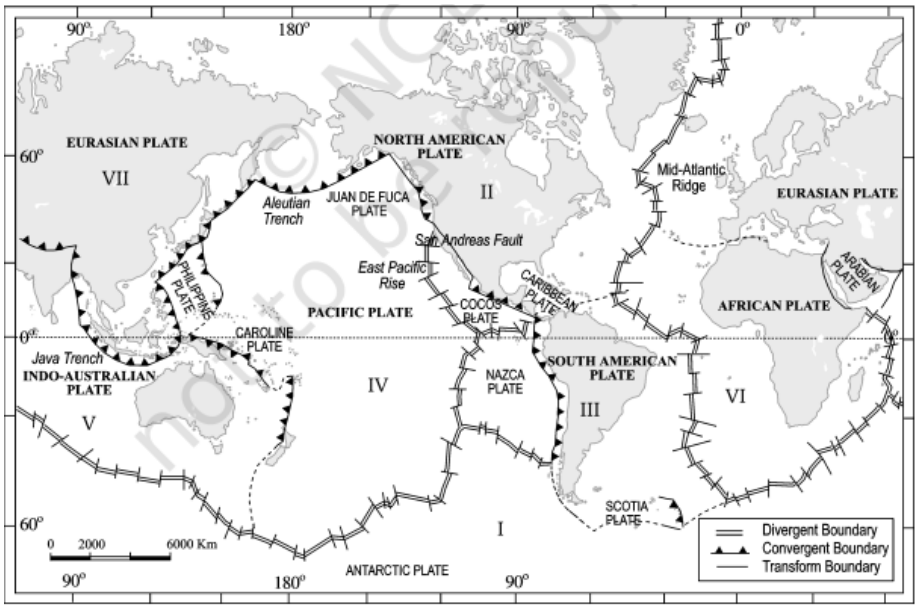
Physical geography

Myanmar Earthquake

Myanmar struck by powerful earthquake: What caused the quake?

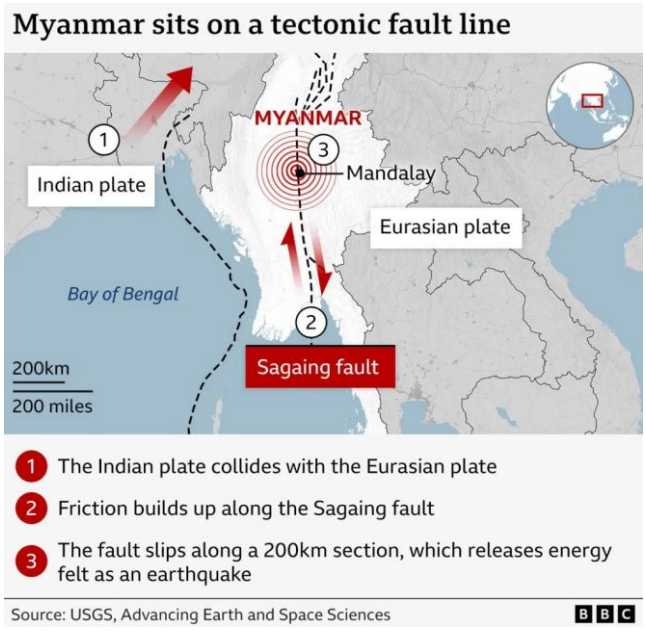
Myanmar Earthquake Update: The quake of magnitude 7.7 was the strongest one anywhere in the world in the last two years, USGS data show

Rescue personnel walk near a building that collapsed after a strong earthquake struck central Myanmar on Friday. (Photo: Reuters)



Basics :Plate Tectonics Theory

Myanmar is considered to geologically "active" - because - four of these tectonic plates - the Eurasian plate, the Indian plate, the Sunda plate and the Burma microplate.



- There is a major fault called the **Sagaing fault, which cuts right through Myanmar north to south and is more than 1,200km long.**
- Early data suggests that the movement that caused 7.7-magnitude earthquake was a **"strike-slip" - where two blocks move horizontally along each other.**
- This aligns with the movement typical of the **Sagaing fault.**

- **As the plates move past each other, they can become stuck, building friction until it is suddenly released and the earth shifts, causing an earthquake.**
- **Aftershock is the term used to describe a shaking event that follows an earthquake.**

Why was the earthquake felt so far away?

- Earthquakes can happen at up to 700km (435 miles) below the surface. This one was just 10km from the surface, making it very shallow. This increases the amount of shaking at the surface.
- The earthquake was also very large – measuring 7.7 on the moment scale. It produced more energy than the atomic bomb dropped on Hiroshima, according to the US Geological Survey.
- The size of the earthquake was because of the type of fault, said Dr Bell.
- "The straight nature [of the fault] means earthquakes can rupture over large areas – and the larger the area of the fault that slips, the larger the earthquake," she explained.
- "There have been six magnitude 7 or greater earthquakes in this region in the last century."
- This straight fault also means a lot of the energy can be carried down its length – which extends for 1200km south towards Thailand.
- How earthquakes are felt at the surface is also determined by the type of soil.
- In soft soil – which is what Bangkok is built on – seismic waves (the vibrations of the earth) slow down and build up, getting bigger in size.
- So Bangkok's geology would have made the ground shaking more intense.

Operation Brahma: India airlifts aid, deploys rescuers, medics to quake-hit Myanmar

India, acting as the first responder, has announced immediate assistance for Myanmar following the deadly earthquake. Under Operation Brahma, over 55 tonnes of relief materials, along with two NDRF teams and a medical crew, have been dispatched to support post-earthquake operations.

Climatology

How global warming is affecting the world's mountain ranges

- **Context :** Soaring temperatures are **leading to rapid and largely irreversible changes in the mountain ranges of the world, according to a new UNESCO report.**
- **Glacier Melting:** Glaciers are disappearing faster than ever, with the last three-year period seeing the largest glacial mass loss on record. Since 1975, glaciers, which do not include the Greenland and Antarctica ice sheets, have lost more than 9,000 billion tonnes of mass. Last year, glaciers in Scandinavia, the Norwegian archipelago of Svalbard and North Asia witnessed the largest annual loss of overall mass on record.

- **Warmer temperatures** are not the only reason behind accelerating glacier melting. More **frequent and intense wildfires and dust storms are leading to more deposition of black carbon** and other particulate matter on glacier surfaces and perennial snowpacks. "The impurities darken snow and ice surfaces, thus causing greater absorption of solar radiation… This can significantly influence the surface energy balance, thereby increasing melt rates, especially during periods and at locations of high incoming solar radiation," according to the UNESCO report.
- **Accelerating Permafrost Thaw: Permafrost is any ground that stays frozen — 0 degrees Celsius or lower — for at least two years straight**. In high-altitude regions, permafrost can underlie much of the landscape. **However, rising temperatures are melting permafrost in these regions rapidly.** This is an issue as permafrost contains a vast amount of organic carbon and other nutrients. **Mountain soils with permafrost contain approximately 4.5% of the global soil organic carbon**, according to the UNESCO report. **As the permafrost thaws, this organic carbon is released into the atmosphere, exacerbating climate change.**
- **Moreover, permafrost in mountain regions also stabilises** rock slopes, moraines (material left behind by a moving glacier), and debris-covered slopes. However, **due to permafrost melting, slopes become more vulnerable to erosion, increasing the risk of landslides and other hazards**.
- **Decline In Snow Cover:** According to the UNESCO report, snow cover in nearly all mountain regions has reduced, especially in spring and summer, with an expected further decrease in the coming decades. Snow cover is the total of all the snow and ice on the ground. It includes new snow and previous snow and ice that have not melted.
- **Erratic Snowfall Patterns:** In some regions, the elevation at which rainfall transitions to snowfall is shifting upwards due to atmospheric warming, the UNESCO report says. "Lower elevations and warmer climates are therefore undergoing greater decreases in snow cover depth and duration," the report added.
- It has also been observed that some of the **mountain ranges are receiving a greater fraction of precipitation falling as rain rather than snow.** The snow duration has reduced, snow-melt is taking place earlier than usual, and the snow-covered area has shrunk.

Significance of the study

- Mountains, which cover 33 million sq km of the Earth's surface, are crucial for sustaining life on the planet. **For instance, around 2 billion people downstream depend on mountains for freshwater resources from melting glaciers**. If climate change-induced glacier melting continues at the current rate, it can have catastrophic impacts on these people. Water flows from mountains will become more erratic, uncertain and variable. **Changes in the timing and volume of peak and low flow periods, increased erosion and sediment loads will affect water resources downstream, in terms of quantity, timing and quality**," the UNESCO report said.
- Glacier melting and permafrost thaw also increase the risk of glacial lake outburst floods (GLOFs). GLOFs are sudden and catastrophic floods caused by the failure of natural dams, usually formed by glacial moraines or ice, which contain glacial lakes. The report noted that these floods "alone have resulted in more than 12,000 deaths in the past 200 years, and have caused severe damage to farmland, homes, bridges, roads, hydropower plants… often prompting further internal displacement".
- According to WGMS, **melted ice of glaciers accounts for 25 to 30% of the currently observed increase in global sea levels**. Between 2006 and 2016, the global mass loss of glacier ice amounted to 335 billion tonnes of lost ice per year, which corresponded to an increase in sea levels of almost 1 mm per year. Every millimetre can expose up to 300,000 people to annual flooding, WGMS said.

Heatwaves

- Context : Heatwaves in India
- A Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India.
- Heat Waves typically occur between March and June, and in some rare cases even extend till July.

Q. What is criterion for declaring heat wave in India?

Heat wave is considered if maximum temperature of a station reaches at least 40^0C or more for Plains and at least 30^0C or more for Hilly regions.

a) Based on Departure from Normal

Heat Wave: Departure from normal is 4.5^0C to 6.4^0C

Severe Heat Wave: Departure from normal is $>6.4^0$C

b) Based on Actual Maximum Temperature

Heat Wave: When actual maximum temperature ≥ 45^0C

Severe Heat Wave: When actual maximum temperature ≥47^0C

If above criteria met at least in 2 stations in a Meteorological sub-division for at least two consecutive days and it declared on the second day.

Q. What is a criterion for describing *Heat Wave* for coastal stations?

When maximum temperature departure is 4.5^0C or more from normal, *Heat Wave* may be described provided actual maximum temperature is 37^0C or more.

Q. What is the period of a heat wave over India?

In India, Heat Waves occur mainly from March to June and in some rare cases even in July. The peak month of the heat wave over India is May.

Q. What are the heat wave prone states over India?

Heat wave generally occurs over plains of northwest India, Central, East & north Peninsular India from March to June. It covers Punjab, Haryana, Delhi,Uttar Pradesh,Bihar, Jharkhand, West Bengal, Odisha, Madhya Pradesh,Chhattisgarh, Rajasthan, Gujarat, parts of Maharashtra & Karnataka, Andhra Pradesh and Telangana. Sometimes it occurs over Tamilnadu & Kerala also. Therefore, most of the states of India are prone to heat waves in varying degrees.

Causes for Heatwaves

Natural Causes of Heatwaves –

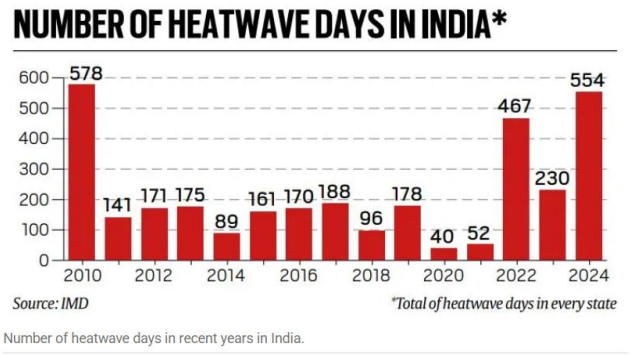
- **Climate phenomena** : The jet stream may get "stuck" in a position (a phenomenon called blocking), keeping hot air over one region for days or weeks.
- **Ocean-Atmosphere Interactions:** Events like El Nino can shift global weather patterns and promote heatwaves
- **Droughts –** Dry soils can't cool the air through evaporation, so surface temperatures rise faster.

Anthropogenic Causes:

- **Global Warming from Greenhouse Gases -** Human emissions are raising average temperatures and amplifying heatwave risks.
- **Changes in Land Use Patterns -** Urbanization and agriculture alter how land absorbs and releases heat.

- **Deforestation -** Reduces shade and evapotranspiration (the natural cooling from trees).
  - Bare land heats up faster and contributes to local warming.
- **Urban Heat Island Effect -** Cities absorb and retain heat due to concrete, asphalt, and a lack of vegetation.

Sector	Impact
Human Health	• Rise in heatstroke and dehydration cases • Increased mortality among vulnerable groups • Worsening of chronic illnesses
Environment	• Forest fires and biodiversity loss • Ecosystem disruption • Water resource depletion
Agriculture	• Decline in crop yields and soil moisture • Livestock stress • Increased irrigation demand
Economy	• Higher energy consumption • Infrastructure damage (e.g., roads, railways) • Reduced labour productivity
Society	• Strain on healthcare systems
	• Water and power shortages • Increased rural-urban and climate-induced migration
Urban Areas	• Intensified Urban Heat Island (UHI) effect



Number of heatwave days in recent years in India.

Steps taken by the Govt :

- Heat Action plans
- IMD forecasts
- National Framework for Heatwave Mitigation and Management
- NDMA frameworks
- Awareness campaigns

Conclusion:

- Heatwaves, intensified by climate change, threaten health, agriculture, and infrastructure, especially in India. Urban heat islands, poor planning, and vulnerable communities worsen the impact. Solutions require better early warning systems, resilient infrastructure, and climate adaptation strategies. Addressing heatwaves must align with India's climate commitments, ensuring long-term resilience against rising temperatures.

Impact of Cloud Band on Monsoon

- **Context:** Strength of cloud band influences movement and density of rains during Indian monsoon, finds IISc study
- A recent study from the Indian Institute of Science (IISc) has shown that contrary to previous understanding, the strength of a cloud band [a nearly continuous cloud formation]plays a key role in its movement as well as the density of rains that the Indian subcontinent receives during the wet spells of the monsoon.
- An IISc release said that India receives 80% of its annual rainfall during the summer monsoon months, between June and September, which are marked by several wet and dry spells along with strong winds.
- These spells are controlled by the Boreal Summer Intraseasonal Oscillation (BSISO), also called monsoon intraseasonal oscillations, **which also brings a cloud band from the equator over to the Indian subcontinent, putting an end to the dry spell.**
- The duration of the wet spell is determined by the size and strength of the cloud band.
- Most theories have suggested that regardless of the strength of disturbance at the equator, the cloud band propagates northward.
- "Most of the existing literature says that even if you put any small instability, it should always propagate northwards. What we have shown is that this is not the case. If the cloud band in the equator is weak to start with, then it cannot propagate north - first author of the study published in *npj Climate and Atmospheric Science*.
- The IISc team examined gaps in predictions among existing climate models and combined projections from highly efficient models to determine what factors drive the movement of the BSISO.
- **They found that the robust northward propagation of the BSISO occurs only when the equatorial cloud band is strong**. This strong cloud band increases moisture in the atmosphere over the subcontinent, via stronger winds, and triggers northward propagation.
- "Research teams at CAOS have been pursuing the topics of interaction between ocean and atmosphere for a long time, using data sets and model simulation. What we found is that air-sea interaction in the equatorial Indian ocean plays a major role in driving wet spells in India. This is likely to change in the future because the atmosphere would be warmer," said P.N. Vinayachandran, Professor and Chair of CAOS and corresponding author of the study.

- Prof. Vinayachandran added that in the future, the background moisture – how much water vapour is already present before the rains begin – will increase over most of this region, resulting in stronger wet spells. The associated rainfall during these wet spells is expected to increase by 42% to 63% over India and the adjoining seas.
- The researchers believe that these findings will help improve the efficiency of current climate models used to forecast seasonal and sub-seasonal rainfall.

Miscellaneous

Energy Statistics India 2025

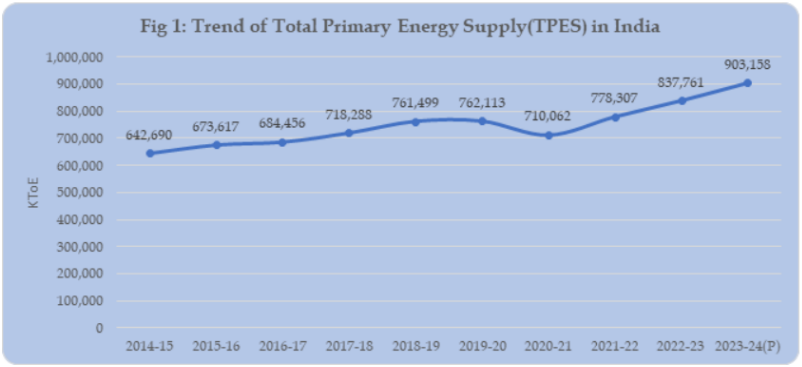
- **Context :** The **National Statistics Office (NSO), Ministry of Statistics and Programme Implementation** has released the annual publication "Energy Statistics India 2025".
- The Publication comprises integrated dataset containing diverse key information about reserve, capacity, production, Consumption, and import/export of all the **energy commodities** (like Coal, Lignite, Petroleum, Natural Gas, Renewable Energy, etc.) of India. The publication also contains different tables (like Energy Balance), graphs (like Sankey Diagram), and Sustainable Energy Indicators as per International Standards.

Key Highlights:

During the Financial Year 2023-24, India has experienced a steady and healthy growth in both, energy supply and consumption by overcoming the shock of global Pandemic to fulfil the dream of becoming a *Viksit Bharat* by *2047*.

The Indian economy has depicted a healthy expansion during the FY 2023-24, with the *Total Primary Energy Supply (TPES)* registering a growth of 7.8% over the past year and stood at 9,03,158 KToE(Kilo Tonnes of oil Equivalent).

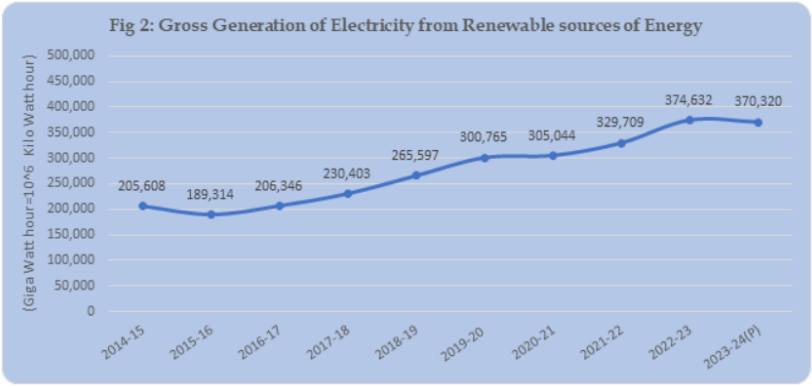
Fig 1: Trend of Total Primary Energy Supply(TPES) in India



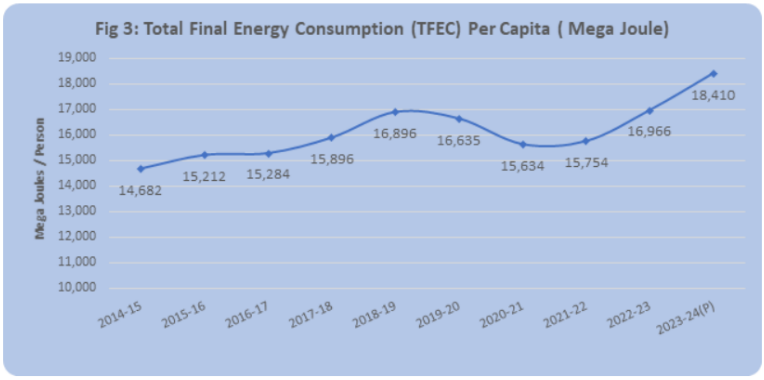
India has a huge potential for generation of renewable energy which stands at 21,09,655 Megawatt as on 31-Mar-24. The potential of generating energy from *Wind Power* is having the dominating share of 11,63,856 Megawatt (around 55%) which is followed by *Solar Energy* (7,48,990 Megawatt) and *Large Hydro* (1,33,410). More than half of the potential for generation of renewable energy has been concentrated within the four States of India viz. Rajasthan (20.3%), Maharashtra (11.8%), Gujarat (10.5%) and Karnataka (9.8%).

- The installed-capacity for generating electricity (including Utility and Non-Utility) from the Renewable resources has also experienced a significant growth over the past years. From 81,593 Mega Watt as on 31-Mar-2015, it has risen to 1,98,213 Mega Watt as on 31-Mar-2024, which is a CAGR of 10.36% over the years.

- The gross generation of electricity from the Renewable resources (both Utility and Non-Utility together) has also increased significantly over the years. From an amount of 2,05,608 GWH of electricity generated during FY 2014-15, it has increased to 3,70,320 GWH during FY 2023-24, which is a CAGR of 6.76% over the years.



- India has also experienced a substantial growth in the *per-capita consumption of energy* over the years. It has gone up from 14,682 Mega Joule/person during FY 2014-15 to 18,410 Mega Joule/person during FY 2023-24 which is a CAGR of 2.55% over the years.



- The utilization of the electricity has been significantly improved over the years by reducing the losses incurred due to transmission and distribution. Percentage loss due to *Transmission and Distribution* which was around 23% during FY 2014-15 has gone down to around 17% during FY 2023-24.

- Among all the major end-use energy- consuming sectors, the *Industry* sector, has witnessed maximum expansion during FY 2023-24. The consumption against *Industry* sector has increased from 2,42,418 KToE during FY 2014-15 to 3,11,822 KToE during FY 2023-24. All other sectors like Commercial and Public service, Residential, Agriculture and Forestry have also registered a consistent growth over the periods.

Soil Fertility Mapping

- Context : Soil & Land Use Survey of India (SLUSI), under Department of Agriculture & Farmers' Welfare is generating of district/village-wise digital soil fertility maps through geo-spatial techniques using Soil Health Card (SHC) data.
- Soil Health Cards are generated under Soil Health & Fertility Scheme of Government of India.
- Soil Health & Fertility Scheme assists states in promoting Integrated Nutrient Management (INM) through judicious use of chemical fertilizers including secondary and micro nutrients, in conjunction with organic manures & bio-fertilizers for improving soil health and its productivity.

- Soil samples are processed following standard procedures and analyzed for various parameters viz, pH, electrical conductivity (EC), Organic Carbon, available Nitrogen, Phosphorus, Potassium, Sulphur and micronutrients (Zinc, Copper, Iron, Manganese & Boron).
- SHC provides information to farmers on soil nutrient status (low, medium & high) and recommendation on appropriate dosage of nutrients to be applied for improving soil health.
- Soil fertility maps for 351 villages spread across 34 districts of Maharashtra has been generated.
- Soil Fertility Maps provide detailed spatial information about the nutrient composition and health of the soil.
- It helps farmers in application of fertilizers and soil amendments judiciously, reducing the risk of overuse or underuse.
- It enhances economic outcomes for farmers, as they are able to maximize their returns with less input, thus increasing overall profitability.
- Geospatial techniques, including remote sensing & AI based tools, are used in Soil Fertility Mapping.
- The SHC soil sampling point is geo-coded using GPS, the sample is assigned a unique QR Code, and this QR code is retained during analysis in soil testing labs.
- Soil Fertility data in the form of SHCs is made available to farmers.
- Farmers can download SHC from the portal by entering registered mobile number.
- Challenges like logistical, technical, and physical infrastructure barriers are there in remote and hilly areas for soil fertility mapping. Presently use of Village Level Soil Testing labs and mini labs in hilly and remote area are addressing these challenges.

Climate Change and the Growing Water Crisis in India: A 2024–25 Assessment

Context

- India is facing an intensifying climate crisis marked by rising temperatures and dwindling water resources.
- The year 2024 went down as the warmest year since 1901, signaling an urgent call for comprehensive environmental and policy action.
- Among the most pressing issues emerging from this warming trend is the exacerbation of water gaps — the difference between renewable water availability and water consumption in a region.

India Tops Global Water Gap Rankings

- According to the article *Global Water Gaps Under Future Warming Levels* published in *Nature Communications*, **India ranks highest among countries with the largest water gaps.**

- Under baseline climate conditions, India's annual water gap stood at **24.3 cubic kilometres**, placing it behind only the United States (53.8), Pakistan (35.8), and Iran (35) in absolute terms.
- However, India is projected to witness **the most significant increase in water stress** under future warming scenarios.
- Under a **1.5°C warming**, India's water gap is projected to rise by **11.1 cubic kilometres per year**, and the situation becomes direr at **3°C warming**, contributing significantly to the global increase of **67.4 cubic kilometres** per year in water gaps.

2024: The Warmest Year on Record

The climate toll became strikingly visible in 2024:

- The India Meteorological Department (IMD) confirmed it as the warmest year on record since 1901.
- According to the Heat Watch report titled Struck by Heat: A News Analysis of Heat Stroke Deaths in India in 2024, **733 people** died due to heat-related causes.
- The **trend is continuing in 2025**, with January temperatures 0.9°C higher than the previous year and March already witnessing **1°C to 3°C above-normal temperatures** in large parts of North and West India.

Water Basins Under Strain

- The **Ganga-Brahmaputra basin** and the **Sabarmati basin** have emerged as the **most water-stressed regions** under baseline climate conditions.
- The Ganga-Brahmaputra basin recorded a water gap of **56.1 cubic kilometres per year**, while the Sabarmati basin followed closely with **52.6 cubic kilometres per year**.
- These basins are critical not only ecologically but also economically and demographically, making the stress particularly alarming for millions of people dependent on them.

Policy Response: Jal Jeevan Mission and Groundwater Recharge

- To address the deepening crisis, the **Government of India's Jal Jeevan Mission** has aimed to ensure access to safe and adequate drinking water to all rural households.
- As of **December 31, 2024**, the mission had provided **tap water connections to over 154 million households** (154,021,333), marking a substantial improvement in rural water infrastructure.

In addition, groundwater sustainability has seen some progress:

- According to the 2024 assessment by the Ministry of Jal Shakti, total annual groundwater recharge increased by 15 billion cubic metres, while extraction declined by 3 billion cubic metres compared to 2017.
- Recharge from **tanks and ponds** has shown consistent improvement across the last five assessments.

The Way Forward: Sustainable and Equitable Water Management

- While policy responses are underway, more is needed to **bridge the gap between water supply and demand**, especially under the looming threat of climate change.
- Protecting existing water bodies from encroachment, recharging aquifers, and promoting efficient water usage practices are key steps toward ensuring long-term sustainability.
- The Paris Agreement's goal of capping warming at 2°C appears increasingly uncertain.
- In this context, **vulnerable communities** are likely to suffer disproportionately from water scarcity unless climate-resilient and inclusive policy measures are prioritised.

What is Water Circularity

- **Context :** Global standards of water availability show that India is water stressed. Reusing treated wastewater can augment water supply while solving the problem of its safe disposa
- Water circularity involves **recycling, reusing, and recovering resources throughout the water treatment process to optimize benefits for people, the environment, and businesses.**
- India is grappling with an escalating water crisis, marked by its ranking of **132nd globally in per capita water availability**, well below the international benchmark of 1,700 cubic metres per person per year.
- According to the India Water Resource Information System, there has been a 73% decline in per capita surface water availability from 1950 to 2024.
- If this trend continues unmitigated, India risks sliding into the category of **"water scarce" nations**, with availability falling below 1,000 m^3 per capita annually.
- With climate change intensifying the water cycle through erratic rainfall, recurring droughts, and urban flooding, the situation is particularly dire in major cities like **Delhi, Mumbai, Bengaluru, Chennai, Pune**, and **Hyderabad**.
- The crisis is further aggravated by unplanned urbanisation and inefficient water resource management.

Current Wastewater Scenario in India

According to the **Central Pollution Control Board (CPCB):**

- Urban India generated **72,368 million litres per day (MLD)** of sewage in 2020–21.
- The **installed treatment capacity** stood at 31,841 MLD, but only **26,869 MLD was operational**.
- Merely **28% (20,236 MLD)** of the total sewage generated was treated.
- A staggering **72% of wastewater** was released untreated into the environmen
- Looking ahead, projections suggest wastewater generation will increase by 75–80% over the next 25 years, reaching 0.13 million MLD, with annual volumes touching 48 billion cubic metres (BCM) by 2050—3.5 times the current treatment capacity.

Findings from Ground Reality: Lessons from 16 Cities

- A study titled **"Waste to Worth"** by the **Centre for Science and Environment (CSE)** explored 35 wastewater reuse case studies in **16 cities across 7 states/UTs**.
- The report provides a critical review of existing reuse practices in states like **Delhi, Uttar Pradesh, Rajasthan, Maharashtra, Karnataka, Haryana, and Tamil Nadu**.

Key Observations:

- **Policy-Practice Gap**: While national policies have been progressive, their implementation at the state and municipal levels remains weak and inconsistent.
- **Centralised Focus**: Reuse initiatives are primarily focused on **centralised treatment plants**, leaving out decentralised solutions at the household or institutional levels.
- Limited Sectoral Integration: Treated water reuse in agriculture, construction, and industry remains minimal despite its potential.
- **Lack of Infrastructure and Awareness**: Absence of separate pipelines for treated water distribution, public resistance, and lack of incentives hamper adoption.
- **Infrastructure for Distribution**
  - Develop **dual piping networks** to segregate freshwater and treated water supplies for non-potable purposes.
- **Incentivise Reuse and Innovation**
  - Offer subsidies or tax rebates for industries and builders using recycled water.
  - Encourage **PPP models** to attract private investment in wastewater recycling.
- **Public Awareness and Behavioural Change**
  - Run national campaigns to sensitise urban citizens on the benefits and safety of treated water reuse.
- **Strengthen Monitoring and Governance**
  - Establish an integrated **Urban Water Management Authority** at state levels to coordinate and monitor reuse initiatives.

Coastal erosion on Sagar Island

- **Context :** Various steps have been taken by authorities to mitigate the issue of coastal erosion and saline ingress on Sagar Island in West Bengal.

Great Nicobar Island Mega Project

Context :

- India's proposed ₹80,000 crore infrastructure project on Great Nicobar Island (GNI), led by NITI Aayog, has ignited significant debate.

- While envisioned as a major strategic and economic initiative, the project's environmental and legal ramifications have raised alarms among conservationists, tribal rights advocates, and legal experts.
- The plan includes a transshipment terminal at Galathea Bay, a greenfield international airport, a modern township, a tourism hub, and a gas-based power plant.
- However, the environmental cost of such development on a fragile island ecosystem has become a focal point of national discourse.

Environment and Ecological Threats:

Large-Scale Deforestation

- One of the most significant concerns is the large-scale felling of old-growth tropical rainforests.
- An estimated **130 square kilometres of primary forest cover** will be lost to make way for the project.
- While initial reports suggested that between 8.65 to 9.64 lakh trees would be cut, updated evaluations hint at numbers potentially exceeding **10 million trees**, threatening biodiversity and disrupting delicate ecological balances.

Threat to Marine and Wildlife Sanctuaries

- Galathea Bay, once protected as a wildlife sanctuary specifically for marine turtle conservation, was **de-notified in 2021** to accommodate the port project.
- This directly contradicts the objectives of the **Marine Turtle Action Plan (2021)**.
- The bay is a known nesting ground for the endangered **leatherback sea turtle**, and development in this area could decimate its population.

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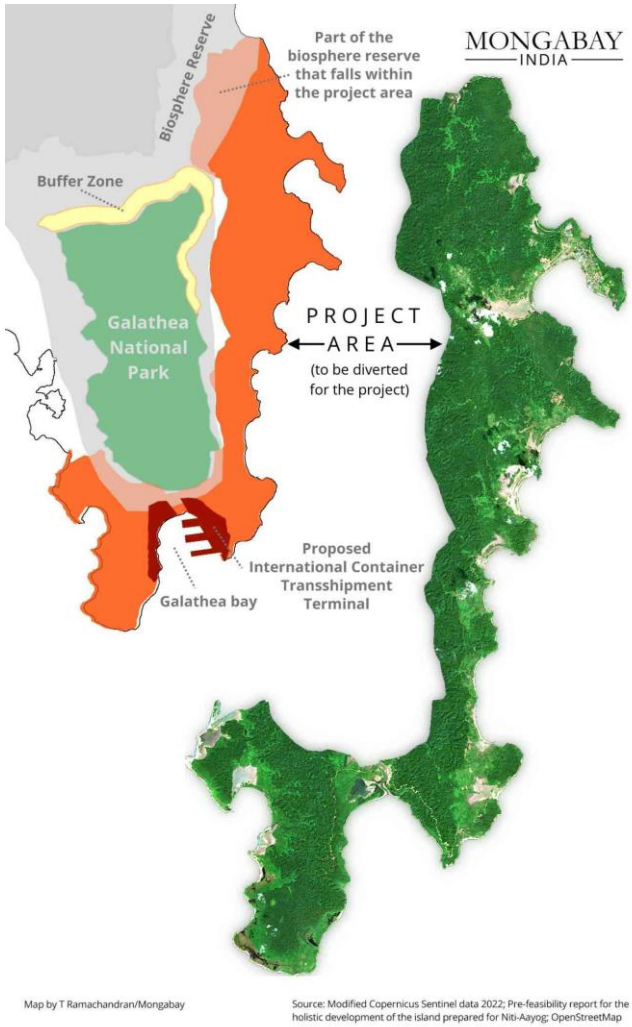
Great Nicobar Island Mega Project



Coral Reef and Coastal Ecosystem Vulnerability

- The project area falls under the **Coastal Regulation Zone (CRZ) 1A**, a category reserved for ecologically sensitive coastal areas.
- Later, a submission was made by ANIIDCO's affidavit in the NGT that the area lies in CRZ 1B where construction of a port is permissible.
- Industrial activities like ship-repair and port construction threaten to damage coral reefs and marine biodiversity irreversibly.

Questionable Compensatory Afforestation

- The compensatory afforestation proposed in **Haryana and Madhya Pradesh** fails to reflect the ecological complexity of the lost Nicobar forests.
- Replacing tropical rainforest biodiversity with deciduous or dry forest plantations does not address the ecological imbalance
- The **Shekhar Singh Commission**, constituted by the Supreme Court in 2002, had strongly advised a complete ban on tree felling in tribal reserves and national parks, and had mandated afforestation before any tree cutting.
- These conditions, however, are not being adhered to.
- The project poses an existential threat to **indigenous communities**, particularly the **Shompen tribe**, who have lived in harmony with the island's forests for generations.
- The absence of meaningful consultation and the lack of a rehabilitation plan undermine the **rights of tribal communities under the Forest Rights Act**.

Arguments FOR the project

Geopolitical and Strategic Edge

- Great Nicobar's proximity to key maritime routes like the **Malacca, Sunda, and Lombok Straits** offers India a strategic vantage point to monitor one of the busiest global sea lanes.
- This enhances India's role in the **Indo-Pacific region**, aligning with the **Act East Policy** and strengthening the **QUAD's regional strategy**.
- The greenfield airport is expected to boost **defence logistics** and quick deployment capabilities, particularly in countering increased Chinese naval activities in the region.

Economic Aspirations

- The **International Container Transshipment Terminal (ICTT)** aims to position India as a global shipping hub, reducing dependency on foreign ports like Colombo and Singapore.
- The project is also embedded within broader policy visions such as **Maritime India Vision 2030** and **Amrit Kaal Vision 2047**, supporting long-term economic growth through infrastructure and logistics enhancement.
- Proponents argue that the project can mirror high-end tourism models like **Singapore and the Maldives**, integrating renewable energy, modern infrastructure, and eco-friendly housing.

- The greenfield township is expected to elevate living standards, generate employment, and stimulate local economies.

Conclusion

- While the Great Nicobar Island project offers immense strategic and economic promise, its implementation must not come at the cost of **irreversible ecological degradation** or **marginalisation of indigenous communities**.
- A **sustainable, transparent, and inclusive approach** is crucial to ensure that development enhances, rather than erodes, the region's ecological and social fabric.

Economic Geography

Textile Industry

- Context : 5 Years of National Technical Textiles Mission
- India's textile industry is important to the economy and makes some of the most innovative fabrics globally**. India is the 6th largest exporter of textiles globally, with a 3.9% share in world textile exports**.
- It contributes nearly 2% to the country's GDP.
- The sector is set to grow to US$350 billion by 2030 further strengthening India's position in the global market. This growth is expected to create 3.5 crore jobs.

Framework for the National Technical Textiles Mission

- With a view to boost technical textiles sector in the country, **National Technical Textiles Mission (NTTM) was launched for a period from 2020-21 to 2025-26 with an outlay of Rs.1,480 crores**.
- The National Technical Textiles Mission (NTTM) **focuses on using textiles in key areas**.

The National Technical Textiles Mission (NTTM) has four key components aimed at boosting the sector's growth:

- **Component I – Research, Innovation and Development:** Supports R&D in technical textiles, inviting proposals to develop new materials and processes.
- **Component II – Promotion and Market Development:** Aims to increase technical textile adoption in India through market promotion and international collaborations.
- **Component III – Export Promotion:** Focuses on boosting exports of technical textiles with a dedicated export council. Outlay.
- **Component IV – Education, Training, and Skill Development:** Promotes technical textiles education, skill training, and internships in top institutes and industries.
- ₹517 crore has been allocated for the National Technical Textiles Mission (NTTM) since its launch.
- So far, ₹393.39 crore has been used for various activities such as research, innovation, market development, export promotion and skill development in technical textiles.
- A total of 168 research projects, valued at around ₹509 crore, have been approved under NTTM.

NTTM Key Highlights

Research Areas Supported: Carbon fiber, aramid fiber, nylon fiber, composites, geotextiles, agro-textiles, medical textiles, mobile textiles, sports textiles, and biodegradable textiles.

Quality Control Orders (QCOs): 68 QCOs issued across various segments (20 Geo-tech, 12 Protective Textiles, 20 Agro Textiles, 6 Medical Textiles, 9 Ropes & Cordages, 1 Indutech textiles).

Export Promotion: The Synthetic & Rayon Textiles Export Promotion Council (SRTEPC) (now MATEXIL) assigned to promote technical textiles exports.

BIS Standards: Over 600 standards developed for technical textiles, including 200+ since NTTM's launch.

Academic Support: 38 proposals approved worth ₹191 crore for lab upgrades and faculty training in technical textiles.

- NTTM Strengthening the Textile Industry with Other Initiatives The National Technical Textiles Mission (NTTM) is driving the transformation of **India's textile sector with a range of initiatives focused on innovation, skill development and promoting indigenous production**.

❖ **Grant for Internship Support for Technical Textiles (GIST 2.0):** Launched under NTTM, GIST 2.0 bridges the gap between industry and academia by offering hands-on learning opportunities in technical textiles. It fosters local innovation, supports the Make in India initiative and helps empower young talent to drive growth in the textile sector.

❖ **Grant for Research & Entrepreneurship across Aspiring Innovators in Technical Textiles (GREAT) Scheme:** Launched in August 2023, the program provides funding to help translate prototypes into technologies and products for commercialization. So far, 8 startups were granted ₹50 lakh each for innovations in medical, industrial and protective textiles. Additionally, three educational institutes, including IIT Indore and NIT Patna, received ₹6.5 crore to introduce specialized courses in geotextiles, geosynthetics, and sports textiles.

- **Skill Development Programs:** To meet the growing demand in the technical textiles sector, NTTM aims to train 50,000 individuals, including undergraduate students, unskilled workers, and professionals. The initiative provides targeted skill development through 12 industry-focused courses developed by organizations like **SITRA** (South India Textiles Research Association), **NITRA** (Northern India Textile Research Association) and **SASMIRA** (South Ahmedabad Silk Mill and Industrial Research Association) in areas like medical, protective, mobile, and agricultural textiles.

- **Technotex 2024:** Held as part of Bharat Tex 2024, showcased the strength of India's technical textiles sector, offering a platform to explore global investment opportunities. A highlight of the event was the Innovation Zone under the National Technical Textiles Mission (NTTM), spanning 693 square meters. This dedicated pavilion featured 71 cutting-edge projects, with 48 presented as prototypes and 23 through informative posters.

Success Stories

In the rapidly evolving textile industry, innovation is driving major advancements in both comfort and functionality. One such example is **Eicher Goodearth's launch of Mahina, India's first bonded leak-proof period underwear.** Offering superior absorbency and leak protection for up to 12 hours, Mahina is made with natural materials, ensuring comfort and safety. It lasts for up to 100 washes without the need for pads or tampons.

States are increasingly focusing on strengthening the technical textiles industry. The Tamil Nadu Budget has prioritized its growth through key initiatives, including the establishment of the **PM MITRA Park in Virudhunagar and a textile park in Salem.** Additionally, the budget boosts capital subsidies for technical textiles investments, increasing the subsidy for spinning modernization from 2% to 6% to reduce costs and promote machinery upgrades.

Conclusion

India's journey to becoming a global leader in technical textiles is well underway. Initiatives like GIST 2.0, along with cutting-edge technology and research, are paving the way for this vision. With continued effort and innovation, India is set to lead the global technical textiles market, driving both economic growth and global competitiveness.

Coal Production

- **Context:** India has achieved a momentous milestone in coal production, surpassing one billion tonnes (BT) on March 20, 2025, in the fiscal year 2024-25.
- India has achieved a momentous milestone in coal production, surpassing one billion tonnes (BT) on March 20, 2025, in the fiscal year 2024-25. This remarkable achievement comes 11 days ahead of last fiscal year's coal production of 997.83 million tonnes (MT), underscoring India's significant progress in ensuring its energy demands and driving industrial, agricultural, and overall economic growth.
- The coal sector's success is attributed to the tireless efforts of Coal Public Sector Undertakings (PSUs), private players, and the dedicated workforce of around 5 lakh mine workers across more than 350 coal mines. These coal miners, who have defied numerous challenges with unmatched dedication, have played a pivotal role in achieving this historic milestone.
- India relies on coal for approximately 55% of its energy mix, and around 74% of the country's electricity is generated by coal-based power plants. This underscores the critical importance of coal in powering India's economy and sustaining energy security.
- The record-breaking coal production reflects the Government's strategic reforms and policies, such as amendments to the Mines and Minerals (Development and Regulation) Act and the opening of the coal sector to private players through the commercial auctioning of coal blocks. These initiatives have led to a marked increase in the availability of domestic coal, progressively substituting imports and significantly contributing to foreign exchange savings. From April to December 2024, India's coal imports declined by 8.4%, resulting in forex savings of around $5.43 billion (₹42,315.7 crore) as compared to the same period of last year.
- This milestone aligns with Prime Minister Narendra Modi's vision of 'Atmanirbhar Bharat' and highlights the Ministry of Coal's ongoing efforts to foster self-reliance in the energy sector while ensuring sustainable development.
- This achievement is not just about coal production; it is a crucial step towards ensuring long-term energy security and propelling India's overall development. By embracing advanced mining techniques, optimizing logistics, and promoting sustainable practices, the coal sector is playing a central role in strengthening India's energy infrastructure and bolstering economic resilience.

- Aligned with the 'Viksit Bharat 2047' vision, this milestone positions India to become fully self-reliant in the energy sector. Through continued strategic reforms, technological advancements, and a focus on responsible resource management, India's journey towards an Atmanirbhar Bharat remains on track. This achievement is a testament to the nation's unwavering dedication to securing a self-reliant, energy-secure future for generations to come.

PYQ

Q. "Inspite of adverse environmental impact, coal mining is still inevitable for development". Discuss

Basic Points

Adverse Environmental Impact

- Coal mining is intrinsically linked with environmental degradation, presenting a multitude of challenges that range from **deforestation and habitat destruction to air and water pollution**. The extraction process often involves **clearing vast expanses of land, leading to habitat loss and fragmentation**. Moreover, the release of harmful chemicals into nearby water sources poses a severe threat to aquatic ecosystems.
- **The combustion of coal for energy generation releases substantial amounts of carbon dioxide, contributing significantly to global warming and climate change**. These environmental consequences highlight the urgent need to transition to cleaner and more sustainable energy sources.

Economic Imperatives

- Despite the environmental concerns, **coal mining persists due to its economic significance.** Many **developing economies heavily rely on coal as a primary energy source,** providing a foundation for industrialization and economic growth. **The coal industry creates jobs, stimulates local economies, and contributes to government revenue through taxes and royalties.**
- This economic dependence on **coal complicates the transition to alternative energy sources,** as the abrupt abandonment of coal mining could result in unemployment, economic downturns, and social unrest. **Striking a balance between economic development and environmental preservation becomes a delicate task, necessitating comprehensive strategies for a smooth transition.**

Energy Security

- Another dimension to the persistence of coal mining is its role in ensuring energy security. **Coal has historically been a reliable and abundant source of energy, especially in regions with extensive coal reserves.** Developing countries, facing the challenge of meeting the growing energy demands of their populations, often turn to coal to bridge the gap between supply and demand. **The intermittency of renewable energy sources like solar and wind power poses challenges to their widespread adoption, making coal a more stable and consistent energy option.**

- Achieving a balance between energy security and environmental sustainability becomes crucial in steering the trajectory of future development.

Technological Advances and Mitigation Measures

- **Advancements in technology have the potential to mitigate the environmental impact of coal mining**.
- Implementation of cleaner and more efficient extraction methods, as well as the **development of carbon capture and storage (CCS) technologies, could minimize the carbon footprint associated with coal usage.**
- **Investing in research and innovation to make coal a more environmentally friendly energy source could serve as a transitional strategy while alternative energy infrastructures are being developed**. However, the efficacy and scalability of such technologies remain key considerations in evaluating the sustainability of continued coal mining.

Basics

- In India, coal is the most abundantly available fossil fuel. It provides a substantial part of the nation's energy needs. It is used for power generation, to supply energy to industry as well as for domestic needs. India is highly dependent on coal for meeting its commercial energy requirements.
- **Coal is formed due the compression of plant material over millions of years. Coal, therefore, is found in a variety of forms depending on the degrees of compression and the depth and time of burial**.
- **Decaying plants in swamps produce peat. Which has a low carbon and high moisture contents and low heating capacity.**
- **Lignite is a low grade brown coal, which is soft with high moisture content.** The **principal lignite reserves are in Neyveli in Tamil Nadu** and are used for generation of electricity.
- **Coal that has been buried deep and subjected to increased temperatures is bituminous coal. It is the most popular coal in commercial use.**
- **Metallurgical coal is high grade bituminous coal** which has a special value for smelting iron in blast furnaces.
- Anthracite is the highest quality hard coal.
- In India coal occurs in rock series of two main geological ages, namely Gondwana, a little over 200 million years in age and in tertiary deposits which are only about 55 million years old.
- The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley (West Bengal Jharkhand). Jharia, Raniganj, Bokaro are important coalfields. The Godavari, Mahanadi, Son and Wardha valleys also contain coal deposits. Tertiary coals occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

- Coal is a one of the important minerals which is mainly used in the generation of thermal power and smelting of iron ore.
- Coal occurs in rock sequences mainly of two geological ages, namely Gondwana and tertiary deposits.
- About 80 per cent of the coal deposits in India is of bituminous type and is of non-coking grade.

Types of Coal

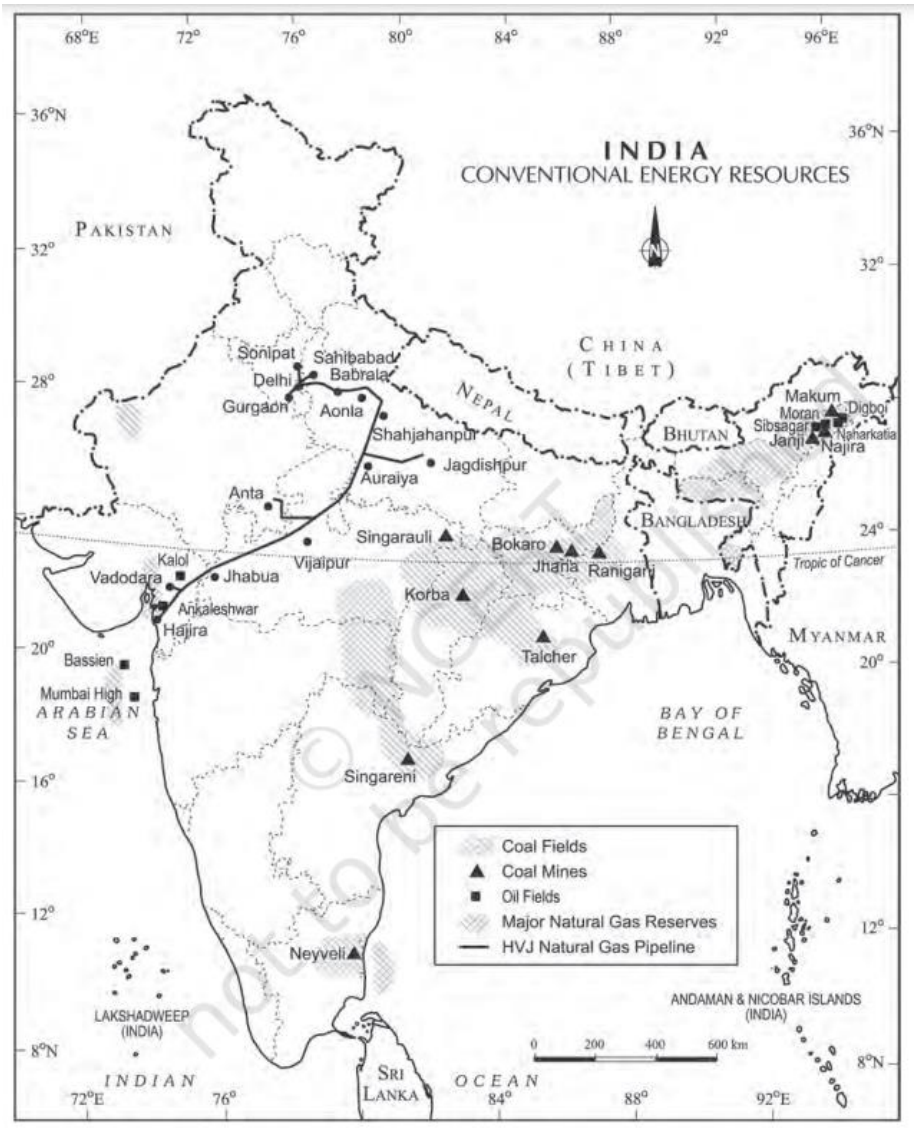
Peat, Lignite, Bituminous, Anthracite Coal- based on carbon, ash and moisture content.

- **Peat** - First stage of transformation + Contains less than 40 to 55 per cent carbon- Moisture Content - more ash
- **Lignite** - Brown coal + 40 to 55 per cent carbon- Low Grade Coal
- **Bituminous Coal** - 40 to 80 per cent carbon- Most widely available
- **Anthracite Coal -** Best quality +80 to 95 per cent carbon – less moisture content **– Jammu and Kashmir**

Major Coalfields in India

- Singrauli – MP
- Bokaro – Jharkhand
- Jharia – Jharkhand

- Raniganj - West Bengal
- Talcher - Odisha
- Singareni
- Korba – Chattisgarh



Coal Belts

- The most important Gondwana coal fields of India are located in **Damodar Valley**.
- They lie in **Jharkhand-Bengal coal belt** and the important coal fields in this region are **Raniganj, Jharia, Bokaro**, Giridih, Karanpura.

The **most important coal mining centres are**

- Singrauli in Madhya Pradesh (part of Singrauli coal field lies in Uttar Pradesh)
- Korba in Chhattisgarh
- Talcher and Rampur in Odisha,
- Chanda–Wardha, Kamptee and Bander in Maharashtra
- Singareni in Telangana
- Pandur in Andhra Pradesh.

Tertiary coals occur in Assam, Arunachal Pradesh, Meghalaya and Nagaland.

It is extracted from

- Darangiri, Cherrapunji, Mewlong and Langrin (Meghalaya);
- Makum, Jaipur and Nazira in upper Assam,

- Namchik – Namphuk (Arunachal Pradesh)

Note - Besides, the brown coal or lignite occur in the coastal areas of Tamil Nadu, Pondicherry, Gujarat and Jammu and Kashmir.

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- Besides, the brown coal or lignite occur in the coastal areas of Tamil Nadu, Puducherry, Gujarat and Jammu and Kashmir.

Green Revolution

- **Context** : Green Revolution' was coined 57 years ago this month; it is time to reassess its legacy
- The 'Green Revolution', a term coined by William S Gaud in 1968, marked a critical juncture in global agriculture by significantly boosting food production, particularly in wheat and rice.
- In India, M S Swaminathan, often termed as the "Father of Green Revolution", spearheaded the scientific advancements to revolutionise India's agriculture sector.
- These transformations not only secured India's food future but also redefined its agricultural destiny forever. Key to such transformations was the adoption of High-Yielding Variety (HYV) seeds integrated with enhanced irrigation, fertiliser subsidies and farm mechanisation.
- Initially benefiting wheat production, these advancements later expanded to rice cultivation, supported by major irrigation projects like Bhakra-Nangal and Damodar Valley.
- Thanks to the Green Revolution, India's rice production soared from 34.58 million tonnes in 1960 to 137.82 MMT in recent years, **solidifying its status as one of the leading rice producers in the world.**
- While the development of HYV wheat led to a **substantial increase in the production of food grains,** it was policies that provided the much-needed impetus for Green Revolution to succeed.

- The government's intervention through **Minimum Support Prices (MSP) and procurement mechanisms**, primarily through the Food Corporation of India, provided economic security to farmers.
- Additionally, access to institutional credit replaced exploitative landlord loans, enabling farmers to invest in mechanisation and modern farming practices.
- The Green Revolution's impact extended beyond productivity gains, influencing global agricultural policies.
- The strategy was based on the premise that **technology spillovers across political and agroclimatic boundaries** could be captured through international public goods institutions. Research centres such as the International Rice Research Institute (IRRI) and the International Maize and Wheat Improvement Center (CIMMYT) played a crucial role in adapting scientific advancements for developing nations. **However, disparities in adoption rates persisted.**
- By 1998, modern varieties covered 82 per cent of cropland in Asia but only 27 per cent in Africa, highlighting regional inequalities in technological diffusion.
- Calls for a 'second Green Revolution' (GR 2.0) have emerged, emphasising sustainable agricultural practices, smallholder competitiveness, and climate resilience.

Unintended consequences of the Revolution

- While the Green Revolution ensured food security, its long-term implications have been profound. The widespread use of chemical fertilisers and pesticides led to soil degradation, groundwater depletion, and loss of biodiversity, particularly in Punjab, Haryana, and western Uttar Pradesh.
- Additionally, its benefits were unevenly distributed, **favouring states with access to irrigation while leaving rain-fed regions in eastern and southern India struggling to catch up.** State governments' policy of free electricity contributed to unsustainable groundwater extraction.
- According to CGWB (Central Ground Water Board) estimates, around 80 per cent of Punjab's water units are categorised as 'overexploited'. This raises strong questions on source sustainability
- The Green Revolution also **exacerbated inequalities between large and small farmers.** While wealthier farmers could invest in advanced technologies, smallholders found themselves burdened with rising costs and dwindling profitability, often trapped in cycles of debt.
- The impact of climate change, erratic monsoons, declining water tables, and extreme weather events, has further intensified these challenges.

- Moreover, government policies on farm power and fertiliser subsidies have strained both natural resources and state finances.
- Originally designed to drive agricultural expansion, such subsidies have now become pressing environmental and economic implications, necessitating urgent policy reforms.

What can we expect for the future

- While India has made tremendous progress in food production, **food security remains a pressing issue. India ranks 111th out of 125 in the 2023 Global Hunger Index**, highlighting that increased agricultural output has not necessarily translated into improved nutrition for all.
- The future of Indian agriculture must **strike a delicate balance between productivity and sustainability to ensure long-term food security and farmer welfare.** Beyond food grains, India has also strengthened its position in marine product exports through the **Blue Revolution**, spurred by initiatives like Pradhan Mantri Matsya Sampada Yojana (PMMSY). In 2023-24, India's marine product exports reached a record $ 7.1 billion, with shrimp leading the sector. **Additionally, horticulture production** in India touched 355.25 million tonnes in 2023-24, **surpassing food grain output, indicating a shift towards diversification potential in Indian agriculture.**
- To secure the future of Indian agriculture, policies must prioritise not just productivity but also the income augmentation of smallholder farmers, who form the backbone of the sector.
- Strengthening value chains, improving market access, integrating renewable energy solutions like agrivoltaics, diversification into high-value cultivation and increasing productivity of inland aquaculture can enhance farmers' livelihoods while ensuring sustainability.
- The need of the hour is a **holistic approach** that combines technological innovation, institutional support, and equitable resource distribution to transform Indian agriculture into a resilient and inclusive growth engine

UPSC PYQ

Q. Why did the Green Revolution in India virtually bypass the eastern region despite fertile soil and good availability of water?[150 Words, 10 Marks]

Introduction

The Green Revolution was a period of agricultural growth in India from the mid-1960s to the late 1970s. It was characterized by the introduction of **new agricultural technologies, such** as **high-yielding varieties of crops, chemical fertilizers, and irrigation**. The Green Revolution was largely successful in increasing food production in India, but it had a number of negative consequences, including environmental degradation, increased inequality, and the displacement of small farmers.

Barring few pockets, the green revolution virtually bypassed the eastern region of the country despite the fact that it has fertile soil and plenty of water due to the following reasons:

- **Irrigation Facilities**: The Green Revolution relied heavily on irrigation, so regions with abundant irrigation facilities and adequate water resources (land of five rivers) , such as Punjab, were chosen to participate. **The northwestern states, such as Punjab and Haryana, received focused attention and support from the government, contributing to their success in adopting and benefiting from the Green Revolution, while the eastern region faced challenges in providing similar irrigation facilities to support the adoption of high-yielding varieties.**
- Institutional Factors : The regions that performed best during the Green Revolution were primarily within the Mahalwari system in Punjab. The focus on individual land ownership in this system provided farmers with a stronger incentive to invest in new agricultural technologies, such as high-yielding crop varieties, chemical fertilizers, and irrigation.
- Although the Zamindari system was abolished, its influence remained in the eastern parts of India. These regions failed to benefit from the Green Revolution for a number of reasons like absentee landlordism and lack of transparency (zamindars often manipulated the land records to their advantage) etc.
- **Size of Land Holdings**: More than **80% of the total land holdings in Eastern India were/are small several landholdings. Ex-** Fragmented Landholding – Due to High TFR and population density.
- **Natural Reasons:** The eastern region **being prone to floods and droughts, made it difficult to maintain consistent crop yields.**

For example –

- Flood Prone area- Bihar – Leading to crop destruction and farm distress
- Cyclone Prone Area – Orissa
- **Lack of Financial institutions and SHG bank linkage network in Eastern India -** Eastern India had a low density of financial institutions, which made it difficult for people to access credit for the same.
- **Expensive Technology**: Even in **Punjab and Haryana, small and marginal farmers found the new technology too expensive to adopt; the input costs were beyond the reach of most farmers in the eastern region.**

- Subsistence Farming: Given that Bihar and Odisha were having substantial numbers of households below the poverty line, hence, the majority of the farmers in those States practiced subsistence farming in low value crops.
- **Cropping Pattern**: The cropping pattern in Eastern India was traditionally dominated by rice and other low-value crops. Rice was slow to respond to the new technology, while the western region surged ahead with significant increases in wheat production.
- **Government policies**: The government's policies were not always supportive of the Green Revolution in the eastern region.
- **Issues of Land ownership rights of tribal cultivators:** The eastern region of India had a large tribal population. Many of these tribals were cultivators, but they often did not have clear land ownership rights which also made it difficult for them to access credit, inputs etc.
- **In addition to these factors**, the eastern region also had a number of social and economic challenges that have made it difficult to implement the Green Revolution. These challenges include **poverty, illiteracy, and caste discrimination.**
- Despite these challenges, West Bengal has significantly increased the rice production and has emerged as one of the top rice producers in the country .

Climate change and wheat production

- **Context :** How climate change affects India's wheat production
- India recorded its warmest February in 124 years this year.
- The India Meteorological Department has already raised an alarm for March, saying that the month will experience above normal temperatures and more than the usual number of days with heat waves.
- The period coincides with the beginning of India's wheat harvest season, and extreme heat poses a grave threat for the country's second-most consumed crop, after rice.

Heat and wheat

- A 2022 study in the International Journal of Molecular Sciences noted that increasing global warming is causing heat stress that "triggers significant changes in the biological and developmental process of wheat, leading to a reduction in grain production and grain quality".
- According to the paper's authors, heat stress is known to affect the growth and development of wheat by altering "physio-bio-chemical processes such as photosynthesis, respiration, oxidative damage, activity of stress-induced hormones, proteins and anti-oxidative enzymes, water and nutrient relations, and yield-forming attributes (biomass, tiller count, grain number and size) upon exposure to temperatures above the optimum range".

- According to experts, the real problem starts with the oceans. The Indian Ocean is warming at an accelerated rate. A 2024 study conducted by scientists at the Indian Institute of Tropical Meteorology, Pune, noted that the Indian Ocean will likely be in a "near-permanent heat wave state" mainly as a result of global warming by the end of the century.
- The frequency of marine heat waves is expected to increase tenfold, from the current average of 20 days per year to 220–250 days per year, the study added.
- A warming Indian Ocean will in turn alter India's monsoon, on which most of the country's agriculture depends. For example, the kharif or summer crop season is starting and ending late, which inevitably delays the beginning of the rabi season.
- Wheat is a rabi crop. If its sowing starts late, the later stages of plant growth will coincide with early heat waves in India. February 2025 was warmer than usual, and similar trends have been predicted for March. This is also the peak season for wheat harvest, and ideal temperature in later stages of the plant's growth should not cross 30^{o} C.
- "High temperatures cause early flowering and faster ripening, shortening the grain-filling period. This results in lighter grains with lower starch accumulation, reducing the total wheat output.
- **Extreme heat causes wheat to develop higher protein content** but lower starch, making the grain harder and affecting milling quality. Farmers may face lower market prices due to reduced grain weight and quality issues,
- Low crop yield also tends to make farmers desperate and result in overuse of fertilizers, fungicides. Higher but inefficient use of resources is another cascading effect of heat-stress challenges in crops.

Adaptation and mitigation

- Guaranteeing food security requires addressing yield gaps and managing resources like fertilisers and pest control efficiently. Immediate policy support, like compensation, is necessary, but long-term solutions are also needed.
- Changes in agricultural management—such as early sowing in areas expecting early heat waves or using improved varieties with shorter growth cycles—can help alleviate heat stress. Improving production must remain the central goal.
- Policymakers must take a multi-pronged approach: combine scientific research, financial support, technology, and farmer education. This includes promoting heat-resistant varieties, adjusting sowing dates, offering financial support and insurance, and providing weather monitoring and advisories.

UPSC PYQ

Q. Discuss the consequences of climate change on food security in tropical countries. (UPSC 2023)

Basic Points

The consequences of climate change on food security in tropical countries

- **Temperature Increase and Crop Yields**
  - One of the primary consequences of climate change in tropical countries is **the rise in temperatures**. Elevated temperatures can have detrimental effects on crop yields, especially for staple crops that form the foundation of diets in these regions. **Crops like rice, maize, and wheat are highly sensitive to temperature changes, and a sustained increase in temperatures can lead to reduced yields.**
- **Changes in Precipitation Patterns**
  - Tropical regions often rely on predictable rainfall patterns for successful agriculture. However, climate change is altering these patterns, leading to increased frequency and intensity of extreme weather events such as **droughts and floods**. Prolonged droughts can result in water scarcity, affecting both rain-fed and irrigated agriculture**. Conversely, intense rainfall and flooding can damage crops, erode topsoil, and disrupt planting schedules, contributing to decreased agricultural productivity.**
- **Increased Incidence of Extreme Weather Events**
  - Tropical countries are more prone to extreme weather events, such as hurricanes, typhoons, and cyclones, which are exacerbated by climate change. These events can have devastating effects on crops, livestock, and infrastructure. **Floods and storms can lead to soil erosion, destroy crops in the field, and disrupt transportation networks, making it difficult for farmers to bring their produce to market**. The aftermath of such events often results in a loss of livelihoods and increased food insecurity for affected populations.
- **Impact on Fisheries and Aquaculture**
  - Climate change not only affects terrestrial agriculture but also has significant implications for fisheries and aquaculture, which are vital sources of protein for many tropical populations. **Rising sea temperatures, ocean acidification, and changes in currents can disrupt marine ecosystems, affecting the distribution and abundance of fish species.** Coral bleaching events, linked to higher sea temperatures, have widespread implications for coral reef ecosystems that support diverse marine life. These changes threaten the livelihoods of communities dependent on fishing and aquaculture, impacting their food security.
- **Spread of Pests and Diseases**

- **Warmer temperatures and altered precipitation patterns create favourable conditions for the spread of pests and diseases**. In tropical countries, where agriculture is often dominated by smallholder farmers with limited resources, the increased prevalence of pests poses a significant threat to crops. **Invasive species and new strains of pathogens can reduce yields and affect the quality of produce**. The need for increased pesticide uses as a response further contributes to environmental degradation and poses health risks to farmers.

- **Water Scarcity and Agriculture**
  - Changes in precipitation patterns and the melting of glaciers in some tropical mountainous regions contribute to water scarcity, a critical factor in agriculture. **Agriculture is a water-intensive activity, and alterations in water availability can lead to reduced crop yields and increased competition for water resources.** In regions heavily dependent on rain-fed agriculture, irregular rainfall can lead to soil moisture stress, affecting crop growth and productivity.

- **Social and Economic Impacts**
  - The consequences of climate change on food security in tropical countries extend beyond the agricultural sector.
  - Vulnerable populations, including smallholder farmers, women, and indigenous communities, often bear the brunt of these impacts. **Loss of crops and livelihoods can lead to increased poverty, migration, and conflicts over scarce resources**. The social fabric of communities is strained as they grapple with the challenges posed by food insecurity, affecting education, health, and overall well-being.

- **Threats to Biodiversity**
  - Climate change contributes to habitat loss and changes in ecosystems, posing threats to biodiversity. The loss of biodiversity can have cascading effects on food systems, as diverse ecosystems often provide essential services such as pollination, pest control, and genetic resources for crops. Disruptions to these services can compromise the resilience of agricultural systems, making them more susceptible to the impacts of climate change.

Human Geography

Masai tribe

- Context : Tanzania: Maasai pastoralists resist carbon credit projects amid fears of land dispossession
- The Masai, cattle pastoralists.
- The Masai are a nomadic tribe who once wandered with their herds of cattle in the central highlands of East Africa~ in Kenya, Tanzania and Uganda.

- At the height of their power, in the mid-nineteenth century they numbered about 50,000. But today after a century's tribal clashes, epidemics and natural deaths, their numbers have been greatly reduced. They are now mainly confined to the 15,000 square miles of Masai reserves in Kenya and Tanzania.
- Their old grazing grounds in the Kenyan Highlands were taken over first by the immigrant white settlers for plantation agriculture (coffee, tea, cotton) and dairy farming and later, after independence, by African farmers.
- They now occupy the less favoured areas of savanna in which are grazed something like a million cattle and perhaps twice as many sheep and goats.
- On the lower slopes of the East African plateau, where rainfall is as low as 20 inches and there are long periods of drought, the grass seldom reaches a foot high and is not nutritious.
- When there is a drought the Masai move upwards to the higher and cooler plateau regions in which their herds can graze on the better pastures .
- They build circular huts with sticks, bushes and muć for temporary shelter.
- The cattle are kept in a special enclosure at night and are protected from attack by wild animals by a strong fence.
- The cattle kept by the Masai are the **zebu cattle** with humps and long horns. They are treated with great respect and affection and are never slaughtered for food or for sale.
- The beef is only consumed when they die a natural death from old age or disease They are never used as draught animals and are kep entirely for the supply of milk and blood. Milking is done by women before day-break and at dusk The yield is extremely low by any standard and usuall- not more than two pints are obtained at a singl milking. The milk is drunk either fresh or sour Cheese-making is still not known to the Masai .Blood from both bulls and cows is drunk.
- **Cattle are kept by every considered far more valuable than anything else, and are symbols of wealth**. The richest man has the largest herds of cattle, leaving aside the sheep and goats which, to the Masai tribes, are of little signifi- cance.
- Cattle are used in payment for wives, and when the father of a family dies, the mother divides the livestock among the sons. The Masai will not slaughter the cattle for food.
- Because the number of cattle is more important to the Masai than their quality, the Masai will not willingly sell their cattle. So the large area of land which they occupy in East Africa is not used profitably.
- Great efforts are being made to get the Masai to care for their animals properly and raise them for sale, keeping only as many animals as the pasture can support .
- Many Masai are responding to modern techniques but the majority stubbornly continue in their old ways. Amongst most of the other African tribes, pastoralism exists side by side with agriculture.

Places in News

Ana Sagar Lake

Context : The Supreme Court accepted the Rajasthan government's proposal of relocating the structures from inside the Seven Wonders Park along the Ana Sagar Lake in Ajmer within a period of six months.

ANASAGAR LAKE

Founded by the grandfather of Prithivi Raj Chauhan, King Anaji Chauhan between 1135 -1150 AD, Ana Sagar Lake is an artificial lake. It is one of Ajmer's most popular lakes and one of India's largest lakes. Named after its founder, the lake was founded during the 12th century, after a dam was built across Luni River. Ana Sagar Lake is surrounded by Daulat Bagh Gardens and Khobra Behroon temple, two popular attractions of Ajmer.

The best time to visit Ana Sagar Lake is between October and March when the climate is pleasant and the water level is full. The lake dries up in the summer season.

Ana Sagar lake is around 13 km from the main city of Ajmer. You can also spot an island in the middle of the lake. Indulge in water scooter ride or boating here.

Betwa River

- Context :The Betwa River is drying up as a result of illegal sand mining, deforestation, and excessive extraction of water through borewells.
- The Betwa rises in Bhopal district (Vindhyan Range) – Tributary of Yamuna River
- It has a total length of 590 km.
- The Dhasan is its important tributary.

Pamban Rail Bridge

- Context : Inauguration - new Pamban rail bridge
- Spanning the azure waters of the Palk Strait, the new bridge, which will replace the British-era Pamban bridge of 1914, connects the Rameshwaram, located on Pamban Island, with the mainland of Tamil Nadu.
- The construction of the new bridge was conceived to address the limitations of the old bridge, which was India's first sea bridge and served over a century, and accommodate the growing traffic volume.

History

Art and Culture

Vikramshila University


Premium

After Nalanda, another Bihar university now set to rise from the ruins

Though the Centre had approved the project in 2015 and sanctioned Rs 500 crore, with the state government unable to identify a suitable land for the project, there had been little progress until now.

Written by Santosh Singh
Antichak (bhagalpur) | Updated: March 25, 2025 14:15 IST

NewsGuard


Ruins of the ancient Vikramshila University in Bhagalpur. (Image source: ASI)

Vikramshila University

Why in News?	**A decade after the revival of Nalanda University, the revival of Vikramshila University in Bihar gains momentum.**
Location	Banks of river Ganges, **Bhagalpur district, Bihar.**
Establishment	Founded by **King Dharmapala of Pala dynasty** in **late 8th - early 9th century.**
Educational Importance	Centre for **Tantric & Vajrayana Buddhism,** esoteric and tantric studies. Diverse Subjects: **Theology, Philosophy, Grammar, Metaphysics, Logic and Tantra**
Features & Structure	Stupa with 208 rooms, library with cooling system, Vice-Chancellor-led administration.
Downfall	**Destroyed in 1203 AD during invasion by Muhammad bin Bakhtiyar Khilji.**

Other Important Ancient Indian Universities

University	Location	Established By	Period	Significance
Taxila	Taxila, Punjab (Now Pakistan)	Believed to be founded by Duryodhana	6th century BCE	Chanakya, Chandragupta Maurya, and the Ayurvedic healer Charaka studied at Taxila.
Odantapuri/ Uddandapura.	Magadha, Bihar	Gopala (Pala dynasty)	8th century - 1193	Second oldest, Buddhist learning,

				destroyed by Khilji
Jagaddala	Varendra, Bengal (Now Bangladesh)	Rampala (Pala dynasty)	11th century	Buddhist monastery.

Important Ancient Indian Universities

University	Location	Established By	Period	Significance
Vallabhi	Bhavnagar, Gujarat	Maitrak dynasty	600 AD - 1200 AD	Hinayana Buddhism, famous alumni - Gunamati and Sthiramati.
Pushpagiri	Kalinga (Odisha)	Ashoka	3rd century BCE - 11th century	spread across three adjoining hills – Lalitgiri, Ratnagiri, and Udayagiri, visited by Hiuen Tsang
Somapura	Bangladesh	Dharmapala (Pala dynasty)	8th - 12th century	Buddhism, Jainism, Hinduism
Sharada Peeth	Kashmir	-	Ancient	Kalhana – historian and author of Rajtarangini, Adi Shankara – philosopher of Advaita Vedanta, Kumarajiva – Buddhist scholar, Vairotsana – Tibetan translator, Thonmi Sambhota – Tibetan scholar studied here.

Six Sites from India in UNESCO Tentative list

Tentative UNESCO Sites (2025)

Six sites added to India's tentative list by UNESCO's World Heritage Centre, says Gajendra Singh Shekhawat in Lok Sabha

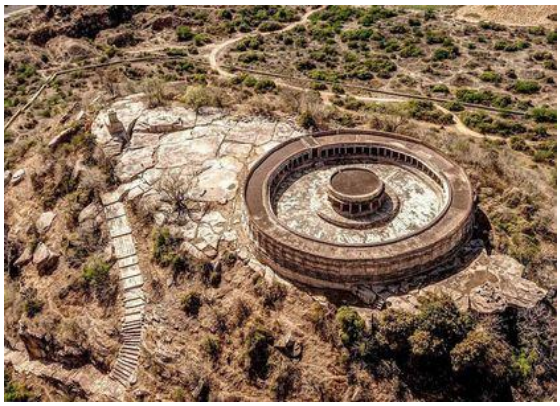
With these additions, India now has 62 sites on the tentative list, an inventory of properties each country intends to consider for UNESCO nomination

Updated - March 17, 2025 03:16 pm IST - New Delhi

Mudumal Menhirs	Kanger Valley National Park	Ashokan Edict Sites	Chausath Yogini Temples	Gupta Temples	Palace-Fortresses of the Bundelas
Telangana	Chhattisgarh	Multiple States	From Different States	Multiple States	MP & UP
Megalithic astronomical observatory. Some menhirs are aligned with the rising and setting sun during the summer and winter solstices.	Remarkable geological formations, stunning natural beauty, and diverse range of flora and fauna; Dandakaranya forests	Ashokan inscriptions; Buddhist spread	Circular temples; dedicated to Yoginis. Tantric traditions	Early Hindu temples; Gupta art	Fortified palaces; Bundela grandeur

- **A menhir is a standing or an upright stone**, which is usually tapered at the top. It is man-made, in that it is sculpted and placed by humans, and usually quite large — the largest surviving menhir, the Grand Menhir Brisé or the Great Broken Menhir in Brittany, France, once stood at 20.6 m tall.
- The term 'menhir' is derived from the Brittonic "*maen*" meaning "stone", and "*hîr*" meaning "long", and entered the archaeological lexicon in the late 18th century.
- At present, a total of 43 properties from India are inscribed on the UNESCO World Heritage List, including 35 in the 'Cultural' category, seven in 'Natural' and one in 'Mixed' category.

- India hosted a **World Heritage Committee meeting for the first time in 2024,** during which the **Moidams** — the mound-burial system of the Ahom Dynasty in Assam — was accorded the coveted UNESCO tag.



- The Chausath Yogini temples have 64 images of the Yoginis in their individual cells or shrine with intricate stone carvings circularly arranged. These temples are mostly situated on hilltops.
- Yogini refers to a female practitioner of yoga and *chausath* is the Hindi word for the number 64.
- They are a group of forest spirits and mother goddesses. The Chausath Yoginis were feared & worshiped for their *tantrik* power.
- It is this embodiment of both alluring and threatening qualities, as well as the large number of goddesses from the group that identifies them as Yoginis.
- The cult of the Yoginis was very powerful between the 9th and 12th centuries CE.
- The tribes in the old Gondwana forests of Central India were the original devotees of the Chausath Yoginis. Ultimately, the traditional Hindu pantheon of Gods and Goddesses got incorporated in the Chausath Yogini.
- This cult celebrated the feminine and its power. The temples were designed to "reflect the form of a reclining, languid woman". This is how they celebrated sensuality and fertility.
- The temples were typically circular, on elevated ground (or pedestal), and open to the sky. The statues of the 64 female forms were in chambers lining the circumference of the temple. Dancers probably performed in the central courtyard.
- There are around 13 such temples in India out of which 8 are in Madhya Pradesh.
- These include Chausath Yogini temples at Khajuraho, Bhedaghat, Mitaoli, Dudhai, Badoh, Hinglajgarh, Shahdol, Naresar in Madhya Pradesh; Hirapur, Ranipur in Odisha and Lakheri, Rikhiyan in Uttar Pradesh and Kanchipuram, Tamil Nadu.

Sarhul Festival


News / Explained / Explained Culture / In celebration of tribal festival Sarhul, link to communities' history, politics

Premium

In celebration of tribal festival Sarhul, link to communities' history, politics

Sarhul, literally "worship of the Sal tree", is among the most revered Adivasi festivals. It is rooted in nature worship and celebrates the symbolic union of the Sun and the Earth.

Written by Shubham Tigga

Ranchi | Updated: April 2, 2025 19:07 IST

NewsGuard

- On 1st April 2025, the Oraon, Munda and Ho tribes in Jharkhand and the larger Chhotanagpur region celebrated the new year and the arrival of spring with the Sarhul festival.
- The festival is observed for three days, from Chaitra Purnima until the third day of the Chaitra month in Shukla Paksh.

- Sarhul, literally means "worship of the Sal tree' and Adivasis venerate **Sal trees (Shorea robusta)**, believing them to be the **abode of Sarna Maa**, the **deity who protects villages from natural calamities.**
- It is rooted in **nature worship** and celebrates the **symbolic union of Sun & Earth.** This union is key to all life on Earth, which depends on the coming together of the Sun's rays and the soil (Earth).

- A male priest from the village **(*pahan*)** plays the role of the Sun, while his wife **(*pahen*)** becomes the Earth.

Features of the Festival:

- **Three-day celebration** held at **Sarna Sthals** (sacred groves).
- **Sal flowers** are offered to the village deity, **Sarna Maa**.
- **Traditional dances** like **Jadur, Gena, and Por Jadur** are performed.
- A **community feast** and consumption of **Handia (rice beer)** mark the final day.

Only **after the rituals are completed do Adivasi folk begin ploughing** their fields, sowing their crop, or entering the forest to gather produce.

New Year Festivals Across Indian States

- Chaitra Sukladi Marks the beginning of the Hindu New Year, based on the lunar calendar.
- The Vikram Samvat calendar used in North India also begins from Chaitra Sukladi.

New Year Festival	State/Region	Specific Feature
Baisakhi	Punjab	Sikh New Year; spring harvest; Bhangra & fairs
Poila Boishakh	West Bengal	Bengali New Year; cultural programs & foods
Puthandu	Tamil Nadu	Features 'Mangai Pachadi' symbolizing life's flavors
Vishu	Kerala	Vishukkani – first sight of auspicious items
Maha Vishubha Sankranti	Odisha	Odia New Year; 'Pana Sankranti' with special drink
Bohag Bihu	Assam	Assamese New Year; dance, songs, feasts
Ugadi/Yugadi	AP, Telangana, Karnataka	Ugadi Pachadi – dish with six flavors

Gudi Padwa	Maharashtra	Gudi hoisting; marks victory & prosperity
Cheti Chand	Sindh/Sindhi	Birth of Jhulelal; Sindhi New Year
Nowruz	Parsi community	Persian New Year; It is celebrated on **21st March** every year, to mark the **beginning of spring and the day of equinox,** inscribed in the list of **UNESCO Intangible Cultural Heritage of Humanity of India in 2016.**
Sajibu Cheiraoba	Manipur	Sajibu Nongma Panba Cheiraoba marks the Meitei New Year, Falling on the first lunar day of the Sajibu month (March/April).
Thapna	Rajasthan (Marwari)	Marwari New Year; community rituals
Jude Sheetal	Bihar (Mithila)	Maithili New Year; family meals & culture

Geet Gawai


'Deeply touched': PM Modi receives traditional Bihari welcome by Indian diaspora at Mauritius port

The Indian prime minister will meet his counterpart, along with President Dharam Gokhool, and address a community programme this evening.

By: Express Web Desk
New Delhi | Updated: March 11, 2025 11:57 IST

In this image by PMO on Tuesday, March 11, 2025, Prime Minister Narendra Modi being welcomed by members of the Indian community, in Mauritius. (PMO via PTI Photo)

- Geet-Gawai is a pre-wedding ceremony that combines rituals, prayer, songs, music and dance.
- It is performed mainly by **Bhojpuri-speaking communities** in Mauritius who have Indian descent.
- The traditional practice takes place at the **home of the bride or groom** and involves female family members and neighbours.
- It begins with five married women sorting items (turmeric, rice, grass and money) in a piece of cloth while other participants sing songs that honour Hindu gods and goddesses.
- After the site has been sanctified, the mother of the bride or groom and a drummer honour musical instruments to be played during the ceremony, such as the dholak (a two-headed drum).
- Uplifting songs are then performed and everyone joins in and dances.
- Geet-Gawai is an expression of community identity and collective cultural memory.

Inscribed in 2016 on the Representative List of the Intangible Cultural Heritage of Humanity.

Additional Information:

- There was a time when Mauritius was a British and French colony. From 1834 to the beginning of 1900, **around five lakh Indians were brought here by the British to work.** Two-thirds of these workers settled here.
- The first batch of 36 people who came to Mauritius in a ship named 'Atlas' on **November 2, 1834** were from Bihar, the Bhojpuri speaking belt. **This day is still celebrated as the Immigrant Day in Mauritius.**
- **Bhojpuri -** Holds a significant position as one of Mauritius's dominant languages, as the 2011 Census shows approximately **5.3% of the population speaks Bhojpuri.**
- **Port Louis** has the immigrant ghat, where Indian workers descended to change the fate of Mauritius. **UNESCO has declared the place a World Heritage Site.**

Kamb Ramayana

The **Ministry of Culture** has launched a comprehensive initiative to preserve and promote Kamba Ramayana recitals in Tamil Nadu.

- Kambar, also known as Kavichakravarthy Kamban (1180 – 1250) CE was a **renowned Tamil poet.**
- He is celebrated for composing the **Ramavataram** (Kamba Ramayanam), the Tamil adaptation of the Ramayana.
- Kambar lived and flourished in the **Chola Empire** during the reign of **Kulothunga III.**
- He received royal recognition and was bestowed the title **Kavi Chakravarthy (Emperor of Poets).**
- **He lived after Vaishnavite philosopher Ramanuja, whom he references in his works.**

Other works:

- Tirukkai Valakkam – Ethical and moral verses.
- Erelupatu and Silai Elupatu – Spiritual compositions.
- Kangai Puranam – Temple-based mythological narrative.
- Sadagopar Antati and Saraswati Antati – Devotional compositions.

Modern Indian History

PEPSU Muzhara Movement


Explained: The story of the PEPSU Muzhara Movement, observed on March 19

The movement began in the 1930s as the landless, tenant farmers or muzharas of Punjab began a struggle to get ownership rights of the land they farmed.

Written by Rakhi Jagga Follow
Ludhiana | Updated: March 20, 2025 15:01 IST

NewsGuard MORE EXPLAINED

March 19 commemorates the anniversary of the Muzhara movement, a significant agrarian struggle in Punjab.

PEPSU Muzhara Movement

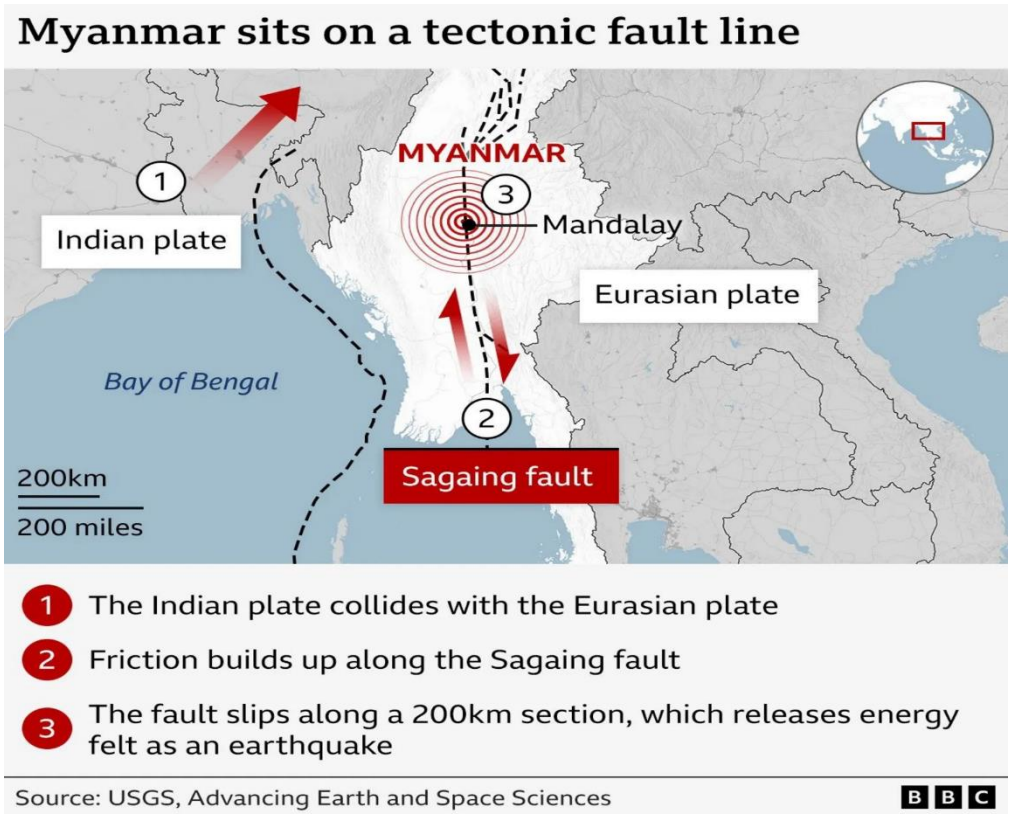
- **Initiation**: Originated in the **1930s** in the **Patiala princely state** (now part of Punjab), where **landless tenant farmers (muzharas)** began demanding ownership rights over the land they had cultivated for generations.
- **Terminology**: The term **'muzhara'** refers to **landless tenant farmers** who worked on lands owned by landlords, known as **biswedars**.
- **Feudal System**: Under the **biswedari system**, landlords extracted a significant portion (often one-third) of the produce from tenant farmers, perpetuating a cycle of exploitation.
- **Post-Independence Developments**: After India's independence, the region became part of the **Patiala and East Punjab States Union (PEPSU)**. In **October 1948**, the Maharaja of Patiala ordered that one-third of village lands be allocated to jagirdars, which was met with resistance from the farmers.
- **Kishangarh Incident (March 19, 1949)**: A pivotal moment occurred when **biswedars attempted to reclaim lands** in **Kishangarh village**. The confrontation led to the death of four farmers, one policeman, and a patwari. This event became a symbol of the movement's struggle.
- **Land Reforms**: The movement culminated in the **PEPSU Tenancy (Temporary Provision) Act of 1952**, granting ownership rights to tenant farmers upon payment of a one-time compensation.
- **Legacy and Commemoration**: March 19 is observed annually to honor the martyrs of the movement. Memorials, including one at Kishangarh village, have been established to commemorate their sacrifice.
- Notable Leaders:
  - **Teja Singh Sutantar**: A revolutionary leader who played a significant role in the movement.
  - **Jagir Singh Joga**, **Buta Singh**, **Sewa Singh Thikriwala**, and **Bhai Jodh Singh**: Prominent activists who contributed to the movement's momentum.

International Relations

India's Neighborhood

Earthquake in Myanmar

- Operation Brahma is an ongoing disaster relief and rescue operation undertaken by the Indian government in response to the 2025 Myanmar earthquake.
- External Affairs Minister S. Jaishankar announced that India initiated the operation on 28 March 2025 led by Indian Army.
- As part of the operation, a specialised medical task force was deployed to deliver urgent medical care, including emergency treatments, trauma management, and surgical interventions for those in need.
- The mission has been named Operation Brahma, after the Hindu God of creation, symbolising India's efforts to assist in the rebuilding of Myanmar following the devastating earthquake.
- The name reflects the nation's commitment to providing immediate relief and supporting long-term recovery and reconstruction in the affected regions.
- On 28 March 2025, a devastating 7.7-magnitude earthquake struck Myanmar at 12:50 pm local time, causing widespread destruction and loss of life.
- The quake, originating from the right-lateral Sagaing Fault, was followed by a 6.4-magnitude aftershock, further impacting the region.
- The death toll has risen to over 1,600, with thousands injured and many still missing.
- The tremors were felt as far as Bangkok, Thailand, leading to building collapses and casualties there as well.
- The powerful earthquake in Myanmar had its source in central Myanmar, about 20 km from Mandalay, the country's second-largest city.
- Mandalay, located on the east bank of the Irrawaddy river, is close to one of the most seismically active faults in the region, called the Sagaing fault, named after a town not far from Mandalay on the river's opposite side.



Protests in Nepal

- The 2025 Nepalese pro-monarchy protests are an ongoing protest movement advocating for the restoration of the Hindu monarchy in Nepal.
- On 9 March 2025, thousands demonstrated in the capital city, Kathmandu, in favor of restoring the monarchy with the former King Gyanendra Shah as its head.
- On February 19, 2025, a public holiday commemorating the 1951 Revolution, former King Gyanendra Shah delivered a video speech urging citizens to support the revival of the monarchy.
- Following this speech, there has been an uptick in pro-monarchy protests and activism.
- Some in Nepal have been frustrated with the current federal republic government. In the past 17 years from the abolition of the monarchy, there have been 13 government formations.
- The country continues to face challenges of governmental instability, corruption and struggling economy.

Background of Protests

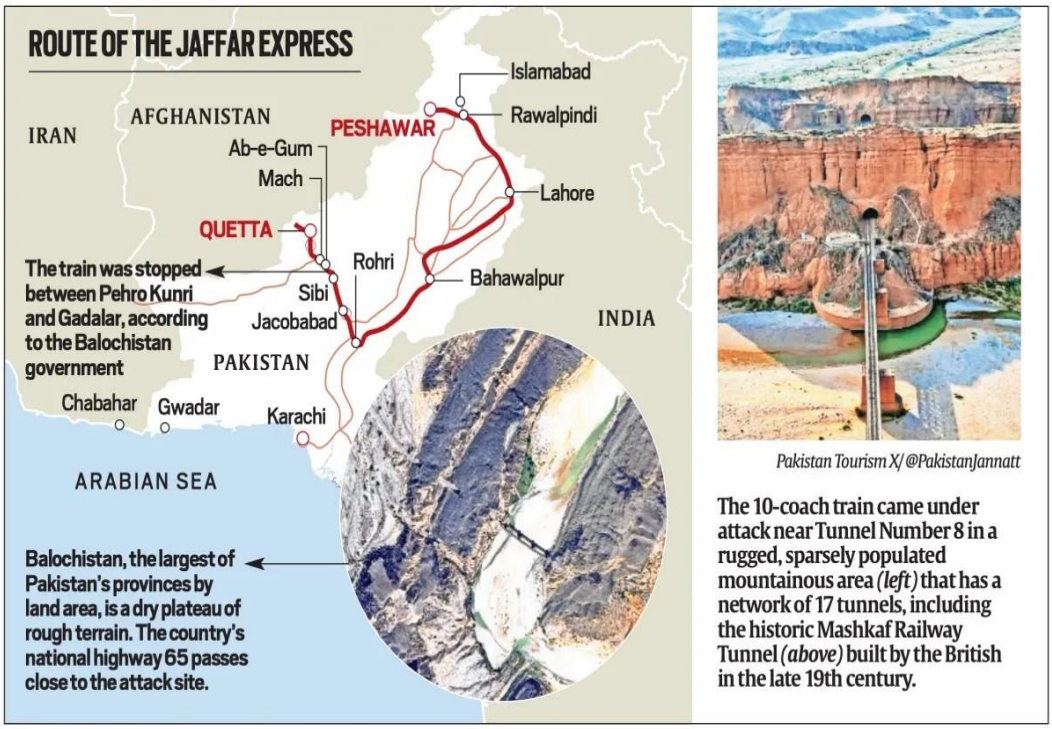
- Nepal became a republic in **2008**, abolishing the 240-year-old monarchy after a decade-long Maoist insurgency and a popular movement for democracy.
- Despite over 15 years of the republican setup, many citizens believe that the new system has failed to address issues like corruption, political instability, and economic challenges.
- The country has experienced frequent changes in government and coalition politics, leading to political uncertainty.

Important Events

- Clashes broke out between protesters and the police, resulting in **two deaths** and several injuries.
- Security forces used **batons and water cannons** to disperse the crowds, leading to criticism of police brutality.
- Protesters carried **portraits of former King Gyanendra** and shouted slogans favoring a **Hindu monarchy**.

Train Hijacking in Pakistan

- On March 11, 2025, insurgents from the Baloch Liberation Army (BLA) hijacked the Jaffar Express in Balochistan, taking approximately 182 hostages.
- The Pakistani military conducted operations to rescue the hostages, resulting in casualties on both sides.
- This event underscores the ongoing security challenges in Balochistan.



Mahrang Baloch

- Prominent Baloch human rights defender Mahrang Baloch was arrested and detained in Quetta's Hudda District Prison.
- Her arrest has drawn international attention, highlighting concerns about human rights and freedom of expression in Pakistan.

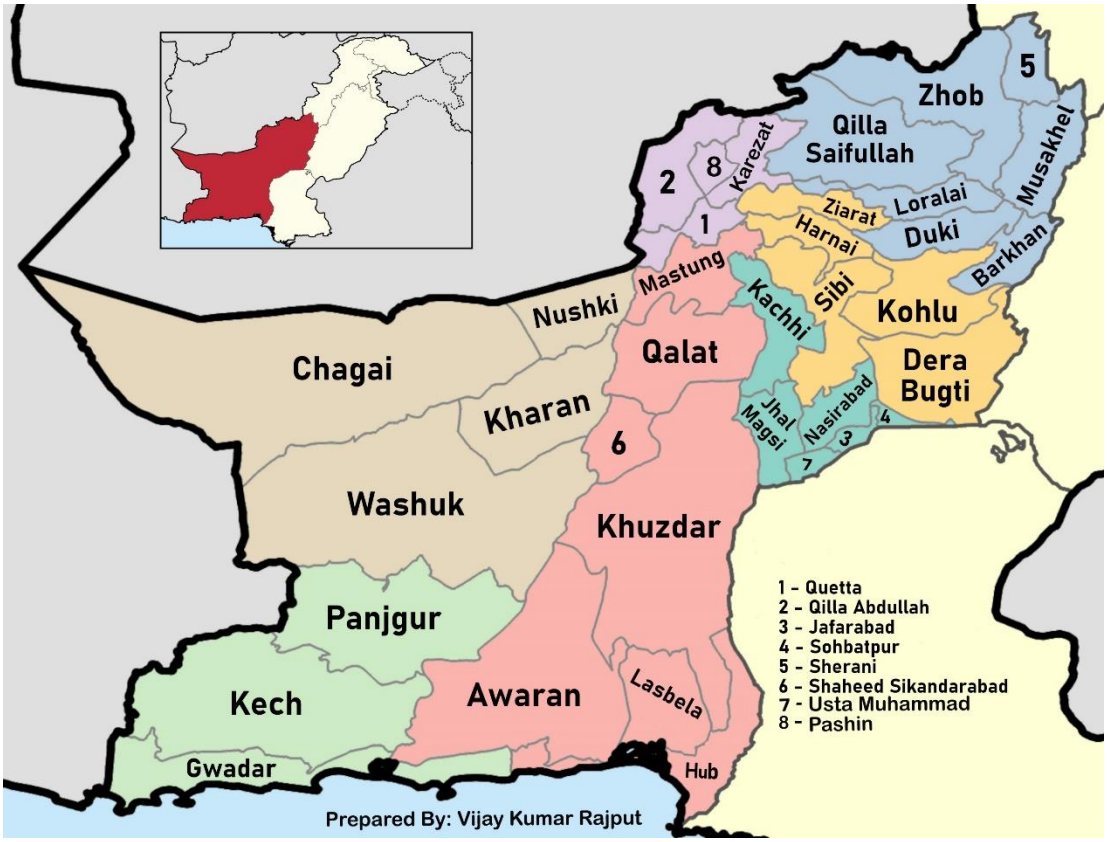
Background

- Balochistan, **the largest Pakistani province**, is **sparsely populated and impoverished** when compared to the rest of the country.
- Balochistan is the largest but least populated of Pakistan's four provinces – Balochistan, Sindh, Punjab and Khyber Pakhtunkhwa.
- At the same time, its **location as well as abundance** of natural resources, especially oil, make it **strategically vital for Pakistan**.
- The province has been the site of a series of bloody insurgencies, brutal state repression, and an **enduring Baloch nationalist movement since 1948**.

Baluchistan's Struggle for Autonomy

- **Balochistan, Pakistan's largest province** by land area, has been embroiled in a protracted conflict marked by ethnic tensions, economic disparities, and political grievances.

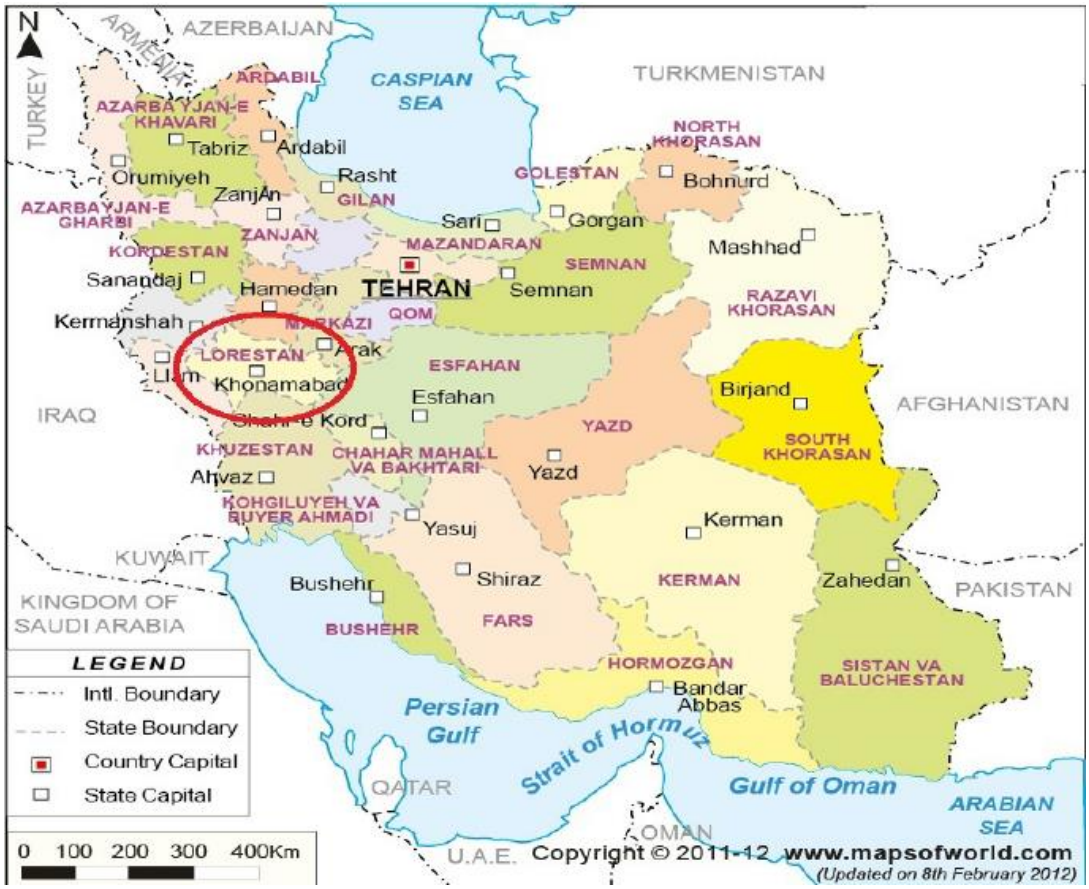
Political Map Of Baluchistan



- **Forced Accession and Subsequent Conflict:**
  - At the dawn of Pakistan's independence, **Balochistan comprised several chiefdoms**, with Kalat being the most prominent under the leadership of Ahmed Yar Khan.
  - Initially hesitant to **accede to Pakistan, Khan's aspirations for an independent Baloch state** were thwarted by geopolitical exigencies, leading to Balochistan's forced accession in 1948.
  - Subsequent protests and insurgencies, **notably initiated by Prince Abdul Karim in 1948,** have characterised **the Baloch** quest for autonomy, spanning decades of violent conflict.
- **Human Rights Concerns and State Response:**
  - The Baloch insurgency has been met with severe state repression, with Pakistani forces accused of **egregious human rights violations**, including extrajudicial killings, enforced disappearances, and torture.
  - Reports from organisations **like Amnesty International and Voice for Baloch Missing Persons** highlight the widespread nature of these abuses, **with tens of thousands of casualties reported since the inception of the conflict.**
  - Baloch nationalist groups, while championing autonomy, have also **faced accusations of human rights violations**, further complicating the conflict's humanitarian dimensions.

- **Ethnic Dynamics and Economic Grievances:**
  - Ethnic disparities, rooted in Balochistan's distinct identity vis-à-vis Punjabis and Sindhis, **have fueled the trajectory of the conflict**, echoing the ethnic cleavages that precipitated **the disintegration of East Pakistan in 1971.**
  - Economic injustice, epitomised by the marginalisation of Balochistan's indigenous population in **resource exploitation projects like the China-backed Gwadar Port,** exacerbates existing grievances.
  - The **preferential employment of non-Baloch technical experts** underscores the systematic exclusion of Baloch individuals from the economic benefits of their own land.
- **External Influences and Geopolitical Dimensions:**
  - The Balochistan conflict is not confined within Pakistan's borders; external actors, including India and Iran, have been implicated in exacerbating tensions to advance their geopolitical interests.
  - **While Pakistan alleges foreign interference, particularly from India, in stoking unrest in Balochistan, such claims remain contested**.

Political Map of Iran



Conclusion

- Balochistan's struggle for autonomy encapsulates a **multifaceted nexus of historical legacies**, socio-economic disparities, **and external influences**.
- The enduring conflict underscores the imperative for a holistic approach addressing ethnic grievances, economic disparities, and human rights abuses to **pave the way for sustainable peace** and inclusive development in Pakistan's southwestern frontier.

India & World

Trump Travel Ban 2.0

- After weeks of speculation , the Trump administration is gearing up to issue a sweeping series of travel restrictions on the citizens of 43 countries, including Afghanistan, Bhutan and Pakistan.

Red List

- No one from this bucket would be allowed to travel to the US.
- Countries include Afghanistan, Bhutan, Cuba, Iran, Libya, North Korea, Somalia, Sudan, Syria, Venezuela and Yemen.

Orange List

- Travel from these countries would be restricted but not completely stopped.
- The entry of affluent business travellers might still be permitted, but that immigrant or tourist visas will not be issued.
- Citizens on this list would have to clear mandatory in-person interviews to receive a visa.
- Countries include Belarus, Eritrea, Haiti, Laos, Myanmar, Pakistan, Russia, Sierra Leone, South Sudan, and Turkmenistan.

Yellow List

- The Yellow List includes 22 countries that would be given 60 days to resolve perceived deficiencies.
- If these remain unaddressed these, countries in this list could be moved to either of the two above buckets.

Trump's First Term

- Trump in his first term enacted the so-called "Muslim ban", following his 2015 campaign proclamation declaring "a total and complete shutdown of Muslims entering the United States until our country's representatives can figure out what the hell is going on."

CHNV Programme

- In a notice posted to the Federal Registry the Department of Homeland Security (DHS) said that it would revoke the temporary legal status of 532,000 migrants from Cuba, Haiti, Nicaragua and Venezuela, who had arrived in the US since October 2022.

Parole Period

- The parole period, including the work permits and protection from deportation under the programme, will expire on April 24.
- All parolees under the programme now face the imminent threat of deportation.
- Parole under the Immigration and Nationality Act officially grants a person permission to enter and temporarily stay in the US under DHS supervision.
- Under the act, the DHS secretary enjoys the discretionary authority to "parole into the United States temporarily under such conditions as he may prescribe only on a case-by-case basis for urgent humanitarian reasons or significant public benefit any alien applying for admission to the United States.
- A parolee is permitted to remain in the US only for the duration specified in the parole grant, and may be granted work authorisation.
- A 2020 Congressional Research Service (CRS) report says that a range of parole programmes were created in response to different situations, and allowed entry to different groups of foreign nationals who were ineligible for refugee status.
- However, this does not translate into formal admission, meaning the person must still apply for such admission to be able to remain in the country for a longer period.
- Similarly, securing parole does not automatically entitle beneficiaries to the status of Lawful Permanent Resident (LPR) or green card holder.
- Only some parolee groups have secured LPR status under a 1960 law after securing immigrant visas and meeting other requirements.
- In 2022, President Joe Biden introduced a parole entry programme for Venezuelans, expanding this to Cubans, Haitians and Nicaraguans in 2023.
- The US does not have diplomatic relations with the four countries.
- These parole programs would be temporary, with a two-year expiry date unless they were renewed.
- Before the programme was introduced, asylum-seekers from the CHNV countries would be stuck in overcrowded shelters in New York and other cities.

Cost of Protecting Europe

- Donald Trump's tactic of using threats to get what he wants in business and politics is something political leaders worldwide are gradually growing accustomed to.
- But the deal to end the Ukraine war the US president is apparently forging behind the scenes with Russian President Vladimir Putin has rattled government leaders.
- British Prime Minister Keir Starmer has responded to these concerns by announcing an increase in the UK's defense budget to 2.5% of gross domestic product (GDP) by 2027, up from the current 2.3%.

- In Germany, political leaders are still struggling to find a response to the British prime minister's call for a European "coalition of the willing" that should take the continent's defense into its own hands.

NO NATO

- For decades, European NATO members have relied on the United States, the alliance's largest and strongest economic power, to shoulder the main burden of the continent's defense.
- Now, leaders in Europe are considering how to respond to the likely collapse of NATO if Trump withdraws US support.
- In response to Russia's war in Ukraine, Germany created a 100 billion euro ($103 billion) special debt fund to modernise the country's long-neglected armed forces.
- Though not yet entirely spent, the money is already allocated.
- However, a steady increase in Germany's regular defense budget has not yet been achieved.
- The Bruegel economists have calculated that US military aid to Ukraine in 2024 amounted to €20 billion out of a total €42 billion. "To replace the US, the EU would thus have to spend only another 0.12% of its GDP — a feasible amount," they said in their analysis.
- Bruegel has also outlined what Europe will need to avoid being defenseless if the US exits NATO.

How To Finance EU's Armament?

- One option is repurposing the European Investment Bank (EIB) or creating a new "rearmament bank" to substantially support the defense sector with minimal impact on national budgets.
- Alternatively, the EIB could issue loans to defense companies or create bonds specifically for military projects.
- The "most straightforward way" for Allen-Reynolds would be if the EU launched a new joint borrowing program comparable to the €750 billion pandemic recovery fund, also known as NextGenerationEU.

Black Sea Ceasefire Talks

- Recent developments indicate that Ukraine and Russia have agreed to a ceasefire in the Black Sea region, facilitated by the United States during negotiations in Riyadh, Saudi Arabia.
- The agreement aims to ensure safe navigation, eliminate the use of force, and prevent the military use of commercial vessels in the Black Sea.
- Ceasefire Terms: Both nations committed to halting military activities in the Black Sea to allow the safe passage of commercial vessels.
- Sanctions Relief: The U.S. agreed to assist in restoring Russia's access to global markets for agricultural and fertilizer exports.

- However, Russia has stipulated that the ceasefire will only commence once sanctions on its agricultural bank and related financial institutions are lifted and they are reconnected to the SWIFT system.
- **Energy Infrastructure:** Both parties consented to develop measures to prevent attacks on energy facilities, aiming to protect critical infrastructure from further damage.

Challenges

- **Implementation Delays**: The ceasefire's initiation is contingent upon the lifting of specific sanctions, leading to potential delays and complications in enforcement.
- **Ukrainian Skepticism**: Ukrainian President Volodymyr Zelensky has expressed distrust towards Russia's commitment, emphasizing the need for tangible actions over verbal agreements.
- **International Concerns:** Critics argue that concessions made to Russia, particularly regarding sanctions relief, might inadvertently empower its military capabilities and undermine the broader sanctions regime

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Black Sea

Black Sea in News in 2024

- **Naval Warfare:** The Black Sea witnessed heightened naval confrontations, with both Russian and Ukrainian forces deploying advanced maritime strategies and technologies. Unmanned Surface Vessels (USVs) played a pivotal role, leading to significant shifts in naval tactics.
- **International Military Exercises:** The U.S. Navy participated in the **Poseidon** mine countermeasures exercise alongside Bulgarian, Romanian, and Turkish forces in the Black Sea, aiming to enhance regional maritime security and interoperability among NATO allies.
- **Oil Spill:** In December 2024, two Russian oil tankers, **Volgoneft-212** and **Volgoneft-239**, were severely damaged during a storm in the Kerch Strait, leading to a substantial oil spill.
- This incident resulted in extensive pollution along the Russian Black Sea coast, affecting marine life and coastal ecosystems.

- **Romania's Offshore Gas Project:** Romania initiated drilling operations in the **Neptun Deep** offshore gas project, one of the European Union's largest gas deposits.
- This endeavor aims to bolster Romania's energy production and reduce dependence on external energy sources.

Black Sea- Information

- The Black Sea connects to the **Mediterranean Sea** via the **Bosphorus Strait** and the **Sea of Marmara** (Turkey).
- It connects to the **Sea of Azov** via the **Kerch Strait** (disputed between Russia and Ukraine).

Unique Features of Black Sea

- **Anoxic Layer:** The Black Sea has **one of the largest oxygen-free water zones in the world** (below 150m depth), making deep-sea marine life rare.
- **High Salinity at Depths:** While the surface is **low in salinity**, deeper waters have a **higher salt concentration**.

Major Rivers Flowing into the Black Sea

- **Danube River** (from Central Europe)
- **Dniester River** (from Ukraine & Moldova)
- **Dnieper River** (from Ukraine & Belarus)
- **Don River** (from Russia)

Trade & Economic Significance

- The Black Sea is a **major transit route for oil, natural gas, and grain exports**.Ports like **Odessa (Ukraine), Novorossiysk (Russia), and Constanța (Romania)** play a crucial role in global trade.
- It is a **key energy corridor**, with several **offshore gas fields** being explored by Romania, Turkey, and Russia.
- The Black Sea contains significant offshore natural gas reserves, particularly in Romanian and Turkish waters.

Major energy projects:

- **TurkStream Pipeline** – Transports Russian gas to Turkey and Europe.
- **Neptun Deep Gas Project (Romania)** – One of the EU's largest new gas reserves.

Ports in Black Sea

- **Constanța, Romania:** As the largest port on the Black Sea, Constanța serves as a crucial hub for trade and transportation, connecting Central and Eastern Europe to Asia and the Middle East.
- **Odessa, Ukraine:** A vital port facilitating Ukraine's grain exports and other goods, playing a significant role in the country's economy.
- **Novorossiysk, Russia:** One of Russia's primary ports on the Black Sea, handling a substantial portion of the nation's maritime trade, including oil and grain exports.
- **Varna and Burgas, Bulgaria:** These ports are essential for Bulgaria's trade activities, serving as key points for the import and export of goods.
- **Trabzon and Samsun, Turkey:** Important Turkish ports that facilitate regional trade and commerce along the Black Sea coast.

Military Zones in Black Sea

- **Sevastopol, Crimea:** Home to the Russian Black Sea Fleet, Sevastopol is a significant naval base that underscores Russia's military presence in the region.
- **Novorossiysk, Russia:** In addition to its commercial importance, Novorossiysk hosts naval facilities that contribute to Russia's maritime defense strategy.
- **Constanța, Romania:** Beyond its commercial role, Constanța accommodates military installations, including NATO facilities, enhancing the alliance's strategic reach in the Black Sea.
- **Varna, Bulgaria:** This port city also hosts military facilities, reflecting Bulgaria's role within NATO and the strategic importance of the Black Sea region.

Countries Surrounding Black Sea

- It is bounded by Bulgaria, Georgia, Romania, Russia, Turkey, and Ukraine

International Organizations

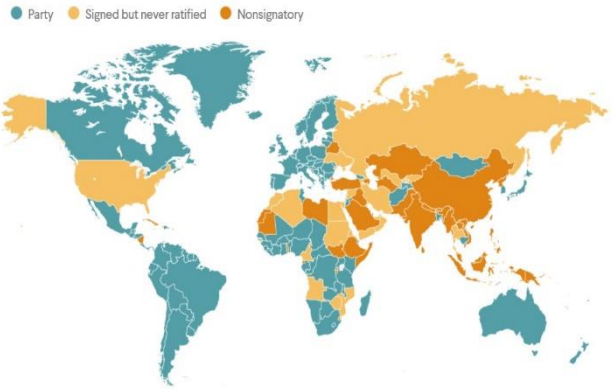
Arrest Warrant Against Duterte

- Former PhilippineS President Rodrigo Duterte was arrested on Tuesday on a warrant issued by the International Criminal Court (ICC), which was investigating allegations that "crimes against humanity" were committed during his so-called "war on drugs".
- The ICC, which has 125 countries as its members, has international jurisdiction over four types of crimes: crimes against humanity, genocide, crimes of aggression, and war crimes.
- It can step in when countries are unwilling or unable to prosecute suspects for these crimes.
- During his six-year term, which ended in 2022, more than 6,000 suspects were killed by police or unknown assailants as part of his "war on drugs" campaign.
- A UN report subsequently revealed that most of the victims were young, poor urban males.

What is ICC?

- The ICC was established under a 1998 treaty called the "**Rome Statute**".
- Its headquarter is situated in **The Hague, Netherlands.**

- 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**.
- **ICC's jurisdiction and prosecutions:**
  - ICC's jurisdiction and prosecutions:
  - Unlike the **International Court of Justice** (ICJ), which deals with **countries and inter-state disputes**, the **ICC prosecutes individuals.**
  - Additionally, the offences **should be committed either in a country that ratified the agreement** or by a national of a ratifying country.
- ICC is the world's first permanent international criminal court.
- The ICC can also practice its jurisdiction over **cases referred by the UN Security Council** to it.



ICC vs ICJ

- Unlike the International Court of Justice, **the ICC is not a component of the United Nations framework.**
- The cooperation between the UN and the ICC is controlled by a separate agreement.
- The **ICJ is one of the UN's six main organs**.
- It primarily considers litigation involving countries.
- It was **founded in 1945** and is headquartered in **The Hague** (Netherlands).

How Does ICC Function?

- The court carries out its investigations through the **Office of the Prosecutor and has 18 judges.**
- Both the judges and prosecutors hold non-renewable nine-year terms.
- The current prosecutor of ICC is **Mr. Karim Khan**.
- There are pre-trial, trial, and appellate benches in the ICC.
- The prosecutor **conducts a preliminary examination** in a matter, before seeking permission from **pre-trial judges** to open a full investigation.

How Does the Prosecutor Open Investigation?

- When a case is **referred by a member country** in its own territory
- When a case is **referred by the UN Security Council**.
- When the prosecutor takes up a case on his own.

Can Non-Member States Be Prosecuted?

- If alleged crimes were **perpetrated by non-members** in member states.
- If the **non-members accept the court's jurisdiction**.
- When the **Security Council** authorises it.

Criticism of ICC

- Some experts question whether the **time, efforts and financial resources invested** in the court by member countries is worth the outcome.
- After 19 years of being active, the **court has convicted 10 persons** accused in a small number of **cases and acquitted four individuals**
- Criticisms also hint at the fact that the **court may be shying away** from taking on western powers like the United States.
- Court, since its formation, largely **took up investigations** into alleged crimes committed in African countries.
- The African Union in 2016 had **endorsed a proposal** led by Kenya for a mass **withdrawal from the Rome Statute**.

Polity

Judiciary and Criminal Law

Strengthening Tribunals in India: Supreme Court's Perspective

Background

- Tribunals play a vital role in resolving specialized disputes, particularly in administrative and tax matters.
- However, the **Tribunal Reforms Act, 2021**, which aims to streamline their functioning, has faced criticism for reducing tenure and imposing age restrictions, thereby deterring capable candidates.

Context

- The Supreme Court recently highlighted the need to strengthen tribunals in India to maintain litigants' faith in their functioning.
- A bench led by Justice Surya Kant emphasized improving the tribunal mechanism while examining issues related to the **Tribunal Reforms Act, 2021**.

Key Features of the Tribunal Reforms Act, 2021

Reduction in Tenure:

- The tenure of tribunal members has been reduced from five years to four years, with an upper age limit of 67 years for the Chairperson and members.

Eligibility Criteria:

- Introduces a minimum age requirement of 50 years for appointment to tribunals, which has been criticized for limiting the pool of eligible candidates.

Abolition of Appellate Tribunals:

- Several appellate tribunals have been abolished, and their functions transferred to other judicial bodies such as High Courts.

Centralized Control:

- The Act gives the central government more control over tribunal appointments, service conditions, and tenure, raising questions about judicial independence.

Search cum selection committee (Except State Administrative Tribunal)

- Chairperson – CJI or SC judge nominated by them
- Two secretaries nominated by government of India
- Outgoing/Sitting Chairman/member of Tribunal

Why the Act is Being Challenged

Violation of Judicial Independence:

- The Act gives the executive greater control over the appointment and tenure of members, which can compromise the autonomy of tribunals.

Lack of Judicial Safeguards:

- The reduction of tenure and the imposition of a minimum age limit are seen as discouraging experienced professionals from joining tribunals.

Non-Compliance with Previous Judgments:

- Several provisions mirror those previously struck down by the Supreme Court, raising concerns about non-compliance with judicial directives.

Impact on Tribunal Efficiency:

- The abolition of certain appellate tribunals has added to the burden of regular courts, contrary to the objective of reducing the pendency of cases.

Table 1 : Transfer of functions of key appellate bodies as proposed under the Bill

Acts	Appellate Body	Proposed entity
The Cinematograph Act, 1952	Appellate Tribunal	High Court
The Trade Marks Act, 1999	Appellate Board	High Court
The Copyright Act, 1957	Appellate Board	Commercial Court or the Commercial Division of a High Court*
The Customs Act, 1962	Authority for Advance Rulings	High Court
The Patents Act, 1970	Appellate Board	High Court
The Airports Authority of India Act, 1994	Airport Appellate Tribunal	• Central government, for disputes arising from the disposal of properties left on airport premises by unauthorised occupants. • High Court, for appeals against orders of an eviction officer.
The Control of National Highways (Land and Traffic) Act, 2002	Airport Appellate Tribunal	Civil Court#
The Geographical Indications of Goods (Registration and Protection) Act, 1999	Appellate Board	High Court

Key Issues Raised

Service Conditions and Tenure:

- Tenure reduction to four years in some tribunals (e.g., CESTAT) deters retired judges from taking up positions.
- Frequent transfers, as seen in the case of Justice DC Chaudhary, disrupt continuity and efficiency.

Recruitment and Staffing:

- Recruitment of judicial members is overseen by a Supreme Court judge-led committee.
- Issues with contractual staff, especially in sensitive tribunals like **NCLT**, raise concerns about data security and accountability.

Vacancies and Appointments:

- Despite the government's claim of minimal vacancies, the court noted discrepancies, affecting tribunal efficiency.
- The absence of skilled candidates due to inadequate service conditions highlights a gap in the recruitment process.

Lack of Attractiveness for Retired Judges:

- Conditions under the 2021 Act discourage experienced retired judges from joining, raising concerns about tribunal quality.

Court's Directives and Next Steps

- The Supreme Court directed the petitioners to compile a chart listing unique and common issues across tribunals.
- The matter will be reviewed periodically, with the next hearing scheduled for March 26.
- The Centre has been asked to provide updated data on tribunal vacancies.

PIL and Challenges

Context

- The Supreme Court has recently expressed concerns over the misuse of Public Interest Litigations (PILs), emphasizing that such misuse hampers the efficacy of PIL as a tool for social justice.
- This observation comes amid growing instances where PILs are being filed with ulterior motives rather than genuine public interest.

What is Public Interest Litigation (PIL)?

Definition:

- PIL refers to the legal action initiated in a court of law by a person or group who may not have a direct stake in the matter but acts to protect the public interest.
- It allows individuals or organizations to approach the courts even without locus standi (i.e., even if they are not personally affected).

Key Features:

- Also known as Social Interest Litigation.
- The concept of PIL is borrowed from American jurisprudence.
- Not defined under any statute or act; developed through judicial activism.
- Both the Supreme Court and High Courts can admit PILs under **Article 32** and **Article 226**, respectively.

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Genesis of PIL in India

Historical Development:

- The concept took shape with the relaxation of the locus standi principle in the **Mumbai Kamgar Sabha v. Abdulbhai Faizullabhai (1976)** case.
- The first reported PIL case in India was **Hussainara Khatoon vs. State of Bihar (1979)**.

- Justice P N Bhagwati, regarded as the father of PIL in India, and Justice V R Krishna Iyer played pioneering roles in promoting PIL.

Role of PIL as a Tool of Social Justice

- PILs have been instrumental in landmark judgements such as:
  - Decriminalization of consensual homosexual relations.
  - Triple talaq judgement.
  - Opening Haji Ali shrines to women.

Concerns Associated with PILs

- **Misuse and Frivolous Litigations:**
  - Increasing misuse for personal gains or to settle political scores.
  - PILs are being filed without substantial public interest, burdening the judiciary.
- **Judicial Backlash:**
  - The judiciary has started scrutinizing PILs more critically to discourage non-genuine petitions.

The Supreme Court had issued **eight directions** in its **Balwant Singh Chaufal Judgment** to help constitutional courts separate genuine PIL petitions from the barmy ones:

- It had asked every High Court to frame its own rules to encourage bona fide PIL petitions and curb the motivated ones
- Verifying the credentials of the petitioner before entertaining the plea.
- Checking the correctness of the contents
- Ensuring the petition involves issues of "larger public interest, gravity and urgency" which requires priority
- Ensuring there is no personal gain, or oblique motive behind the PIL
- Ensuring that it is aimed at redressal of genuine public harm or public injury

Judicial Accountability

- The Supreme Court of India recently issued a statement clarifying the reasons behind the proposed transfer of Justice Yashwant Varma, a senior judge of the Delhi High Court, to the High Court of Judicature at Allahabad.
- The statement was in response to media reports linking the transfer with an incident involving a fire at Justice Varma's residence, where a rumor surfaced regarding the recovery of a "huge pile of cash."

Supreme Court's Clarification

Transfer and Enquiry Are Unrelated:

- The Supreme Court stated that the proposal to transfer Justice Varma was examined and processed independently, separate from any in-house enquiry.
- The transfer proposal was examined on March 20, while the in-house enquiry was initiated earlier by the Chief Justice of the Delhi High Court.

Details of the Incident:

- The incident involved a fire at the residential bungalow of Justice Varma, leading to rumors of cash recovery.
- The Supreme Court confirmed that the in-house enquiry, initiated by Chief Justice D.K. Upadhyaya of the Delhi High Court, was still underway.
- The enquiry report would be submitted to Chief Justice of India Sanjiv Khanna for further examination.

- Chief Justice of India (CJI) Sanjiv Khanna on Saturday (March 22) initiated an unprecedented three-member in-house inquiry into the conduct of Delhi High Court judge Justice Yashwant Varma following allegations that wads of currency notes were found in his official residence where a fire broke out on March 14.
- The internal inquiry of the judiciary — which follows a process that is distinct from that of impeachment under the Constitution — will be carried out by the Chief Justice of Punjab & Haryana High Court Justice Sheel Nagu, Chief Justice of Himachal Pradesh High Court Justice G S Sandhawalia, and Justice Anu Sivaraman of Karnataka High Court.
- The process of impeachment of a judge of the Supreme Court is laid down in Article 124(4) of the Constitution of India. Article 218 says the same provisions shall apply in relation to a judge of the High Court.
- Under Article 124(4), a judge can be removed by Parliament through a laid-down procedure on only two grounds: "proved misbehaviour" and "incapacity".
- For an impeachment motion against an SC or HC judge to be accepted, at least two-thirds of those "present and voting" in both Lok Sabha and Rajya Sabha must vote in favour of removing the judge — and the number of votes in favour must be more than 50% of the "total membership" of each House.
- If Parliament passes such a vote, the President will pass an order for the **removal of the judge**. In cases where Parliament is dissolved or its term ends, a motion for impeachment of a judge would fail.
- It is not necessary that a complaint against a judge is made only by or to parliamentarians. The CJI or Chief Justice of an HC may also be called upon to examine a complaint against a judge.
- The need for an internal mechanism was felt in 1995, after allegations of financial impropriety surfaced against then Bombay High Court Chief Justice A M Bhattacharjee.
- After the Bombay Bar Association, headed at the time by senior advocate Iqbal Chagla, moved a resolution calling for the judge's resignation, a writ petition was filed before the Supreme Court seeking to restrain the Bar from protesting.
- While hearing the case, Justices K Ramaswamy and B L Hansaria of the SC noted the "hiatus between bad behaviour and impeachable misbehaviour" *(C. Ravichandran Iyer v. Justice A.M. Bhattacharjee*).
- The SC noted there was no process to hold a judge accountable for "bad conduct inconsistent with the high office", when such conduct did not meet the high bar of impeachment set by Article 124 of the Constitution.

- To fill what the judges called "a yawning gap between proved misbehaviour and bad conduct inconsistent with the high office", the SC decided to formulate an in-house procedure.
- It constituted a five-member committee comprising Justices S C Agarwal, A S Anand and S P Bharucha from the SC, and Justices P S Mishra and D P Mohapatra, the senior-most HC Chief Justices at the time, to devise the procedure "for taking suitable remedial action against judges, who by their acts of omission or commission, do not follow the accepted values of judicial life, including the ideals expressed by the Supreme Court in the Restatement of Values of Judicial Life".
- The committee submitted its report in October 1997. It was adopted with amendments in a full court meeting of the SC in December 1999.

Process revisited in 2014

- In 2014, when a woman additional district and sessions judge from Madhya Pradesh filed a complaint of sexual harassment against a sitting judge of the High Court, the SC revisited its in-house procedure.
- Justices J S Khehar and Arun Mishra summarised and explained this process through "seven steps" (*Additional District and Sessions Judge 'X' v. Registrar General High Court of Madhya Pradesh*).

Summary of In-House Enquiry Procedure Against Judges

Initiation of Complaint:

- The process starts when the **Chief Justice of a High Court (HC)**, the **Chief Justice of India (CJI)**, or the **President of India** receives a complaint.
- The CJ of the HC or the President forwards the complaint to the CJI.

Preliminary Assessment:

- If deemed serious, the CJI may seek a **preliminary report** from the HC Chief Justice.
- The CJI can dismiss the complaint if it lacks merit.

Deeper Inquiry:

- If the preliminary report suggests a deeper probe, the CJI may order a **three-member inquiry** committee.
- The committee consists of **two Chief Justices of HCs and one HC judge**.
- The committee ensures **natural justice** by allowing the judge concerned to present their case.

Outcome of Inquiry:

- The committee submits a report to the CJI, indicating whether there is substance in the allegations or The allegations warrant **removal proceedings**.
- If the allegations are not severe enough, the CJI may **advise the judge**.
- If severe, the CJI may advise the judge to **resign or retire voluntarily**.

Post-Inquiry Action:

- If the judge refuses to resign, the CJI instructs the HC CJ not to assign any **judicial work** to the judge.

- Example: In Justice Varma's case, CJI Khanna instructed the **Delhi High Court CJ** not to allocate judicial work to him.

The In-House Enquiry Procedure

- The Supreme Court emphasized that the enquiry is being conducted according to established procedures to ensure fairness and transparency.
- **Two-Stage Enquiry Process:**
  - **Stage One:** Conducted by the Chief Justice of the High Court to ascertain prima facie facts.
  - **Stage Two:** Monitored by the **Chief Justice of India (CJI)** if deeper investigation is warranted.
  - A three-member committee, comprising two Chief Justices and a High Court judge, may be formed if the CJI endorses the need for a detailed probe.

Constitutional Framework

Immigration And Foreigners' Bill 2025

- Passed by both Lok Sabha and Rajya Sabha
- Repeals following acts :
  - the Passport (entry into india) act, 1920,
  - the Registration of foreigners act, 1939,
  - the Foreigners act, 1946, and
  - the Immigration (carriers' liability) act, 2000.

Key Features :

- Persons entering or departing from India must also have a valid visa (for foreigners) along with valid passports or other valid travel documents.
- These documents may be examined by the immigration officer.
- Empowers the Central government to notify designated immigration posts for entry into and exit from India
- Bureau of immigration will be set up for performing immigration functions and other prescribed functions
- These include :
  - Visa issuance and regulation of entry into India, or
  - transit, stay and movement within and exit from India.
- The commissioner of the bureau, appointed by the central government, will supervise immigration and other prescribed functions.
- On arrival in India, foreigners must register with registration officer.
- Carriers landing or embarking in India need to furnish information of crew/passengers on board to a civil authority or immigration officer.
- Educational institutions must provide prescribed information to the registration officer on admitting foreigners.
- Further, medical institutions must provide information regarding foreign patients availing indoor treatment or their attendants availing lodging facilities to the registration officer.

Definition of Carrier expanded :

- Transportation of passengers and cargo by air, water, or, land through aircraft, ship, or any other mode of transport.(Earlier only water/air mentioned).
- Prohibits aircrafts/vessels/any other mode of transport departing from india until a clearance has been obtained from the immigration officer.
- This clearance will be granted on submitting a prescribed general declaration.

Burder of Proof

- Lies on the foreigner/illegal immigrant.

Penalties

- For certain offence they have been changed
- Maximum fine on foreigners entering without valid passport increased from 50000 to 5 lakh.

Powers Of Arrest

- Empowers police officers not below the rank of a head constable to arrest without warrant.(EARLIER SUB INSPECTOR)

Challenges :

Human Rights and Deportation

- The law could lead to stricter deportation policies, affecting long-term foreign residents and asylum seekers.
- Human rights activists may raise concerns about due process and treatment of deported individuals.

Impact on Universities and Medical Institutions

- Educational institutions and hospitals may find it difficult to comply with the new reporting requirements for foreign nationals.
- There may be concerns regarding bureaucratic hurdles in admitting international students and medical tourists.

Enforcement and Implementation Issues

- Effective implementation will require strong coordination between immigration officers, airlines, universities, and security agencies.
- The government must ensure transparency in enforcement to prevent harassment or wrongful detentions

Overseas Citizen of India – Mauritius

Context

- Prime Minister Narendra Modi recently announced the issuance of Overseas Citizen of India (OCI) cards to Mauritius' Prime Minister Navin Ramgoolam and his spouse Veena Ramgoolam.
- The announcement took place during a community event attended by over 3,500 people, including Mauritius Cabinet members and government officials, highlighting the strong bilateral relations between India and Mauritius.

Background

- Mauritius has a significant Indian diaspora, with approximately 22,188 Indian nationals and 13,198 OCI cardholders residing in the country.

- India's initiative to issue OCI cards to Mauritian nationals of Indian descent up to the seventh generation underscores the deep-rooted cultural and ancestral ties between the two nations.
- The OCI cards were also presented to Mauritius' President Dharambeer Gokhool and First Lady Vrinda Gokhool during PM Modi's state visit

What is an OCI Card?

- An OCI card is issued to foreign nationals of Indian origin, granting them the right to live, work, and study in India indefinitely.
- It also facilitates visa-free travel and certain economic, financial, and educational privileges, similar to Non-Resident Indians (NRIs).

Eligibility for OCI Card:

- Persons of Indian origin who have obtained citizenship of another country.
- Foreign nationals whose ancestors were Indian citizens at the time of India's independence.

What are the benefits to an OCI Cardholder?

(1) Multiple entry lifelong visa for visiting India for any purpose:
Provided that for undertaking the following activities, the OCI Cardholder shall be required to obtain a special permission or a Special Permit, as the case may be, from the competent authority or the Foreigners Regional Registration Officer or the Indian Mission concerned, namely:-
(i) to undertake research;

(ii) to undertake any Missionary or Tabligh or Mountaineering or Journalistic activities;

(iii) to undertake internship in any foreign Diplomatic Missions or foreign Government organisations in India or to take up employment in any foreign Diplomatic Missions in India;

(iv) to visit any place which falls within the Protected or Restricted or prohibited areas as notified by the Central Government or competent authority:

(2) Exemption from registration with the Foreigners Regional Registration Officer or Foreigners Registration Officer for any length of stay in India:
Provided that the OCI Cardholders who are normally resident in India shall intimate the jurisdictional Foreigners Regional Registration Officer or the Foreigners Registration Officer by email whenever there is a change in permanent residential address and in their occupation;

(3) Parity with Indian nationals in the matter of:
(i) tariffs in airfares in domestic sectors in India; and

(ii) entry fees to be charged for visiting national parks, wildlife sanctuaries, the national monuments, historical sites and museums in India;

(4) Parity with Non-Resident Indians in the matter of:
(i) inter-country adoption of Indian children subject to the compliance of the procedure as laid down by the competent authority for such adoption;

(ii) appearing for the all India entrance tests such as National Eligibility cum Entrance Test, Joint Entrance Examination (Mains), Joint Entrance Examination (Advanced) or such other tests to make them eligible for admission only against any Non-Resident Indian seat or any supernumerary seat:
Provided that the OCI Cardholder shall not be eligible for admission against any seat reserved exclusively for Indian citizens;

(iii) purchase or sale of immovable properties other than agricultural land or farm house or plantation property; and

(iv) pursuing the following professions in India as per the provisions contained in the applicable relevant statutes or Acts as the case may be, namely: -
(a) doctors, dentists, nurses and pharmacists;
(b) advocates;
(c) architects;
(d) chartered accountants;

What are the benefits to which the OCI Cardholder is not entitled to?

The OCI Cardholder is not entitled to vote, be a member of Legislative Assembly or Legislative Council or Parliament, cannot hold Constitutional posts such as President, Vice President, Judge of Supreme Court or High Court etc. as specified in section 7B(2) of The Citizenship Act, 1955. The OCI Cardholder shall not be entitled for appointment to public services and posts in connection with the affair of the Union or of any State except for appointment in such services and posts as the Central Government may, by special order, in that behalf specify. Further, the OCI Cardholder cannot acquire agricultural land or farmhouse or plantation properties in India.

Preventive Detention and Fundamental Rights

Context :

- The Supreme Court of India recently emphasized the strict need for adherence to constitutional and statutory safeguards in cases of preventive detention.
- Highlighting the draconian nature of preventive detention, the Court underlined that fundamental rights cannot be overridden without following due process.
- The ruling came in a case involving preventive detention under the **Prevention of Illicit Traffic in Narcotic Drugs and Psychotropic Substances Act, 1988 (NDPS Act)**.

Background

- In the current case, the Supreme Court quashed detention orders against Ashraf Hussain Choudhary and his wife, Adaliu Chawang, who were detained by the Nagaland government under the **NDPS Act**.
- The couple was detained after 239 grams of heroin were seized from a vehicle.
- The Court found significant procedural lapses, including the failure to provide detention orders in a language known to the detainees.

Key Issues :

Violation of Procedural Safeguards:

- The Supreme Court noted that preventive detention curtails personal liberty without a criminal trial, warranting strict adherence to constitutional safeguards.
- In this case, the detention orders were not provided in a language understood by the detainees, violating the principles established in the **Harikisan vs State of Maharashtra (1962)** case.

Lack of Justification for Detention:

- At the time of issuing detention orders, neither Choudhary nor Chawang had applied for bail, weakening the justification for preventive detention.
- The authorities failed to demonstrate a clear threat that warranted detention.

Mechanical Application of Law:

- The Court observed that the authorities acted mechanically without adequate application of mind.
- The detention orders were issued without verifying the likelihood of the detainees resuming illicit activities.

Supreme Court's Observations

- The bench emphasized that preventive detention should not be a substitute for criminal prosecution.
- Fundamental rights cannot be compromised without ensuring that all procedural requirements are meticulously followed.

- The Supreme Court also criticized the use of English in detention orders, when the detainees did not understand the language, citing it as a fundamental lapse in respecting detainee rights.

Right to Development

Context :

- The Supreme Court of India recently set aside the orders of the National Green Tribunal (NGT) and the Madras High Court, which halted development activities in Auroville for lack of environmental clearance.
- The court highlighted the importance of balancing the right to development with the fundamental right to a clean environment.

Background

- The dispute arose when the NGT, Chennai, in April 2022, directed the **Auroville Foundation** to halt construction in the township project until environmental clearance was obtained.
- This decision was primarily based on concerns that road construction under the Master Plan might harm the **Darkali forest** area, which some claimed to be a forest despite it being a man-made plantation not recognized in government records.
- The Madras High Court, in March 2024, invalidated a standing order issued by the Foundation regarding the reconstitution of the **Auroville Town Development Council**.
- The Supreme Court set aside both decisions, emphasizing the need for sustainable development while respecting environmental safeguard

Key Observations of the Supreme Court

Right to Development vs. Clean Environment:

- The court acknowledged that while the right to a clean environment is a fundamental right under **Articles 14 and 21** of the Constitution, the right to development through industrialization is also prioritized under **Articles 14, 19, and 21**

Misinterpretation of Jurisdiction by NGT:

- The court held that the NGT committed a gross error by intervening in the execution of the **Auroville Master Plan**, which had statutory backing and finality.
- The Master Plan was approved by the Foundation's governing board in 1999, by the Ministry of Urban Development in 2001, and published in the Official Gazette in 2010.

Frivolous Litigation:

- The Supreme Court observed that some disgruntled residents had dragged the Auroville Foundation into unnecessary litigation. The court imposed a cost of Rs. 50,000 on respondent Natasha Storey for unwarranted legal proceedings.

Way Forward

- **Judicial Prudence:**
  - Courts must avoid intervening in policy matters that have statutory backing unless there is a clear violation of environmental norms.

- **Responsible Activism:**
  - Activists must ensure that challenges to development projects are substantiated with credible data rather than speculative concerns.
- **Sustainable Urban Planning:**
  - Townships and development projects should be planned keeping environmental concerns in mind, minimizing legal challenges.

About Auroville :

- Auroville, nestled within the Villupuram district in Tamil Nadu with some parts in Puducherry, formerly known as Pondicherry, is an experimental township and possibly one of its kind in world history.
- It was founded in 1968 by French-born Mirra Alfassa, a spiritual guru and ardent follower of Sri Aurobindo, the Indian philosopher, poet, and freedom fighter.
- She later came to be known as The Mother

About Auroville :

- The township's inauguration ceremony was attended by delegates from 124 nations, and the city and its residents at that point had declared that Auroville belonged to nobody, that those who become residents—they call themselves Aurovilians—will have no caste, creed or nationality.
- In 1988, the Government of India, with Rajiv Gandhi as Prime Minister, passed the Auroville Foundation Act to bring the township under legal protection and administration.

Torture and FR

- Recent judgments from courts in the UK and the US regarding the extradition of Sanjay Bhandari and Tahawwur Rana have sparked debates on India's human rights record.
- The High Court of Justice in London ruled against Bhandari's extradition to India on the grounds of potential custodial torture.
- Similarly, Rana's appeal against extradition to India for his alleged involvement in the 26/11 Mumbai attacks cites the UK ruling as evidence of systemic custodial abuse in India.
- India has faced challenges in securing extradition from other countries due to concerns over human rights violations, particularly custodial torture.
- Despite being a signatory to various international treaties on human rights, including the **Universal Declaration of Human Rights (1948)** and the **International Covenant on Civil and Political Rights (1976)**, India has not ratified the **United Nations Convention against Torture (UNCAT)**.
- This non-ratification has been a significant impediment in extradition cases, as seen in Bhandari's and Rana's cases.

Key Judicial Observations

Sanjay Bhandari Case (UK):

- The court ruled against extradition, citing the real risk of custodial torture in India.
- Judges Holroyde and Steyn pointed to India's failure to ratify the UNCAT as a critical factor.

Tahawwur Rana Case (US):

- Rana, accused of involvement in the 26/11 attacks, appealed against extradition, referencing the Bhandari ruling.
- His defense highlights credible reports of custodial violence and India's lack of legislative safeguards against torture.

India's Stand on Anti-Torture Legislation

Lack of a Comprehensive Anti-Torture Law:

- Despite recommendations from the **Law Commission (273rd Report, 2017)** and the **NHRC** no comprehensive legislation has been enacted.

Judicial Perspective:

- The Supreme Court has upheld the right against torture as a fundamental right under **Article 21** (D.K. Basu, 1997; Puttaswamy, 2017).
- In **Ashwani Kumar (2019)**, the court noted the absence of an anti-torture law but refrained from directing legislative action.

International Comparisons

Guantanamo Bay Precedent:

- The US faced global criticism for custodial torture at Guantanamo Bay, damaging its democratic image.

Other Countries:

- Nations like the UK have strict anti-torture laws that enhance their extradition credibility.

Recommendations

Ratification of UNCAT:

- Align India's domestic laws with international human rights standards by ratifying the UNCAT.

Enactment of Anti-Torture Legislation:

- Establish legal frameworks to prohibit and penalize custodial torture.

Judicial Proactivity:

- Courts must actively interpret the right against torture in a broader human rights context.

Governance and Social justice

Maternity Benefits : Challenges

Context :

- Despite significant progress in providing social security for women, pregnant women in India continue to face challenges in accessing maternity benefits.
- The National Food Security Act (NFSA) of 2013 mandates maternity benefits, but implementation gaps persist.
- Recent data shows a steep decline in effective coverage under the **Pradhan Mantri Matru Vandana Yojana (PMMVY)**, raising concerns about the welfare of pregnant women.

Background

- Maternity benefits were mandated under the **National Food Security Act (NFSA), 2013**, which entitles every pregnant woman (excluding those covered under the formal sector) to a cash benefit of ₹6,000 per child.

- This entitlement aims to provide financial support during pregnancy to ensure better health outcomes for both mother and child.
- However, the actual implementation of this entitlement has been problematic.
- The **Pradhan Mantri Matru Vandana Yojana (PMMVY)**, introduced in 2017 to operationalize the NFSA's mandate, has faced numerous challenges, including restricted coverage, reduced benefit amounts, and implementation bottlenecks.

Issues :

Restricted Coverage:

- Benefits are limited to one child per family, recently extended to the second child if it is a girl.
- This violates the universal entitlement principle laid down by the NFSA.

Reduced Benefit Amount:

- The PMMVY provides ₹5,000 instead of the mandated ₹6,000, with the first instalment being just ₹3,000.

Poor Implementation:

- Effective coverage peaked at just 36% in 2019-20 and dropped drastically to 9% in 2023-24.
- Software glitches and digital complications, especially with Aadhaar-based payments, have hampered disbursement.

Lack of Transparency:

- The Ministry of Women and Child Development has been criticized for not proactively disclosing data, violating the RTI Act.

Successful Models from States

Tamil Nadu and Odisha:

- Tamil Nadu offers ₹18,000 per child under its maternity benefit scheme.
- Odisha provides ₹10,000 per child, increased to ₹20,000 ahead of the 2024 elections.
- These states report much higher coverage rates (Tamil Nadu: 84%, Odisha: 64%) compared to PMMVY.

Central Government's Stand

- Officials have acknowledged a virtual standstill in PMMVY implementation in 2023-24, attributing it to changes in software and processes.
- They also highlighted persistent issues with digital payment systems.

Recommendations

Increase Benefit Amount:

- Update the cash benefit to ₹12,000, considering inflation and nutritional needs.

Broaden Coverage:

- Remove restrictions limiting the benefit to one child per family.

Improve Implementation:

- Simplify digital processes and reduce dependency on Aadhaar verification.

Ensure Transparency:

- Proactive data sharing by the Ministry of Women and Child Development as mandated by the RTI Act.

Eight years of Poshan Abhiyaan

Context

- Launched on March 8, 2018, by Prime Minister Narendra Modi in Jhunjhunu district, Rajasthan, **Poshan Abhiyaan** aims to improve the nutritional status of adolescent girls, pregnant women, lactating mothers, and children (0-6 years).

- The mission focuses on reducing stunting, under-nutrition, anemia, and low birth weight through technology, convergence, and community involvement.

Background

- Malnutrition has long been a challenge in India, especially among women and children.
- To address this, Poshan Abhiyaan, also known as the **National Nutrition Mission**, was introduced to enhance nutrition outcomes through targeted interventions.
- By leveraging technology and fostering community participation, the program seeks to achieve its ambitious goals.

Objectives of Poshan Abhiyaan

- **Prevent and reduce stunting** in children (0-6 years).
- **Prevent and reduce under-nutrition** (underweight prevalence) in children (0-6 years).
- **Reduce anemia** among young children (6-59 months) and women (15-49 years).
- **Reduce Low Birth Weight (LBW)**.

Strategic Pillars of Poshan Abhiyaan

Access to Quality Services:

- Focuses on providing essential health services through schemes like **ICDS**, **NHM**, and **PMMVY** during the first 1,000 days of a child's life.

Cross-Sectoral Convergence:

- Integrates efforts across ministries, including **Swachh Bharat Mission** and **National Drinking Water Mission**, to address malnutrition.

Leveraging Technology:

- Utilizes tools like the **Poshan Tracker** app for real-time data collection and monitoring interventions.

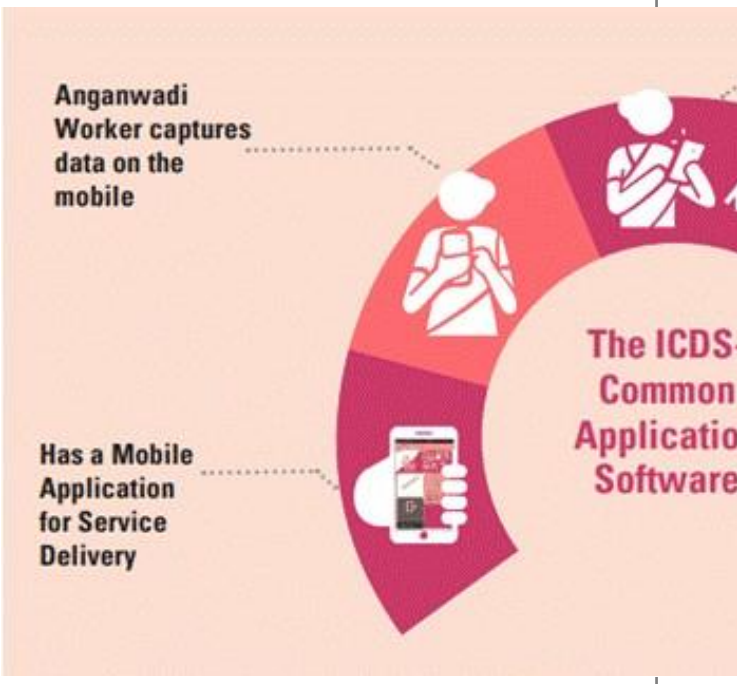
Jan Andolan:

- Mobilizes community engagement to foster awareness and drive behavioral change around nutrition.

Mission Saksham Anganwadi and Poshan 2.0

- Launched as a strategic upgrade to Poshan Abhiyaan, it aims to strengthen Anganwadi services and enhance child and maternal health.
- Covers **14 lakh Anganwadi Centers (AWCs)** and **10 crore beneficiaries** across 36 states/UTs.
- Focus on improving **infrastructure**, including functional toilets and drinking water facilities.


Key Themes a
of POSHAN Abhiyaan to be pr
01
Overall Nutrition
02
ANC, diet of pregnant women, calcium, supplementation, institutional delivery & early initiation of breastfeeding
05
Full immunization & vitamin A supplementation
06
Growth monitoring and promotion
09
Diarrhoea management
10
Girls education, diet and right age at marriage


Anganwadi Worker captures data on the mobile
Has a Mobile Application for Service Delivery
The ICDS
Common
Applicatio
Software

S&T

AI

India's AI Revolution

Context-India is undergoing a remarkable transformation in Artificial Intelligence

- These efforts align with the vision of **Viksit Bharat by 2047,** where India aspires to become a global AI powerhouse, leveraging cutting-edge technology for economic growth, governance, and societal progress.

AI Mission

- A key focus of this mission is the development of a high-end common computing facility equipped with 18,693 **Graphics Processing Units (GPUs),** making it one of the most extensive AI compute infrastructures globally. This **capacity is nearly nine times that of the open-source AI model DeepSeek** and about two-thirds of what ChatGPT operates on.
- The **initial phase** of the mission has already made **10,000 GPUs available**, with the remaining units to be added soon. This will enable the creation of indigenous AI solutions tailored to Indian languages and contexts.

Advancing AI with Open Data and Centres of Excellence (CoE)

- Recognising the importance of data in AI development, the government has launched the IndiaAI Dataset Platform to provide seamless access to high-quality, non-personal datasets.
- **IndiaAI Dataset Platform for Open Data Access:** The platform will enable Indian startups and researchers to access a **unified repository of high-quality**, anonymised datasets, reducing barriers to AI innovation.
- **Boosting AI Model Accuracy with Diverse Data:** By providing large-scale, non-personal datasets, the **initiative will help reduce biases and improve the reliability** of AI applications across domains such as agriculture, weather forecasting, and traffic management.
- **Centres of Excellence:** The government has established three **AI Centres of Excellence (CoE) in Healthcare, Agriculture, and Sustainable Cities** in New Delhi. The Budget 2025 further announced a new CoE for AI in education with an outlay of ₹500 crore, making it the fourth such centre.
- **Skilling for AI-Driven Industries:** Plans are in place for **five National Centres of Excellence for Skilling,** which will equip youth with industry-relevant expertise. These centres will be set up in collaboration with global partners to support the 'Make for India, Make for the World' vision in manufacturing and AI innovation

India's AI Models & Language Technologies

- **India's Foundational Large Language Models:** IndiaAI has launched an initiative to develop indigenous foundational AI models, including **LLMs and Small Language Models (SLMs), through a call for proposals.**
- **Digital India BHASHINI:** An AI-led **language translation platform** designed to enable easy access to the internet and digital services in Indian languages, including voice-based access, and support content creation in Indian languages.
- **BharatGen**: The **world's first government-funded multimodal LLM initiative,** BharatGen was launched in 2024 in Delhi. It aims to **enhance public service delivery and citizen engagement through foundational models** in language, speech, and computer vision. BharatGen involves a consortium of AI researchers from premier academic institutions in India.
- **Sarvam-1 AI Model:** A large language model optimised for Indian languages, Sarvam-1 has 2 billion parameters and **supports ten major Indian languages**. It is designed for applications such as **language translation, text summarisation, and content generation**.
- **Chitralekha:** An open-source video transcreation platform developed by AI4Bhārat, Chitralekha enables users to **generate and edit audio transcripts** in various Indian languages.
- Hanooman's Everest 1.0: A multilingual AI system developed by SML, Everest 1.0 supports 35 Indian languages, with plans to expand to 90.

AI Talent & Workforce Development

- **AI Talent Pipeline & AI Education:** Under the **IndiaAI Future Skills initiative**, AI **education is being expanded across undergraduate, postgraduate, and Ph.D. programs**. Fellowships are being provided to full-time Ph.D. scholars researching AI in the top 50 NIRF-ranked institutes. To enhance accessibility, Data and AI Labs are being established in Tier 2 and Tier 3 cities, with a model IndiaAI Data Lab already set up at NIELIT Delhi.
- **India Ranks 1st in Global AI Skill Penetration:** According to the Stanford AI Index 2024, **India ranks first globally in AI skill penetration with a score of 2.8,** ahead of the US (2.2) and Germany (1.9). AI talent concentration in India has grown by 263% since 2016, positioning the country as a major AI hub. India also leads in AI Skill Penetration for Women, with a score of 1.7, surpassing the US (1.2) and Israel (0.9).
- **AI Innovation:** India has emerged as the **fastest-growing developer population globally** and ranks second in public generative AI projects on GitHub. The country is home to 16% of the world's AI talent, showcasing its growing influence in AI innovation and adoption.
- **AI Talent Hubs:** The India Skills Report 2024 by Wheebox forecasts that India's AI **industry will reach USD 28.8 billion by 2025,** with a CAGR of 45%.

- The AI-skilled workforce has seen a 14-fold increase from 2016 to 2023, making India one of the top five fastest-growing AI talent hubs, alongside Singapore, Finland, Ireland, and Canada. The demand for AI professionals in India is projected to reach 1 million by 2026.

Electronics

Satellite-based tolling

Context-the government has deferred the rolling out of its ambitious Global Navigation Satellite System (GNSS) for toll collection.

- Series of meetings have been conducted by the Expert committee and as per deliberation, it is proposed to proceed with corridor/stretch-based projects for **ANPR FASTag system (AFS)-based Barrier Less Free Flow tolling**

Global Navigation Satellite System (GNSS)

- Under the GNSS, the toll collection system work with the help of **satellites and on-board unit (OBU) fitted vehicles** and the toll is calculated based on distance traveled.

Issue with GNSS

- Sources said that the GNSS has been put on hold as a decision was taken that it will be rolled out **only when India has its own complete satellite system** as there are serious privacy concerns regarding individuals and vehicle data.
- In view of security and privacy considerations, breach and overall operational control, have recommended further deliberations for Satellite based Tolling

Space

SPHEREx telescope

- **Context-** NASA launched SPHEREx telescope to explore what happened right after Big Bang

SPHEREx

- Short for Spectro-Photometer for the History of the Universe, Epoch of Reionization and Ices Explorer - is looking to answer questions about the **origin of the universe while mapping the distribution of galaxies.**
- The mission is intended to gain insight into a phenomenon called **cosmic inflation**, the rapid and exponential expansion of the universe from a single point in a fraction of a second after the Big Bang that occurred roughly 13.8 billion years ago. By way of comparison, Earth is about 4.5 billion years old.

- By mapping the distribution of galaxies over the whole sky, we can directly constrain unique properties of inflation. This is why we want to map the whole sky and why we need spectroscopy (studying objects based on color) to make the map 3D. The fact that we can connect these two things - the distribution of galaxies on large scales all the way to the physics of inflation - is very powerful and very mind-boggling and almost magical," Dore added.

Space debris

- **Context-** metal object weighing 500 kg fell in Makueni county in Kenya.
- Experts from the Kenya Space Agency characterised it as a separation ring from a space-bound rocket.

Space debris

- Despite being a critical issue in space governance, space debris **lacks a universally accepted legal definition in international treaties.**
- Commonly accepted **working definitions come from the Inter-Agency Space Debris Coordination Committee** and the **UN Committee on the Peaceful Uses of Outer Space (COPUOS).** The latter refers to space debris thus: "**Space debris is all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional.**"

Issues

Convention for International Liability for Damage Caused by Space Objects of 1972

- Given the lack of definition, legal disputes often hinge on whether a piece of debris qualifies as a "space object" under the **Convention for International Liability for Damage Caused by Space Objects of 1972**. This distinction is critical because liability attaches to space objects under the Convention, **but if debris is no longer under a state's jurisdiction, responsibility becomes more challenging to enforce**.

Article VI of the Outer Space Treaty 1967

- **It** forms the cornerstone of international space law. It says **states bear responsibility for all national space activities**, whether conducted by governmental or private entities.
- The **1972 Convention** also introduced "**absolute liability**" for damage caused by space objects on the earth. Unlike fault-based liability, **absolute liability requires no proof of negligence:** launching states are automatically responsible for harm caused by their debris.

Lack of enforcement

- The resolution of disputes banks on diplomatic negotiations, often **resulting in prolonged settlements** that fall short of actual costs. After the **Soviet satellite Cosmos 954, carrying a nuclear reactor, crashed in Canada in 1978, Canada spent years negotiating with the USSR** and ultimately secured only $3 million of the estimated $6 million clean-up cost. The case underscored the **gap between legal liability and practical enforcement,** leaving affected parties vulnerable to inadequate resolutions.

- If a fragment from a defunct satellite causes damage decades later, can the original launching state still be held liable? Such legal uncertainties also weaken the effectiveness of existing liability frameworks and complicate enforcement

Recent concerns

SpaceX Falcon 9

- The surge in global space activity and the repeated use of rockets and rocket parts has made uncontrolled reentries risky. Earlier this month, pieces from a SpaceX Falcon 9 rocket landed in Poland.
- But the US **Federal Aviation Administration (FAA) said its oversight ended when SpaceX lost control of the rocket**. The response exemplified a growing concern: once a space object is no longer actively controlled, no clear authority is responsible for its reentry or any damage it may cause.

China's Long March 5B rocket

- In July 2024, China's Long March 5B rocket core stage, a 23-tonne metal behemoth, plunged **uncontrolled into the southern Pacific Ocean**, narrowly avoiding populated areas. This was the rocket's fourth such reentry event since 2020 alone, and reignited global alarm over space debris.
- Unlike more modern rockets, which have parts that are designed and machined to burn up completely during reentry or have the ability to be steered over remote areas, the **Long March 5B core stage lacks disposal mechanisms**, making its descent a game of orbital roulette. While China has improved reentry predictions, warnings often come too late for other states to put meaningful safeguards in place.

Rapid growth of satellites

- The rapid growth of satellite mega-constellations, such as **SpaceX Starlink, Amazon Kuiper, and Eutelsat's OneWeb**, will add more than 100,000 satellites by 2030, increasing the risk of uncontrolled reentries.
- Many older satellites also lack deorbiting plans, worsening debris accumulation in orbit. While small satellites usually burn up, larger objects like rocket boosters and fuel tanks often survive reentry, posing threats. In 2022, a fragment of SpaceX's crew capsule Dragon crashed in Australia.

Way Forward

- The world urgently **needs regulatory clarity** to rescue it from the overarching problem: no mandatory oversight exists for reentries unless direct harm occurs. Without urgent reforms, uncontrolled reentries will become more frequent and the affected communities will continue to bear the costs without recourse.

- The world **needs stronger regulations**. For one, COPUOS must push for binding global regulations that require controlled reentries and penalties for non-compliant actors. In parallel, national governments should strengthen domestic policies, requiring companies to adopt debris mitigation strategies as a condition for getting launch licenses.
- **Disposal rules should be mandatory** as well as require spaceflight entities to have controlled reentries or the ability to move to graveyard orbits (where defunct satellites are moved to avoid colliding with other satellites). And these needs should be enforced through sanctions or launch bans.
- **Improved tracking systems**, such as expanding the US Space Fence, can improve monitoring and reentry predictions. Sustainable space practices, including debris-neutral technologies and reusable rockets, should also be incentivised to reduce clutter in orbit and enhance long-term safety.
- The 1972 Liability Convention must be modernised to include an independent international tribunal with binding enforcement powers.

Conclusion

- Space is not a lawless frontier but it risks becoming one without decisive action. The time for voluntary guidelines is over: global cooperation, enforceable rules, and accountability mechanisms must take precedence before the sky truly starts falling.

Red color of Mars

- Context-Recent research, combining data from various **space missions and ground-level observations**, challenges the long-standing belief about the origin of Mars' red hue.

Key Finding:

- **Mars' red color** is now believed to be **primarily due to Ferrihydrite**, a **water-formed iron oxide**, **not Hematite** as previously thought.

Ferrihydrite:

- Forms in **cool, water-rich environments**
- Indicates **presence of water during its formation**

Significance

- Presence of **Ferrihydrite** suggests **Mars once had abundant liquid water**, which is a crucial requirement for life.
- Additionally, the detection of **hydrogen bound to iron-rich minerals** provides further evidence of **past interactions with water**.

Water-ice on Moon

- **Context-**A new analysis of data from one of the instruments aboard Chandrayaan-3 suggests that there was a good probability that water-ice was present in locations outside of the polar regions of the Moon.

Key findings

- Using data from Chandra's Surface Thermophysical Experiment (ChaSTE), scientists have shown that **surface and sub-surface temperatures in the higher latitudes** of the Moon's surface **varied greatly with even very small changes in altitudes** over a short distance.

- Inclined areas in these latitudes that were not directly facing the Sun could have environments very **similar to the polar regions**, and could host water-ice below the surface.
- ChaSTE, which is a sort of a thermometer, was the **first instrument to carry out on-site temperature measurements** of the Moon's surface and sub-surface near the polar regions. Previous estimates of temperatures in these regions came from satellite measurements.

Significance

- ChaSTE had earlier revealed that there was a **difference of nearly 60 degree Celsius between the temperature of the Moon's surface, and the layer just 10 cm beneath it.** This extreme **non-conductivity of heat by the top layer** of lunar surface shed new light about the composition and evolution of the Moon, and could have interesting practical **implications like creating temperature-controlled habitats** for future human visitors.
- ChaSTE findings not only indicate fine scale spatial variability in regolith (upper layer of the surface) temperatures but also **suggest that high-latitude regions are potential sites for scouting water-ice, resource prospecting and habitation**. Such sites are not only scientifically interesting but also pose less technical challenges for exploration in comparison with regions closer to the poles of the Moon

Chandrayaan-3

- India has **landed its Chandrayaan-3 spacecraft on the moon**, becoming only the fourth nation ever to accomplish such a feat.
- India became **first country in the world to make a soft landing near the Moon's South Pole**
- India also became **only the fourth country to make a soft landing on the Moon** after Russia, US and China.
- With the success of Chandrayaan-3, **India became the second country to land a spacecraft on the moon in the 21st century after China**, which has put three landers on the lunar surface since 2013 — including the first to touch down on the moon's far side
- The **lander (called Vikram**, after the founder of Isro) weighs about 1,500kg and carries within its belly **the 26kg rover which is named Pragyaan,** the Sanskrit word for wisdom.

Sl. No	Lander Payloads	Objectives	
1.	Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere (RAMBHA)	Langmuir probe (LP)	To measure the near surface plasma (ions and electrons) density and its changes with time
2.	Chandra's Surface Thermo physical Experiment (ChaSTE)	To carry out the measurements of thermal properties of lunar surface near polar region.	
3.	Instrument for Lunar Seismic Activity (ILSA)	To measure seismicity around the landing site and delineating the structure of the lunar crust and mantle.	
4.	LASER Retroreflector Array (LRA)	It is a passive experiment to understand the dynamics of Moon system.	

Sl. No	Rover Payloads	Objectives
1.	LASER Induced Breakdown Spectroscope (LIBS)	Qualitative and quantitative elemental analysis & To derive the chemical Composition and infer mineralogical composition to further our understanding of Lunar-surface.
2.	Alpha Particle X-ray Spectrometer (APXS)	To determine the elemental composition (Mg, Al, Si, K, Ca,Ti, Fe) of Lunar soil and rocks around the lunar landing site.

Sl. No	Propulsion Module Payload	Objectives
1.	Spectro-polarimetry of HAbitable Planet Earth (SHAPE)	Future discoveries of smaller planets in reflected light would allow us to probe into variety of Exo-planets which would qualify for habitability (or for presence of life).

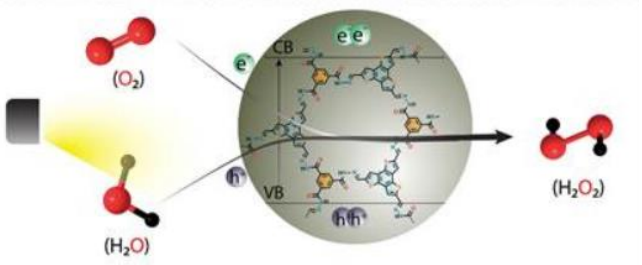
Alternative energy sources

Hydrogen peroxide

- **Context-** Researchers have found an **efficient, less energy-intensive**, and environmentally friendly way of synthesizing hydrogen peroxide, a chemical that is crucial to the industry for disinfection, paper bleaching, and so on.

About

- A new class of porous and ordered polymers with modifiable catalytic sites and light-harvesting properties in visible range, called **covalent organic frameworks (COFs),** have emerged as promising photocatalysts.
- It was observed that the hydrazone-linked COFs **provide abundant docking sites for water and oxygen**, thereby promoting water oxidation reaction (WOR) and oxygen reduction reaction (ORR) - two main pathways for **photocatalytic H_2O_2 generation**.
- As a result, the hydrazone-linked COF exhibited exceptional photocatalytic H_2O_2 production without external sacrificial electron donors when irradiated with a 40 W blue LED (λ = 467 nm).



Hydrazone-linked COFs

Hydrogen Peroxide

- It is a **chemical compound** composed of **two hydrogen atoms and two oxygen atoms (H_2O_2)**.
- It's a **pale blue liquid** in its pure form but appears colorless when diluted. It is **slightly more viscous than water** and has strong **oxidizing properties**.

Applications

- Disinfectant- Kills bacteria, viruses, used in cleaning wounds
- Bleaching Agent-Used for hair, textiles, paper, and teeth
- Rocket Propellant-In concentrated form, used in propulsion systems
- Water Treatment-Acts as an oxidizer for pollutants
- Environmental Cleanup-Helps in removing organic contaminants

Photo-assisted, self-charging energy storage devices

- Researchers have unveiled a novel air-chargeable battery for a sustainable power solution. This technology **traps the oxygen from the environment** to drive the charging process for energy storage and is a step towards a carbon-neutral future.

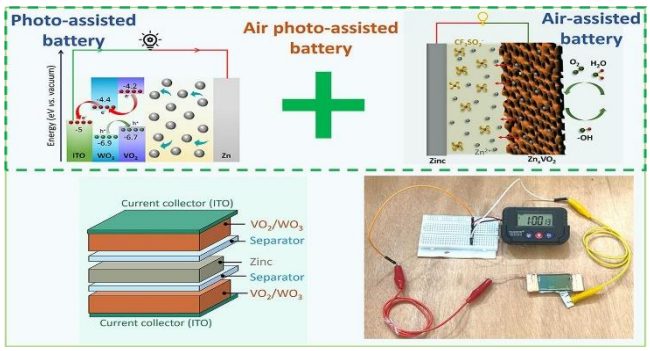
Photo-assisted battery

- In a world racing toward renewable energy solutions, a photo-assisted battery offers great promise as they combine the **best of two worlds--** the light-capturing capability of solar cells and the robust energy storage of conventional batteries.
- Generally, solar panels convert sunlight into electricity, but they rely on separate battery systems to store the energy for later use. In contrast, photo-assisted batteries merge these functions into a single device, **creating a seamless synergy between solar energy conversion and storage.**
- Photo-assisted batteries enhance the capacity of the batteries in the presence of light. However, **it needs an external power supply to charge the battery**. To overcome this limitation, there is an urgent requirement to develop energy storage devices with self-rechargeability.

Air-assisted self-charging device

- Recent research has explored the "air-assisted self-charging" aiming to utilize oxygen from the air to replenish the charge of the battery.
- Researchers from the Centre for Nano and Soft Matter Sciences (CeNS), an autonomous institution under the Department of Science and Technology (DST) in Bengaluru, India, have developed a photo-assisted self-chargeable energy storage device that enhances the charge storage capacity in the presence of light. **It can charge by its own in the presence of oxygen from the atmosphere.**
- Photo-assisted self-chargeable aqueous Zn-ion energy storage device." This work published in the Chemical Engineering Journal explores the integration of photo-assisted and self-chargeable features into zinc-ion batteries (ZIBs), utilizing vanadium oxide (VO_2) and tungsten trioxide (WO_3) as the primary cathode material.

- This work introduces a novel approach utilizing VO_2 as an active material, blended with WO_3 as a charge-separating layer, to design a photoelectrode for air-photo-assisted self-charged zinc ion energy storage. In addition, this work reports the utilization of WO_3 as a charge-separating layer in photo-assisted self-chargeable energy storage device for the first-time. The device shows a significant increment in the charge storage capacity (170%) at a constant current density of 0.02 mA/cm^2. Additionally, the VO_2 layer works as an air cathode electrode that can help air-assisted self-charging. It demonstrates an open circuit potential (OCP) of 1 V. This shows the superiority of photo-assisted self-charged energy storage performance.
- The findings pave the way for integrating these devices into self-reliable electronics, potentially powered by renewable energy sources. This marks a major step forward in the pursuit of sustainable energy solutions and demonstrates the practical utility of energy storage devices in modern technology.



Biotechnology

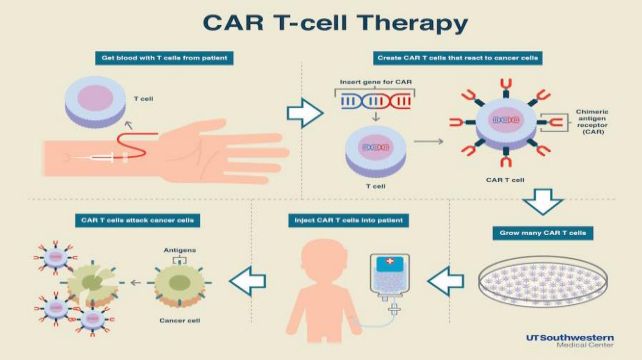
CAR T-Cell therapy

Context-A study has reported a **73% response rate for CAR T-cell therapy among patients with certain blood cancers.** The clinical trials were conducted by researchers from the Indian Institute of Technology (IIT) Bombay and Tata Memorial Hospital, Mumbai.

- The therapy, which involves **modifying T-cells**— a type of immune cell— was tested on patients with B-cell leukaemia and lymphoma. These cancers affect the bone marrow and lymphatic system, respectively.
- CAR T-cells, like normal T-cells, remain in the body for a long time, which helps prevent relapses.

CAR-T stands for chimeric antigen receptor (CAR) T-cell therapy.

- It is a type of cell therapy that is **used with gene-based therapies,** but it is not a type of gene-based therapy by itself.
- CAR-T cell therapy involves changing a **person's own immune cells to recognize and fight cancer cells** inside the body.



Ultra-conserved elements (UCEs)

Context- Recently Researchers spot a clue as to **why human and mouse genomes overlap**.

- Parts of human, mouse, chicken, dog, and even fish DNA called **ultra-conserved elements haven't tolerated a single change in the last 80 million years**

Key Findings

- Eighty million years ago humans, rats, and mice shared the same mammalian ancestor.
- More recently, researchers made the astonishing discovery that **even today our genomes contain close to 500 segments** that have remained totally unchanged since then. These segments are called **ultra-conserved elements (UCEs).** Nearly all the UCEs are also **highly unchanged in the chicken and dog genomes,** and many are significantly conserved in fish, too.
- What biological constraint maintained the UCEs intact in so many different genomes for these tens of millions of years?
- But a team made a breakthrough this year that a UCE in a mouse gene has an important role in limiting the production of the protein encoded by this gene.
- Using genetic engineering, they **deleted this gene in mouse testes**, and found that these mice over-produced the corresponding protein in their testes. The **overproduction resulted in death of the sperm-producing cells** and the mice becoming infertile.
- This result suggested that if the UCE underwent any change that interfered with its role in limiting that protein's levels, it would result in loss of sperm production. Thus the **altered UCE wouldn't be transmitted to the next generation, accounting for the maintenance of the UCE across species.**

From gene to protein

- The DNA is a double-helix molecule. Each helix is a string of four bases. The double helix is held together because a base on one strand bonds with a base on the other. Each bond represents a base-pair. A gene is a relatively short stretch of the DNA molecule, typically only a few thousand base-pairs long.
- When a gene is 'expressed', the cell copies its sequence of bases into a messenger RNA (mRNA) and loads it onto a cellular machine called the ribosome. There its base sequence specifies the sequence amino acids should be stitched together to make the protein encoded by the gene.
- The mRNA also has any one of three short sequences of bases called stop codons. When the ribosome encounters a stop codon, it stops adding more amino acids and releases the newly synthesised protein.

- Our genome contains 20,000 genes that code for proteins and another 20,000 used to make RNA that influence the expression of other genes.

Splicing

- After a gene is read (transcribed into RNA), the cell **cuts out "introns"** (non-coding parts) and **keeps "exons"** (coding parts) to make mature mRNA.
- Sometimes, the cell **splices the RNA in different ways**, creating **alternate versions** called **splice variants**.

Tra2b Gene

- The **Tra2b gene** has:
  - 9 exons and 8 introns.
  - It makes a protein called Tra2β, which helps with splicing.
- Inside **intron 1** of this gene, there is a **UCE**.
- When the **Tra2β protein becomes too abundant**, it causes the cell to **treat the UCE as an extra exon** (now called a **"poison exon"**).

Poison Exon

- This extra exon:
  - Does not code for a functional protein.
  - Contains stop signals (stop codons) that shut down protein production.
  - Causes the mRNA to degrade, stopping more Tra2β from being made.
- **Result**: It acts like a **self-destruct switch**, **limiting excess protein** — this is why it's called a **"poison exon"**.
- **UCEs**, though mysterious, can control **important regulatory processes**.
- In the **Tra2b gene**, the UCE acts as a **poison exon** that prevents too much of a splicing protein from being made.
- It's an example of genetic self-regulation.

Health

HeroRATS

- **Context**- A non-profit based in Tanzania says its initiative to use trained rats as a secondary diagnostic tool for TB, has helped with early diagnosis and curtailed transmission in three East African countries

HeroRATS

- APOPO, a non-profit organisation, headquartered in Tanzania and working in 11 countries, that trains **African giant pouched rats (nicknamed HeroRATS),** to detect TB in sputum samples.
- These rats have an outstanding ability to **sniff diseases due to their sensitive olfactory receptors**
- The rats demonstrate **remarkable accuracy,** particularly in detecting cases that traditional methods often miss, serving as a secondary diagnostic tool.
- Their ability to **identify TB quickly** and accurately helps improve early diagnosis and curtail transmission particularly in areas with limited healthcare resources.

- Remarkably, **100 samples can be tested in just 20 minutes**, a process typically taking a technician three to four days using conventional sputum-smear microscopy.

Disease detection by animals

- **Dogs -**are widely used: they have between **125 million and 300 million olfactory receptors** and a special sensory organ called the Jacobson's organ located in their nasal passage, specifically designed to **detect pheromones and other chemical signals**. Some research indicates that trained dogs may be able to identify **Parkinson's disease**.
- **Ants-**Unlike dogs, who require extensive training, ants learn quickly and inexpensively, making them a promising alternative for **cancer detection**. Ants detected cancer cells in three days using chemical cues and a sugar reward. Their ability to distinguish cancer types highlights their medical potential.
- **Honeybees**-Another macrosmatic species (one with a highly developed sense of smell), honeybees possess highly sensitive olfactory antennal lobes. They can **detect lung cancer** using synthetic biomarkers (artificial human breath that contains cancerous odours). Neural activity in the honeybee antennal lobe changes in response to cancer and non-cancerous samples, distinguishing between small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC) with 88% accuracy.

Notifiable disease

Context- Recently there have been calls to designate cancer as a notifiable disease in India.

- The **Union Government** has opposed the move, citing that only **infectious diseases are typically notified**.
- In contrast, in 2024, **snakebite**—a non-communicable yet urgent health issue—was made notifiable.
- Globally, countries like the **U.S. (1995)** have listed **lead poisoning** as a notifiable condition, indicating a shift in the approach to non-communicable diseases (NCDs).

What is a Notifiable Disease?

- A notifiable disease is one **legally mandated** to be reported to public health authorities.
- It compels physicians to report designated diseases to public health authorities, failing which they could face legal consequences
- It facilitates **early intervention**, **outbreak control**, and **public health preparedness**.
- Typically applies to **infectious and fast-spreading conditions** posing immediate health risks.

Arguments in Favour of Notification of Cancer

- **Enhanced surveillance** and **early detection** through mandatory reporting.
- Better **resource allocation**, policy formulation, and **treatment planning**.
- May address **regional disparities** in cancer incidence and care through data collection.

Arguments Against Notifying Cancer

- First, **cancer is not a single-point diagnosis**. Arguably, cancers as a disease are more diverse ranging from benign to malignant. Notifiability triggers rapid containment measures, whereas cancer **requires long-term management** rather than emergency interventions. Legal obligations on physicians could impose a burden that does not translate into improved patient care.
- Second, making cancer a notifiable disease also raises **privacy concerns**. Notifiability generally does not account for privacy because disease notification is meant to preserve public health over individual confidentiality. There is still stigma attached to cancer.
- Many State public health acts **still contain provisions that give sweeping powers to local authorities during a health emergency.** Introducing cancer into such a framework could further deepen the **reluctance among patients to come forward** for diagnosis and treatment, making it counterproductive and potentially deterring patients from seeking timely treatment due to stigma and discrimination.
- The **World Health Organization** advocates mainly cancer registries, which mention notification as an option at the individual level alone.

Way Forward

- India's **National Cancer Registry Programme** (since 1982) functions as a data collection mechanism, compiling crucial information on the demographics of cancer patients, cancer identification including type, stage, and morphology, the timing of diagnosis and staging at the time of detection, treatment details such as chemotherapy, radiation, and surgery, and follow-up and survival outcomes. The NCRP **includes hospital-based registries, which collect data from cancer-treating hospitals,** and population-based registries, which capture cancer incidence in a defined geographic area.
- An effective approach would be to **expand the NCRP** to ensure comprehensive data collection at all tertiary and district hospitals. Improving cancer screening initiatives would ensure early detection. **Strengthening reporting mechanisms** without legal mandates would allow oncologists and healthcare providers to contribute accurate data voluntarily rather than reporting under duress. Mandatory notification remains an apt approach suited for single-point, outbreak-prone diseases. For cancer, a well-structured registry system, bolstered by wider hospital participation, including private hospitals and robust follow-up mechanisms, offers a far superior solution to improving cancer surveillance in India.

Hantavirus

- **Context-** The recent passing of Betsy Hackman, wife of renowned American actor Gene Hackman, has drawn attention to deadly Hantavirus.

Hantaviruses

- Hantaviruses are a family of viruses carried by **certain rodents, such as deer mice, white-footed mice, rice rats, and cotton rats**.
- Humans typically **contract hantavirus through contact with infected rodent urine**, droppings, and saliva.
- The most common way the virus spreads is through **aerosolisation**, when fresh rodent waste is disturbed, the virus particles become airborne and can be inhaled. This often happens during activities like **sweeping infested areas, cleaning long-closed spaces such as sheds, or handling contaminated materials.**
- Additionally, hantavirus **can enter the body if a person touches their eyes, nose, or mouth** after handling contaminated materials or if the virus enters an open wound. Though extremely rare, the virus can also spread through rodent bites.
- They **do not typically transmit from person to person**, although rare cases of human-to-human transmission have been reported with certain strains, such as the Andes virus.
- Currently, even though there is **no specific antiviral treatment or cure for hantavirus**, medical care focuses on managing symptoms and supporting the patient through the most dangerous phases of the illness.

Security

Military Exercises

Exercise Khanjar-XII

- **Type:** Joint Special Forces Exercise
- **Participants:** India and Kyrgyzstan
- **Location:** Tokmok, Kyrgyzstan
- **Duration:** March 10 to March 23, 2025

Exercise Khanjar-XII

- The 12th edition of this annual exercise focused on counter-terrorism operations and special forces skills in urban and mountainous terrains.
- The Indian contingent was represented by troops from The Parachute Regiment (Special Forces), while the Kyrgyzstan contingent was represented by the Kyrgyz Scorpion Brigade.

Exercise Sea Dragon

- **Type:** Multinational Anti-Submarine Warfare (ASW) Exercise
- **Participants:** Australia, India, Japan, Republic of Korea, and the United States
- **Location:** Andersen Air Force Base, Guam
- **Duration:** March 4 to March 19, 2025
- Hosted by Commander, Task Force 72, this exercise involved intensive ASW training, enhancing collaboration among participating nations.
- The Indian Navy's P-8I Neptune aircraft participated alongside other maritime patrol aircraft from partner nations
- **Commander, Task Force 72 (CTF 72)** is a key operational unit within the United States Navy's Seventh Fleet. CTF 72 is primarily responsible for **patrol, reconnaissance, and surveillance missions** in the Indo-Pacific region.
- It plays a crucial role in monitoring maritime traffic, conducting anti-submarine warfare (ASW), and ensuring situational awareness over vast ocean areas.

Exercise Varuna

- The Varuna naval exercise is an annually held bilateral Naval exercise between India and France and it forms and integral part of France–India strategic relationship in the 21st century and consists of naval cooperation drills between the French Navy and the Indian Navy.
- The joint-exercises are held either in the Indian Ocean or Mediterranean Sea with the aim of improving Indo-French coordination on capabilities like cross-deck operations, replenishment-at-sea, minesweeping, anti-submarine warfare and information sharing.
- It was first started in 1983, though given its present name in 2001.
- France is a *Littoral State* of the Indian Ocean through the French Overseas region of Réunion, Mayotte and Scattered Islands in the Indian Ocean.
- The 23rd edition of the exercise was conducted between 19 and 22 March 2025.
- The aircraft carriers INS Vikrant (2013) and Charles de Gaulle, alongside their fighter aircraft, destroyers, frigates, and a Kalvari class submarine.

- The exercise would include a anti-submarine warfare, air defence, air-to-air combat drills including Rafale-M and MiG-29K.

Exercise Bongosagar

- **Type:** Bilateral Naval Exercise
- **Participants:** India and Bangladesh
- **Location:** Bay of Bengal
- **Duration:** March 10 to March 12, 2025
- **Details:** This exercise aimed to enhance interoperability and cooperation between the two navies, focusing on joint patrols and maritime security operations.

Exercise Indra

- The 14th edition of the Indian - Russia bilateral naval exercise INDRA, a cornerstone of the enduring maritime partnership between India and Russia, is set to take place off Chennai from 28 Mar to 02 Apr 25.
- Since its inception in 2003, Exercise INDRA epitomises the long-term strategic relationship between the two Navies.
- The exercise has evolved into a symbol of maritime cooperation, showcasing the two nations' commitment to enhancing naval interoperability and operational synergy.
- The exercise will see participation of Russian Federation Naval Ships Pechanga, Rezkiy and Aldar Tsydenzhapov along with Indian Naval Ships Rana, Kuthar and Maritime patrol aircraft P8l.

Exercise Iniochos

- INIOCHOS is a biennial multinational air exercise hosted by the Hellenic Air Force.
- It serves as a platform for air forces to hone their skills, exchange tactical knowledge, and strengthen military ties.
- The exercise will integrate multiple air and surface assets from 15 countries under realistic combat scenarios, designed to simulate modern-day air warfare challenges
- **Type:** Multinational Air Exercise
- **Participants:** Hosted by Greece, with participation from India and other nations
- **Location:** Andravida Air Base, Greece
- **Duration:** March 31 to April 11, 2025
- The Indian Air Force participated with Su-30 MKI fighters, IL-78 mid-air refuelers, and C-17 Globemaster aircraft.
- The exercise aimed to enhance air combat capabilities and interoperability among participating air forces.
- The objective of Exercise INIOCHOS 25 is to enhance international cooperation, synergy and interoperability among participating Air Forces.
- This exercise will provide an opportunity to train in planning and executing Combined Air operations, refine tactics in complex air warfare scenarios, and gain insights into operational best practices.

Naxalism

Decline in Naxalism

- Union Home Minister Amit Shah said that the Centre's ruthless approach to Naxalism has helped in bringing down the number of Naxal-affected districts to 6 from the earlier 12.
- India is determined to uproot Naxalism by March 31, 2026.
- As per the Union home ministry data, Naxal activities and violence still continue in the Left-Wing Extremism (LWE)-affected districts.
- These districts are further sub-categorised as 'most-affected districts', and 'districts of concern'.
- The LWE-affected districts have been further sub-categorised as 'most-affected districts, ' a terminology brought in in 2015, and 'districts of concern,' which was coined by the home ministry in 2021.
- As per official records, there were 35 such districts in 2015, 30 in 2018 and 25 in 2021.
- As per the latest review by the Ministry of Home Affairs (MHA) in March 2025, the number of 'most affected' Left Wing Extremism (LWE) districts has been reduced from 12 to 6.

Districts Most Affected by LWE

- Chhattisgarh:
  - Bijapur
  - Kanker
  - Narayanpur
  - Sukma
- Jharkhand:
  - West Singhbhum
- Maharashtra:
  - Gadchiroli

Naxal surrenders double in 1st Quarter of 2025

- Surrenders by Naxalites in the first quarter of 2025 have more than doubled from the comparative period last year, with the CRPF activating its intelligence wing to persuade these cadres to lay down arms in the toughest battle zone of Chhattisgarh.
- It also asked the intelligence wing personnel to "engage with the denizen, encouraging them to play a role in persuading CPI (Maoist) cadres to surrender and renegade their ideology and integrate into mainstream society" in view of the Union government's declaration of eradicating Left Wing Extremism (LWE) from the country by March, 2026.
- An official data of Naxal surrenders in Chhattisgarh has been accessed by PTI which shows that while 124 hardcore (ultras bearing a cash reward), non-award carrying cadres and 'Jan militia' members laid down their arms or ideology in the first three months (January-March) of 2024, these numbers rose to 280 in the comparative period this year.
- The year 2024 saw a total of 787 surrenders, mostly by the "engagements" made by the Central Reserve Police Force and its special commando unit CoBRA.

CRPF

- The CRPF is the lead anti-Naxal operations force with about 20 full battalions deployed in Chhattisgarh and the COBRA unit is mandated to execute "specific intelligence-based" operations.
- Each such battalion has a dedicated unit for intelligence gathering and analysis.
- A senior CRPF officer said the force is working on a three-pronged strategy since the last few months-- anti-Naxal operations including setting up of remote bases, launching civic camps and effecting increased number of surrenders.
- According to the Union government records, Maoist violence has come down by 81 per cent in the country while deaths of civilians and security forces has reduced by 85 per cent.

Chhattisgarh Naxal Surrender/ Victim Relief and Rehabilitation Policy-2025

- Land to civilian victims of Maoist violence and increased compensation for the kin of those killed while assisting in anti-Naxalite operations are part of the new rehabilitation policy recently cleared by the Chhattisgarh cabinet.
- The primary objective of the new policy is to support those affected by Naxal violence and reintegrate surrendered Naxalites into the society.
- The government believes a balance between strict action and rehabilitation is essential to eliminate Naxalism.
- Compensation given in the case of death of 'gopniya sainik' (informers) specially assisting police in anti-Naxalite operations has been increased from Rs 5 lakh to Rs 10 lakh (over and above the compensation payable under central schemes).
- Similarly, compensation given in the case of permanent disability to such a person has been hiked to Rs 5 lakh from Rs 3 lakh, the official said, citing the draft of the new policy.
- In case of murder, serious injury or permanent disability to civilians, the victims or families will be provided 1.5 hectares of agricultural land or 4 decimal (1,742 sq ft) of residential land in urban areas.
- In case land could not be made available, financial assistance of Rs 4 lakh will be given to victims in rural areas and Rs 8 lakh in urban areas.
- If a victim's family purchases agricultural land within three years of the incident, they will get complete exemption from stamp duty and registration fee on purchase of a maximum of two acres of land.
- In cases of death of civilians, if a government job cannot be provided to a family member, an assistance of Rs 15 lakh will be paid (Rs 10 lakh to spouse-children and Rs 5 lakh to parents).
- If a victim secures a private sector job, the government will pay 40 per cent of the salary for five years, with a cap of Rs 5 lakh per year.

- Children from victim families will get free education at Prayas Residential Schools and Eklavya Model Schools. If they wish to study in private schools, they will get priority in reserved seats under the Right To Education Act.
- Additionally, students pursuing higher education or technical training will receive a Rs 25,000 annual scholarship, the official said.
- A Naxalite who is unmarried, or whose spouse is not alive, will be given a grant of Rs 1 lakh within three years for marriage.

Anti Naxal Operation

- In a significant anti-naxal operation, 16 Maoists were killed in an encounter with security forces along the Sukma-Dantewada border in south Chhattisgarh. (March 29, 2025).
- The operation, conducted by the District Reserve Guard (DRG) and the Central Reserve Police Force (CRPF), also left one CRPF personnel and two DRG jawans injured.
- Sukma remains a key operational zone for 1 Battalion of the People's Liberation Guerrilla Army (PLGA), the most dreaded unit of the banned Communist Party of India (Maoist).
- The presence of high-ranking Maoist cadres in the dense forests of the region has made it a challenging battleground for security forces.

Defence Modernization

New Acquisitions

- India's defence acquisition council gave initial approval for the purchase of arms and equipment worth more than 540 billion rupees ($6.26 billion) to enhance the capabilities of its armed forces.
- The approval includes the purchase of more powerful engines for Russian-origin T-90 battle tanks operated by the Indian Army, additional anti-submarine torpedoes for the Indian Navy, and airborne early warning and control aircraft systems for the Indian Air Force.

Defence Acquisition Council

- The **Defence Acquisition Council (DAC)** is the highest decision-making body in India's Ministry of Defence (MoD) regarding defense procurement.
- It plays a crucial role in formulating policies and ensuring timely acquisition of military equipment to meet the armed forces' requirements.
- Established: 2001
- **Objective:** To streamline the defense procurement process and reduce delays.
- Headed by: The Minister of Defence of India.

The DAC is chaired by the **Minister of Defence** and includes:

- **Chief of Defence Staff (CDS)**
- **Chief of the Army Staff (COAS)**

- **Chief of the Naval Staff (CNS)**
- **Chief of the Air Staff (CAS)**
- **Defence Secretary**
- **Financial Adviser (Defence Services)**
- **Secretary (Defence Production)**
- **Director General (Acquisition)**

Primary Functions

- **Policy Formulation:**
  - Formulates policies on defense procurement and modernization.
  - Ensures alignment with India's defense policy and long-term strategic needs.
- **Capital Acquisitions:**
  - Grants approvals for the procurement of military hardware and systems.
  - Decides on purchases for the Army, Navy, Air Force, and Coast Guard.
- **Procurement Prioritization:**
  - Prioritizes acquisitions based on operational requirements and budget allocations.
- **Indigenization and Make in India:**
  - Encourages indigenous production and collaboration with Indian defense manufacturers.
  - Promotes technology transfer agreements.
- **Acceptance of Necessity (AoN):**
  - Approves proposals by granting an **Acceptance of Necessity (AoN)**, the first step in procurement.
- **Approval of Long-Term Plans:**
  - Approves the **Long-Term Integrated Perspective Plan (LTIPP)**, which outlines procurement for the next 15 years.

Significance of DAC

- **Strategic Readiness:**
  - Enhances the operational capabilities of the armed forces.
  - Ensures timely procurement to maintain defense preparedness.
- **Self-Reliance:**
  - Supports the **Make in India** initiative, boosting domestic defense production.
- **Efficiency in Decision Making:**
  - Reduces procedural delays by centralizing decision-making at the highest level.

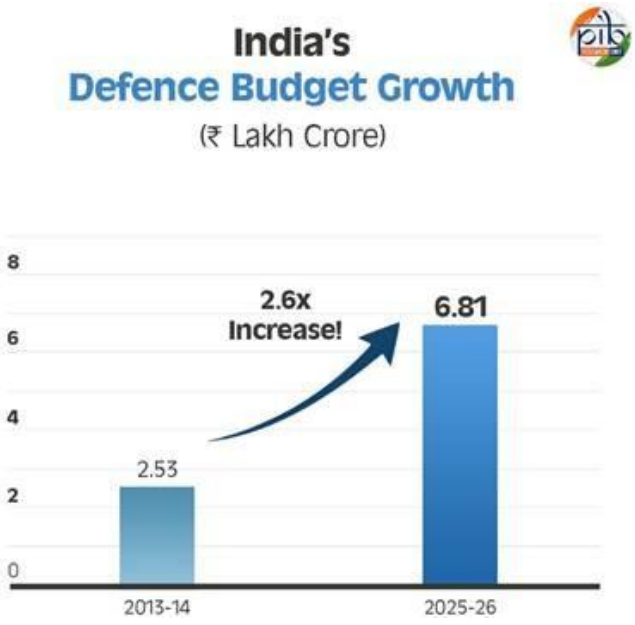
Recent Acquisitions

- On March 28, 2025, India signed a substantial contract worth over ₹627 billion (approximately $7.33 billion) to procure 156 Light Combat Helicopters (LCH) named "Prachand."
- These helicopters are designated for both the Indian Air Force (IAF) and the Indian Army, aiming to enhance their operational capabilities.
- The LCH Prachand, developed by Hindustan Aeronautics Limited (HAL), is designed for high-altitude operations and is equipped with advanced avionics and weaponry.
- This acquisition aligns with India's focus on bolstering indigenous defense manufacturing under the "Make in India" initiative.
- On March 7, 2025, India entered into a $248 million agreement with Russian state arms exporter Rosoboronexport to acquire advanced 1,000 horsepower engines for its T-72 battle tanks.

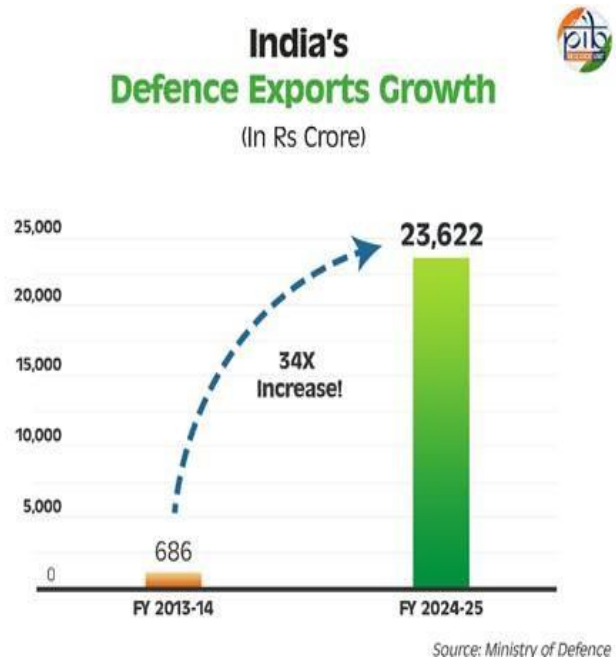
- This upgrade is intended to enhance the battlefield mobility and offensive capabilities of the Indian Army's armored fleet.
- The deal also includes a technology transfer component, facilitating licensed production of these engines by India's Armoured Vehicles Nigam Ltd.

Defence Exports

- India's defence production has grown at an extraordinary pace since the launch of the "Make in India" initiative, reaching a record ₹1.27 lakh crore in FY 2023-24, with defence exports rising to an all-time high of ₹23,622 crore in FY 2024-25.
- Once dependent on foreign suppliers, the country now stands as a rising force in indigenous manufacturing, shaping its military strength through home-grown capabilities.
- This shift reflects a strong commitment to self-reliance, ensuring that India not only meets its security needs but also builds a robust defence industry that contributes to economic growth.



- Strategic policies have fuelled this momentum, encouraging private participation, technological innovation, and the development of advanced military platforms.
- The surge in the defence budget, from ₹2.53 lakh crore in 2013-14 to ₹6.81 lakh crore in 2025-26, underlines the nation's determination to strengthen its military infrastructure.
- India's expanding global footprint in defence manufacturing is a direct result of its commitment to self-reliance and strategic policy interventions.
- Defence exports have surged from ₹686 crore in FY 2013-14 to an all-time high of ₹23,622 crore in FY 2024-25, marking a 34 times increase over the past decade.



Important Points

- In 2024-25, defence exports reached ₹15,233 crore from the private sector and ₹8,389 crore from DPSUs, up from ₹15,209 crore and ₹5,874 crore in 2023-24.

- DPSU exports grew by 42.85% in 2024-25, showcasing the increasing global acceptance of Indian defence products and industry integration into the global supply chain.
- The Department of Defence Production issued 1,762 export authorisations in 2024-25, up from 1,507 in 2023-24, registering a 16.92% growth, while the number of exporters increased by 17.4% during the same period.
- India's diverse export portfolio includes bulletproof jackets, Dornier (Do-228) aircraft, Chetak helicopters, fast interceptor boats, and lightweight torpedoes.
- India now exports defence equipment to over 100 countries, with the USA, France, and Armenia emerging as the top buyers in 2023-24.
- The government aims to achieve ₹50,000 crore in defence exports by 2029, reinforcing India's role as a global defence manufacturing hub while boosting economic growth.
- 65% of defence equipment is now manufactured domestically, a significant shift from the earlier 65-70% import dependency, showcasing India's self-reliance in defence.
- A robust defence industrial base includes 16 DPSUs, over 430 licensed companies, and approximately 16,000 MSMEs, strengthening indigenous production capabilities.
- The private sector plays a crucial role, contributing 21% to total defence production, fostering innovation and efficiency.
- India targets ₹3 lakh crore in defence production by 2029, reinforcing its position as a global defence manufacturing hub.

Important Defence Acquisitions

- **Procurement of Light Combat Helicopters (LCH) Prachand**: The Ministry of Defence signed two contracts with Hindustan Aeronautics Limited (HAL) on March 28, 2025, for 156 LCH Prachand helicopters worth ₹62,700 crore (excluding taxes).
  - The Indian Air Force will receive 66 helicopters, while the Indian Army will get 90.
  - Deliveries will begin in the third year and continue over five years.
  - Designed for high-altitude operations above 5,000 meters, LCH has over 65% indigenous content, involving 250 domestic companies, mostly MSMEs, and generating over 8,500 jobs.
- **Approval for Advanced Towed Artillery Gun System (ATAGS):** The Cabinet Committee on Security (CCS), chaired by the Prime Minister, approved the procurement of 307 ATAGS along with 327 High Mobility 6x6 Gun Towing Vehicles for 15 Artillery Regiments under the Buy Indian–Indigenously Designed, Developed, and Manufactured (IDDM) category at a cost of ₹7,000 crore.

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iDEX

- Launched in April 2018, Innovations for Defence Excellence (iDEX) has created a thriving ecosystem for innovation and technology development in defence and aerospace.
- By engaging MSMEs, startups, individual innovators, R&D institutes, and academia, iDEX has provided grants of up to ₹1.5 crore for developing innovative technologies.
- To further enhance self-reliance in defence technology, ₹449.62 crore has been allocated to iDEX, including its sub-scheme Acing Development of Innovative Technologies with iDEX (ADITI), for 2025-26.
- As of February 2025, 549 problem statements have been opened, involving 619 startups and MSMEs, with 430 iDEX contracts signed.

Objectives of iDEX

- Facilitate rapid development of new, indigenised, and innovative technologies for the Indian Defence and Aerospace sector, to meet their needs in a shorter time span.
- Create a culture of engagement with innovative startups, to encourage co-creation for Defence and Aerospace sectors.
- Empower a culture of technology co-creation and co-innovation within the Defence and Aerospace sectors.

ADITI Scheme

- Raksha Mantri Shri Rajnath Singh launched Acing Development of Innovative Technologies with iDEX (ADITI) scheme to promote innovations in critical and strategic defence technologies, during DefConnect 2024 in New Delhi on March 04, 2024.
- Under the scheme, start-ups are eligible to receive grant-in-aid of up to Rs 25 crore for their research, development, and innovation endeavours in defence technology.
- The scheme will nurture the innovation of youth, and help the country leap forward in the field of technology
- The ADITI scheme worth Rs 750 crore for the period 2023-24 to 2025-26 falls under the iDEX (Innovations for Defence Excellence) framework of Department of Defence Production (DDP), Ministry of Defence.
- It aims to develop about 30 deep-tech critical and strategic technologies in the proposed timeframe.
- It also envisages to create a 'Technology Watch Tool' to bridge the gap between the expectations and requirements of the modern Armed Forces and the capabilities of the defence innovation ecosystem.

ADITI Scheme- Focus Areas

- Agriculture: Precision farming and yield prediction.
- Healthcare: Remote diagnosis and AI-assisted health services.
- Education: Personalized learning and automated assessment tools.
- Urban Management: Smart traffic systems and waste management.
- Cybersecurity: AI-driven threat detection.

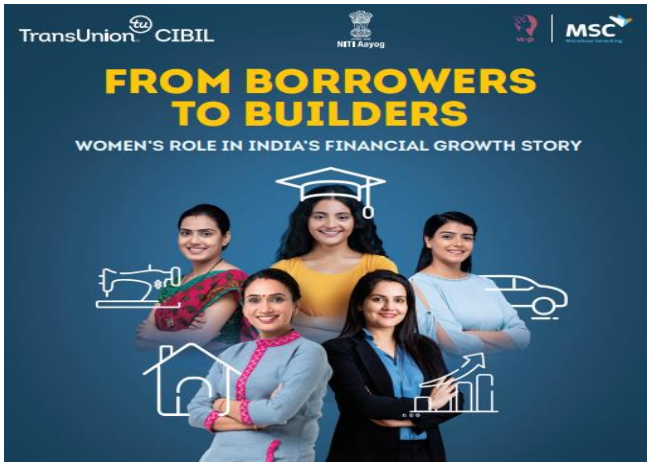
Recent Developments

- **Successful Pilot in Karnataka:**
  - AI-based crop monitoring system led to a 20% increase in yield prediction accuracy.
- **Urban Traffic Management in Delhi:**
  - AI-driven signal optimization reduced congestion by 15%.
- **Collaboration with Tech Giants:**
  - Partnerships with companies like TCS and Infosys for AI tool development.

Social Issues

Woman Related Issues

Women's Contribution to India's Financial Growth



Context:

- A recent report by NITI Aayog titled ***"From Borrowers to Builders: Women's Role in India's Financial Growth Story"*** highlights the increasing participation and role of women in India's financial growth.

Key Findings of the Report:

Rising Credit Awareness:

- 27 million Indian women actively monitored their credit scores by December 2024, marking a significant growth of 42% compared to the previous year.

Growth in Self-Monitoring:

- The proportion of women within the total population self-monitoring their credit scores increased to 19.43% (2024) from 17.89% (2023).

Non-Metro vs Metro Trends:

- Notably higher growth of credit awareness among women in non-metro regions (48%) compared to metro areas (30%).

State-wise Participation:

- Maharashtra, Tamil Nadu, Karnataka, Uttar Pradesh, and Telangana constitute nearly half (49%) of self-monitoring women, with southern states leading (10.2 million).

Rise in Women Borrowers:

- Since 2019, women's participation in business loan origination rose by 14%.
- Women's share in gold loans increased by 6%, with women making up 35% of total business loan borrowers by December 2024.
- Rajasthan, Uttar Pradesh, and Madhya Pradesh reported the highest growth rates (CAGR) of active female borrowers over five years.

Persisting Challenges:

- **Credit Aversion:** Reluctance or fear amongst women in accessing formal credit channels due to limited familiarity and trust issues.
- **Negative Banking Experiences:** Previous adverse experiences impacting women's comfort level in engaging with formal banking systems.
- **Collateral and Guarantor Barriers:** Difficulties faced due to limited asset ownership among women, impacting their ability to offer collateral or guarantors required for loans.
- **Credit-Readiness Barriers:** Lower financial literacy, awareness, and limited exposure to formal financial products persist as obstacles.

Conclusion:

- Actively supporting women's entrepreneurship has substantial potential to significantly boost employment opportunities, potentially creating around 150 to 170 million jobs.
- Enhanced participation of women in financial markets and businesses can notably strengthen overall economic growth and lead to increased labour force participation of women in India.

International Women's Day 2025

Context:

- International Women's Day is observed globally every year on 8th March to celebrate and acknowledge women's contributions in social, political, economic, and cultural spheres.

Theme of International Women's Day 2025:

- ***"For ALL Women and Girls: Rights. Equality. Empowerment."***
- Highlights the necessity to ensure equal rights, power, and opportunities for every woman and girl, advocating for an inclusive society where no individual is excluded or marginalized.

Significance of 2025:

- Marks the 30th anniversary of the Beijing Declaration and Platform for Action (adopted in 1995).
- The Beijing Declaration is globally recognized as the most comprehensive and progressive framework aimed at advancing women's rights and gender equality.
- Adopted during the Fourth World Conference on Women on 15 September 1995, organized by the United Nations.

About Beijing Declaration:

- A landmark UN resolution for women's empowerment, addressing various dimensions such as education, economic participation, political empowerment, and elimination of gender-based violence.
- Serves as a global guideline for countries to frame their policies and actions towards achieving gender equality.

Conclusion:

- International Women's Day 2025 reinforces global commitment toward women's rights and gender equality. Celebrating three decades since the Beijing Declaration provides an important opportunity to evaluate progress, address gaps, and strengthen efforts towards an inclusive and equal future for women and girls worldwide.

Globalisation and its impact on Indian Society

India launches multi-nation alliance on sustainable development

Union Minister of Housing and Urban Affairs Manohar Lal seen at the launch of 12th Regional 3R and Circular Economy Forum in the Asia & the Pacific in Jaipur. Photo: X/@PIBodisha

Context:

- India launched the C-3 alliance during the 12th Regional 3R and Circular Economy Forum held in Jaipur, focusing on sustainable urban growth and efficient resource management.

About C-3 Initiative:

- **Nature of Alliance:** International collaboration focusing on city-to-city cooperation, knowledge exchange, and partnerships with the private sector.
- **Core Purpose:** It provides an essential platform for policymakers, businesses, researchers, and global development actors to formulate and implement effective strategies for sustainable waste management and efficient resource use across Asia-Pacific.

Role of the Initiative:

- Acts as a key driver for achieving resource efficiency and promoting a low-carbon economy.
- Strengthens collaboration and synergy among government officials, industry experts, and academic researchers.
- Facilitates joint efforts in building sustainable urban development.

Significance:

- The C-3 initiative holds transformative potential by revolutionizing city-to-city collaboration internationally.
- Enhances strategic alignment on sustainability among cities, ultimately benefiting global environmental health.

About the Regional 3R and Circular Economy Forum (Asia-Pacific):

- **Established:** Initiated in 2009 under the guidance of the United Nations.
- **Primary Objective:** Encouraging circular economy practices aimed at achieving zero-waste societies within the Asia-Pacific region.
- **Strategic Advice:** Offers policy recommendations to national governments to integrate 3Rs (Reduce, Reuse, Recycle) in governance structures.
- **Knowledge Exchange:** Serves as a critical platform for exchanging expertise and innovative practices in waste management and circular economy strategies.

Jaipur Declaration (2025-2034):

- It represents a non-political, voluntary commitment guiding international efforts toward sustainable urban growth and resource efficiency for the upcoming decade (2025-2034).
- Aims to establish a comprehensive framework promoting global sustainability through cooperation and mutual knowledge sharing.

Conclusion:

- The C-3 initiative signifies India's proactive global leadership in sustainable urbanization and waste management. By promoting collaborative strategies and innovative solutions, this alliance promises substantial advancement towards environmental sustainability, resource conservation, and sustainable economic growth across the Asia-Pacific region and beyond.

Communalism, Regionalism, Secularism

Linguistic Secularism in India

The language debate over the National Education Policy rages on even as the Supreme Court had favoured "linguistic secularism" or the acceptance of the legitimate aspirations of the speakers of different languages in India in a 2014 judgment. | Photo Credit: Sushil Kumar Verma

Context:

- The recent National Education Policy (NEP) has triggered debates and concerns over the perceived imposition of Hindi language in India.

Understanding Linguistic Secularism:

- **Definition:** It refers to the principle of providing equal respect, treatment, and accommodation to all languages within a diverse and multilingual society.
- **Importance:** Essential for maintaining harmony in a linguistically diverse nation like India, preventing dominance or marginalization of any particular language.

Constitutional Provisions for Language Rights:

- **Article 343:** Recognizes Hindi in Devanagari script as the official language of the Indian Union.
- **Article 29(1):** Guarantees all communities, including minorities and majorities, the right to preserve their distinct language, script, and culture.
- **Article 19(1)(a):** Protects citizens' rights to choose their preferred medium of instruction, particularly at the primary education level.

Judicial Perspective on Linguistic Secularism:

U.P. Hindi Sahitya Sammelan vs. State of U.P. (2014):

- Court emphasized language development should be organic and flexible rather than forced or rigid.
- Highlighted India's accommodative approach toward languages, ensuring linguistic secularism.

Sunil K.R. Sahastrabudhey vs. Director, IIT Kanpur (1982):

- Court clarified that Article 351 assigns the Union Government the responsibility to promote Hindi as a medium to reflect India's composite culture.
- However, it stressed that no citizen could compel any institution to use Hindi exclusively as a medium of education.

Conclusion:

- Linguistic secularism is critical for India's unity and diversity. Policies must reflect constitutional ideals, supporting harmonious coexistence and respect for all languages. Maintaining linguistic balance without imposing one language over others is fundamental to India's pluralistic ethos.