INDEX

POLITY AND GOVERNANCE

- Gender Justice in the context of Rapes
- Govt ignored Niti red flag that data protection law could weaken RTI
- Activist Sonam Wangchuk, others detained at Delhi border launch indefinite fast
- Overseas Citizen of India (OCI)
- SC rejects pleas for review of its verdict holding states'' power to tax mineral right
- Central Electricity Regulatory Commission
- NCBC suggests inclusion of many Maharashtra communities in central OBC list
- Assam Accord Road Map
- SC Strike Down 'Casteist' Provisions in India's Prison Manuals
- Telangana Begins Sub-Categorization of SCs
- National Electricity Plan (Transmission)
- What is Article 142, invoked by Supreme Court?
- India's Renewable Energy Capacity Reaches 200 GW
- National Organ Transplant Programme
- Right to Form Trade Union in India
- Drugs Technical Advisory Board
- Chief Justice of India Appointment
- Challenge to the Marital Rape Exception
- Constitutional Bench of SC upholds validity Section 6A of Citizenship Act

- Supreme Court's Assam verdict
- Demands of Ladakh for Statehood, inclusion in 6th Schedule.
- SC Upholds States'' Right to Regulate Industrial Alcohol
- 95% of Land Records in Rural India Digitized
- Karmayogi Competency Model for Civil Servants
- Appointment of CHIEF JUSTICE OF INDIA (CJI)
- Delimitation angle of the Census
- Justice K. S. Puttaswamy passes away

DEFENCE AND SPACE

- INSV TARINI Sails Out for NAVIKA SAGAR PARIKRAMA II
- PSLV-37 mission re-enters Earth's atmosphere
- Fattah 2
- Isro to build third launch pad at Sriharikota, Cabinet approval pending
- Malabar 2024
- Hunter Drones Cleared: CCS Clears 31 MQ9B for $ 3.1 Billion
- India's Nuclear-Powered Attack Submarines (SSNs): A Long-Awaited Project Finally Cleared
- What Are TAURUS MISSILES and what can they do?
- ISRO targets to launch Venus Orbiter Mission in March 2028
- Space Based Surveillance (SBS) Mission
- NASA'S Europa Clipper Mission
- Non-Kinetic Warfare
- Indian Navy's Next Generation Missile Vessels

- Moonlight Program
- 6th India-Singapore Defence Ministerial Dialogue
- IAEA's Climate Change and Nuclear Power report 2024
- What Is Betelgeuse?
- Z-Morh Tunnel
- Euclid Mission
- THE LASER INTERFEROMETER SPACE ANTENNA (LISA) MISSION
- EOS 6 & INSAT 3DR
- Singapore India Maritime Bilateral Exercise (SIMBEX)
- India's Expanding Space Program
- Marching Towards Atmanirbharta: India''s Defence Revolution
- SPACE SECTOR NEW PROJECTS
- Bharatiya Antariksh Station (BAS)

INTERNATIONAL RELATIONS

- INDO-PACIFIC ECONOMIC FRAMEWORK FOR PROSPERITY (IPEF)
- India, U.S. Sign Pact on Critical Minerals
- Uranium Enrichment in Iran, amid Global Concerns
- Nepal, India, And Bangladesh Sign Historic Cross-Border Electricity Trade Deal
- Jaishankar to visit Pakistan for SCO meeting - What is the organisation — and what is its significance?
- International Medical Device Regulators Forum (IMDRF)
- Power Play in the Indian Ocean: India and Maldives Forge a New Strategic Partnership
- PM Modi attends 21st ASEAN-India Summit in Lao PDR

- PM Modi attends 19th East Asia Summit
- World Telecommunication Standardization Assembly (WTSA)
- Refugee rights, the gendered nature of displacement
- India, Pakistan rule out bilateral talks during SCO Summit
- India-Russia working group on the Northern Sea Route (NSR)
- Lok Sabha Speaker Addresses IPU Assembly In Geneva Inter-Parliamentary Union (IPU)
- UNIFIL: The UN"s Peacekeeping Mission In Lebanon
- India-Canada Bilateral Relations
- Five Eye Alliance
- India Canada diplomatic row explained
- Italy-Albania Migration Pact
- Korean Peninsula
- India-Mauritius Bilateral Cooperation
- India-China Border Patrol Agreement
- Shadow Fleet / Dark Fleet ??
- CHINA - TAIWAN ISSUE AND INDIA
- BRICS Summit 2024
- UN Peacekeeping
- UNITED NATIONS DAY
- India Launches $25 Million G20 Pandemic Fund
- India and Spain Sign Multiple agreements
- LAC and LOC ?
- United Nations Relief And Works Agency For Palestine Refugees In The Near East
- Brazil not to join China's BRI
- India, Germany hold 7th Inter-Governmental Consultations

ECONOMICS

- India's core sectors slipped to a nine-month low
- India's current account deficit (CAD) widened
- Cruise Bharat Mission
- MONETARY POLICY COMMITTEE
- Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)
- NATIONAL STATISTICAL COMMISSION (NSC)
- National Mission on Edible Oils – Oilseeds (NMEO-Oilseeds)
- International Energy Efficiency Hub
- Weeds Cause ₹92,000 Crore Loss in Crop Productivity
- Business- Ready Index
- An Annual Review by IRENA
- National Agriculture Code (NAC)
- Passive Mutual Fund
- Why fair returns for farmers are elusive?
- India's Forex Reserves Top $700 bn, India becomes 4th country to cross this mark
- PM GatiShakti National Master Plan completes 3 years of transforming India''s Infrastructure landscape
- Union Government releases tax devolution of ₹1,78,173 crore to State Governments in addition to regular instalment due in October, 2024
- Sitharaman reviews performance of Regional Rural Banks in northeast
- What is Codex Alimentarius?
- RBI, Maldives Monetary Authority enter into currency swap pact
- GDP Base Year Revision

- Sustainable Agriculture to Recover Groundwater
- Yield Curve
- The Problem with Free Food
- Nobel Prize in Economics 2024
- Reserve Bank Climate Risk Information System (RB-CRIS)
- Minimum Support Prices
- "Scam se Bacho" Campaign
- Indian Development and Economic Assistance Scheme
- Centre Hikes MSP for Rabi Crops 2025-26
- Global Public Debt
- GST Overhaul Needed Before 2026 Cess Repayment
- Economic Freedom of the World Report
- 21st Livestock Census in India
- Commitment to Reducing Inequality (CRI) Index 2024
- India Set to Establish Its First Coal Exchange
- World Economic Outlook
- India's FTA Strategy
- Bihta dry port
- MORMUGAO Port
- Rs 1,000 Crore Venture Capital Fund Initiative for Space sector
- Indians Lose ₹120 Crore to Digital Arrest Scams in Q1 2024
- India's coking coal imports
- Challenges of India''s Fertilizer Sector
- IDiGi Framework
- International Monetary and Financial Committee (IMFC)
- Urban GDP Declines
- What is NAFED?

- India's heavy reliance on imports for critical minerals
- Passenger Terminal & a Cargo Gate at Petrapole Land Port
- Union Home Ministry has issued an alert against illegal payment gateways
- CARIN (Camden Assets Recovery Inter-Agency Network)

ENVIRONMENT

- Eco-Sensitive Zones & Western Ghats
- Ocean Warming Rate Doubles Since 2005: Report
- Mudumalai Tiger Reserve
- Nature's new nest: India's 1st oxygen bird park opens its wings at Maharashtra''s Jamtha
- PM opens bio-gas plants, Assam gets 4
- Ecomark Rules notified by Ministry of Environment, Forest and Climate Change
- India and Brazil to collaborate on SAF, leverage biofuel expertise to decarbonise aviation
- Leopard population in Odisha's forests jumps by 22% to 696 in two years
- PM E-DRIVE Scheme
- Guardians of the Flock: Wolves may be villains in Bahraich, but are sacred beings for Koppal's Kuruba shepherds
- National Wildlife Week is celebrated from October 2 to October 8
- INTERNATIONAL BIG CAT ALLIANCE (IBCA)
- Halari donkeys are considered to be intelligent animals which work closely with human beings

- **10th Wild Ass Population Estimation (WAPE)**
- **Nilgiri tahr**
- **Battery Lifecycles and Environmental Implications**
- **India's potent black carbon emissions from kerosene lamps make up 10% of total residential emissions**
- **Waste Management and Waste to Energy**
- **Darjeeling's Padmaja Naidu Himalayan Zoological Park has been selected for the prestigious (WAZA) Conservation Award 2024**
- **Carbon Border Adjustment Mechanism (CBAM) and Deforestation rules are'unilateral' and 'arbitrary'**
- **Living Planet Report of the World Wildlife Fund's (WWF)**
- **DUST-DRIVEN OCEAN FERTILIZATION**
- **Coastal Flooding: Varied Impact on Tree Species**
- **Butterflies in Kaziranga**
- **"The Unjust Climate" report**
- **Coogee Beach**
- **National Green Hydrogen Mission**
- **Oceans on Brink**
- **Pyrocystis noctiluca**
- **Ranthambore Tiger Reserve**
- **Ratapani Wildlife Sanctuary and Tiger Reserve**
- **Mining Dust-Based Carbon Capture: A Sustainable Innovation**
- **CBD COP16**
- **KUNO NATIONAL PARK**
- **Hornets Vs Wasps**
- **Orchids**

- SPECIES IN NEWS : ANGUICULUS DICAPRIOI, TENKANA JAYAMANGALI, NILGIRI TIT
- Spraying DIAMOND DUST To cool Earth
- GIANT SALMON CARP
- Mass Bleaching of Coral Reefs
- STUBBLE BURNING & RIGHT TO HEALTHY ENVIRONMENT
- Global Ecosystems Atlas was launched at the 16th Conference of Parties (COP16)
- PONG Dam
- Asiatic Golden Cat
- Centre Issues Guidelines on Seaweed Import
- Digital Sequence Information (DSI)
- Nature Conservation Index
- Mangroves and Cyclones
- NEED FOR FGD REGULATIONS IN INDIAN TPPs
- Similipal Tiger Reserve
- The Great-Eared Nightjar
- Asthamudi Lake
- WMO Releases GREENHOUSE GAS BULLETIN
- Hasdeo Arand Forest and Ongoing Protests
- STATUS OF THE WORLD'S TREES REPORT

GEOGRAPHY

- How, why global forecasters got La Nina prediction wrong
- Tsangyang Gyatso Peak

- Geological Survey of India conducts Swachhata Hi Seva campaign at Shyok-Nubra valley in Ladakh
- Solar Storm Warning: ISRO On Alert As India Braces for Potential Disruptions
- India's southwest monsoon has ended on an optimistic note, with 8% more rain, focus shifts to Northeast Monsoon
- Salt Pan land to be used for Homes
- 2023 driest for global rivers in 33 years, reveals WMO's report
- Delhi Government pushes for cloud seeding ahead of post-Diwali air crisis
- Chaukhamba Peaks of the Garhwal Himalayas
- Azores Islands
- Atmospheric rivers are shifting poleward
- Stratospheric Aerosol Injection (SAI)
- Atlantic Meridional Overturning Circulation (AMOC)
- Cloud Chamber Under Project Mausam
- The Caspian Sea is shrinking – but why?
- Mekong River
- TN Govt notifies heatwave as state-specific disaster

SCIENCE AND TECHNOLOGY

- BharatGen -World's first Government-funded Multimodal Large Language Model (LLM)
- Small nuclear reactors get traction: Private players offer captive sites for power projects
- Stem Cells Offer Hope for Type 1 Diabetes

- **New artificial synaptic chip mimicking biological synapses to transform information technology**
- **Novel polymer nanocomposite creates base for road safety sensor for accident prone turnings**
- **SPRP for dengue and other Aedes-borne arboviruses**
- **Union Health Minister Unveils Key Initiatives to boost Nutrition Support for TB Patients and their Families**
- **The discovery of microRNA wins the 2024 physiology Nobel Prize**
- **Unified Genomic Chip for cattle**
- **MACE, Asia's Largest and World's Highest Imaging Cherenkov Observatory, at Hanle, Ladakh**
- **WHO declares that India has eliminated Trachoma as a public health problem in 2024**
- **High Court Allocates ₹974 Crore for Rare Diseases, Forms National Committee**
- **Physics Nobel awarded to neural network pioneers who laid foundations for AI**
- **Helicase-assisted continuous editing**
- **Union Cabinet has extended the universal supply of fortified rice in all central government schemes**
- **The Nobel Prize in Chemistry 2024**
- **New cancer therapy target could help patients overcome resistant to current treatments**
- **India meets WHO international standards for vaccine regulations**
- **Crucial role of Biobank regulations in advancing Precision medicine in India**
- **Wayanad's new X-band radar**

- **India Commits to Safe and Trusted AI with New EoI initiative**
- **New Photocatalyst can Efficiently Degrade Broad-Spectrum Antibiotics**
- **Prime Minister Early Career Research Grant (PMECRG)**
- **Jiangmen Underground Neutrino Observatory (JUNO)**
- **IndiaAI Mission**
- **Artificial Stone**
- **Haemodialysis (HD) Machines**
- **'Smart' insulin prevents diabetic highs — and deadly lows**
- **Unique Drug Delivery Method to Improve Treatment of Brain Tuberculosis**
- **World Iodine Deficiency Day**
- **Candy leaf has Potential beyond its Natural Sweetening properties**
- **Nonylphenol Ethoxylates (NPEs) and Nonylphenol (NP)**
- **CAENORHABDITIS ELEGANS**
- **IndiaAI at MeitY & Meta collaborates to advance Open Source AI**
- **Novel molecules Developed to Treat Alzheimer's Disease**
- **What is pink cocaine?**
- **Study finds long-term dynamics of transplanted stem cells**
- **Tuberculosis replaces COVID-19 as top infectious disease killer**
- **Valeriana**

SOCIETY

- **Sarco Suicide Pod**
- **SARTHIE 1.0**
- **Celebrating 10 Years of Swachh Bharat Mission**

- **GI Tag for Bodo Products from Assam**
- **A tribe out of time: how Chenchus have been caught between ancestral past and uncertain future in Andhra Pradesh**
- **India ranks 105 in Global Hunger Index 2024**
- **Launch of Tribal Welfare Projects Under DAJGUA, EMRS and PM-JANMAN**
- **Equitable Agrifood Systems for Food Access**
- **Global Hunger Index (GHI), 2024**
- **'E-Cube Hindi Language Lab'**
- **'Karmayogi Saptah'**
- **Compassion case**
- **Global Multidimensional Poverty Index 2024**
- **UDAN Scheme**
- **eShram Portal**
- **PM Young Achievers' Scholarship Award Scheme for Vibrant India (PM YASASVI)**
- **Pradhan Mantri Vanbandhu Kalyan Yojana**
- **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)**
- **PARAKH RASHTRIYA SARVEKSHAN**

ART AND CULTURE

- **Status of Classical Language**
- **Banjara Virasat Museum**
- **Doddalathur Megalithic Burial Site**
- **Cabinet approves development of National Maritime Heritage Complex**

- Abhidhamma Divas and recognition of Pali as classical language
- Copper plates from Vijayanagara Kingdom
- Visa-Free Kartarpur Corridor
- NATIONAL ONE HEALTH MISSION (NOHM)
- Raigad Fort
- Discovery of Two New Cities in Uzbekistan on the Silk Route
- Sohrai Painting
- Warli Painting
- Konark wheel replicas installed at Rashtrapati Bhavan

FACTS FOR PRELIMS

- Bhagat Singh's Birth Anniversary
- Prime Minister Shri Narendra Modi pays tributes to freedom fighter Shyamji Krishna Varma on his birth anniversary
- Periyar Memorial in Kerala's Alappuzha
- Battle of Walong
- Musaned Platform
- India pledges $250 million for traditional medicine centre; part of $300 million contribution to WHO for 2025-2028

POLITY AND GOVERNANCE

Gender Justice in the context of Rapes

The recent incident **of sexual assault and Rape of a medical Intern in RG Kar Medical Hospital** in Kolkata has again shed light on the precarious living **conditions of women in India and their never ending struggle for gender Justice.**

About Rape

- **Definition**: Rape is any **non-consensual vaginal, anal or oral penetration of a sexual nature** of the body of another person with any bodily part or object, including through the use of physical violence
- **Legal Definition:** Rape has been **legally defined under Section 375 of Indian Penal Code 1860** as, a man is said to commit a rape when there has been sexual intercourse with a woman in any of the following circumstances,
    - **Against her will and consent**
    - **When the consent is obtained but it should not be under the pretext of fear of death**
    - **When the consent has been obtained fraudulently under the pretext of marraige**
    - **When the consent is given by a person who is of unsound mind or intoxicated or unable to understand the nature of giving the consent.**
    - **When a girl is under 16 years of age, with or without her consent.**
- **Prevalence**: As per the **National Crime Records Bureau (NCRB)** Data,
    - **Rapes:** The **Crime in India 2021 annual report,** reports 31,677 rape cases, a rise from 2020 with 28,046 cases.
        - Of these, **10 per cent were rapes of minors**
    - On an average India reported **90 cases per day in 2022.**
    - **Conviction Rates:** It ranged between 27%- 28% from 2018-2022

Rape: A Tool for Violence against Women

- **Power Crime:** Rapes is widely s**een as an accepted course of action to control a women** with independent, modern thinking and lifestyle or just **make a disagreeable women to agree** as sexual assault is motivated **by hostility, power and control**.
    - **Example: In The 2012 Nirbhaya Case, Th**e Rapist acknowledged to have committed the crime to teach the victim a lesson as she was being disagreeable.

Landmark Judgements and Changes in Rape Laws in India:

- **Tukaram vs. State of Maharashtra (Mathura Case) 1983: T**he rape of a young tribal girl **led to the first amendment of rape laws stipulating a minimum mandatory punishment of seven years** for general rapes and 10 years for aggravated rapes
- **Vishaka vs the State of Rajasthan (Bhanwari Devi Gang Rape Case):** She was gang-raped by five men as she **was preventing child marriage. in 1997 the Vishaka guidelines were formulated and made into the 2013 enactment 'Sexual Harassment of Women at the Workplace (Prevention, Protection and Redressal) Act'**
- **Protection of Children from Sexual Offences (POCSO) Act 2012:** It placed sexual violation of all children **under 18, male or female, within its scope**. It incorporated child-friendly procedures for reporting, investigation, recording of evidence, and trial.
    - Failure to report the crime and even consensual sex with minors became a offence.
- **Nirbhaya Case 2013:** The rape laws were **widened with a change in definition and minimum punishment increased of 20 years** of imprisonment and death i extreme circumstances.

- **In State v. Deepak,** session court judges decided that being a **sex worker does not mean accepting consent for sexual intercourse.** The sex worker still possesses the right to be sought permission for such acts.

- **Notion of Sexual Purity:** Women **bear the responsibility of her Family's Honour by maintaining her sexual purity** and any deviation on her part makes her liable for punishment.
    - **Example: Khap Panchayat's orders of Revenge Rapes** or mass Raping the women if she breaks the societal dictat.
- **Patriarchal Attitudes on Women:** The Patriarchal literature across all the societies and religions consider **women's primary role as child bearing.** Thus, **catering to male sexual entitlement** becomes her purpose.
    - **Example: Manusmriti** mentions women as one of the impure groups.
- **In Conflict Situations: R**apes as a **tool to shame and humiliate the other communit**y in times of violence ie. **ethnic (Manipur), communal (Bilkis Bano Rape Case), caste(Bhawari Devi Rape Case)**
- **Rape Culture:** It is an environment **where rapes and sexual violence is normalized and excused in the media and popular culture, perpetuated through the use of misogynistic language**, the objectification of women's bodies, and the glamorization of sexual violence
    - **Example: Victim Blaming** ("She asked for it!"); **Trivializing sexual assault** (Boys will be boys or Men make Mistake); Sexually explicit jokes; Tolerance of sexual harassment; Publicly scrutinizing a victim's dress, mental state, motives, and history
- **Reinforce Repressive Gender and Caste Hierarchies**: Women in **general and Lower Caste women in particular are more vulnerable to rapes and sexual a**ssault as they are otherwise treated as lesser species already. Such crimes are also a means to Reinforce Repressive Gender and Caste Hierarchies
    - **Example: In the Bhanwari Devi gang rape case of 1992,** the trial court acquitted the accused on the grounds that an upper-caste man would not

have touched a lower-caste woman.

- **Rape Myths: No means yes; a lady never says yes; women like to be taken by force etc. a**re all myths perpetuated in common culture d**epriving women of their voice or agency t**o exercise her choice.
    - **Example: In the Movie 'Pink',** A beautiful scene showed a woman's 'NO means NO'- there is no grey area here.
- **Gender Inequality in Family:** A familial s**tructure where violence against women** (mother, sister, daughter) is acceptable, ofte**n results in a dysfunctional violent household** where this same anti women ideology is imparted on to the next generation.
- **Pathological Obsession:** The raping of minors, old aged women, women of unsound mind or even committing bestiality is n**othing but a pathological obsession or addiction with sex.**
- **Technology Enabled:** The increasing **penetration of mobile phones and internet a**nd lack of sexual education at homes and schools **has led to young boys (minors) come across sexually explicit content (porn, bullying, abusive) in secrecy.**
    - **Example: T**hree boys under eleven years of age were booked for gang raping a three year old girl in Bihar's East Champaran District in 2021.

Gender Justice

- **Gender Justice is the principle of equality and equity for all people**, irrespective of one's gender, in all areas of life and is **an intersectional approach focusing on the needs of the most discriminated and oppressed.**
    - The concept of gender justice is inclusive of transgender and nonbinary people.
- **Constitutional Provision Promoting Gender Justice: Article 14** (Right to Equality), **Article 15(1)**(Right against Discrimination), **Article 16** (Right to equal opportunity for all citizens in matters of public employment), **Article 21** (Right to

Life), **Article 23** (Prohibits Trafficking in humans, begar, and other forms of forced labor), **Article 42** (state's responsibility to provide just and humane working conditions and maternity relief)

How the Principles of Gender Justice Can Combat Sexual Crimes?

- **Equal rights:** Everyone should have **equal rights and be free from discrimination** manifested in violence, abuse and unequal treatment at home, at work and wider communities.
    - Everyone should be **well versed about their gender specific rights and Gender Curriculum s**hould be introduced in schools and colleges.
- **Equal Access:** Everyone should have **equal access to resources and opportunities to learn, to earn and to lead,** which will lead to safe places at work.
    - Follow the **Vishakaha guidelines** stringently and also adopt some **women specific initiatives like period leaves, separate resting rooms at workplace** (RG Kar Hospital) etc.
- **Representation:** Equal representation of women as per their population will **help shape the policies, structures and decisions** affecting their lives and society as a whole. Women make up only **11 per cent of the police force.**
    - **Example: Gender Budgeting; Gender Policing; Transgender Laws etc**
- **Safety:** Everyone should have the **right to bodily autonomy and safety** with steps such as **Gender Policing, Street Lighting, One Stop Centres for Crimes against women and Transgenders** taken to make them feel secure. Workplaces should **adopt a Zero Tolerance Policy.**
- **Freedom to Express Gender:** Sexual Crimes are **Gender Neutral affecting everyone, thus everyone should be free to express their gender** in any way they choose, or to not express a gender at all without shame or fear.
- **Accountability:** There should be increased accountability for sexual and gender-based violence wit**h proactive and sensitive and speedy policing and trails of**

such cases

Way Forward

- **Adopt the RESPECT Framework:** RESPECT women stands for **(Relationship skills strengthening; Empowerment of women; Services ensured; Poverty reduced; Enabling environments (schools, work places, public spaces) created; Child and adolescent abuse prevented; and Transformed attitudes, beliefs and norms).**
- **Promoting Gender Sensitization:** Conducting widespread **gender sensitization programs to challenge and change the societal attitude**s towards women and sexual violence.
    - **Example: National campaigns like Beti Bachao Beti Padhao** should be expanded to include comprehensive gender sensitization at the community level.
- **Expanding Victim Support Services: E**stablishing comprehensive support services for rape survivors, including legal aid, counseling, and rehabilitation.
    - **Example: The government could expand the scope of One Stop Centres** to provide holistic support for survivors across the country.
- **Implementing Mandatory Sex Education:** Integrating comprehensive sex education into school curriculums to foster a culture of respect and consent from an early age.
    - **Example: States can implement an Adolescent Education Programme (AEP)** more widely to educate young people about gender equality and sexual rights.

Govt ignored Niti red flag that data protection law could weaken RTI

NITI Aayog, the top think tank of the government, had opposed some of the provisions of the Digital Personal Data Protection Act, and particularly red-flagged the changes

proposed to the Right to Information (RTI) Act that could "weaken" the legislation.

Background: –

- In simple words, what the data protection law proposed is an amendment to a section in the RTI Act with such effect that disclosure of personal information about public officials would not be allowed even when these are justified in larger public interest.

Digital Personal Data Protection Act:

- It is a comprehensive privacy and data protection law that provides guidelines on processing, storing, and securing personal data.
- It aims to regulate the processing of digital personal data while ensuring individuals' right to protect their data and the need to process it for lawful purposes.
- It protects digital personal data by providing:
    - The obligations of Data Fiduciaries (that is, persons, companies, and government entities who process data) for data processing (that is, collection, storage, or any other operation on personal data);
    - The rights and duties of Data Principals (that is, the person to whom the data relates);
    - Financial penalties for breach of rights, duties, and obligations.

Salient Features of the Digital Personal Data Protection Act:

- It applies to the processing of digital personal data within India where such data is collected in digital form or non-digital form and digitised subsequently.
- It empowers individuals with the right to know and control their personal data. This includes rights to access, correction, and erasure of their data, giving citizens greater control over their personal information.
- It mandates that personal data may be processed only for a lawful purpose after obtaining the consent of the **Data Principal** (who shall have the right to withdraw

consent at any time). For a child or a person with a disability, consent will be provided by the parent or legal guardian.

- It makes provisions to enhance data security and facilitate easier enforcement of data protection laws as certain types of sensitive personal data are required to be stored and processed within India.
- It establishes a **Data Protection Board of India (DPBI)** to oversee compliance and handle grievances. It is responsible for adjudicating disputes and imposing penalties for violations.
- It mandates organisations to notify individuals and the Data Protection Board of any data breaches that may compromise personal information. It aims to ensure transparency and prompt action in the event of data leaks.
- It specifies penalties for various offences such as up to ***Rs 200 crore for non-fulfilment of obligations*** for children, and Rs 250 crore for failure to take security measures to prevent data breaches.

Issues with the Digital Personal Data Protection Act:

- It violates the fundamental right to privacy as it provides exemptions for the State. Using exemptions, a government agency may collect data about citizens to create a 360-degree profile for surveillance.
- It does not provide enough safeguards regarding the transfer of personal data outside India as it may not ensure adequate data protection standards in the countries where the transfer of personal data is allowed.
- It has **removed Section 43A of the Information Technology (IT) Act, 2000**, which mandated companies to compensate users in case of mishandling their data.
- It has provided a complicated approach to grievance redressal as aggrieved individuals are required to first approach the data fiduciary's redressal mechanism.
- It proposes that the personal information of public officials will not be disclosed

under the Right to Information (RTI) Act, which could aid corrupt practices by not disclosing assets, liabilities, etc.

- It provides that the data fiduciary will not undertake any processing that has a detrimental effect on the well-being of a child. However, there is no definition of detrimental effect or any guidance for determining such effect.
- It does not grant the right to data portability and the right to be forgotten to the data principal.

Activist Sonam Wangchuk, others detained at Delhi border launch indefinite fast

Climate activist Sonam Wangchuk was detained on the Delhi border as he led a group of protesters to petition the Central government for the inclusion of Ladakh in the **Sixth Schedule** of the Constitution among other demands for autonomy to the region.

Asymmetrical Federalism

- Asymmetrical federalism refers to a system where certain States or areas have more autonomy and special provisions than others.
- The Indian Constitution provides different levels of autonomy to some States/regions, unlike a symmetrical federation (e.g., the U.S. or Australia), where all States have equal powers.
- Examples in India:Areas/states under Fifth and Sixth Schedules.

History of the Fifth and Sixth Schedules

- *Pre-British Era*: Tribal populations had control over their lands and were mostly autonomous under earlier Muslim rulers.
- *British Era*: British policies affected tribal rights, especially through restrictive forest laws, leading to discontent and various tribal rebellions. Eg: Kol rebellion (1831-32), Santhal revolt (1885), Munda Rebellion (1899-1900) and Bastar

rebellion (1911).

- *Post-Rebellion Policies*: After tribal revolts, the British adopted an isolationist policy, creating 'excluded' and 'partially excluded' areas in the Government of India Act, 1935.
- The Fifth and Sixth Schedules have been modelled on the basis of these provisions which allowed 'partially excluded' and 'excluded' areas under the Government of India Act, 1935.

Fifth Schedule:

- The Fifth Schedule is applicable to what are officially called 'scheduled areas' that are declared by the President.
- The guiding norms for declaring an area as a 'scheduled area' include preponderance of tribal populations, compactness of area, a viable administrative unit like a district or block, and economic backwardness.
- At present **10 States have such 'scheduled areas.'**
- Tribes Advisory Councils (TAC): Set up to advise on the welfare of Scheduled Tribes (ST).
- The Governor, subject to the approval of the Central government, shall make regulations for the allotment and transfer of lands among the members of the STs.
- The Governor shall also regulate the businesses of money-lenders in 'scheduled areas.' The Governor may direct that a particular act of Parliament or State legislature shall not apply or apply with modifications to such 'scheduled areas.'

Sixth Schedule:

- Applicable to: Tribal areas in Assam, Meghalaya, Mizoram, and Tripura. There are 10 such 'tribal areas' at present in these four States**. Autonomous District Councils (ADC)** are formed in these 'tribal areas.'
- The ADC shall have powers to make laws with respect to the use and

management of land, regulate shifting cultivation, inheritance of property, marriage and divorce, social customs etc. These laws take effect after being **approved by the Governor**. For all such matters, the laws by the State legislature will not be applicable in these 'tribal areas' unless extended by the ADC.

- The ADCs are empowered to establish and manage primary schools, dispensaries, roads and waterways in the districts. They can assess and collect land revenue and impose taxes on profession, trade etc. They can grant licences or leases for the extraction of minerals.
- These areas have more executive, legislative, judicial, and financial powers than Fifth Schedule areas.

Special Provisions for Northeastern States-

- Apart from the Fifth and Sixth Schedules, there are special provisions applicable to many of the northeastern States under **Part XXI** of the Constitution.
- These are contained in Articles 371A (Nagaland), 371B (Assam), 371C (Manipur), 371F (Sikkim), 371G (Mizoram) and 371H (Arunachal Pradesh).

Are Further Reforms Needed?

- Autonomy on Paper vs. Practice: The regulations made by the Governor in 'scheduled areas' are subject to approval by the Central government. Similarly, the laws made by ADCs in 'tribal areas' are subject to the approval of the Governor of the State. When different parties are in power at the Centre, State as well as ADC, political differences affect the autonomy of these areas.
- Unnotified Areas: Many tribal areas across India are not notified as scheduled areas , denying them constitutional protections.
- 125th Constitutional Amendment bill: Pending in Rajya Sabha, it aims to grant more powers to Autonomous District Councils (ADCs).
- Growing Demand for Inclusion: Arunachal Pradesh, Manipur Hill Areas, and Ladakh have expressed interest in being included under the Sixth Schedule.

Forest Rights Act, 2006: The recognition of tribal forest rights should be ensured across the country, including Fifth and Sixth Schedule areas.

Overseas Citizen of India (OCI)

In the wake of several **Overseas Citizen of India (OCI) card holders** complaining about being **reclassified as "foreigners"**, the **Ministry of External Affairs** clarified that **there were no changes made to the OCI rules.**

Definition: The Ministry of Home Affairs defines an **OCI** as a person who

- was a citizen of India on or after 26th January 1950; or
- Was eligible to become a citizen of India o**n 26th January 1950;** or
- Is a child or grandchild of such a person, among other eligibility criteria.

Introduced: The Overseas Citizen of India (OCI) scheme was introduced in August **2005.**

Purpose: While tabling the legislation, it was stated that the Bill aimed to offer dual citizenship to the Indian diaspora.

Benefits of an OCI Card:

*Visa and Stay***:** OCI cardholders receive a **multiple-entry**, multi-purpose **life-long visa** for visiting India.

*Exemption from Registration***:** They are **exempt from registering with local police authorities**, regardless of their length of stay in India.

Global Statistics (2023)

*Total OCI Cardholders***:** Over 45 lakh registered OCI cardholders from 129 countries.

*Top Countries***:** US, UK, Australia and Canada.

Parity with NRIs

*Initially***:** OCI card holders had general parity with Non-Resident Indians (NRIs) regarding economic, financial, and educational fields, **except in acquiring agricultural**

or plantation properties.

NRI's: NRIs are Indian citizens who are permanent residents of foreign country.

Restrictions on OCIs

Voting Rights: OCIs are **not entitled to vote in Indian elections.**

Political Office: They **cannot become members of the Legislative Assembly, Legislative Council, or Parliament.**

Constitutional Posts: OCIs are not eligible to hold **constitutional positions** such as President, Vice President, or Judge of the Supreme Court or High Courts.

Government Employment: They generally **cannot hold employment in the Indian government.**

Ineligibility for OCI Card:

Citizenship Restriction: Individuals are ineligible for OCI **if their parents or grandparents have ever been citizens of Pakistan or Bangladesh.**

Foreign Spouse Eligibility: A foreign spouse of an Indian citizen or an OCI can apply, provided the **marriage has been registered and subsisted for at least two years.**

Foreign Military Personnel: **Both active and retired foreign military personnel** are not eligible for an OCI card.

Cancellation of OCI: The central government may cancel the registration of OCIs on certain grounds.

- If the OCI has registered through **fraud**, or
- If, within five years of registration, the OCI has been **sentenced to imprisonment for two years or more**, or
- If it becomes **necessary in the interest of the sovereignty and security of India,** or
- If the OCI has **violated the provisions** of the **Citizenship Act, 1955** or of any other law as notified by the central government.

SC rejects pleas for review of its verdict holding states'' power to tax mineral right

The Supreme Court has dismissed pleas seeking review of its July 25 verdict that ruled legislative power to tax mineral rights vests with the states

Constitutional Provision for Review Petitions

- **Review Power of Supreme court:** Under **Article 137** of the Indian Constitution, the Supreme Court has the power to review its judgments or orders. This is governed by the **Supreme Court Rules**, where **Order XLVII Rule 1** outlines the circumstances under which a review can be sought.
- A review is generally considered only if there is an **evident error or new evidence** that warrants reconsideration.

The July 25 Judgment and its Significance

- **Landmark Decision:** The ruling was a significant step in supporting **fiscal federalism**, ensuring States have the authority to levy taxes on mineral lands and quarries.
- **States' Right to Impose Taxes:** The court emphasised that **States have the right** to impose taxes on mines and quarries within their boundaries.
    - It asserted that any restriction on this right would impact the **States' ability to raise revenue**.

MMDR Act and States' Legislative Power: The judgement clarified that the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act)** does not prevent States from creating laws and taxing mines and quarries.

- States are free to legislate and tax within their **jurisdiction**, independent of restrictions from the Centre **States' Demand for Autonomy in Mineral Taxation**

o **States' Desire for Autonomy:** States with abundant mineral resources, like Chhattisgarh, Jharkhand, and Odisha, have sought greater control over taxing their mineral wealth.

o **Economic Challenges:** Despite their resource richness, these States have faced economic difficulties, with lower per capita incomes compared to the national average.

o **July 25 Judgment as a Victory:** The Supreme Court's July 25 ruling was seen as a win for these States, as it granted them more fiscal independence by allowing them to tax mining lands.

o **Clarification on Prospective Application:** Concerns arose about whether the judgement would apply only to future cases.

- The court clarified on **August 14** that allowed states to collect dues retrospectively on royalty on mineral-bearing land from Centre, mining companies from **April 1, 2005**

o **Majority Decision:** The majority of the judges, except Justice Nagarathna, ruled that the judgement would apply to all relevant cases, ensuring the validity of past State tax laws on mineral lands.

Mines and Minerals (Development and Regulation) Act, 1957

- The MMDR Act is a significant legislation in India that governs the exploration, development, and regulation of mineral resources.

Key provisions of the MMDR Act include

- **Licensing and permits:** The Act grants licences and permits for mining operations, subject to certain conditions and requirements.
- **Environmental regulations:** It mandates mining companies to comply with environmental standards to minimise the impact of mining on the ecosystem.
- **Safety standards:** The Act sets safety regulations to protect the lives and health of mine workers.
- **Rehabilitation of mined areas:** It requires mining companies to rehabilitate mined areas after operations cease to restore the land to its original state or a

suitable alternative use.

- **Conservation of critical minerals:** The Act prioritises the conservation of critical minerals that are essential for the country's economic growth and security.

Central Electricity Regulatory Commission

The Central Electricity Regulatory Commission (CERC), appointed a single-member bench to assess the preparedness of stakeholders in handling sudden surges in power demand.

Central Electricity Regulatory Commission (CERC)

- **Statutory body:** Established under the Electricity Regulatory Commissions Act, 1998 by the Government of India.
- **Composition:** Comprises a **Chairperson and four other members**, including the Chairperson of the Central Electricity Authority as an ex-officio member.

Role:

- Promote competition, efficiency, and economy in bulk power markets.
- Improve the quality of power supply and encourage investments.
- Advise the government on removing institutional barriers to bridge the demand-supply gap, benefiting consumers.
- **Regulator:** CERC acts as the regulator for India's power sector.

Electricity Act 2003

- A central law governing India's electricity sector.
- Establishes Electricity Regulatory Commissions at both central (CERC) and state levels (SERCs).

NCBC suggests inclusion of many Maharashtra communities in central OBC list

- The National Commission for Backward Classes (NCBC) has recommended the inclusion of several communities from Maharashtra into the Central List of Other Backward Classes (OBCs) **New Communities Added to Central OBC List for Government Benefits and Schemes**

- **Eligibility for Benefits:** Inclusion in the Central OBC list will make these communities eligible for Central government schemes and appointments.
- **Communities Cleared:** The communities approved include:
    - Lodh, Lodha, Lodhi
    - Badgujar
    - Suryavanshi Gujar
    - Leve Gujar, Reve Gujar, Reva Gujar
    - Dangari
    - Bhoyar, Pawar
    - Kapewar, Munnar Kapewar, Munnar Kapu, Telanga, Telangi, Pentarreddy, Bukekari
- **State Recognition:** These communities are **already categorized as OBCs** in Maharashtra's state list and benefit from state schemes and reservations.
- **Hearing Process:** The NCBC conducted hearings over the past six months, with a two-member bench led by Chairperson **Hansraj Gangaram Ahir.**
- **Pending Requests:** The NCBC chairperson mentioned that three to four more communities might be recommended for inclusion soon, from a **total of 21 requests**.
- **Criteria:** Inclusion decisions are based on **current socio-economic data**, specifically data from 2015 or later, as per a Supreme Court requirement.
- **Previous Cases:** The NCBC has previously stalled inclusion requests for around 80 communities, mainly Muslim, from West Bengal due to lack of current data on their backwardness.
- **Focus on Expediency:** Since taking charge in December 2022 the Chairperson has prioritized expediting pending inclusion requests for various communities in

the Central OBC list

Other Backward Classes (OBCs)

- Other Backward Class is a Collective term used to **classify castes which are educationally or socially disadvantaged.**
- **Central List** : **Article 342A (1)** authorized the President (in consultation with the governor of the state) to specify the Central list of the OBCs, in relation to a particular State or Union Territory.
- Any modification to the central list of the OBCs can be done only by the Parliament.
- **State List : Article 342A (3)** empowers every State or UT to prepare and maintain for its own purposes, **a list of SEBC** entries which may be **different from the Central List.**
- **The Constitution's 127th Amendment (2021) empowered** States and Union Territories to create their own lists of socially and educationally backward classes (SEBCs) and allocate reservations accordingly.

Constitutional Provisions for OBC

- **Article 15(4):** State has the power to make special provisions for the advancement of any socially and educationally backward class i.e., the OBC.
- **Article 16(4):** State is empowered to enact laws for the reservation of appointments or posts in favour of OBCs.
- **Article 340:** President, may by order appoint to investigate the conditions of SEBCs and to make recommendations as to the steps that should be taken by the Union or any State to remove such difficulties and to improve their condition.

Assam Accord Road Map

The Assam government plans to develop a road map for implementing the recommendations of the **Justice Biplab Kumar Sharma Committee** regarding Clause

6 of the Assam Accord by 25th October, 2024.

- ***Clause 6***:
    - Clause 6 of the accord promises Constitutional, legislative and administrative safeguards, to preserve and promote the cultural, social, linguistic identity and heritage of the Assamese people.
    - The main aim was to protect the indigenous identity of the Assamese people.
        - The clause was added in response to changes in population ratios and the influx of migrants from Bangladesh.
- ***Assam Accords***:
    - The Assam Accord, signed in 1985, was a tripartite agreement between the Central Government, the Assam State Government, and leaders of the Assam Movement, aimed at stopping the influx of illegal migrants from Bangladesh.
    - It led to the introduction of Section 6A into the Citizenship Act, of 1955, exclusively for Assam.

Biplab Sarma Committee Report

- The committee was chaired by retired Assam High Court Justice Biplab Kumar Sarma and included judges, retired bureaucrats, writers, AASU leaders, and journalists.
    - In July 2019, the Union Home Ministry constituted a 14-member committee to suggest ways to implement Clause 6 of the accord.
- **Definition of Assamese**:
    - Indigenous Tribals
    - Other Indigenous Communities of Assam,
    - Indian citizens residing in Assam on or before January 1, 1951, and their descendants,
    - Indigenous Assamese people.

- The committee completed its report in February 2020, and recommended that the definition of "Assamese people" should include:

- **Recommendations**:
  - Land:
    - Establish Revenue Circles where only "Assamese people" can own and transfer land, and implement a three-year program to grant land titles to those occupying land without proper documentation.
    - Conduct a special survey of char areas (riverine regions along the Brahmaputra) and prioritize erosion-affected people in land allotment.
  - Language:
    - Establish an Autonomous Language and Literature Academy/Council to preserve and promote Assam''s indigenous languages.
    - Make Assamese a compulsory subject up to Class VIII or X in all English medium schools under the state board and CBSE.
  - Cultural Heritage:
    - Establish an autonomous authority for the development of sattras (neo-Vaishnavite monasteries) with financial assistance.
    - Create multipurpose cultural complexes in each district to uplift the cultural heritage of all ethnic groups.
  - The primarily Bengali-speaking Barak Valley is exempted from these recommendations, along with the Sixth Schedule areas.
  - The 52 recommendations primarily focus on safeguards related to language, land, and cultural heritage.
  - Key Points:
  - The Sixth Schedule autonomous councils in Assam — Bodoland Territorial Council, North Cachar Hills Autonomous Council, and Karbi Anglong Autonomous Council — will decide on implementing these 52

recommendations.

- Recommended reservations for "Assamese people" in Parliament, the state Assembly, local bodies, and jobs.

Recommendations that have been Left Out

- Some of the most sensitive recommendations by the committee are not included in the 52 points listed by the state government.
- Key missing recommendations include:
  - The introduction of an Inner Line Permit for entry into Assam, similar to those in Nagaland, Arunachal Pradesh, Manipur, and Mizoram.
  - Reservations for "Assamese people".
  - Creation of an Upper House (Legislative Council of Assam), fully reserved for "Assamese people."

Challenges in Implementation of the Assam Accords

- Complexity of Defining Assamese Identity : The committee''s recommendation to define "Assamese people" can lead to disputes over who qualifies for protections under Clause 6 and this may foster resentment among different ethnic groups.
- Land Ownership and Rights: Establishing Revenue Circles for exclusive land ownership by "Assamese people" may create significant legal and administrative issues. Conducting a survey for land allotment in char areas presents logistical challenges
- Language Policies: The requirement to make Assamese the official language and compulsory in schools may face resistance, especially in Bengali-dominant areas like the Barak Valley.
- Funding and Management: Establishing an autonomous authority for sattras and cultural complexes may require substantial funding and effective management structures.
- Political and Bureaucratic Resistance: Recommendations requiring concurrence

from the Central Government may face delays or resistance, complicating the implementation process.

- Exemptions for Barak Valley: Exempting the Barak Valley and Sixth Schedule areas from these recommendations may create perceptions of inequity and division within the state, potentially exacerbating existing regional tensions.

Road ahead

- Stakeholder Engagement:
  - Foster continuous dialogue with all stakeholders, including various ethnic groups, civil society organizations, and political entities, to build consensus on the definition of "Assamese people" and ensure inclusive implementation of the recommendations.
- Phased Implementation:
  - Adopt a phased approach to implementation, prioritizing recommendations that are less contentious and can yield quick wins, such as language policies in education, while gradually addressing more complex issues like land ownership and identity definitions.
- Capacity Building:
  - Invest in capacity building for local authorities and community leaders to manage land surveys and title distributions effectively. This will ensure transparency and build trust within communities.
- Resource Allocation:
  - Secure adequate funding and resources to support the establishment of cultural authorities and education reforms, ensuring that these initiatives are sustainable and effectively managed.

SC Strike Down 'Casteist' Provisions in India's Prison Manuals

Recently, the Supreme Court ruled that **caste-based division of labour** in prisons is

"unconstitutional," marking a key step towards eliminating institutional biases in India's correctional system. The SC invalidated several provisions in State prison manuals that upheld caste distinctions, declaring them a violation of prisoners'' fundamental rights.

Colonial Stereotypes in Prisons

- West Bengal Jail Code: The court highlighted Rule 404 of the West Bengal Jail Code, which states that a convict overseer may only be appointed as a night guard if they do not belong to tribes considered to have a "strong natural tendency to escape," such as wandering tribes.
- Andhra Pradesh, Tamil Nadu, and Kerala Prison Manuals: These manuals define "habitual criminals" as those who, by "habit," engage in crimes like robbery, housebreaking, theft, forgery, or extortion—even without prior convictions.
- Restrictions on Labour: In Andhra Pradesh, members of "wandering or criminal tribes" are equated with individuals of "bad or dangerous character" or those who have escaped custody. As a result, they are barred from being employed in labor outside prison walls.
- Colonial Legacy: The now-repealed Criminal Tribes Act, 1871, allowed the British colonial regime to label certain marginalised communities as "criminal tribes," based on the false stereotype that they were "born criminals."
- Denotified Tribes: After the Act''s repeal, these communities were reclassified as "denotified tribes." However, prison manuals continued to categorize them as "habitual offenders" despite no convictions. Example:
- Perpetuation of Discrimination: The court observed that this continued classification reinforces colonial-era caste-based discrimination,

worsening the social and economic marginalisation of these groups.

- Examples of Caste Based Discrimination in Prisons:
  - Tamil Nadu Prison: The segregation of Thevars, Nadars, and Pallars into separate sections at the Palayamkottai Central Jail in Tamil Nadu was a caste-based segregation of barracks.
  - Rajasthan Prison: The Rajasthan Prison Rules, 1951, assigned latrine duties to the "Mehtar" caste, a Scheduled Caste community, while Brahmins or high-caste Hindu prisoners were placed in kitchens.

Denotified, Nomadic, and Semi-Nomadic Tribes

- They are also known as "**Vimukt Jatis".** These communities are among the most vulnerable and disadvantaged.
- Denotified communities, once labelled as "born criminals" during British rule under laws like the Criminal Tribes Act, 1871.
  - They were officially de-notified by the Indian Government in 1952.
- A few of these communities which were listed as de-notified were also nomadic.
  - Nomadic and semi-nomadic communities are defined as those who move from one place to another rather than living in one place all the time.
- Historically, Nomadic Tribes and De-notified Tribes never had access to private land or home ownership.
- While most DNTs are spread across the Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC) categories, some DNTs are not covered in any of the SC, ST or OBC categories.

Fundamental Rights of Prisoners Violated

- Caste Classification Limitation: The Supreme Court emphasised that caste can only be used as a classification criterion if it benefits victims of caste discrimination. Eg. Caste based affirmative action (reservation).
  - Segregating prisoners based on caste reinforces caste differences and

animosity, should be eliminated.
    - The prison manuals failed to serve this purpose and violated **Article 14** of the Constitution.
- Direct and Indirect Discrimination: The SC highlighted both direct and indirect discrimination against marginalized communities.
    - Assigning cleaning and sweeping jobs to lower castes, while allowing higher castes to perform tasks like cooking, is a clear example of direct discrimination under **Article 15(1).**
    - The allocating certain tasks to these communities based on traditional roles, rather than offering them more skilled or dignified work, results in indirect discrimination.
- Violation of Equality: Differentiating inmates based on "habit," "custom," "superior mode of living," or "natural tendency to escape" undermines the principles of substantive equality.
    - The SC highlighted prison rules that mandate food be cooked by a "suitable caste" or assign "menial duties" to certain communities, classifying these practices as untouchability, which is prohibited under **Article 17.**
- Right to Life and Dignity: The court underscored that prison rules restricting the reformation of marginalised prisoners violate their right to life and deprive them of dignity and equal treatment, further marginalizing them.

Constitutional and Legal provisions Against Discrimination

- *Constitutional Provisions:*
    - Equality Before Law: According to Article 14 no person shall be denied treatment of equality before the law or the equal protection of the laws within the territory of India.
    - Prohibition of Discrimination: Article 15 of the Constitution of India states that the State shall not discriminate against any citizen on grounds only of

religion, race, caste, sex, place of birth or any of them.
    - Abolition of Untouchability: Article 17 of the constitution abolishes Untouchability.
- *Legal Provisions:*
    - The Protection of Civil Rights Act, 1955: The act was enacted to enforce Article 17 of the Constitution of India, which abolished the practice of untouchability.
    - The SCs and the STs (Prevention of Atrocities) Act, 1989: It was enacted to safeguard the members of SCs and STs from caste-based discrimination and violence.

Directives Issued by SC

- Amend Prison Manuals: All States and Union Territories were ordered to revise their prison manuals and rules within three months to eliminate discriminatory practices.
- Removal of Caste References: The court mandated the removal of the "caste column" and any references to caste from the registers of undertrials and convicts maintained in prisons.
- Issues in Model Prison Manual and Act: The Union government's Model Prison Manual, 2016, and the Model Prisons and Correctional Services Act, 2023, were flagged for shortcomings such as caste discrimination.
    - The 2016 manual was particularly criticized for its vague definition of "habitual offender," allowing States to perpetuate stereotypes against denotified tribes.
    - The court ordered that reforms be made to both the 2016 and 2023 Act within three months.
- Compliance Monitoring: District legal services authorities and boards of visitors were tasked with conducting regular inspections to ensure compliance with these directives.

- Police Instructions: Police authorities were instructed not to arbitrarily arrest members of denotified tribes, ensuring adherence to guidelines established in previous Supreme Court rulings.

The Supreme Court''s recent ruling to abolish these discriminatory practices marks a significant step towards achieving substantive equality in prisons. By mandating the removal of caste references, revising outdated definitions, and addressing biases against marginalised communities, the court has reinforced the importance of dignity, fairness, and reform for all prisoners. This decision paves the way for a more just and inclusive correctional framework in India.

Telangana Begins Sub-Categorization of SCs

Recently, the Telangana government has initiated the process of categorizing Scheduled Castes (SCs) into four distinct sub-groups: A, B, C, and D.

- This development follows the Supreme Court''s landmark judgment which granted states the authority to sub-classify reserved categories, including Scheduled Castes (SCs) and Scheduled Tribes (STs), for reservation purposes.

Supreme Court Ruling:

- The Supreme Court, in a review-judgment of Punjab and Haryana High Court, allowed states to sub-classify SCs and STs under Article 14 of the Constitution based on varying levels of backwardness.
- It ruled that the **''creamy layer'' principle**, previously applied only to Other Backward Classes (OBCs) (as highlighted in Indra Sawhney Case), should now also be applied to SCs and STs.

It also held that reservations are applicable solely to the first generation; if a family

member has availed of the benefits, the second generation becomes ineligible.

National Electricity Plan (Transmission)

- **Central Electricity Authority (CEA)** advanced the plan in consultation with stakeholders, emphasizing the combination of forty seven GW of Battery Energy Storage Systems and 31 GW of Pumped Storage Plants.
- CEA with the aim of **transmitting of 500 GW** of Renewable Energy installed capacity by the year 2030 and over 600 GW of Renewable Energy installed capacity by the year 2032, prepared the detailed Nation Electricity Plan (Transmission) in consultation with various Stakeholders.

Key components: The plan outlines the addition of over 191,000 circuit kilometers of transmission strains and 1,270 GVA of transformation capacity from 2022-2032, with a central point on high-voltage structures (220 kV and above).

- It encompasses cross-border interconnections with countries like Nepal, Bhutan, and capacity links to Saudi Arabia and the UAE.
- It emphasizes the adoption of latest technologies including Hybrid Substations and high-overall performance conductors and targets to foster ability development inside the zone.
- It also consists of provisions for delivering power to green hydrogen and green ammonia manufacturing hubs, which are emerging as key sectors in India's green economy.
- These hubs may be positioned at coastal areas such as Mundra, Kandla, Gopalpur, Paradeep, Tuticorin, Vizag, and Mangalore.

Objectives

- Power demand is expected to surge to 388 GW by 2031-32, necessitating more suitable transmission infrastructure.
- Therefore , The plan aims to facilitate the transmission of 500 GW of renewable strength with the aid of 2030 and over 600 GW by 2032.
- Overall, the plan alerts massive funding opportunities, with over INR 9,15,000

Crores expected in the transmission sector by 2032.

Challenges

- Lack of clarity in regulatory policies can create uncertainty for buyers and slow down infrastructure development
- Construction of new transmission strains frequently faces opposition due to environmental effect issues,
- A shortage of skilled professionals inside the transmission zone can hinder the development.

Future Outlook

- The National Electricity Plan is seen as a critical step closer to attaining net-zero emissions by 2070.
- It serves as a roadmap for balancing growing electricity demand with green energy goals, positioning India as a global leader in clean energy by 2047.

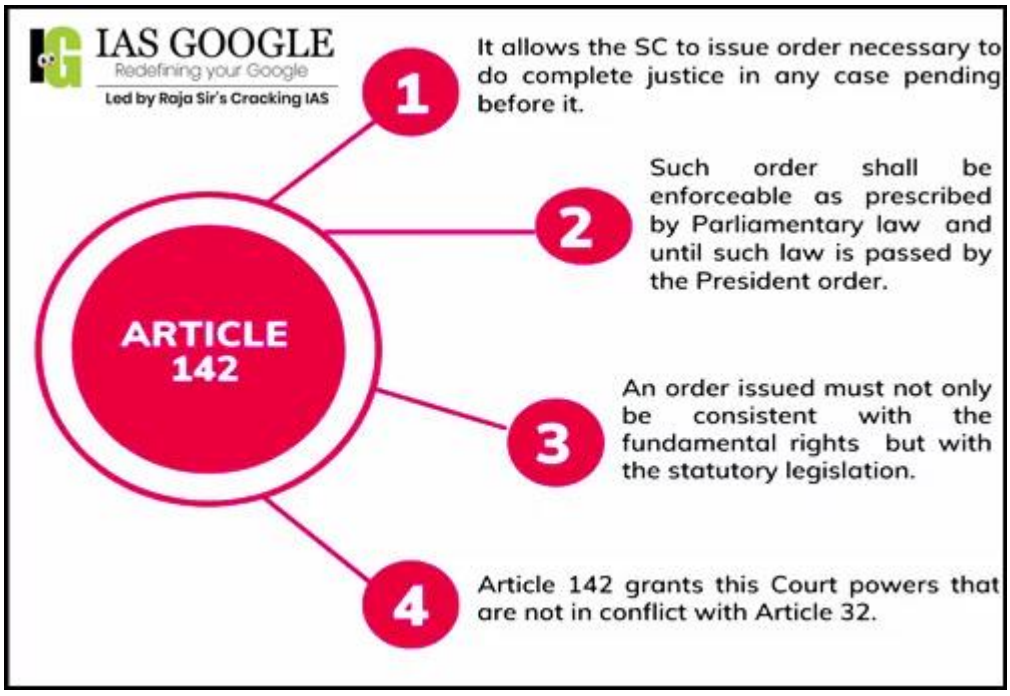
Central Electricity Authority (CEA)

- A **statutory employer beneath the Ministry of Power**, was established thru the Electricity (Supply) Act, 1948, and now functions beneath the provisions of the Electricity Act, 2003.
- CEA affords professional recommendation to the Ministry of Power on technical, financial, and operational subjects related to power generation, transmission, and distribution.

What is Article 142, invoked by Supreme Court?

- The Supreme Court on Monday (October 14) refused to entertain a PIL seeking directions under **Article 142 to include** sexual offences against men, trans persons and animals under the newly enacted Bharatiya Nyaya Sanhita (BNS).
- **Article 142 of the Indian Constitution** holds great significance in the context of

the judiciary's power and its relationship with the legislative and executive branches.



Article 142

- Article 142(1) states that the Supreme Court (SC) may pass any order necessary to **do "complete justice"** in any matter pending before it. This gives the SC wide discretionary powers to ensure justice is served, even in situations where existing laws might be insufficient or silent.
- Article 142(2) provides the SC the authority to secure the attendance of persons, production of documents, and punishment for contempt of its orders.

Judicial Activism and Judicial Overreach

- Judicial Activism: Article 142 is often cited as a tool for the judiciary to correct injustices when the law falls short, reflecting its activist role. The judiciary, using Article 142, has sometimes stepped into domains traditionally handled by the legislature and executive, leading to debates around separation of powers.

- Judicial Overreach: Critics argue that in certain instances, the SC's use of Article 142 encroaches upon the functions of the other branches of government.

Key Judicial Pronouncements

- *Union Carbide Case (1989):* Article 142 was invoked to finalize the compensation for the Bhopal gas tragedy victims, bypassing procedural delays to deliver justice.
- *Ayodhya Verdict (2019):* The SC used Article 142 to ensure a peaceful resolution to the Ayodhya land dispute, by granting the disputed land to a trust and allocating alternate land to the Muslim litigants.
- *Coal Block Allocation Case (2014):* In this case, the SC invoked Article 142 to cancel over 200 coal block allocations that were found to be illegal.

Complete Justice: The Broad Scope

- The phrase **"complete justice**" allows the SC to go beyond the limitations of statutory law. For example, in cases involving environmental protection, Article 142 has been **used to enforce strict norms even when explicit legislation was not in place.**
- It also enables the SC to issue binding directions when existing laws are inadequate. For example, in criminal cases, the court has sometimes ordered the release of prisoners or alteration of punishments for humanitarian reasons.
- While the power under Article 142 is extraordinary, the SC has noted that it must be exercised with caution. It should not contradict or bypass existing laws unless there are compelling reasons to do so.

Criticism and Debate

- Undemocratic Power ?- Some legal scholars argue that the broad powers under Article **142 may undermine parliamentary sovereignty**, as the judiciary can effectively create law in certain situations.

- Ambiguity in the Term "Complete Justice": The **lack of a clear definition of "complete justice"** leaves significant room for interpretation, which has been both praised for flexibility and criticized for the potential for misuse.

India's Renewable Energy Capacity Reaches 200 GW

- India has recently achieved a significant milestone in its renewable energy sector, reaching **a total installed capacity of 200 gigawatts (GW).** This achievement marks a pivotal moment in the country's commitment to sustainable energy and climate change mitigation.

Overview of the Milestone

- According to the data, the installed power capacity of India's Renewable Energy System **on October 14, 2024, is 46.3 percent**. This figure is according to the country's active drive towards renewable energy especially solar, wind, hydro and biomass energy. The passion that the government has for increasing the use of renewable energy is part of their larger plans in tackling carbon emission and climate change.

Breakdown of Renewable Energy Sources

India's renewable energy capacity is diversified across several key sources:

- **Solar Energy:** In the recent past, there has been a rather remarkable witnessed shift, where solar power was realized as the biggest generation source of renewable electricity in India. Solar power alone has contributed the lion's share for the 200 GW target due to the immense solar farm and roofs across the country.
- **Wind Energy:** Wind energy is another important part, as India is among the leaders in installed wind power at the moment. It has been done in a proper

manner especially at the coastal areas and open plan for the establishment of wind farms.

- **Hydroelectric Power:** Therefore, despite several attempts to diversify generation resources, hydropower remains a dominant source of renewable electricity in India. It has many hydro electric schemes which are very useful for its total capacity and useful for getting electricity in a consistent way.
- **Biomass and Other Sources:** Other renewable sources such as biomass energy equally form part of the total capacity although not as dominant as the solar power and wind power forms.

Government Initiatives and Policies

The Indian government has implemented various initiatives and policies to facilitate this growth in renewable energy:

- **Wind Energy Policy:** The government has issued policies that grant private investments on wind energy developments positive incentives for promoters, and fast-track approval for projects.
- **Renewable Purchase Obligations (RPO):** These obligations mean that electricity distribution companies have to govern a particular percentage of power from renewable sources – guaranteeing the renewable sector constant demand.
- **Renewable Purchase Obligations (RPO):** These duties require electricity distribution companies to buy a certain level of power from renewable sources and due to this, ensure a continuous market for clean energy.

Challenges Ahead

Despite this remarkable achievement, India faces several challenges in further expanding its renewable energy capacity:

- **Infrastructure Development:** Improvement of the current transmission networks as well as creation of new ones is a critical key to integrating more renewable energy sources into the electric grid.

- **Financing and Investment:** Access to suitable funding remains a bottleneck when it comes to financing big renewable power projects. For infrastructure development, new sources of funding need to be tapped and international funding has to be mobilised.
- **Policy Consistency:** Any policy that relates to the long-term development of renewable energy must therefore be consistent. Fluctuations in regulations make it difficult for investors to invest the targeted amounts and for progress to be made.
- Attaining the 200 GW mark is evidence that India is on the right path to the part of demand for a cleaner energy supply system. There is potential for possible future improvements in the investment, the policies and overall technology to evolve that will help India to go farther in terms of percentage of renewable energy. This achievement also helps support climate action internationally as well as ensures job openings to encourage the development of green energy.As India proceeds to the future, it would remain to supercharge the solved problems while maintaining the **renewable-resource abundance to form a bright, green future.**

National Organ Transplant Programme

The Union Health Ministry has warned states and institutions for functioning without regular transplant coordinators, a critical role under the **National Organ Transplant Programme (NOTP)**.

- NOTP has provision for **two transplant coordinators** for government medical colleges and **one** for well-performing private medical colleges.

National Organ Transplant Programme scheme

- **The National Organ Transplant Programme (NOTP)** is aimed at improving access to life-saving organ transplants for needy citizens.
- The current phase of the scheme covers the period from 2020-21 to 2025-26.

Key objectives of the NOTP:

1. Promote deceased organ donation
2. Improve access to transplantation for needy citizens
3. Bridge the gap between availability and demand for organs and tissues
4. Enhance organ donation rates in India

Strategies and activities under the NOTP

- **Awareness campaigns:** Conduct public awareness campaigns to educate people about organ donation and dispel myths and misconceptions.
- **Training and capacity building:** Train healthcare professionals in organ donation and transplantation procedures.
- **Establishment of infrastructure:** Develop a network of **organ procurement and transplantation organisations (OPTOs)** across the country**.**
- **Financial assistance:** Provide financial support to needy transplant recipients and deceased donors.
- **Coordination and collaboration:** Collaborate with various stakeholders, including government departments, NGOs, and medical institutions, to promote organ donation and transplantation.

Achievements of the NOTP

- **Increase in organ donation rates:** The organ donation rate in India has increased significantly since the launch of the NOTP.
- **Establishment of OPTOs:** A network of OPTOs has been established across the country, facilitating organ procurement and transplantation.
- **Improved access to transplantation:** More patients have been able to receive life-saving organ transplants due to the NOTP

Eligibility for Organ Donation in India

- **Living Donors**: Living donors must be at least 18 years old, have no infectious diseases, active cancer, or severe infection, and are typically restricted to donating to immediate blood relatives.
- In **special cases,** donations can also be made out of affection and attachment for the recipient.
- Living donors are eligible to donate the following organs:

1. One of their kidneys
2. A portion of the pancreas
3. Part of the liver

- **Deceased Donors:** They have an opportunity to donate **six vital organs:** kidneys, liver, heart, lungs, pancreas, and intestine.
- While uterus transplants are performed, they are not classified as **life-saving organs.**
- **Consent from the family is required** for organ donation from a person declared legally dead.

2023 Revised Guidelines for Organ Donation:

- **Upper age limit of 65 years** for receiving deceased donor organs was removed.
- The **domicile requirement** for registering patients for deceased donor transplants was removed to increase accessibility.

Legislation Governing Organ Transplantation in India:

- **Transplantation of Human Organs and Tissues Act (THOTA):** It was enacted in 1994 and **amended in 2011**, establishes the legal framework for organ transplantation in India.
- This law governs multiple facets of organ donation and transplantation, including the recognition of brain death as a form of death and the necessity of family consent for organ donation following brain death.

Organ Transplant Governance:

- **The National Organ & Tissue Transplantation Organization (NOTTO)**, located in New Delhi, coordinates procurement and distribution of organs nationwide.
- **Five Regional Organ and Tissue Transplant Organizations (ROTTOs)** and **14 State Organ and Tissue Transplant Organizations (SOTTOs)** have been established under NOTP.
- **National Network division of NOTTO**: It function as apex center for all India activities of coordination and networking for:
    - Procurement and distribution of organs and tissues.
    - Registry of Organs and Tissues Donation and Transplantation in the country.

Right to Form Trade Union in India

Samsung Workers Demand Union Recognition Amid Police Action in Tamil Nadu

- **Fundamental Right to Form a Union**: The workers at Samsung India's Sriperumbudur facility are **demanding the registration of the Samsung India Workers Union (SIWU**) to enable collective bargaining for better employment terms.
- This is rooted in their **fundamental right to form a union,** as upheld by Article **19(1)(c) of the Constitution.**
- **Government's Response**: The **Tamil Nadu government** formed a **'workmen committee'** to resolve the issue but also resorted to police action to suppress the strike.
- A **workmen committee**, also known as a **works committee**, is an integral body within industrial establishments aimed at **fostering better relations between employers and employees**.
- It plays a key role in **resolving conflicts and maintaining industrial harmony.**

Collective bargaining

- Collective bargaining is a **voluntary process** where **workers and their employers negotiate the terms and conditions of employment.**
- It's a **fundamental right** that's recognized in the **ILO Declaration of Fundamental Principles and Rights at Work.**

International Laws on Collective bargaining

- **Right to Organise and Collective Bargaining Convention, 1949**
- This fundamental convention from the ILO protects workers from **anti-union discrimination and protects workers' and employers' organisation**s from interference.
- **ILO Declaration of Fundamental Principles and Rights at Work, 1998**
- This declaration reaffirms the importance of the **right to collective bargaining.**
- It was adopted in **1998 and amended in 2022**, is an expression of commitment by **governments, employers' and workers' organisations** to uphold **basic human values** – values that are vital to our social and economic lives.

ILO Convention No. 154 (1981)

- This convention outlines collective bargaining as a **process for negotiating working conditions and terms of employmen**t, and regulating the relationship between employers and workers.

<u>Constitutional Provisions for Collective bargaining-</u>

Freedom of speech and expression:

- **Article 19(1)(a)** provides the **right to freedom of speech and expression** which is one of the most important **fundamental rights** which provide every citizen to **express their views or to express dissent.**
- Thus, every citizen has the **right to speech and expression**, which can be exercised **individually or in groups.**

- **The right to form an association or union:**
- **Article 19(1)(c)** provides the **right to form an association or union** which can be said to be the foundation of the **trade unions** in India.
- **Workers participation in management:**
- **Article 43A** gives the state the **authority to enact and implement laws** that encourage workers to take **part in management.**

Legal Provisions related to Collective bargaining:

Industrial Disputes Act, 1947

- The primary law governing collective bargaining in India.
- This act gives workers the **right to form trade unions and bargain with employers.**
- It also allows for the **resolution of employment disputes** through a conciliation officer, board of conciliation, or labour court.
- **Section 4 of the Ac**t allows as few as **seven workers** to apply for union registration.

Industrial Employment (Standing Orders) Act, 1946

Trade Unions Act, 1926 .

Right to Strike in India

- The right to strike in India is **limited and regulated by the Industrial Disputes Act, 1947,** which is now part of the **Industrial Relations Code of 2020**.
    - The act defines a strike as a **cessation of work by a group of employees** in an industry.
- **No Explicit Constitutional Right:** The Indian Constitution does not explicitly guarantee the right to strike.
    - However, the **Industrial Disputes Act, 1947**, provides a legislative framework for strikes, recognizing them as a legal right, but not as a fundamental one.

- **Article 19 and Strikes:** While Article 19 of the Constitution protects the right to protest, the right to strike has limitations.
    - It is not considered a fundamental right but is derived from the **fundamental right to form associations or unions**
    - **Trade Union Act, 1926:** The Act provided a **limited right to strike,** allowing trade unions to engage in specific activities to further a trade dispute.

Industrial Relations Code, 2020: The right to strike has been subsumed under this modern legislation, **continuing to regulate strikes within legal limits.**

A fair resolution requires **respecting workers' fundamental rights** to unionise while addressing corporate concerns through dialogue. Constructive negotiations, rather than conflict, will ensure a sustainable and cooperative industrial environment.

Drugs Technical Advisory Board

Recent Recommendations by DTAB:

- **Inclusion of antibiotics as "New Drugs":**
  All antibiotics would fall under the category of "new drugs," requiring manufacturing, marketing, and sale to be more strictly documented and regulated.
- **Union government control:**
  Manufacturing and marketing approvals for antibiotics would need clearance from the Union government, rather than state authorities.
- **Prescription mandatory:**
  Antibiotics would only be available with a valid prescription, curbing over-the-counter purchases and indiscriminate use.
- **Labeling changes:**
  A blue strip or box would be added to antibiotic packaging to distinguish antimicrobial products, improving public awareness.
- **Focus on AMR:**

This move is part of efforts to address rising antimicrobial resistance in India, where common infections like UTIs, pneumonia, and typhoid are becoming resistant to standard treatments.

Significance:

- **Curbing Antimicrobial Resistance:** Reducing misuse of antibiotics will help slow the rise of drug-resistant infections.
- **Centralized Regulation:** Bringing antibiotics under central control ensures uniform regulation across the country.
- **Public Health Protection:** Mandatory prescriptions and labeling aim to safeguard public health by preventing self-medication and misuse.

Drugs Technical Advisory Board (DTAB):

- **Role:** It is the highest statutory body for advising on technical drug-related matters in India.
- **Established under:** The Drugs and Cosmetics Act, 1940.
- **Part of:** Central Drugs Standard Control Organization (CDSCO).
- **Nodal ministry:** Ministry of Health and Family Welfare.
- **Functions:** Advises the central and state governments on technical matters related to the administration of the Drugs and Cosmetics Act and performs other assigned functions under the Act.

Chief Justice of India Appointment

Chief Justice of India (CJI) D.Y. Chandrachud is set to retire on **November 10, 2024**, and has recommended **Justice Sanjiv Khanna** as his successor to become the **51st Chief Justice of India**.

Process of Chief Justice of India appointment (CJI):

- **Seniority Principle:** The appointment of the CJI is typically based on the senior-most judge of the Supreme Court.
- **Memorandum of Procedure (MoP):** The **Law Ministry** requests a recommendation from the outgoing CJI regarding their successor.
- **Presidential Appointment:** After receiving the recommendation, the **President of India** appoints the next CJI.
- **Tenure and Retirement:** The CJI serves until reaching the age of **65**, and the process repeats upon each CJI's retirement.
- **Merit and Integrity Consideration:** In addition to seniority, **merit and integrity** are important factors in the recommendation, as seen in previous appointments like **Justice Khanna's** own elevation to the Supreme Court.

Challenge to the Marital Rape Exception

Section 375 of the Indian Penal Code (IPC):

- **Definition of rape:** Section 375 of the IPC defines acts constituting rape committed by a man against a woman.
- **Exceptions:**

  It provides two exceptions:
  - **Marital rape decriminalization:** A man is not considered guilty of rape if he has sexual intercourse with his wife, provided she is not under 18 years of age.
  - **Medical procedures:** Medical procedures or interventions are excluded from the definition of rape.
- **Historical context:** Originally enacted during British colonial rule in 1860, the age of marital consent was raised from 10 to 15 years in 1940, and later to 18 years through a 2017 Supreme Court ruling.

Laws governing marital rape:

1. **Section 375 of IPC:** Defines rape but includes Exception 2, which decriminalizes

marital rape for wives over 18, granting immunity to husbands for non-consensual sex within marriage.

2. **Independent Thought v. Union of India (2017):** The Supreme Court raised the age of consent in marriage from 15 to 18 but did not criminalize marital rape.
3. **Section 85 of Bharatiya Nyaya Sanhita (BNS), 2023:** Addresses cruelty towards women but doesn't explicitly recognize marital rape as a criminal offense.
4. **Protection of Women from Domestic Violence Act, 2005:** Provides civil remedies like protection orders and monetary compensation for victims of marital abuse but lacks provisions for criminal prosecution of marital rape.

Judicial cases and verdicts:

1. **Joseph Shine v. Union of India (2018):**
    a. The Supreme Court dismantled parts of the doctrine of coverture, asserting that marriage shouldn't limit a woman's autonomy.
2. **Hrishikesh Sahoo v. State of Karnataka (2022):**
    a. The Karnataka High Court allowed prosecuting a husband for marital rape, citing the 2013 Justice J.S. Verma Committee Report. The ruling was stayed by the Supreme Court.
3. **Delhi High Court Split Verdict (2022):**
    a. Justice Rajiv Shakdher ruled that the marital rape exception violates Article 21 and bodily autonomy.
    b. Justice C. Hari Shankar upheld the exception, citing that sexual relations are a legitimate marital expectation.

Government's arguments against criminalizing marital rape:

- **Impact on marriage:** The government argued that making marital sexual acts punishable as "rape" could severely impact conjugal relationships and the institution of marriage.
- **Parliamentary decision:** Parliament retained Exception 2 to Section 375 during the 2013 amendments, which exempted marital rape from being criminalized.

- **Separate provisions for consent within marriage:** The government acknowledged violations of consent but argued that the consequences should differ for marital relationships compared to non-marital relationships.
- **Judicial interference:** The government urged the Supreme Court to respect Parliament's decision and not interfere in socio-legal matters concerning marriage.
- **Disproportionate punishment:** Criminalizing marital rape could lead to disproportionate punishment, as it may not consider the nuances of the marital context.

Arguments in favour of criminalizing marital rape:

- **Violation of consent:** Consent remains central to the definition of rape, and marriage should not negate the autonomy of a woman over her body.
- **Arbitrary legal exception:** The marital rape exception is arbitrary, as it discriminates against married women, depriving them of legal protections available to unmarried women.
- **International norms:** Around 77 countries, including Australia, Canada, and the USA, have criminalized marital rape, aligning with international human rights standards.
- **Equal protection under law:** The law should provide equal protection to all women, irrespective of their marital status.
- **Supreme court's recognition:** The Supreme Court has already recognized marital rape under the Medical Termination of Pregnancy (MTP) Act, showing the need for broader criminal recognition.

Way ahead:

- **Legislative review:** Parliament should reconsider the current exception, focusing on gender justice and equal protection of women's rights.
- **Public dialogue:** A broader socio-legal dialogue is essential to align marital rape

laws with evolving social norms and international standards.

- **Safeguards:** Implement safeguards to prevent misuse, addressing concerns of false accusations while ensuring justice for victims of marital rape.

Criminalizing marital rape is a necessary step to protect the dignity and rights of women. While respecting the institution of marriage, it is crucial to ensure consent and equality in marital relationships, moving toward a more just legal framework for all.

Constitutional Bench of SC upholds validity Section 6A of Citizenship Act

- **Enacted in 1985** as part of the Citizenship (Amendment) Act, following the **Assam Accord**.
- The **Assam Accord** aimed to resolve issues related to the influx of illegal migrants from **Bangladesh** into Assam after the **Bangladesh Liberation War (1971)**.
- Section 6A was inserted specifically to address the **unique historical and demographic challenges** faced by Assam due to large-scale migration.

Provisions:

- **Citizenship for Migrants Pre-1966**:
  Persons of **Indian origin** who entered Assam from Bangladesh before **January 1, 1966**, were granted **Indian citizenship** retroactively.
- **Migrants Between 1966-1971**:
  Migrants who arrived between **January 1, 1966, and March 25, 1971** were to register and were granted citizenship after **10 years of residence**, provided they fulfilled certain conditions.
- **Post-1971 Migrants**:
  Persons who entered Assam after **March 25, 1971**, were to be **detected and deported** as per the law.

Citizenship Act, 1955:

- **Governing Indian Citizenship**: The **Citizenship Act, 1955** regulates who can

obtain **Indian citizenship** based on birth, descent, registration, or naturalization.

- **Illegal Immigrants**: The Act bars **illegal immigrants** from obtaining citizenship. An illegal immigrant is someone who:
    - Enters India without valid documents (e.g., passport, visa), or
    - Enters with valid documents but **overstays** beyond the permitted period.
- **Single Citizenship**: India follows a policy of **single citizenship**, and the Act does not allow **dual citizenship**.
- **Constitutional Framework**: Citizenship matters fall under the **Union List** and are dealt with in **Part II of the Indian Constitution (Articles 5-11)**. The **term "citizen"** is not defined in the Constitution, leaving it to statutory laws like the Citizenship Act.





The Assam Accord was signed under the premiership of Rajiv Gandhi *(second from left)* on August 15, 1985. *Archive*

ASSAM ACCORD CLAUSE 5 & CITIZENSHIP

IN 1979, All Assam Students Union (AASU) began aN agitation demanding the identification and deportation of "illegal foreigners", predominantly from Bangladesh. The agitation went on for six years, culminating with the historic Assam Accord between the Central and state governments, and the leaders of the Assam Movement.

CLAUSE 5 of the Accord, which discussed the "Foreigners Issue", set January 1, 1966 as the "base date and year" for the "purposes of detection and deletion [from electoral rolls] of foreigners". Those who arrived after this date but up to March 24, 1971, would "have their names deleted from electoral rolls" for 10 years, after which their names would be restored.

IN 1985, in order to give effect to the Assam Accord, Section 6A was introduced in The Citizenship Act, 1955. The petitioners argued that this section was arbitrary and discriminatory, as it applied only to Assam.

THE CAA, 2019, introduced another group-specific section, Section 6B, in The Citizenship Act, which set December 31, 2014 as the cutoff date for Hindu, Christian, Sikh, Parsi, Buddhist, and Jain migrants from the Muslim majority countries of Pakistan, Bangladesh, Afghanistan.

Supreme Court's Assam verdict

1. **Assam Accord (1985)**: Set March 24, 1971, as the cut-off date for citizenship, aiming to resolve tensions between indigenous Assamese people and migrants.
2. **Section 6A**: Added to the Citizenship Act to implement the Assam Accord, establishing special criteria for Assam, different from India's post-Partition cut-off.
3. **NRC (2019)**: Updated to identify legitimate citizens in Assam, excluding 1.9 million people, raising questions about human rights and citizenship.
4. **Legal Challenges**: Petitioners argued Section 6A violates Articles 14 (equality) and 29 (cultural rights) of the Constitution, singling out Assam and threatening its indigenous identity.

Arguments Against Section 6A

1. **Violation of Article 14**: Creates an unequal framework by applying different rules for Assam.
2. **Cultural Erosion**: Threatens the cultural identity of indigenous Assamese under Article 29.
3. **External Aggression**: Cites illegal immigration as "external aggression," threatening Assam's security.
4. **Accord Betrayal**: Seen as undermining the original spirit of the Assam Accord.
5. **Implementation Issues**: Misuse and bureaucratic delays create unrest in Assam.

Arguments in Favor of Section 6A

1. **Parliamentary Competence**: Parliament has the authority to regulate citizenship under Article 11.
2. **Unique Situation**: Assam's demographic challenge justifies a special framework.
3. **Controlled Process**: Section 6A provides a regulated, time-bound process for citizenship.

4. **Alignment with Constitution**: Articles 6 and 7 align with Section 6A.
5. **National Unity**: The ruling upholds fraternity and national cohesion.

Supreme Court Verdict

1. **Affirmation of Legislative Power**: Reaffirms Parliament's right to legislate on citizenship.
2. **Balance of Concerns**: The ruling balances Assam's demographic concerns with national unity.
3. **Judicial Precedent**: Differentiates Section 6A from earlier cases on illegal immigration.
4. **Dissenting Opinion**: Justice Pardiwala called for its prospective invalidation due to outdated relevance.

Way Forward

1. Strengthen border controls to prevent further illegal immigration.
2. Periodic review of Section 6A for effective implementation.
3. Safeguard Assam's linguistic and cultural identity.
4. Broaden national discussions on citizenship policies, including the Citizenship Amendment Act (CAA).
5. Increase public awareness to promote understanding and reduce tensions.

The Supreme Court's verdict on Section 6A acknowledges Assam's unique demographic challenges while affirming Parliament's legislative authority. It balances regional concerns with national unity and may influence future discussions on citizenship laws in India.

Demands of Ladakh for Statehood, inclusion in 6th Schedule.

- Ladakh, a region characterized by its unique cultural and geographical landscape, has been at the center of significant political discourse since its transition to a Union Territory (UT) in 2019. The abrogation of Article 370, which

previously granted special status to Jammu and Kashmir, led to the bifurcation of the state and the creation of Ladakh as a UT. However, five years later, the region is witnessing widespread protests demanding statehood and greater autonomy.

Historical Context

- **The Abrogation of Article 370:** August 2019 saw the abrogation of Article 370 and was a historic time for Ladakh. The Indian government had justified this constitutional change to integrate Ladakh more fully into India in triplication to the local grievances of representation in governance. And yet it abandoned the region's special status, leaving it open to New Delhi's direct control and questioned its autonomy and self-governance.
- **Formation of Union Territory:** Long standing demands by Ladakhis were presented as the reason for creation of Ladakh as a UT, especially in Leh part which had been feeling marginalised by political favours attached towards Jammu and Kashmir. In fact, this change has not been accompanied with responsible governance nor adequate representation of Ladakhis. Instead, it has left locals feeling disenfranchised with no one to speak for them beyond the legislative body they no longer have.

Current Demands of Ladakh

- **Demand for Statehood:** Statehood is one of the main demands coming out of Ladakh. Residents have pressed for greater autonomy and control over their governance as protests have intensified. There's no legislative assembly, so the local powers play themselves out without input from local communities. It results in feelings of alienation and frustration. The demand for statehood is an attempt to find self determination and local governance needs.
- **Inclusion in the Sixth Schedule:** There is another mountain demand for Ladakh to be included in the Sixth Schedule of the Indian Constitution, for all

tribal areas, for more autonomy and self rule for them. This would allow the local council to exercise better control over resources, land use and cultural preservation. Ladakh is home to numerous ethnic groups each with different social and cultural identity so including them in the Sixth Schedule will safeguard their identity for sustainable development.

Governance Challenges

- **Lack of Local Representation:** Ladakh continues to enjoy bad governance in the sense that it does not adequately represent its residents. Without an elected legislative assembly, there is little paying attention to local issues in favor of broader national interests. Such decisions are made without the benefit of input from those most directly affected. The geographic disconnect has led to protests and demands for a more democratic form of governance.
- **Security vs. Development:** Owing to ongoing tensions with China along the Line of Actual Control (LAC), Ladakh has only been seen from a lens of security since 2019. National security is obviously important, but in the process, there has been too much focus on such important national security without addressing major national issues like livelihoods, environment and civic rights. But these concerns have been left to the sidelines, where they fuel resentment amongst residents who accuse the city of starving their voices for its own security reasons.

The Role of Deliberation

- **Importance of Deliberative Processes:** Involvement of the local communities in the decision making processes build confidence between residents and the government and in the same way it makes decisions more relevant to the needs of those that are affected. A deliberative approach can reduce the gap between the portrayed national interests and the local realities.
- **Mechanisms for Deliberation:** To facilitate effective deliberation, several mechanisms can be implemented:

- Community Consultations: By consulting with community leaders and residents regularly, you may gain insights about local issues and priorities that will help you perform your best function.
- Participatory Governance Models: Distribution of power through participatory governance frameworks that enable local councils to effectively represent and account for citizens can be established.
- Feedback Mechanisms: Channels for feedback on government policies can make sure that the government makes the right decisions that accommodate community needs.

Conclusion

- The legitimate demands of Ladakh for statehood and inclusion in the Sixth Schedule reflect broader aspirations for autonomy, representation, and sustainable development.
- As India navigates its complex federal structure, it is crucial to recognize the unique challenges faced by regions like Ladakh. By prioritizing deliberative processes that engage local communities in decision-making, the government can address grievances effectively while fostering a sense of ownership among residents.

SC Upholds States'' Right to Regulate Industrial Alcohol

- In a big victory for states, the Supreme Court (SC), in an 8:1 majority, upheld the **states' right to regulate taxes on industrial alcohol**, overruling a **1990 judgment.**

Background of the Case (Issue Before the Court)

- The core of the dispute arises from two "overlapping" entries in the Seventh Schedule of the Constitution, which lays down the division of lawmaking powers between the Centre and the states.

- The case revolves around the interpretation of **Entry 8 of List II (State List)** and **Entry 52 of the Union List in the Constitution.**
- **Entry 8 of List II (State List)** gives states the power to regulate "the production, manufacture, possession, transport, purchase and sale of intoxicating liquors"
- **Entry 52 of List I (Union List)** allows the Centre to regulate industries as a whole to the extent "declared by Parliament by law to be expedient in public interest".

Centre VS States Arguments

- **Centre:** As alcohol and other products of fermentation industries that deal with non-potable (non-drinkable) alcohol are included in the **Industries (Development and Regulation) Act, 1961.** The Centre **argued that it "occupied the field"** when it comes to industrial alcohol, and that states could not regulate the subject.
- **States**: States, on the other hand, argued that industrial alcohol can be misused to produce consumable alcohol illegally, which required them to enact legislation.
- The Supreme Court needed to address whether "**industrial alcohol**" or denatured spirits could be classified under the term "**intoxicating liquor**," thus allowing states to regulate and tax it.
- The controversy traces back to a **1990 Supreme Court judgment** in ***Synthetics & Chemicals vs. State of Uttar Pradesh***, which limited the definition of "intoxicating liquor" to potable alcohol, ruling that states could not tax industrial alcohol.
- The current case revisited this ruling, with the Supreme Court considering its implications on state powers and public health concerns.

Key-takeaways from Supreme Court's Ruling

- **Definition of Intoxicating Liquor**: The Supreme Court ruled that "industrial alcohol" falls within the meaning of "intoxicating liquor" under **Entry 8 of List II of the Constitution**. This broader interpretation allows states to regulate and

tax industrial alcohol.

- The definition of "**intoxicating liquor**" extends beyond just alcoholic beverages suitable for human consumption. It includes all types of alcohol that could pose risks to public health.
- The court stated, "**Alcoholic liquor is defined by its ingredients, and 'intoxicating' is defined by its effects**." This emphasis on public health reinforces states' obligations to prevent misuse of industrial alcohol.
- **Overruling of Previous Judgment**: The court overruled the earlier decision in **Synthetics & Chemicals**, asserting that the Entry 8 of List II cannot exclude raw materials used in producing intoxicating liquors. The Bench highlighted the necessity for states to enact regulations to prevent industrial alcohol from being misused as a consumable liquor.
- **Legislative Powers**: The ruling confirms that the subject of intoxicating liquors falls exclusively within state jurisdiction, allowing state legislatures to enact laws addressing the production, transport, and sale of industrial alcohol. This grants states greater autonomy to combat illegal consumption and regulate alcohol-related activities.
- The judgment **empowers state governments to introduce more stringent regulations on industrial alcohol, potentially leading to changes in how it is produced, transported, and consumed**.

Key Details.

- **Entry 8 of List II (State List)**: It grants states the power to regulate intoxicating liquors.
- **Entry 52 of the Union List**: It empowers the central government to regulate industries of public interest.
- **Article 47 of the Constitution**: It states the duty of the state to raise the level of nutrition and standard of living and to improve public health.

Industrial alcohol

- Industrial alcohol is essentially **impure alcohol** that is used as an industrial solvent. Mixing chemicals such as **benzene, pyridine, gasoline,** etc. in **ethanol,** which is produced by fermenting grains, fruit, molasses, etc., — a process that is called 'denaturation' — turns it into **industrial alcohol**. This makes the alcohol unfit for human consumption, and significantly lowers its price.
- Industries use this impure alcohol to manufacture a range of products including pharmaceuticals, perfumes, cosmetics, and cleaning liquids.
- However, this same industrial or denatured alcohol is sometimes used to make illicit liquor, cheap and dangerous intoxicants whose consumption poses severe risks, including blindness and death.

95% of Land Records in Rural India Digitized

- Rural India is undergoing a significant transformation with the digitization of land records, modernizing the management of land ownership. This initiative enhances transparency and efficiency in land administration, empowering millions of rural households

Need for Digitization of Land Records

- The digitization of land records in India has transformed land management by addressing traditional challenges like disputes, fraud, and inefficient manual processes.
- Now, ownership information is easily accessible online, enhancing transparency and reducing illegal encroachments.
- Digitized records simplify dispute resolution, easing court burdens, and empower marginalized communities by improving access to land rights. Integration with geospatial mapping enhances land management, enabling accurate surveys and

planning.

- During land acquisitions or disasters, digital records ensure fair and timely compensation. Overall, this shift has paved the way for a more transparent, accessible, and efficient land governance system in India.

Digital India Land Records Modernization Programme (DILRMP)

- The Digital India Land Records Modernization Programme (DILRMP), previously known as the **National Land Record Modernization Programme**, was restructured as a Central Sector Scheme in April 2016, with full funding from the central government. Its main goal is to establish a modern and transparent land records management system by developing an Integrated Land Information Management System.
- This system aims to provide real-time land information, optimize land use, benefit landowners and potential buyers, support policy-making, reduce land disputes, prevent fraudulent transactions, eliminate physical visits to offices, and enable data sharing with various organizations.

Achievements:

- Significant progress has been made under DILRMP. Around 95% of land records have been computerized, covering over 6.26 lakh villages. Digitization of cadastral maps has reached 68.02% at national level. Additionally, 87% of Sub-Registrar Offices (SROs) have been integrated with land records. The government extended DILRMP until 2025-26, adding new features like Aadhaar-based integration with land records and computerization of revenue courts

Key Initiatives under DILRMP

- **Unique Land Parcel Identification Number (ULPIN):**

The ULPIN or "Bhu-Aadhar" provides a 14-digit alphanumeric code for each land parcel, based on its geo-coordinates. Implemented in 29 States/UTs, it helps streamline real

estate transactions, resolve property disputes, and improve disaster management efforts.

- **National Generic Document Registration System (NGDRS):**

NGDRS or e-Registration provides a uniform process for deed/document registration across the country, allowing online entry, payments, appointments, and document searches. So far, 18 States/UTs have adopted it, and 12 others share data with the national portal.

- **e-Court Integration:**

Linking land records with e-Courts aims to provide authentic land information to the judiciary, aiding in faster case resolution and reducing land disputes. Integration has been cleared in 26 States/UTs.

- **Transliteration of Land Records:**

To overcome language barriers in accessing land records, the program is transliterating land documents into any of the 22 languages listed in Schedule VIII of the Indian Constitution. This is already in use in 17 States/UTs.

- **Bhoomi Samman:**

Under this initiative, 168 districts across 16 States have achieved "Platinum Grading" for completing over 99% of the program''s core components, including land record computerization and map digitization.

Karmayogi Competency Model for Civil Servants

- The Capacity Building Commission (CBC), has developed the **Karmayogi Competency Model for civil servants**.
- It is a framework of behavioral and functional skills designed to resource their transition from a karmachari (worker) to a karmayogi (devoted worker).
- The model aims to optimize deployment of officers to roles based on their capabilities, which are also mapped to publications on the **Integrated Government Online Training (iGOT)** portal.

Components of the Competency Model

- The version consists of 34 capabilities, classified as behavioral and purposeful.
- **Behavioral Competencies:** There are 13 behavioral skills, similarly divided into two sub-classes; Core Competencies ,Leadership Competencies
- **Key behavioral competencies include:** Self-awareness, Personal effectiveness, Creativity and innovation and Strategic leadership.
- **These talents are inspired by 4 resolutions that every public official has to encompass:** Vikas (Development), Garva (Pride), Kartavya (Duty) and Ekta (Unity).
- **Functional Competencies:** There are 21 functional competencies, which cognizance of competencies required to efficiently perform precise roles in governance.
- **Key functional capabilities include:** Citizen-centricity, Policy architecture, Digital fluency, Financial management and Data analytics.

Mission Karmayogi National Program

It is a flagship programme of Government of India launched in 2020 for education of civil servants, which intends to convert the Civil Services from 'Rule Based' to 'Role Based' way of functioning and Citizen Centric.

Mission Karmayogi has the following six pillars;

- Policy Framework,
- Institutional Framework,
- Competency Framework,
- Digital Learning Framework (Integrated Government Online Training Karmayogi Platform (iGOT-Karmayogi),
- Electronic Human Resource Management System (e-HRMS), and
- Monitoring and Evaluation Framework.

Key Features of Mission Karmayogi

- **Capacity Building Commission (CBC):** CBC monitors and opinions the implementation of capacity-building applications, aligning them with the targets of Mission Karmayogi.
- The CBC was established in April 2021 and is uniquely staffed with representation from the personal region and the civil society.
- **IGOT (Integrated Government Online Training) Platform:** This digital platform provides anytime, anywhere education, allowing civil servants to get entry to personalized studying paths based on their roles and talent gaps.
- **Annual Capacity Building Plans (ACBP):** Each government branch creates and implements its personal capacity-building plans in alignment with its priorities and goals.
- **Role-based Competency Framework:** The education is designed to develop function-based skills in civil servants that specialize in precise talents required for their respective skills .

Integrated Government Online Training (iGOT) portal

- It is being evolved as an important part of the Digital India stack for capacity building of all authorities personnel.
- It targets to provide 'anytime-anywhere-any device' gaining knowledge of to educate around 2.0 crores customers which turned into thus far unachievable thru conventional measures.
- It is expected to conform into a vibrant and global class marketplace for content modeled on FRACs.
- Supported by a strong e-gaining knowledge of the content material industry the content can be curated by individual government ministries or companies.

Conclusion

- Mission Karmayogi seeks to convert India's civil services, making them higher organized and citizen-oriented, in the end contributing to the country's bold dreams.
- It is a transformative initiative that empowers civil servants to force India's development. By nurturing citizen-centric, tech-savvy Karmayogis, we pave the way for a Viksit Bharat by 2047.

Appointment of CHIEF JUSTICE OF INDIA (CJI)

- Justice Sanjiv Khanna has been appointed as the next (51st) Chief Justice of India (CJI).
- The President of India appointed Justice Sanjiv Khanna as the next Chief Justice of India (CJI). This decision follows the recommendation from the current CJI, D Y Chandrachud.
- Justice Khanna, who is the senior-most judge in the Supreme Court, will take over from CJI Chandrachud on November 11, just a day after Chandrachud''s retirement. He is expected to serve as CJI for about six months until his own retirement on May 13, 2025.

How is the CJI Appointed?

- By convention, the **senior-most judge of the Supreme Court becomes the CJI.** This principle has been formalized in the **Memorandum of Procedure (MoP)**, which outlines the process for appointing Supreme Court judges.
- According to the MoP, the **appointment should be made for the "senior most judge of the Supreme Court considered fit" for the role.** This guideline has been followed even before the MoP was established in 1999.
- The **process starts when the Union Minister of Law and Justice asks the outgoing CJI for a recommendation about who should be the next CJI.** This generally happens about a month before the current CJI retires. For example, CJI Chandrachud sent his recommendation to the government on October 17.

- **After the recommendation is accepted, the Union Minister will present it to the Prime Minister, who advises the President on the appointment.** Although the final decision lies with the government, it generally follows the CJI''s recommendation.
- The **Parliament fixes the salary and working conditions for the CJI,** which are specified in The Supreme Court Judges (Salaries and Conditions of Service) Act, 1958.

Evolution of the MoP

- The MoP''s development derived from several landmark Supreme Court cases—the **First Judges Case** (1981), **Second Judges Case** (1993), and **Third Judges Case** (1998). These cases established a collegium system for selecting judges, which involves the senior-most judges of the Supreme Court.
- The **MoP was first drafted in 1999, it highlights how judges are appointed, and the roles of the government, the Supreme Court, and the High Courts in the appointment process.** Notably, this process is a judicial innovation and not rooted in formal legislation or constitutional text.
- **Note:** In 1973, the Government appointed Justice A N Ray as CJI, bypassing three senior judges. This was seen as politically motivated, especially since Justice Ray was viewed as more favorable to the government.

Tenure of CJIs :

- **He serves until the age of 65, with no fixed term in the Constitution,** however, he can be removed through a constitutional process. According to Article 124(4), a **chief justice can only be removed if both Houses of Parliament support this decision by a two-thirds majority, based on misconduct or incapacity.**

- **Note: In the situation where both the President and Vice President are absent, the CJI acts as the president.** This is outlined in the President (Discharge of Functions) Act, 1969. For example, after President Zakir Hussain''s death, Justice Mohammad Hidayatullah temporarily took on this role.

Delimitation angle of the Census

- ***The Centre***, it seems, is ***finally preparing to conduct the Census*** which it ***could not carry out*** in ***2021 because of the Covid-19 pandemic.***
- ***This Census is linked to two other important outcomes*** — the ***delimitation of Parliamentary constituencies***, which has been ***on hold*** for the last five decades, and the ***implementation of women's reservation in Parliament.***

2021 census

- ***The year 2021 marked the first time India's Census missed*** its decadal schedule since it was ***first carried out in 1881.***
- But the pandemic was very much over by 2022, and that could have enabled the start of the ***Census process in 2023 or 2024.***
- However, a ***Census completed by 2026***, or earlier, might not allow for an immediate delimitation.

The delimitation angle

- ***Delimitation***, a ***Constitutional mandate***, is supposed to happen ***after every Census.***
- The ***process adjusts the number of constituencies of Parliament*** and state Assemblies in accordance with ***the latest population figures***, to ensure that the number of people represented by ***any Member of Parliament*** or Member of Legislative Assembly is roughly the same.
- However, this exercise has been suspended since 1976 ***due to a lack of political consensus.***
- If the ***standard logic of delimitation*** were to be followed, ***the wide divergence***

in ***population growth trends*** in various states would mean that some would see the number of ***Parliamentary constituencies reduce***, while others would see an increase.

- ***Southern states*** have argued that this would amount to punishing them for successfully ***meeting population control objectives.***
- A ***delimitation exercise in 2002***, following the ***2001 Census***, involved only the ***redrawing of existing boundaries of constituencies***, and not a ***change in the number of constituencies.***
- As of now, ***delimitation is suspended till at least 2026.*** The ***84th Constitutional Amendment of 2001*** said that the ***next delimitation*** can be held ***only based on the Census*** conducted after 2026.
- Therefore, even if ***the 2021 Census*** had been held on time, or in 2023 or 2024, delimitation could have been done ***only after the 2031 Census.***
- If the Census, which takes two years to complete, begins next year, delimitation can ***theoretically happen immediately thereafter.***

Caste Census demand

- There is also ***an expectation*** that the ***next Census may collect caste data*** as well to eliminate the need for a ***separate caste census***, which has been demanded by some political parties in recent years.
- The collection of ***caste data in the Census*** would not be unprecedented. Some information related to caste was ***obtained until the 1941 Census*** and the practice was discontinued only in ***independent India.***
- In some earlier years, information on caste or sect of people belonging to ***all religions was obtained in the Census.*** In other years, only the caste data of Hindus was collected.
- The practice was ***discontinued from the 1951 Census onwards***, and only data on ***Scheduled Castes or Tribes*** has been collected since then.

DEFENCE AND SPACE

INSV TARINI SAILS OUT FOR NAVIKA SAGAR PARIKRAMA II

Second Edition of Navika Sagar Parikrama - **Circumnavigating the Globe** flagged off at Ocean Sailing Node, INS Mandovi, Goa.

Navika Sagar Parikrama II covering more than 21,600 nautical miles (approx 40,000 km) will unfold in five legs with stop overs at four ports for replenishment and maintenance, as required.

The broad contour of voyage will be as follows: -

(a) Goa to Fremantle, Australia

(b) Fremantle to Lyttleton, New Zealand

(c) Lyttleton to Port Stanley, Falkland

(d) Port Stanley to Cape Town, S Africa

(e) Cape Town to Goa

INSV Tarini, a 56 foot sailing vessel built by **M/s Aquarius Shipyard Ltd** was inducted in the Indian Navy on 18 Feb 17. The vessel has clocked more than 66,000 nautical miles (1,22,223 km) and participated in first edition of Navika Sagar Parikrama in 2017, trans-oceanic expedition from Goa to Rio, Goa to Port Louis and other significant expeditions.

PSLV-37 mission re-enters Earth's atmosphere

The Indian Space Research Organisation (ISRO) informed that the upper stage of the Polar Satellite Launch Vehicle C-37 (PSLV C-37 mission) re-entered the Earth's atmosphere on October 6.

PSLV-C37 Mission

- Launched on February 15, 2017 with Cartosat-2D as the main payload along with another 103 satellites,
- INS-1A, INS- 1B, Al-Farabi 1, BGUSAT, DIDO-2, Nayif 1, PEASS, 88 Flock-3p satellites, and 8 Lemur-2 satellites.

Orbital Decay and Re-entry

- After injecting satellites into orbit, the **PS4 upper stage** was left in a 470×494 km orbit.
- Due to **atmospheric drag**, the **orbit decayed**, leading to re-entry.
- **Re-entry** occurred in the **North Atlantic Ocean**, as predicted by both ISRO and US Space Command (USSPACECOM).

Compliance with International Guidelines

- The re-entry was **compliant with the Inter-Agency Space Debris Coordination Committee (IADC) guidelines**, which recommend l**imiting post-mission orbital life** of defunct objects in **Low-Earth Orbit (LEO) to 25 years**.
- **ISRO reduced** the residual orbital lifetime to **8 years through a passivation sequence**.

Future Debris Mitigation Initiatives

- ISRO is working to **reduce the post-mission orbital lifetime of PSLV upper stages** to **less than 5 years** using engine restarts.
- **Controlled re-entry is planned** for future PSLV missions.
- ISRO aims to achieve the **"Debris Free Space Mission" (DFSM) by 2030** as part of its commitment to space sustainability.

Debris-Free Space Missions (DFSM)

- The Debris-Free Space Missions (DFSM) is an **initiative by the Indian Space Research Organisation (ISRO)** to make **all Indian space missions debris-free by 2030.**
- The initiative aims to ensure the **sustainability of space** by **reducing the amount of space debris and preventing future collisions**.

The DFSM initiative includes:

- **Avoiding debris generation**: This includes avoiding debris during the operational life of satellites and launch vehicles, as well as during post-mission disposal.
- **Avoiding on-orbit collisions:** This includes using failure mode studies, redundant systems, and mission design with high reliability.

Guidelines for space actors:

This includes for all Indian space actors, both governmental and non-governmental, It is on **how to select clean orbits, budget fuel** for post-mission **disposals, and control trajectories** during atmospheric re-entry.

Fattah 2

Iran used hypersonic missiles like the **Fattah-2** in the ongoing conflict with Israel.

Features

- It is equipped with a **Hypersonic Glide Vehicle (HGV) warhead,** which allows the missile to manoeuvre and glide at speeds between **Mach 5 and 20.**
- Fattah-2 **boasts a range of 1,500 km,** only slightly more than its predecessor, the Fattah-I.
- The missile can accelerate outside the Earth's atmosphere.

- Its aerodynamic control surfaces allow for steering within the atmosphere.



Isro to build third launch pad at Sriharikota, Cabinet approval pending

- The Indian Space Research Organisation (Isro) is set to construct a third launch pad at its Satish Dhawan Space Centre in Sriharikota, Andhra Pradesh.

- This **new facility will serve as a crucial redundancy measure** and support Isro''s ambitious future missions, including the New Generation Launch Vehicle (NGLV) program.
- The current second launch pad, originally designed for the Polar Satellite Launch Vehicle (PSLV), **has been re-engineered to handle** the more powerful Geosynchronous Satellite Launch Vehicle (GSLV) and its cryogenic stage.
- The proposed third launch pad will incorporate innovative design elements to **support Isro''s evolving launch vehicle technology**. Unlike traditional vertical integration, the NGLV will be integrated horizontally and then tilted for launch, requiring a specially adapted launch pad.
- The **new facility will also accommodate more liquid engine boosters**, necessitating a redesigned jet deflector system.
- Another significant feature of the third launch pad will be its capacity for entire-stage testing, eliminating the need for separate testing **at Mahendragiri**. This integration of testing and launch capabilities is expected to streamline Isro''s launch preparation processes.
- The project has already **received approval from the National Space Commission at its 153rd meeting,** alongside other major initiatives such as the Venus mission, Chandrayaan-4, and the first module of India''s space station.

Malabar 2024

Malabar is a quadrilateral naval exercise between India, the United States, Australia and Japan

- **Host: India** is hosting the Malabar Exercise in 2024, with activities centered around Visakhapatnam.
- Activities: The exercise includes live weapon firing, complex surface operations, anti-air and anti-submarine warfare drills, and joint maneuvers involving a range of naval assets.

- It was **initiated in 1992** as a **bilateral exercise between India and the US**, gained further traction as a significant maritime engagement, with **Japan (2015) and Australia (2020) joining in subsequently.**
- The exercise focuses on enhancing **maritime security, interoperability, and cooperation** in the Indo-Pacific region.
- The exercise is aligned with the Indian Government's vision of **Security & Growth for All in the Region (SAGAR)** and reflects India's growing engagement with like-minded nations.

Security and Growth for All in the Region (SAGAR):

- SAGAR is **India's foreign policy doctrine** for maritime cooperation in the **Indian Ocean region.**
- The term was **first used by Prime Minister Narendra Modi in 2015** at Port Louis.

Goals of SAGAR are :

- **Increase cooperation:** Strengthen ties with neighboring countries, especially in the Indian Ocean region
- **Promote development:** Support sustainable development and economic growth
- **Ensure maritime security:** Safeguard national interests and ensure maritime security and safety
- **Build trust:** Create a climate of trust and openness
- **Resolve issues peacefully:** Address regional concerns and resolve maritime issues peacefully
- **Follow international rules**: Ensure all countries in the Indian Ocean Region adhere to international maritime rules and norms

Hunter Drones Cleared: CCS Clears 31 MQ9B for $ 3.1 Billion

The Cabinet Committee on Security (CCS) has officially approved the acquisition of 31 **MQ-9B High Altitude Long Endurance (HALE)** drones for the Indian armed forces.

- These UAVs, acquired from General Atomics of the United States, will be distributed across India's three military branches, with 15 allocated to the Indian Navy, and 8 each to the Indian Army and Air Force.
- The approval marks a significant step in enhancing India's intelligence, surveillance, and reconnaissance (ISR) capabilities across both maritime and land borders

Strategic Necessity for the Indian Navy

- For the Indian Navy, these drones represent a much-needed strategic upgrade. Currently, the P-8I Poseidon aircraft is used for long-range maritime surveillance in the Indian Ocean Region (IOR). However, operating ***the P-8I for extended missions*** is an expensive affair.
- The MQ-9Bs, with their ability to stay airborne for extended durations, provide a **more cost-effective** alternative for surveillance deep into the IOR, where Chinese naval activity has been increasing.
- The endurance of these UAVs will allow the Navy to keep a tighter watch on critical chokepoints such as the **Malacca, Sunda, and Lombok Straits,** vital maritime routes through which submarines and other vessels from the South China Sea enter the IOR.
- **The MQ-9Bs, equipped with Synthetic Aperture Radar (SAR)** sensors and advanced **ELINT (Electronic Intelligence) and SIGINT (Signals Intelligence)** pods, will provide real-time situational awareness, making them a critical asset in monitoring movements and potential threats along these volatile borders

Boost for Indian Navy's Anti-Submarine Warfare

- Perhaps the most significant advantage of the MQ-9B drones will be felt by the Indian Navy. The endurance and range of these UAVs make them ideal for long-

duration missions in the IOR, where China has been increasingly deploying submarines and surface vessels

Tactical Advantage on Both Borders

- For India's western border with Pakistan, ***the MQ-9Bs will provide real-time*** monitoring and high-definition imagery, giving Indian forces a significant advantage in detecting infiltrators.

Future Implications

- The acquisition of these drones comes at a crucial time as India continues to modernize its defense capabilities in response to emerging threats from both its western and northern neighbors.
- The MQ-9Bs will serve as a force multiplier, allowing the Indian armed forces to operate with enhanced situational awareness and precision across diverse and challenging operational environments.

India's Nuclear-Powered Attack Submarines (SSNs): A Long-Awaited Project Finally Cleared

- In a significant move to bolster its maritime capabilities, the Indian government has approved a ₹40,000 crore project to construct the country's first two nuclear-powered attack submarines (SSNs).
- This long-stalled project, crucial to India's defense, received clearance from the Cabinet Committee on Security (CCS), marking a decisive step forward for the Indian Navy, which has long required **SSNs for operations in the Indian Ocean Region and beyond .**

Why SSNs Are Essential

- Unlike SSBNs, which carry nuclear missiles as part of a country's nuclear triad, ***SSNs are designed to hunt and neutralize enemy ships and submarines***. They are stealthy, fast, and capable of remaining submerged for extended periods without needing to surface for air, thanks to their nuclear propulsion.

- Given India's expansive maritime domain, particularly in the Indian Ocean, SSNs are vital for safeguarding sea lines of communication, deterring enemy naval activities, and projecting power far from Indian shores

Nuclear Attack Submarines (SSNs)

- Nuclear-Powered Attack Submarines (SSNs) are **advanced maritime vessels** that are **powered by nuclear reactors** and are primarily used for **offensive operations.**
- They are **one of the two main types** of nuclear submarines, the other being **Ballistic Missile Submarines (SSBNs).**

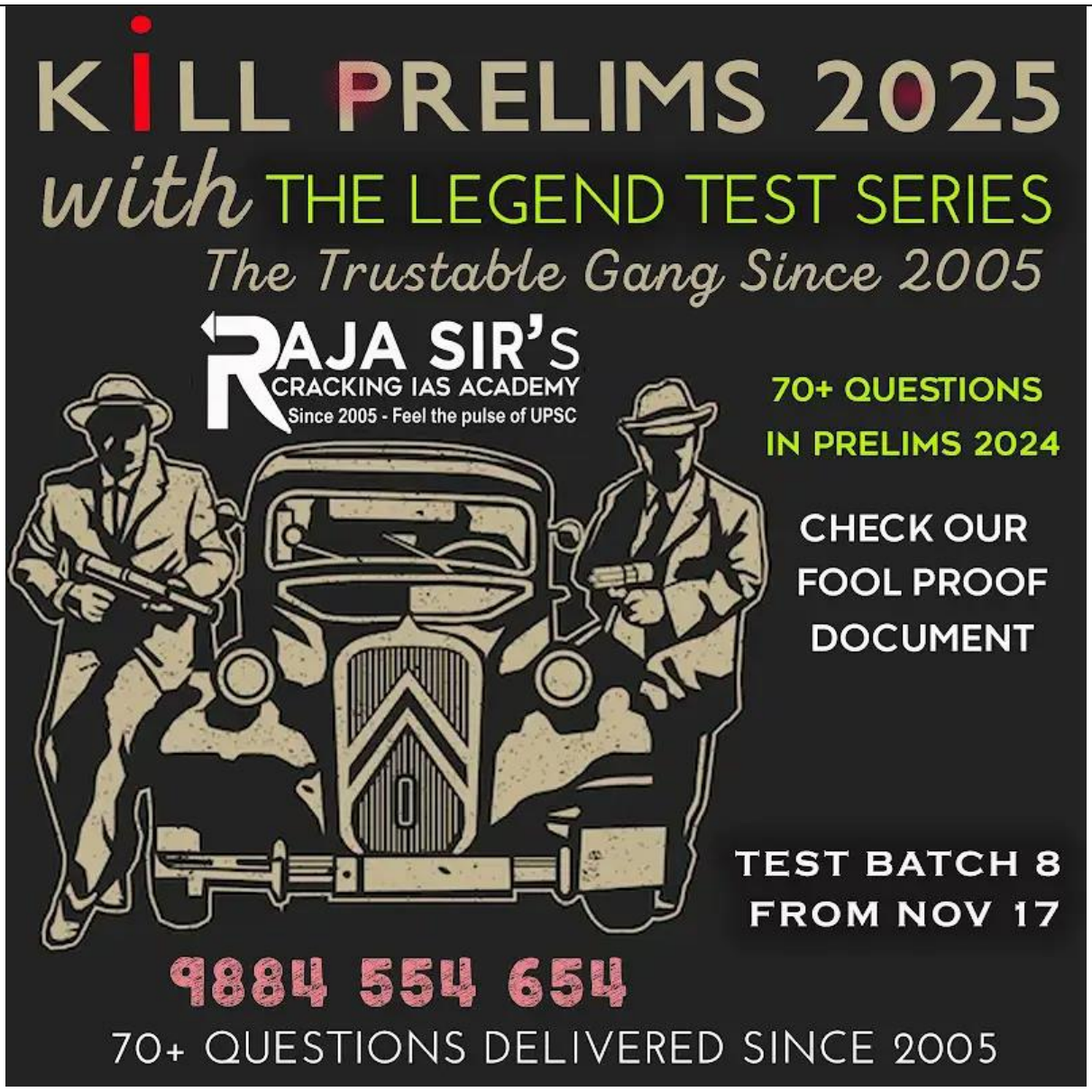
SSNs

- **Stealth:** SSNs can remain **submerged for extended periods**, unlike conventional submarines that need to surface to **recharge their batteries**.
- **Weapons:** SSNs are equipped with a **variety of tactical weapons**, including torpedoes, anti-ship cruise missiles, and land-attack cruise missiles.
- **Endurance:** SSNs can **operate underwater almost indefinitely,** limited only by the **crew's food supplies**.
- **First SSN:** The first nuclear-powered submarine was the **USS Nautilus (SSN-571)**, which was commissioned in **1954**.
- India has **one nuclear-powered ballistic missile submarine**, the **INS Arihant**, which was commissioned in **2016**, and India **plans to commission its second, INS Arighat, in 2024.**
- India has made progress in nuclear submarine technology through the **Advanced Technology Vessel (ATV) program.**
- India's Arihant-class submarines are **ballistic missile submarines (SSBNs)** that are part of the country's nuclear deterrent.

Indigenous Construction of Two Nuclear Attack Submarines (SSNs)

- **Project**: Building of **two indigenous SSNs** (Nuclear Attack Submarines).

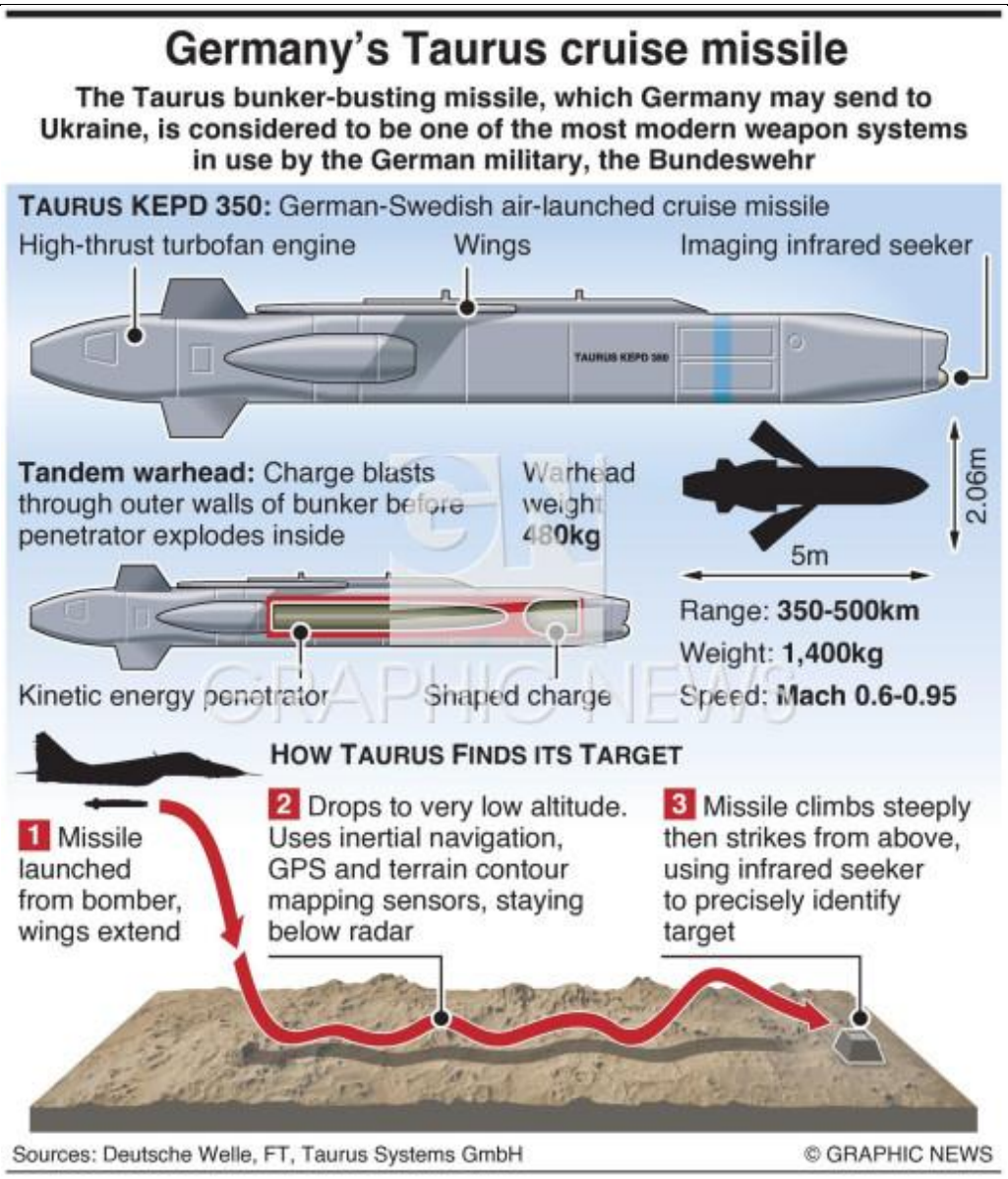
- **Significance**:
- Provides the Navy with **unlimited endurance** (limited only by crew endurance).
- Follows the success of India's **SSBN** program (Nuclear-powered Ballistic Missile Submarines), with **INS Arihant** (2016) and **INS Arighaat** (2023) already in service.
- Critical for enhancing India's **naval capabilities**.
- **Past Context**: India previously leased two SSNs from **Russia**.


KILL PRELIMS 2025
with THE LEGEND TEST SERIES
The Trustable Gang Since 2005
RAJA SIR'S
CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC
70+ QUESTIONS
IN PRELIMS 2024
CHECK OUR
FOOL PROOF
DOCUMENT
TEST BATCH 8
FROM NOV 17
9884 554 654
70+ QUESTIONS DELIVERED SINCE 2005

What Are TAURUS MISSILES and what can they do?

- Equipped with ***stealth*** technology that makes them less visible to detection, the missiles have a range of up to 500 kilometers (310 miles), which would help Ukraine to put pressure on Russia in the Black Sea and elsewhere.
- The German- and Swedish-made missiles would be able to reach targets deep in Russia from Ukrainian soil. (Taurus is shorthand for Target Adaptive Unitary and dispenser Robotic Ubiquity System.) In Latin, taurus means "bull.
- This missile was developed in the mid-1990s as a joint effort between the German company LFK (now MBDA Deutschland) and the Swedish company Saab Bofors Dynamics.
- It is capable of precision strikes on stationary and semi-stationary targets.

  Features:
  - Weighing in at 1,400 kg and measuring approximately 5.1 meters in length, this versatile missile can be deployed from a variety of platforms.
  - Powered by turbofan engine, the missile achieves subsonic speeds with impressive fuel efficiency.
  - It features a **dual-stage warhead known as MEPHISTO,** which is specifically designed to penetrate hardened bunkers and underground facilities before detonation.
  - It flies at an altitude of only 35 meters, which makes it almost impossible for radar systems to detect.
  - Range: 500 km
  - The missile's guidance system **merges GPS, INS** (Inertial Navigation System), and **TERCOM** (Terrain Contour Matching) technologies, guaranteeing unerring precision even in GPS-denied environments.
  - Its **low radar cross-section** and advanced defense mechanisms protect it against interception and neutralization attempts.



ISRO targets to launch Venus Orbiter Mission in March 2028

India'sVenus Orbiter Mission is planned to be launched in March 2028 and will embark on a 112-day journey to reach the planet.

- The Rs 1,236-crore Venus Orbiter Mission (VOM) was recently approved by the Union Cabinet and the Indian Space Research Organisation (ISRO) revealed the

targeted launch window for the mission.

- The VOM by ISRO is scheduled for launch on March 29, 2028, with an expected arrival at Venus on July 19, 2028.
- This mission will be launched using the Launch Vehicle Mark-3 (LVM-3), ISRO's heavy-lift launch vehicle.
- The spacecraft will be placed in an Elliptical Parking Orbit (EPO) of 170 km x 36,000 km, with an inclination of 21.5 degrees and an Argument of Perigee (AOP) of 178 degrees.
- The ***Venus Orbiter Mission will study the surface topography*** of the planet, Venusian dust and clouds, lightning, volcanic activity, atmosphere, ionosphere, solar forcing and the Sun-Venus interaction.
- It will also study the underlying causes of the transformation of Venus, which is believed to be once habitable and quite similar to Earth.
- It is expected to answer some of the outstanding scientific questions resulting in various scientific outcomes.
- The mission will be accomplished by the Department of Space.

Key Phases and Details:

- **Launch and Elliptical Parking Orbit (EPO):** The spacecraft will be launched into an EPO, where it will orbit Earth before heading towards Venus.
- **Venus Orbit Injection (VOI):** After the cruise phase, the spacecraft will be injected into an elliptical orbit around Venus of 500 km x 60,000 km.
- **Aerobraking Maneuver:** Over a period of six to eight months, aerobraking will be used to gradually lower the spacecraft into the desired Science Orbit of 200 km x 600 km with a 90-degree inclination. This will allow for low-altitude science operations and studies of Venus's atmosphere and surface.

Scientific Objectives:

- Study the dust in Venus's atmosphere.

- High-resolution mapping of Venus's surface topography.
- Investigate the solar X-ray spectrum near Venus.
- Analyse Venusian airglow.
- Examine sub-surface characteristics of the planet.
- Explore the interaction between Venus and the Sun.

Payloads:

- A total of 19 payloads onboard VOM, including **16 Indian payloads**, two collaborative payloads (Indian and international), and one international payload.

Quick facts on Venus:

- Venus is the second planet from the Sun and is Earth's closest planetary neighbour.
- Venus is often called Earth's twin because it's similar in size and density. However – there are radical differences between the two worlds.
- Venus has **a thick, toxic atmosphere** filled with carbon dioxide and it's perpetually shrouded in thick, yellowish clouds of sulfuric acid that trap heat, causing a runaway greenhouse effect.
- It is the **hottest planet in our solar system**, even though Mercury is closer to the Sun. Surface temperatures on Venus are about 900 degrees Fahrenheit (475 degrees Celsius) – hot enough to melt lead.
- The **surface is a rusty colour** and it is peppered with intensely crunched mountains and thousands of large volcanoes.
- Venus has **crushing air pressure** at its surface – more than 90 times that of Earth.
- Venus **rotates on its axis backward**, compared to most of the other planets in the solar system. This means that, on Venus, the Sun rises in the west and sets in the east.
- Venus **rotates very slowly on its axis** – one day on Venus lasts 243 Earth days. The planet orbits the Sun faster than Earth, however, so one year on Venus takes

only about 225 Earth days, making a Venusian day longer than its year.

Past missions to Venus

- Venus was the **first planet to** be explored by a spacecraft – **NASA's Mariner 2** successfully flew by and scanned the cloud-covered world on December 14, 1962.
- Since then, numerous spacecrafts from the US and other space agencies have explored Venus, including NASA's Magellan, which mapped the planet's surface with radar.
- Soviet spacecraft made the most successful landings on the surface of Venus to date, but they didn't survive long due to the extreme heat and crushing pressure.
- More recent Venus missions include ESA's Venus Express (which orbited from 2006 until 2016) and Japan's **Akatsuki Venus Climate Orbiter** (orbiting since 2016).
- NASA's **Parker Solar Probe** has made multiple flybys of Venus.

Space Based Surveillance (SBS) Mission

Recently, the Cabinet Committee on Security (CCS) has approved phase 3 of the Space Based Surveillance (SBS) mission.

- It will help in better land and maritime domain awareness for civilian and military applications.
- It will involve the launch of at least 52 satellites in low earth orbit and geostationary orbit for surveillance.
    - 21 satellites will be built by ISRO and the remaining 31 by private companies.
- The SBS mission is being handled by the **National Security Council Secretariat** and Defence Space Agency under the Ministry of Defence.
    - The three armed forces will have dedicated satellites for their land, sea or air-based missions.
- SBS 1 was launched in 2001, and involved the launch of four satellites e.g., Risat 2 while SBS 2 came in 2013 with the launch of six satellites e.g., Risat 2A.

- The SBS 3 mission will be supported by India''s acquisition of 31 Predator drones from the US, joint construction of military satellites with France and anti-satellite missile capabilities.
- India aims to acquire capabilities to detect enemy submarines in the Indo-Pacific and monitor infrastructure construction by adversaries along its land and sea borders.

NASA'S Europa Clipper Mission

- A **SpaceX Falcon** Heavy rocket carrying **NASA's Europa Clipper** spacecraft lifted off from **NASA's Kennedy Space Center** in Florida.

What is Europa Clipper Mission ?

- The Europa Clipper is **NASA's largest spacecraft** for planetary exploration, with an estimated mission cost of **$5.2 billion**

Aims: To place a spacecraft in orbit around **Jupiter to perform a detailed investigation of Europa**.



Mission Objective:

- To find out if the **ice-encased moon Europa** could be habitable.

- Europa shows strong evidence for an ocean of liquid water beneath its icy crust.
- **Important science instruments with spacecraft**
- **Plasma Instrument for Magnetic Sounding (PIMS):** Measures magnetic fields to detect the ocean's properties.
- **Mapping Imaging Spectrometer for Europa (MISE):** Identifies surface composition.
- **Europa Imaging System (EIS):** Captures high-resolution images.
- **Radar for Europa Assessment and Sounding Ocean to Near-surface (REASON):**Probes beneath the ice to study the subsurface structure.
- **Europa Clipper Magnetometer** :Analyses Europa's magnetic environment
- **Power Source:** Spacecraft has large solar arrays to collect enough light for its power needs as it operates in the Jupiter system.

Europa

- Europa is a ***moon of Jupiter*** that's considered one of the most promising places in our solar system to search for life beyond Earth.
- **Size:** Slightly smaller than Earth's moon and its diameter is about one-quarter that of the Earth.
- **Potential for Primitive Life:** Scientists believe Europa could potentially harbour microbial life near thermal vents at the ocean floor, similar to life forms found in Earth's deep oceans.

Jupiter

- Position and Size: **Fifth planet from the Sun** and the largest in the solar system. If hollow, it could fit 1,000 Earths inside.
- Oldest Planet: Jupiter formed 4.6 billion years ago from the dust and gases left over from the Sun's formation.
- Shortest Day: Has the fastest rotation, completing a spin on its axis in just 10.5 hours.
- Orbital Period: Takes approximately 12 Earth years to orbit the Sun.
- Moons: Jupiter has 95 officially recognized moons.

- The four largest moons (Io, Europa, Ganymede, Callisto) were first observed by Galileo in 1610.
- **Ganymede, the largest moon, is bigger than Mercury**.

Non-Kinetic Warfare

- **Definition:**
  - Warfare that goes beyond physical combat and involves electronic warfare, cyberattacks, psychological, information, and economic tactics.
  - It can include non-military stakeholders and aims to disrupt or cripple a country's infrastructure or governance.
- **Methods Used:**
  - **Cyber warfare:** Attacking critical infrastructure like power grids, hospitals, and communication networks.
  - **Information warfare:** Spreading disinformation or controlling the narrative to influence public perception and decision-making.
  - **Electronic warfare:** Jamming or intercepting communication systems.
  - **Psychological warfare:** Manipulating public opinion and morale through fear, misinformation, or propaganda.
  - **Economic warfare:** Disrupting a nation's economy by targeting financial systems or trade.
- **Impact:**
  - Non-kinetic warfare can be deadlier than traditional combat, as conflicts can be won without physical confrontation.
  - A well-coordinated cyber or economic attack can destabilize a nation without the need for conventional military force.
- **Examples:**
  - **Russia-Ukraine conflict:** Use of cyberattacks and disinformation.
  - **Israel-Palestine conflict:** Psychological and information warfare tactics.
  - Lebanon: Use of pager blasts as a form of disruption.

- **Counter-Drone Technologies:**
  - **Kinetic options:** Shooting down drones physically.
  - **Non-kinetic options:** Jamming, taking control, or using laser and electromagnetic waves to disrupt drone operations.
- **Importance for India:**
  - As non-kinetic warfare becomes a key component of modern conflicts, India's armed forces must develop both kinetic and non-kinetic capabilities to counter these emerging threats.

Indian Navy's Next Generation Missile Vessels

- The **Indian Ministry of Defence** has announced that **GE Aerospace** will supply **LM2500 marine gas turbine engine kits** to power six **Next Generation Missile Vessels (NGMVs)** for the Indian Navy. These vessels will be built by **Cochin Shipyard Limited** in Kochi.

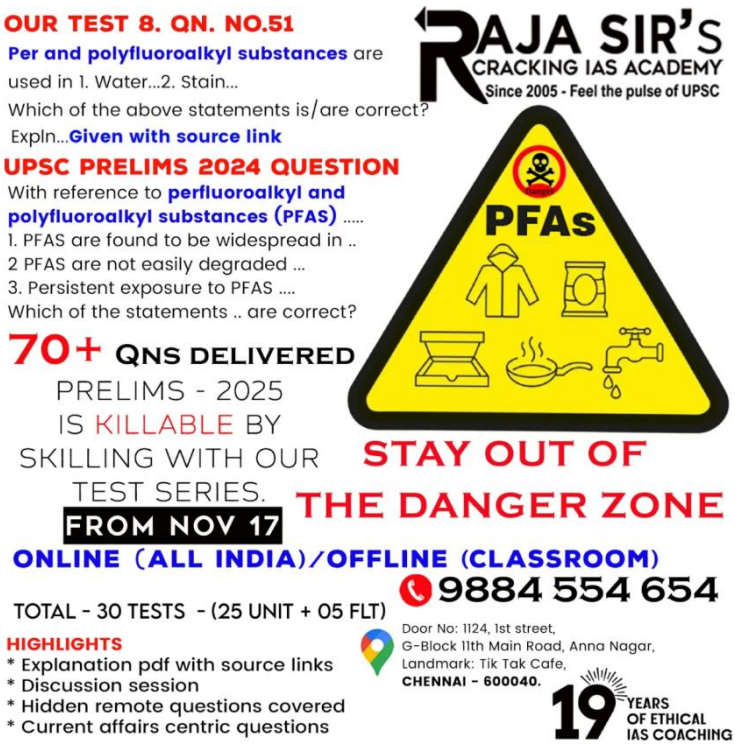
Key Features of the LM2500 Marine Gas Turbine Engine

- **Engine Specifications**: The LM2500 marine gas turbine is engineered for high performance, capable of propelling modern naval vessels effectively. It provides a power output that allows ships to achieve high speeds and enhanced operational efficiency.
- **Auxiliary Systems**: In addition to the engines, GE Aerospace will supply a full range of gas turbine auxiliary systems, essential for optimal engine performance and reliability.
- **Existing Applications**: The LM2500 engines are already in service in various Indian naval platforms, including:
- Six Shivalik-class frigates
- INS Vikrant, India''s first indigenous aircraft carrier, which is powered by four LM2500 gas turbines.
- **Global Reliability**: Over 714 vessels worldwide utilize GE Aerospace's marine gas

turbines, underscoring their reliability and availability in naval operations.

Importance of the Next Generation Missile Vessels (NGMVs)

- **Design and Capability**: The NGMVs will be equipped to launch **BrahMos missiles**, making them formidable assets for the Indian Navy. They will be capable of reaching speeds up to 35 knots (65 kilometers per hour) and will carry advanced anti-surface weaponry.
- **Stealth Requirements**: The propulsion system, centered around the LM2500 engine, is designed to meet the stealth requirements necessary for modern naval warfare.
- **Historical Significance**: The Indian Navy has a strong tradition of conducting successful ship-to-shore missile attacks, notably during the **1971 war against Pakistan**. The development of NGMVs aims to strengthen this legacy and enhance the navy''s operational capabilities.



Moonlight Program

The **European Space Agency (ESA)** has launched the **Moonlight programme**, aiming to create a **dedicated satellite constellation** for **telecommunication** and **navigation services** on the **Moon.**

Features of the Moonlight Program

- **Satellite Constellation**: The program will consist of **five satellites**: one for **high-data-rate communications** and four for **navigation**.
- **Lunar-Earth Connectivity**: The satellites will cover a **400,000 km** network, connecting the Moon to Earth via **three ground stations**.
- **Coverage: The Moonlight program will offer coverage at the Moon's south pole**, an area of interest due to the presence of **polar ice,** which could be used for water, oxygen and rocket fuel.
- **Significance:** The Moonlight initiative aims to make services like satellite navigation, video conferencing, and data sharing **as seamless on the lunar surface as they are on Earth.**
- Enable precise lunar landings, surface mobility, and establish a high-speed, low-latency communication network between **Earth and the Moon.**
- The Mission will **reduce future lunar mission costs** by **offering shared communication and navigation infrastructure**, eliminating the need for individual setups and is crucial for **long-term human presence** on the Moon.
- It will create **opportunities for private companies** by providing **commercial data relay services**, fostering a growing lunar-related market.
- **Partnerships**: Moonlight is a collaboration between **ESA**, **Telespazio**, and the **UK** and **Italian** space agencies.
- ESA is also working with **NASA** and **JAXA** on **LunaNet**, ensuring compatibility with future lunar infrastructure.
- **Global Lunar Navigation System**: Moonlight will undergo the first **lunar**

navigation interoperability tests in **2029** to support a global communication and navigation system for international space agencies and private entities.

Timeline and Development

- **Lunar Pathfinder**: The first stage of the Moonlight programme involves launching the **Lunar Pathfinder**, a communications relay satellite developed by **Surrey Satellite Technology Ltd (SSTL)**, set to begin operations in **2026**.
- The **Lunar Pathfinder** will provide **commercial data relay services** and test existing Earth-orbiting navigation satellites for lunar use.
- **Full Deployment**: The complete deployment of Moonlight's services is expected by **2030**.

6th India-Singapore Defence Ministerial Dialogue

- Raksha Mantri Shri Rajnath Singh and Minister of Defence of Singapore Dr Ng Eng Hen co-chaired the **sixth India-Singapore Defence Ministerial Dialogue** in New Delhi on October 22, 2024. Both Countries acknowledged the deep and long-standing bilateral defence relations based on shared outlook on regional peace, stability and security.
- This meeting assumes significance in the backdrop of **India marking a decade of its Act East policy**, in which Singapore has played a key role in promoting economic cooperation & cultural ties, and developing strategic connectivity with countries in the region.
- As **2025 marks 60 years** of establishment of diplomatic relations between India and Singapore, both Countries agreed to further step up defence cooperation and agreed to achieve new feats. They also agreed to extend bilateral agreement on Joint Military Training Army for the next five years.
- Recognising that **both nations are natural partners** for commencing co-development and co-production of defence equipment, both sides agreed to enhance industry cooperation, including exploring collaboration in niche

domains such as automation and Artificial Intelligence, cyber security.

- **Defence and Security Cooperation**: India and Singapore share similar concerns about the challenges posed by terrorism and extremism and have found it mutually beneficial to evolve a broad framework of security cooperation. Singapore participates in Indian Ocean Naval Symposium **(IONS**) and multilateral Exercise MILAN hosted by Indian Navy.
- Singapore's membership of Indian Ocean Rim Association (IORA) and India's membership of ADDM+ (ASEAN Defence Ministers' Meeting - Plus) provides a platform for both countries to coordinate positions on regional issues of mutual concern



IAEA's Climate Change and Nuclear Power report 2024

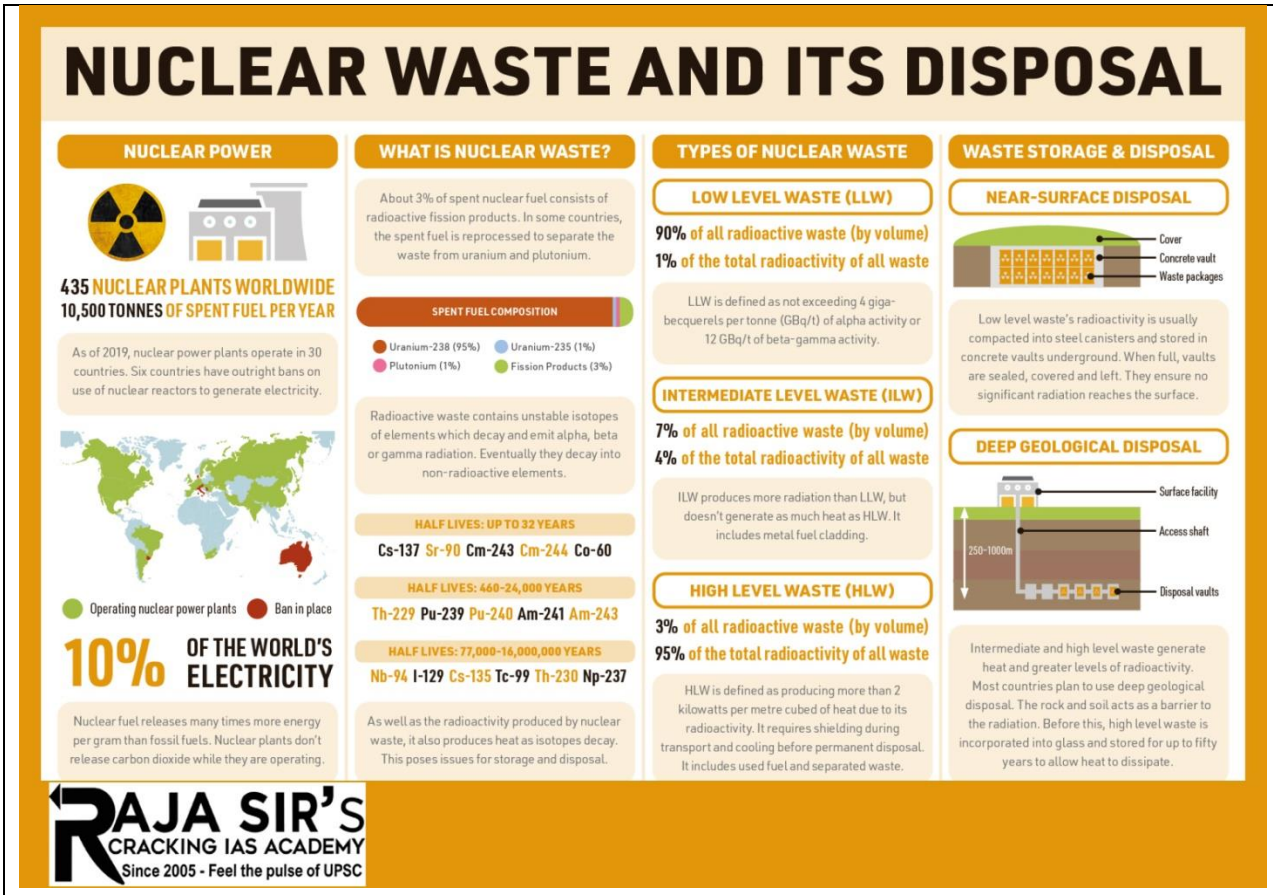
- The 2024 edition of the IAEA's Climate Change and Nuclear Power report has been released.
- Nuclear power is enjoying increasing interest as countries seek to strengthen energy security and decarbonize. A rapid expansion of clean energy technologies is required to achieve net zero emissions by 2050 and nuclear power is expected to play a key role, with the IAEA projecting a capacity increase of 2.5 times the current level by mid-century in its high case scenario.

International Atomic Energy Agency (IAEA)

- Founded in 1957 as **an autonomous international** organization under the United Nations (UN).
- The Agency's genesis was U.S. President Eisenhower's "Atoms for Peace" address to the General Assembly of the United Nations on 8 December 1953.
- Its primary mandate is to promote the peaceful use of nuclear energy while ensuring that nuclear technology is not diverted for military purposes, especially for nuclear weapons.
- Headquarters: Though governed by its own founding treaty, the organization reports to both the General Assembly and the Security Council of the United Nations, and is headquartered at the UN Office at Vienna, Austria.

Key Objectives:

- To promote safe and secure use of nuclear energy for power generation, medical purposes, and agricultural uses.
- To monitor and verify compliance with nuclear non-proliferation treaties such as the Non-Proliferation Treaty (NPT).
- To ensure that nuclear materials are not diverted from peaceful uses to military or weapons programs.



Functions:

- Safeguards and Verification: Conducts inspections of nuclear facilities to verify that nuclear materials are not being diverted to weapons programs.
- Technical Cooperation: Provides assistance to member states in the peaceful use of nuclear technology for various sectors, such as healthcare, agriculture, and industry.
- Safety and Security: Promotes nuclear safety standards and assists countries in implementing measures to secure nuclear materials and facilities.
- Nuclear Energy Development: Facilitates the sharing of information and best

practices related to the peaceful use of nuclear energy.

- Membership: Membership is open to all UN members and others willing to abide by the agency's statute.
- Nobel Peace Prize: The IAEA, along with its Director General Mohamed ElBaradei, was awarded the Nobel Peace Prize in 2005 for efforts to prevent nuclear energy from being used for military purposes.

India and IAEA:

- India is a **founding member of the IAEA.**
- Following the ratification of the Treaty on the Non-Proliferation of Nuclear Weapons in 1968, all non-nuclear powers are required to negotiate a safeguards agreement with the IAEA, which is given the authority to monitor nuclear programs and to inspect nuclear facilities.
- India signed a safeguards agreement with the IAEA in 2009 as part of the India-U.S. Civil Nuclear Agreement, allowing IAEA to inspect its civilian nuclear facilities.
- India contributes to IAEA activities such as nuclear safety, security, and technical cooperation

What Is Betelgeuse?

Betelgeuse is a **red supergiant star** roughly 700 light-years away from our own Solar System.

The ***second brightest object in the constellation Orion***, the rust-coloured star has attracted attention from astronomers for centuries for its relative closeness and potential for collapsing in a spectacular supernova event within the next 100,000 years. A new study suggests that the Betelgeuse star's enigmatic brightening and dimming

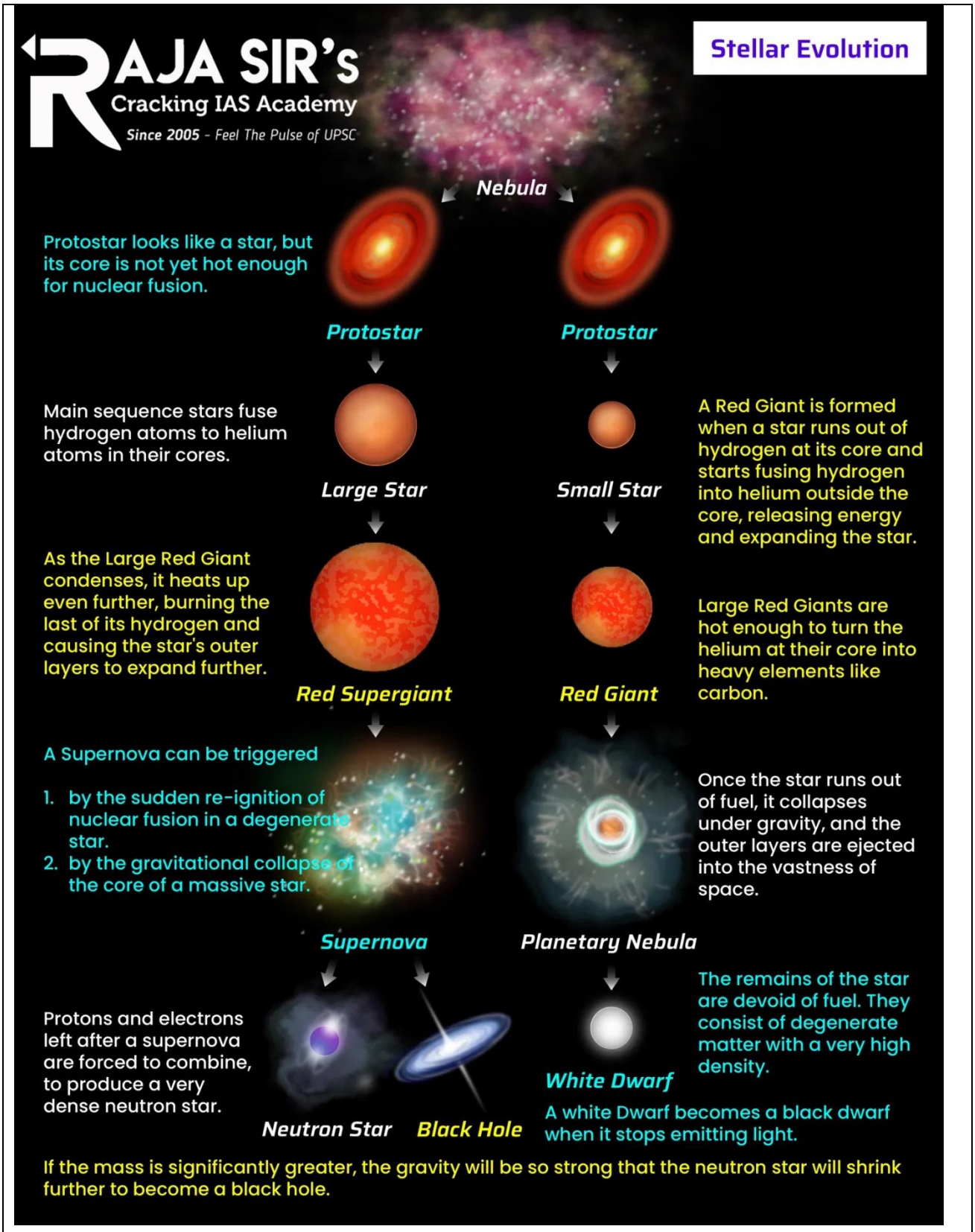
patterns may be caused by an unseen companion star.

- Astrophysicists from the Flatiron Institute's Center for Computational Astrophysics have proposed the existence of a companion star, dubbed "**Betelbuddy,"** orbiting Betelgeuse. Their findings indicate that this companion acts like a cosmic snowplow, pushing aside light-blocking dust and temporarily increasing Betelgeuse's apparent brightness.

Details about Betelgeuse

Type: Betelgeuse is a **red supergiant star**.

- Constellation: It is located in the constellation Orion, marking the left shoulder of the hunter.
- Brightness: Betelgeuse is usually the 10th-brightest star in the night sky.
- Distance: It is approximately 500 light-years away from Earth.
- Size: Betelgeuse is one of the largest stars known, with a diameter about 1,000 times that of the Sun.
- Luminosity: It is about 100,000 times more luminous than the Sun.
- Mass: Estimates suggest it has around 10-20 times the mass of the Sun.
- Variable Star: Betelgeuse is a variable star, meaning its brightness changes over time. It has two distinct pulsation patterns: a short term cycle of about a year and a longer six-year cycle. The researchers concluded that the longer cycle, known as a long secondary period, is likely caused by the Betelbuddy's orbital motion through Betelgeuse's surrounding dust.
- Recent Dimming: In late 2019 and early 2020, Betelgeuse experienced an unusual dimming event, leading to speculation that it might be about to go supernova. However, recent studies suggest that this dimming was likely caused by a large amount of dust ejected by the star.


RAJA SIR'S
Cracking IAS Academy
Since 2005 - Feel The Pulse of UPSC
Stellar Evolution
Nebula
Protostar looks like a star, but its core is not yet hot enough for nuclear fusion.
Protostar
Protostar
Main sequence stars fuse hydrogen atoms to helium atoms in their cores.
A Red Giant is formed when a star runs out of hydrogen at its core and starts fusing hydrogen into helium outside the core, releasing energy and expanding the star.
Large Star
Small Star
As the Large Red Giant condenses, it heats up even further, burning the last of its hydrogen and causing the star's outer layers to expand further.
Large Red Giants are hot enough to turn the helium at their core into heavy elements like carbon.
Red Supergiant
Red Giant
A Supernova can be triggered
1. by the sudden re-ignition of nuclear fusion in a degenerate star.
2. by the gravitational collapse of the core of a massive star.
Once the star runs out of fuel, it collapses under gravity, and the outer layers are ejected into the vastness of space.
Supernova
Planetary Nebula
Protons and electrons left after a supernova are forced to combine, to produce a very dense neutron star.
The remains of the star are devoid of fuel. They consist of degenerate matter with a very high density.
White Dwarf
A white Dwarf becomes a black dwarf when it stops emitting light.
Neutron Star
Black Hole
If the mass is significantly greater, the gravity will be so strong that the neutron star will shrink further to become a black hole.

Z-Morh Tunnel

Recently, Seven people were killed in Jammu and Kashmir when suspected militants targeted the workers of infrastructure company APCO Infratech**,** which is constructing the **Z-Morh tunnel** on the **Srinagar-Sonamarg highway.**

Location of Z-Morh Tunnel.

- The Z-Morh tunnel is a 6.4-kilometer tunnel connecting the Sonamarg health resort with Kangan town in central Kashmir's Ganderbal district.
- It is located near Gagangir village, just ahead of Sonamarg, and will ensure all-weather connectivity to the popular tourist destination on the Srinagar-Leh highway.
- The tunnel gets its name from the Z-shaped road stretch at the construction site.



Commencement of the project

- The Z-Morh tunnel project, originally conceived by the Border Roads Organisation (BRO) in 2012, was initially awarded to Tunnelway Ltd.
- Later, the National Highways & Infrastructure Development Corporation Limited (NHIDCL) took over the project.
- Although expected to be completed by August 2023, the project faced

delays.

- A soft opening took place in February 2024, but the official inauguration was postponed due to the Model Code of Conduct in place for the Jammu and Kashmir Assembly elections.

- **Need for the tunnel**
  - The stretch where the tunnel is under construction is situated at an altitude of over 8,500 feet, and is prone to snow avalanches in the winter.
  - The road to Sonamarg as such remains closed for most part of the winter.
- **Strategic importance of the Z-Morh tunnel**
  - The Z-Morh tunnel, part of the larger Zojila tunnel project, aims to ensure year-round connectivity from Srinagar to Ladakh.
- The **Zojila tunnel, connecting Sonamarg to Drass in Ladakh**, is under construction and expected to be completed by December 2026.
  - While the Z-Morh tunnel will provide all-weather access to the Sonamarg health resort, it is crucial for maintaining quick military access to Ladakh.
  - The Z-Morh tunnel is key to enabling all-weather road connectivity between Srinagar, Drass, Kargil, and Leh, reducing dependence on air maintenance for forward military positions.
  - This will improve troop and supply transport, lower costs, and extend the life of aircraft used by the Indian Air Force.
  - The project is vital for Indian defense forces deployed in Siachen and Eastern Ladakh, where tensions with Pakistan and China persist.

Revival of Terrorism in Jammu & Kashmir - analysis

- **Recent terror attack on infra project in J&K and the exposing of vulnerabilities**
  - The terror attack on workers of APCO Infratech, constructing the Z-Morh tunnel, marks a significant event in Jammu & Kashmir.
  - It reflects the revival of terrorism and points towards a broader strategy

aimed at exposing vulnerabilities in the region.

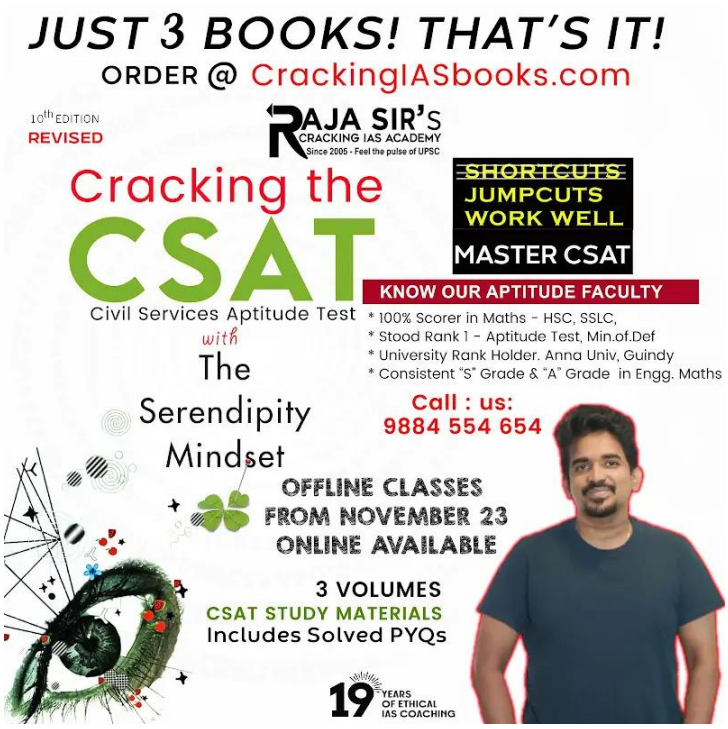
- The incident suggests a deliberate effort by Pakistan's deep state to derail peace and stability, especially after the peaceful elections and installation of a democratic government in Srinagar.
- Deep state is an alleged secret network of especially nonelected government officials and sometimes private entities (as in the financial services and defense industries) operating extralegally to influence and enact government policy

- **Pakistan's Deep State and its Role**
  - The Pakistani deep state appears determined to re-establish its relevance in J&K by instigating violent events.
  - Their goal is to obstruct India''s process of stabilizing J&K, particularly after the abrogation of Article 370.
  - A strategic terror event like this attack is seen as a way to prevent peace dividends from taking root and ensure continued instability.
- **Targeting Peripheral Areas and Infrastructure Projects**
  - While traditional urban areas like Srinagar, Anantnag, and Baramulla remain heavily secured, the attackers have shifted focus to peripheral regions with low security.
  - The Z-Morh tunnel, a flagship infrastructure project, requires a large workforce and specialized expertise.
  - The attack may indicate a larger threat to infrastructure projects in J&K's peripheral regions, such as the Kishanganga project and railway projects in Banihal and Qazigund.
- **Possible Chinese angle**
  - The People's Anti-Fascist Front (PAFF), a Pakistani terror group, issued a statement praising The Resistance Front (TRF), an offshoot of Lashkar-e-Taiba, for the recent attack in Jammu and Kashmir that killed seven civilians.

- PAFF described the attack as "strategic" and claimed it was meant to disrupt Indian military deployments toward the eastern border, also citing "Chinese friends" as part of their justification.
- While China and Pakistan have known strategic ties, there is no evidence of Beijing's involvement so far.

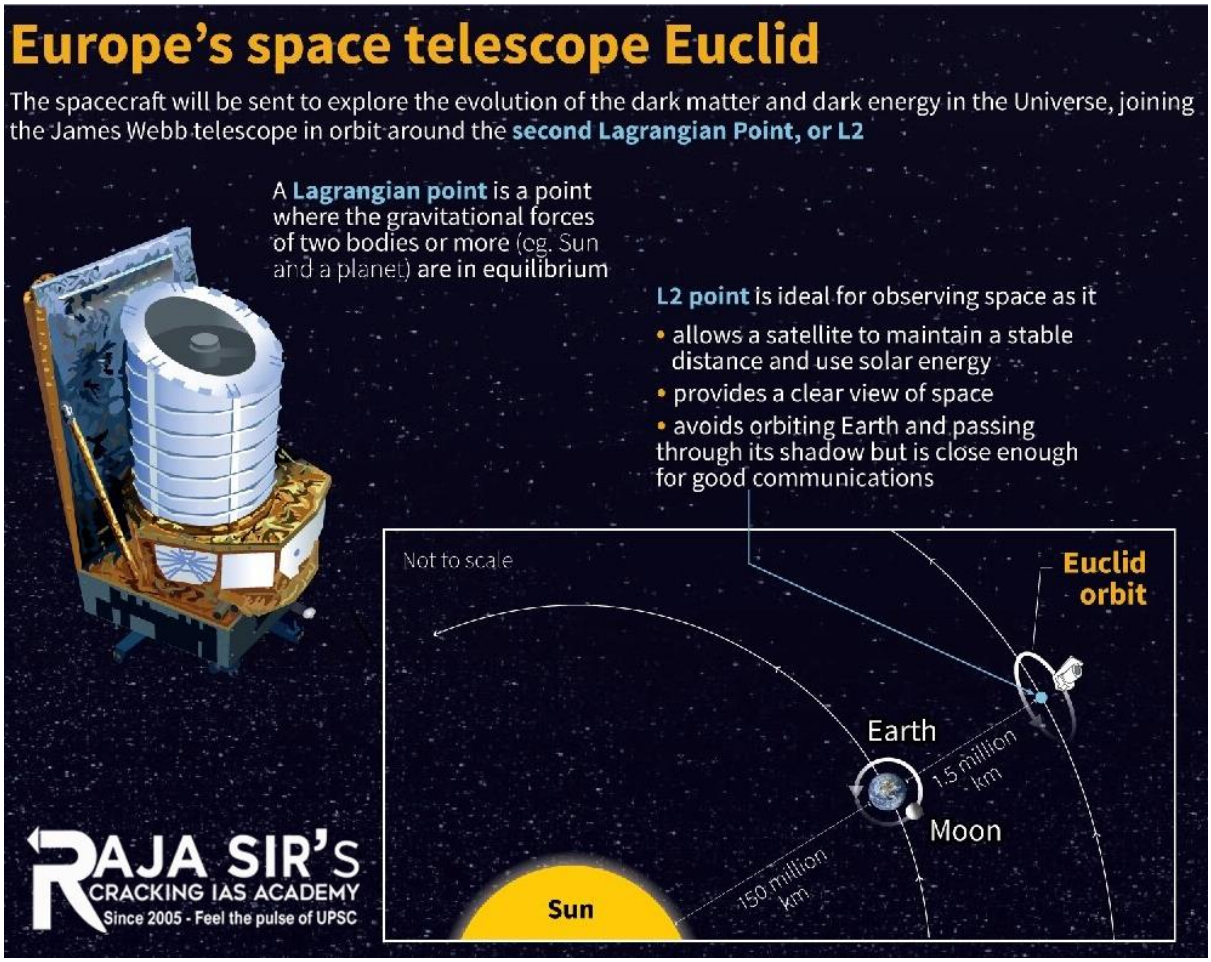
- **Broader Pattern of Unusual Activities**
  - The attack could be part of a wider scheme targeting India's emerging strategic confidence.
  - Recent events such as bomb hoaxes, strange blasts, and diplomatic pressure over transnational issues appear connected, signaling a broader attempt to put India on the defensive.

The proxy war in J&K is far from over. While the frequency of violence has decreased, complacency must be avoided, and efforts should focus on combating terror networks, financing, and drug mafias to sustain stability in the region.



Euclid Mission

- Recently, a mosaic was released by the Euclid space telescope.



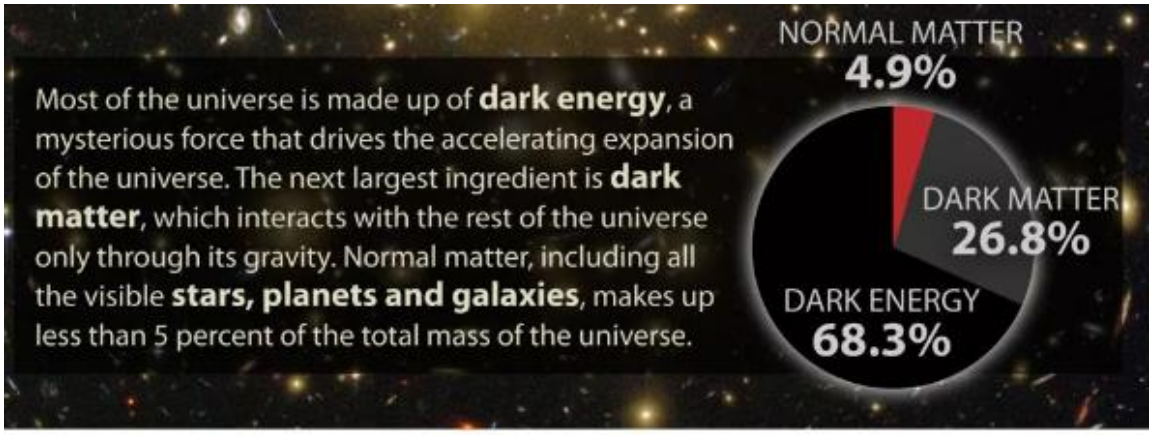
ESA's Euclid Mission

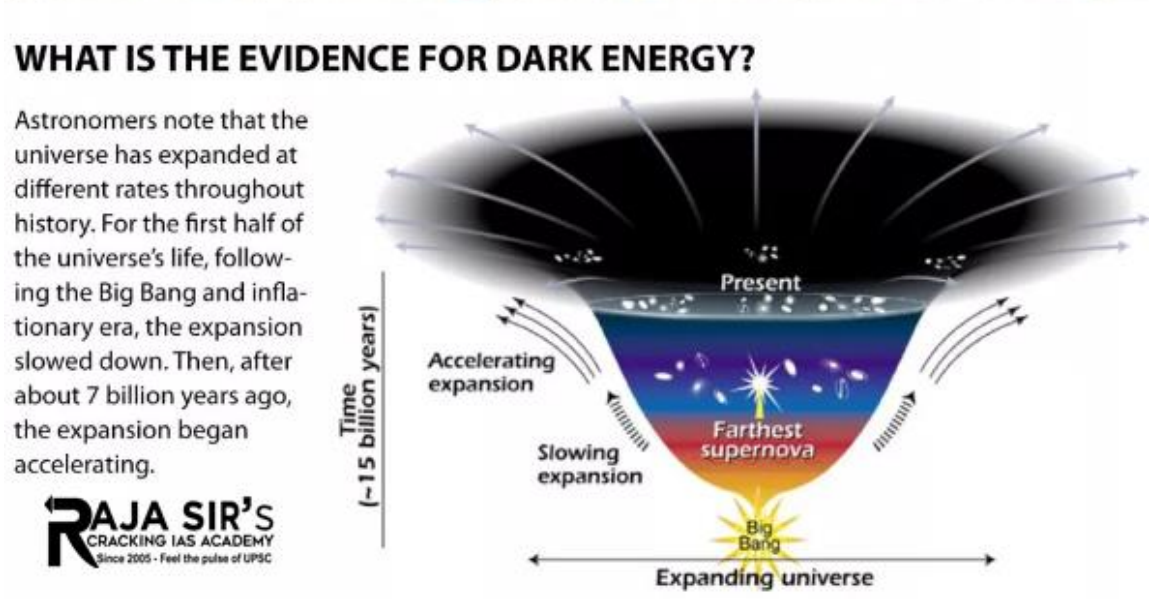
- The **ESA's Euclid Mission** is a space telescope designed to explore the composition and evolution of the **dark universe**.
- The Euclid mission **launched on July 1, 2023 from Cape Canaveral, Florida.**
- The Euclid mission's **goals** include:
- Creating a **3D map of the universe's** large-scale structure
- Observing billions of **galaxies up to 10 billion light-years away**
- Exploring **how the universe has expanded**

- Revealing more about the role of **dark matter, dark energy, and gravity**
- **Destination:** The Euclid mission will travel to the **Sun-Earth Lagrange Point 2 (L2), 1.5 million km** from Earth.

Key Concepts

- **Dark Matter**: A mysterious substance that makes up a significant portion of the universe. While it has gravitational effects, it does not interact with light or any part of the electromagnetic spectrum, making it invisible.
- **Dark Energy**: A hypothetical form of energy believed to permeate all of space, causing the accelerated expansion of the universe.

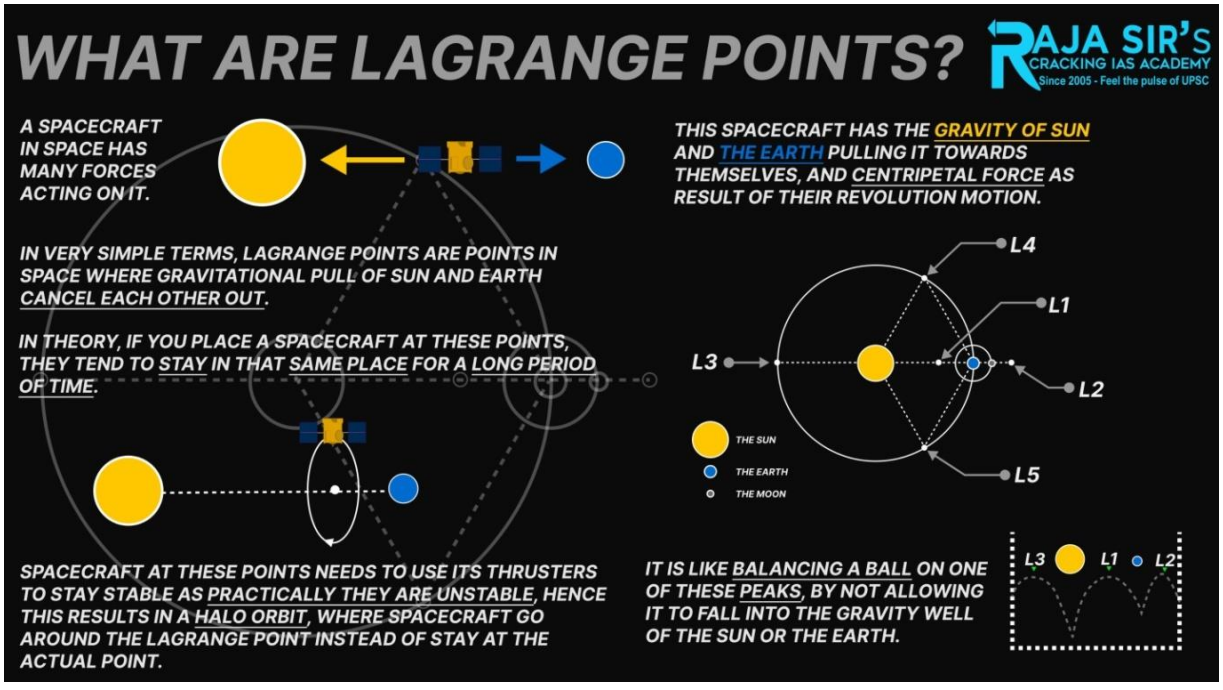




Lagrange Points

- Lagrange points are **positions in space** where the **gravitational forces** of two large orbiting bodies, like the Earth and Sun, create regions of **equilibrium,** allowing a smaller object to maintain its position with **minimal fuel usage**.
- There are **five Lagrange points (L1, L2, L3, L4, L5)**.
    - **L1**: Offers an uninterrupted view of the Sun, making it ideal for solar observations. It's home to the **SOHO space telescope** (joint NASA and ESA mission to study the Sun) and India's **Aditya L1 mission**.
    - **L2**: Ideal for astronomy, as spacecraft located here can communicate with Earth, harness solar power, and have a clear view of deep space. This point is home to both the **James Webb Space Telescope** and the **Euclid Telescope**.
    - **L3**: Located behind the Sun and is less useful due to communication challenges.

L4 and L5: These points are stable. Objects orbiting these points are called **Trojans**, after three large asteroids (Agamemnon, Achilles, and Hector) found there.



THE LASER INTERFEROMETER SPACE ANTENNA (LISA) MISSION

- The National Aeronautics and Space Administration(NASA) has revealed the first full-scale prototype of six telescopes of The Laser Interferometer Space Antenna (LISA) mission.

The Laser Interferometer Space Antenna (LISA) Mission

- It is a collaborative effort between NASA and the European Space Agency (ESA) set to launch in the mid-2030s.
- **The space mission consists of three spacecraft** which are separated by millions of miles to detect gravitational waves.
- These spacecraft **will fly in a triangular formation behind the Earth and the Sun.**
- The spacecraft will be placed in a **heliocentric orbit** at a distance of 50 million km from Earth at a distance of 2.5 million km between each spacecraft.
- All three spacecraft will carry **two telescopes each**.

Purpose

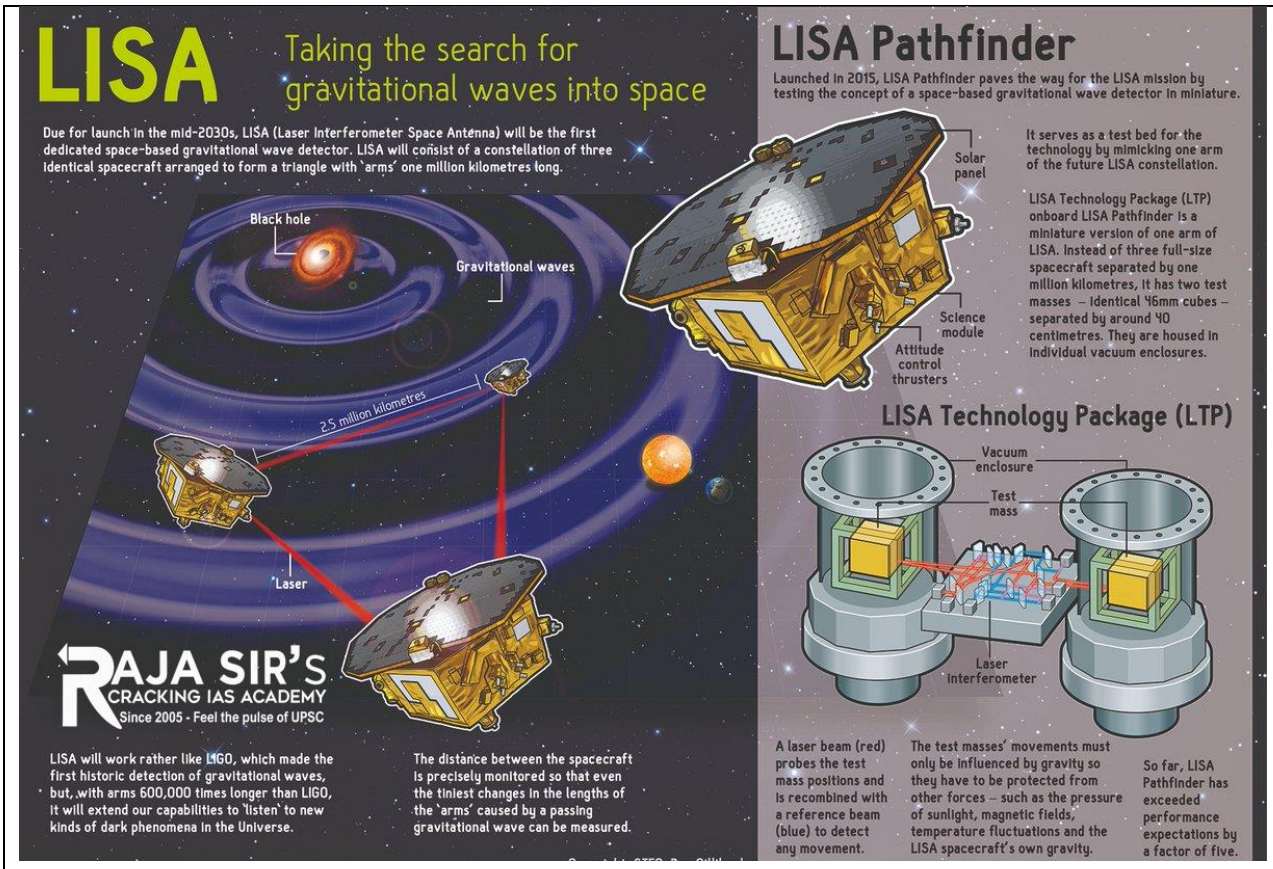
- Its main purpose is **to search for gravitational wave signatures which emerge from distortions in spacetime** caused by massive objects like black holes.

Detection Mechanism

- The spacecraft **uses Laser Beam Technology to relay laser beams to measure shifts in the positions of the objects due to gravitational waves.**
- It aims to measure changes which are smaller than the diameter of a helium nucleus over a distance of a million miles.

LISA Pathfinder Mission

- It is nothing but a **proof-of-concept mission to test technologies developed for LISA.**
- It was launched on December 3, 2015, and it reduced noise levels by a factor of 100, which is higher than the target requirements.



Gravitational Waves

- **They are the disturbances in space and time caused by massive accelerating objects such as the black hole mergers.**
- **Significance of Gravitational Waves**
- They offer **insights into the astrophysical phenomena which are not visible to traditional astronomy, which are mostly light waves based.**
- It also **enables the exploration of black holes, the Big Bang, and other unknown cosmic objects such as neutron stars.**
- They are the source of the **origin of our universe and detecting them can be used to understand the evolution, origin and disturbances in galaxies.**

EOS 6 & INSAT 3DR

- ISRO is monitoring Cyclonic Storm 'Dana' with the satellites named **EOS 6 and Insat 3DR.**

EOS-6 (Oceansat-3)

About	• EOS-6, also known as **Oceansat-3 is a satellite developed by Indian Space Research Organisation (ISRO).** • It was launched on November 26, 2022 in the PSLV-C54 launch vehicle.
Mission	• It is an **earth observation satellite with a focus on the study of ocean and coastal zones.** • It will be applied for ocean surface studies, coastal zone management, and marine weather forecasting in the Indian ocean region.
Objective	• It is aimed to continue the services of Oceansat-2 with enhanced payload specifications.
Payloads	**It has lowing four payloads:** • Ocean Color Monitor (OCM-3), • Sea Surface Temperature Monitor (SSTM), • Ku-Band Scatterometer (SCAT-3), • ARGOS
PSLVC54	• It is the 56th mission of the ISRO's Polar Satellite Launch Vehicle (PSLV). **The PSLV C54 rocket has four stages:** • **First stage (PS1):** It uses a solid rocket motor and six solid strap-on boosters

	• **Second stage (PS2):** It uses liquid rocket engines • **Third stage (PS3):** Uses a solid rocket motor • **Fourth stage (PS4):** It uses liquid rocket engines and It is the final stage to launch the satellite into orbit.
INSAT-3DR	
About	• INSAT-3DR is a satellite launched into Geostationary transfer orb at 74° E by the Indian Space Research Organisation (ISRO) on September 8, 2016.
Mission	• It will be used for weather monitoring, meteorological services, search and rescue information.
Payloads	**It has three playloads. These are:** • Data Collection Service (DCS), • Advanced Aided Search & Rescue (SAS&R), • Imager, Sounder
Applications	• This satellite has applications in Meteorological data collection, terrestrial data collection, search and rescue services, etc.
GSLV Mk II	
About	• GSLV Mk II is an **Indian Space launch vehicle designed to pace communication satellites into geosynchronous transfer orbit (GT** • It originally used the Russian cryogenic stages, however it has been employing indigenous cryogenic technology since 2014.
Features	• It is a **three-stage**, fourth-generation launch vehicle with four liquid strap-on boosters. **Its key features include:** • The indigenously developed Cryogenic Upper Stage (CUS).

- Height: 73 m,
- Lift-Off Mass: 420 tonnes,

Payload Caacity

- It can carry primarily for communication satellites like the INSAT series up to 2,250 kg to GTO, and up to 6,000 kg to Low Earth Orbit (LEO).

Stages

It has three stages:

- **First Stage (GS1):** Solid motor, HTPB fuel, 4800 kN thrust, 100 sec burn-time, with four liquid strap-on boosters.
- **Second Stage (GS2):** Vikas engine, UH25 + N2O4 fuel, 846 kN thrust, 150 sec burn-time.
- **Third Stage (CUS):** Uses CE-7.5 engine, LOX + LH2 fuel, 75 kN thrust, 814 sec burn-time.



Singapore India Maritime Bilateral Exercise (SIMBEX)

- The 31st edition of the Singapore India Maritime Bilateral Exercise (SIMBEX) is scheduled from 23 to 29 Oct 2024, in the Eastern Naval Command at Visakhapatnam.
- The exercise began as "**Exercise Lion King" in 1994**, and has since evolved into one of the most significant bilateral maritime collaborations between the **Indian Navy and the Republic of Singapore Navy (RSN).**
- The exercise will be conducted in two phases - **the Harbour Phase** at Visakhapatnam and the **Sea Phase** in the Bay of Bengal.

Purpose:

- Aims to **strengthen the strategic partnership** between India and Singapore by enhancing interoperability, improving maritime domain awareness, and fostering cooperation to **address common maritime challenges.**
- **The Harbour Phase will include Subject Matter Expert Exchanges (SMEEs),** cross-deck visits, sports fixtures, and pre-sail briefings between personnel from both navies. The Sea Phase will witness advanced naval drills, including live weapon firings**, anti-submarine warfare (ASW) training, anti-surface and anti-air operations, seamanship evolutions, and tactical manoeuvres.**

Subject Matter Expert Exchanges (SMEEs)

- SMEE"s are Identical functional, technical, and professional information exchanges between US military exchange experts and experts from the Marine and Naval Infantry forces from our partner nations.

India's Expanding Space Program

- The Indian government has recently taken significant strides in advancing its space program, approving a series of ambitious projects that signal a new era of

exploration. With plans for new missions to the Moon and Venus, along with a strong emphasis on collaboration with the private sector, India is poised to enhance its position in the global space arena.

Key Approvals and Missions

- The Union Cabinet approved several critical missions under **the Gaganyaan human spaceflight program,** including four missions aimed at testing technologies for India''s first space station, the **Bharatiya Antariksh Station** 1, expected to be operational by 2028.
- The Indian Space Research Organisation (ISRO) will conduct one uncrewed Gaganyaan flight in addition to two planned missions. This initiative is supported by an additional funding of Rs 11,170 crore.
- **Next Generation Launch Vehicle (NGLV):** The Cabinet also greenlit the development of the Next Generation Launch Vehicle (NGLV), with an allocation of Rs 8,240 crore. This vehicle will be developed in collaboration with private industry to ensure a smooth transition to operational flights once testing is complete. The NGLV is expected to support a variety of future missions, including launching satellites into orbit.

Upcoming Space Missions

- **Venus Orbiter Mission:** Scheduled for launch in March 2028, this mission will cost Rs 1,236 crore and aims to study the planet's harsh atmosphere and surface conditions.
- **Chandrayaan-4:** Planned as a sample-return mission, this project will involve launching components using two LVM-3 rockets. It is designed to gather lunar soil and rock samples and return them to Earth by 2027 at a cost of Rs 2,104 crore.
- **Lunar Polar Exploration Mission (LUPEX):** A joint effort with Japan, this mission will utilize a new lander distinct from those used in previous

Chandrayaan missions, facilitating future crewed lunar explorations.

- **Infrastructure Expansion** :The Space Commission has also approved the development of a third launch pad at Sriharikota, essential for testing and launching the NGLV, reflecting ISRO''s commitment to expanding its infrastructure to meet growing demands.
- **Enhanced Surveillance and Training**

The Cabinet Committee on Security approved the Space Based Surveillance (SBS) project, which involves constructing 21 satellites by ISRO and 31 by private companies, totaling ?26,968 crore. This marks a substantial increase from earlier phases of the project.

- In preparation for international missions, Indian astronaut Sudhanshu Shukla has begun training at SpaceX''s headquarters, getting ready for the Axiom-4 mission to the International Space Station.
- **Satellite Collaborations (NISAR and Proba-3):** India is gearing up for the launch of two important satellites:
- **NISAR**: A collaboration with NASA, this Earth-observation satellite recently received its radar antenna in India and is set to launch in early 2025 using a Geosynchronous Satellite Launch Vehicle.
- **Proba-3:** From the European Space Agency, this mission will study the Sun''s corona and is scheduled for a launch aboard a PSLV-XL vehicle.

Marching Towards Atmanirbharta: India''s Defence Revolution

- The Atma Nirbhar Bharat initiative has converted India’s defence sector, with a surge in domestic defence production and exports.
- According to the Defence Ministry, the cost of defence manufacturing in India has gone up to ₹1,26,887 crore in FY 2023-24, reflecting a growth of 16.7% over the defence manufacturing of FY 2022-23.
- Of the total value of manufacturing in 2023-24, about 79.2% has been

contributed by the Public Sector and 20.8% by the private sector.

- India's defense budget of US$ 74.7 billion ranked 4th highest globally in 2024.
- Defense exports was ₹21,083 crore in FY 2023-24, reflecting a growth of 32.5% during the last fiscal when the figure was ₹15,920 crore.
- India has set a goal of US$ 6.02 billion worth of annual defence exports by 2028-29.
- India has developed essential defense systems including the Dhanush Artillery Gun System, **Advanced Towed Artillery Gun System (ATAGS)**, Main Battle Tank Arjun, Light Combat Aircraft Tejas, submarines etc.

Advantages of growth in defence production

- **Self-defence:** The presence of adversarial friends like China and Pakistan makes it essential for India to enhance its self-defence and preparedness.
- **Strategic advantage:** Self-reliance will make India's geopolitical stance strategically more potent as a net defence sector.
- **Technological development:** Advancement in the defense generation sector will automatically enhance different industries hence catapulting the economy similarly in advance.
- **Economic drain:** India spends around 3% of GDP on defence and 60% of that is spent on imports. This results in an incredible economic drain.
- **Employment:** Defence manufacturing will need the support of several different industries which generate employment opportunities.

Concerns

- **Narrow Private Participation:** Private sector participation within the defence sector is limited by the lack of a conducive economic framework, meaning our defense manufacturing is unable to gain from contemporary layout, innovation, and product improvement.
- **Lack of Critical Technology:** Lack of design capability, inadequate R&D

investment, lack of ability to manufacture foremost subsystems and components abate indigenous manufacturing.

- **Lack of Coordination Between Stakeholders:** India's defence production capability is hindered by overlapping jurisdictions among the Ministry of Defence and the Ministry of Industrial Promotion.

Government projects to Increase Defence Export

- **IDR Act:** Defence Products listing requiring Industrial License has been rationalized and manufacture of most of components or components does not require Industrial License.
- The initial validity of the Industrial Licence granted has been improved from 03 years to 15 years with a provision to in addition expand it by 03 years on a case-to-case foundation
- Government schemes along with **iDEX** (Innovations for Defence Excellence) and DTIS (Defence Testing Infrastructure Scheme) to permit innovation in the Defence & Aerospace environment.
- FDI inside the Defence Sector has been better as 74% through the Automatic Route and 100% by Government Route, to promote export and liberalize overseas investments.
- The government has established 2 dedicated Defence Industrial Corridors within the States of Tamil Nadu and Uttar Pradesh to behave as clusters of defense manufacturing that leverage current infrastructure, and human capital.
- **Defence Production and Export Promotion Policy 2020 (DPEPP):** The Ministry of Defence (MoD) has formulated a draft DPEPP 2020 as a guiding file of MoD to offer a centered, structured, and large thrust to defence production competencies of the country for self-reliance and exports.
- In 2021, **Defence Acquisition Council (DAC)** boosted the 'Make in India' initiative through Acceptance of Necessity (AoN) — to capital acquisition proposals worth US$ 1.07 billion (Rs. 7,965 crore) — for modernisation and

operational needs of militia.

- As part of the Make in India initiative, major defence platforms such as the Dhanush Artillery Gun System, Advanced Towed Artillery Gun System (ATAGS), Main Battle Tank (MBT) Arjun, Light Combat Aircraft (LCA) Tejas, submarines, frigates, corvettes, and the recently commissioned INS Vikrant have been developed, reflecting the growing capabilities of India''s defence sector.
- Consequently, the annual defence production has not only crossed ₹1.27 lakh crore but is also on track to reach a target of ₹1.75 lakh crore in the current fiscal year. With aspirations to achieve ₹3 lakh crore in defence production by 2029, India is solidifying its position as a global manufacturing hub for defence.

Key Government Initiatives

- In recent years, the Indian government has implemented a series of transformative initiatives aimed at bolstering the country''s defence production capabilities and achieving self-reliance. These measures are designed to attract investment, enhance domestic manufacturing, and streamline procurement processes. From liberalizing foreign direct investment (FDI) limits to prioritizing indigenous production, these initiatives reflect a robust commitment to strengthening India''s defence industrial base. The following points outline the key government initiatives that have been pivotal in driving growth and innovation in the defence sector.
- **Liberalized FDI Policy:** The Foreign Direct Investment (FDI) limit in the defence sector was raised in 2020 to 74% through the Automatic Route for companies seeking new defence industrial licenses and up to 100% through the Government Route for those likely to result in access to modern technology. As of February 9, 2024, ₹5,077 crore worth of FDI has been reported by companies operating in the defence sector.
- **Budget Allocation:** The allocation for the Ministry of Defence for the financial year 2024-25 is ₹6,21,940.85 crore, as part of the “Demand for Grant” presented

in Parliament during the ongoing Budget Session.

- **Priority for Domestic Procurement:** Emphasis is placed on procuring capital items from domestic sources under the Defence Acquisition Procedure (DAP)-2020.
- **Positive Indigenization Lists:** Notification of five 'Positive Indigenization Lists' totalling 509 items of services and five lists of 5,012 items from Defence Public Sector Undertakings (DPSUs), with an embargo on imports beyond specified timelines.
- **Simplified Licensing Process:** Streamlining the industrial licensing process with a longer validity period.
- **iDEX Scheme Launch:** The Innovations for Defence Excellence (iDEX) scheme was launched to involve startups and Micro, Small, and Medium Enterprises (MSMEs) in defence innovation.
- **Public Procurement Preference:** Implementation of the Public Procurement (Preference to Make in India) Order 2017 to support domestic manufacturers.
- **Indigenization Portal:** Launch of the Self-Reliant Initiatives through Joint Action (SRIJAN) portal to facilitate indigenization by Indian industry, including MSMEs.
- **Defence Industrial Corridors:** Establishment of two Defence Industrial Corridors, one each in Uttar Pradesh and Tamil Nadu, to promote defence manufacturing.
- **Opening Defence R&D:** Defence Research & Development (R&D) has been opened up for industry and startups to foster innovation and collaboration.
- **Domestic Procurement Allocation:** Out of the total allocation of ₹1,40,691.24 crore under the Capital Acquisition (Modernization) Segment, ₹1,05,518.43 crore (75%) has been earmarked for domestic procurement in the Budget Estimates for 2024-25.

SPACE SECTOR NEW PROJECTS

- The Indian government is working on new projects such as a new moon and

Venus missions and India is also preparing to launch the SBS and Proba-3 satellites .

Space-Based Surveillance (SBS) mission

- It is a mission for better land and maritime domain awareness for civilian and military applications.
- The SBS mission is managed by the National Security Council Secretariat and Defence Space Agency under the Ministry of Defence.
- It aims to enhance land and maritime domain awareness for both civilian and military applications.
- It also aims to enable real-time surveillance for better national security and monitoring

Strategically it aims to:

- Develop capabilities to detect enemy submarines in the Indo-Pacific.
- Monitor adversary infrastructure along India''s land and sea borders.
- Under the mission, 52 satellites are to be launched over the next decade in low earth orbit (LEO) and geostationary orbit.
- Out of these, 21 satellites will be built by ISRO and the remaining 31 will be constructed by private companies.
- Under this Separate satellites will be allocated to the Army, Navy, and Air Force for land, sea, and air-specific missions.

Budget

- The project cost is estimated at 26,968 crore rupees.
- Previous Phases:
- SBS 1: It was launched in 2001 under the Vajpayee government. It launched 4 satellites including Cartosat 2A, Cartosat 2B, Eros B, and Risat 2 in space.
- SBS 2: It was launched in 2013. It launched 6 satellites including Cartosat 2C and Risat 2A in orbit.

PROBA -3

- Proba-3 is the European Space Agency's (ESA) and the world's first precision

formation flying mission.

- It demonstrates the formation flying and rendezvous technologies using two satellites flying in a fixed configuration as a "large rigid structure" in space.
- Its primary mission goal is to enable large-scale formation flying for future scientific and observational missions.

Scientific Objective

- It aims to create a 144-meter-long solar coronagraph by the precise alignment of two satellites, Coronagraph spacecraft and Occulter spacecraft to study the corona of the sun.
- It will study the corona more closely to the solar corona than ever before.
- It will observe the solar corona in visible, ultraviolet, and polarised light by blocking out the blinding light of the solar disk.

Mass and Configuration

- The Coronagraph spacecraft weighs 340 kg.
- Occulter spacecraft on the other hand weighs 200 kg.
- Both satellites will have a separation distance of approximately 144 meters.

Technological Innovations

- It demonstrates a precise formation flying technology to achieve a millimeter precision without ground guidance.
- Autonomous Collision Avoidance Maneuver will also be demonstrated to prevent satellite collisions during formation flying
- It utilizes relative GPS navigation, guidance, and control algorithms.

Future Applications

- Formation flying validated by Proba-3 will aid Earth observation, satellite servicing, and Mars Sample Return missions in future.
- The Testing of sensors and algorithms for rendezvous operations will be applicable in de-orbiting satellites from low-Earth orbit.

Bharatiya Antariksh Station (BAS)

- The Indian Space Research Organisation (ISRO) and the Department of Biotechnology (DBT) have signed an agreement to design and conduct a series of experiments that will eventually be integrated into India's planned space station — Bharatiya Antariksh Station (BAS) — expected to be **operational between 2028 and 2035.**
- Experiments include studying the effects of weightlessness on muscle atrophy, identifying types of algae that could serve as nutrients or food preservatives, investigating algae-based methods for producing jet fuel, and examining radiation's effects on astronaut health.

Key points:

- The ISRO-DBT collaboration is part of the DBT's 2023 BioE3 (Biotechnology for Economy, Environment and Employment) policy, which promotes bio-manufacturing with an eye toward building India's bio-economy, expected to reach $300 billion by 2030.
- The agreement emphasizes advancing space-based bio-manufacturing, health research, regenerative medicine, and biotechnology for waste management, which will also support Indian startups in this emerging field.
- This initiative aims to drive innovation in human health, pharmaceuticals, biotherapeutics, and bio-based technologies.

How will the space station benefit India?

- A national space-based facility such as the **Bharatiya Antariksh Station** will boost microgravity based scientific research & technology development activities. However, it also entails substantial technical, financial, and logistical challenges.
- **Microgravity Experiments:** A space station would allow India to conduct scientific experiments in a microgravity environment, enabling potential breakthroughs in materials science, biology, and medicine.
- For example, studies on the International Space Station (ISS) have shown that

certain plants, such as Chinese cabbage, develop differently in space, providing insights for agriculture and food sustainability.

- **Innovation:** The design, construction, and operation of a space station drive technological advancements in life support, robotics, space habitats, and other high-tech areas essential for sustained space missions.
- **Leadership and Prestige:** Owning and operating a space station would elevate India's position as a leader in space exploration, fostering international partnerships and enhancing its global reputation. It would also open opportunities for Indian companies in satellite manufacturing, servicing, and the broader aerospace sector.
- **Human Spaceflight Experience:** Building on experience from the upcoming Gaganyaan mission, a space station would allow Indian astronauts to engage in long-duration missions, gaining valuable experience and contributing to further crewed missions.

Challenges in building and operating space stations

- **Design and Engineering:** The complex engineering required to ensure a safe and sustainable structure in space poses substantial challenges. Space stations must withstand harsh conditions, from cosmic radiation to micrometeoroids, while providing a stable environment for scientific research.
- **Life Support Systems:** Reliable life support systems for air, water, and waste management are crucial for long-term space missions. Such systems must be designed to function autonomously over extended periods, which requires highly dependable technology and redundancy.
- **Affordability for India:** Building a national space station demands significant financial investment. The International Space Station (ISS), a collaborative project among multiple nations, has cost over %150 billion. A smaller, national station could cost between $10-30 billion.
- Comparatively, ISRO's budget for 2024-25 is around $1.95 billion, far less than

NASA's annual budget of $25 billion. The cost of building and maintaining such a facility could strain India's resources, as seen with the former Soviet Union's abandonment of the Mir space station due to unsustainable operational costs.

- **Space Race and International Collaboration:** While international partnerships could offer technical and financial assistance, they also entail challenges due to competition in space technology, particularly with established space powers like the United States, Russia, and China.
- **Crew Health and Safety:** The health and safety of astronauts are critical in prolonged space missions. Microgravity affects the human body in various ways, such as bone density loss (up to 1 per cent per month) and increased intracranial pressure, which can impact vision. Psychological stress from isolation and confinement also poses a challenge.
- **Supply Chain Management:** Maintaining a space station requires frequent resupply missions for essentials like food, equipment, and scientific samples. Without a fleet of reusable rockets, as seen in programs like SpaceX's Falcon 9, ISRO would face logistical difficulties in ensuring consistent resupply, which is vital for a fully functioning station.

INTERNATIONAL RELATIONS

INDO-PACIFIC ECONOMIC FRAMEWORK FOR PROSPERITY (IPEF)

India signed the US-led **14-member Indo-Pacific Economic Framework for Prosperity (IPEF)** bloc's agreements on a clean and fair economy

- Agreement on clean economy intends to accelerate efforts of IPEF partners towards energy security, GHG emissions mitigation, developing innovative ways of reducing dependence on fossil fuel and promoting technical cooperation. Agreement on fair economy intends to create transparent and predictable business environment, which can spur greater trade and investment in member

countries.

Indo-Pacific Economic Framework for Prosperity (IPEF)

- The Indo-Pacific Economic Framework for Prosperity (IPEF) is a strategic initiative led by the United States, launched in May 2022, to enhance economic cooperation and strengthen economic ties in the Indo-Pacific region.
- It is seen as a response to growing geopolitical competition in the region, especially concerning China's influence, and aims to foster a rules-based economic order.

IPEF is based on four key pillars, each addressing critical aspects of economic growth and sustainability:

1. Trade (connected economy):
    - Focus on creating high-standard trade agreements, particularly in the areas of digital economy, labor standards, and trade facilitation.
    - Prioritizes inclusive trade that benefits all member countries, with an emphasis on labor rights, transparency, and environmental sustainability.
2. Supply Chain Resilience (Resilient Economy):
    - Enhances the resilience and reliability of supply chains in the Indo-Pacific.
    - Seeks to address supply chain vulnerabilities, ensuring critical goods flow smoothly across borders, even during crises.
3. Clean Economy:
    - Promotes cooperation on green energy, clean technology, and sustainable infrastructure development.
    - Supports initiatives to address climate change by driving the adoption of renewable energy sources and building eco-friendly infrastructure.
4. Fair Economy:
    - Aims to foster fair and transparent tax systems.
    - Seeks to combat corruption by enhancing anti-money laundering measures and promoting financial transparency across member nations.

Member Countries:

- IPEF includes 14 member countries, representing a diverse group from across the Indo-Pacific region.They are Australia, Brunei Darussalam, Fiji, India, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, United States, and Vietnam.

India, U.S. Sign Pact on Critical Minerals

India's Trade Minister and US Commerce Secretary signed an Memorandum of Understanding (MOU) to enhance cooperation on the critical minerals supply chain in the **6th commercial dialogue held in Washington.**

- This agreement focuses on minerals like **lithium and cobalt** essential for electric vehicles and clean energy.
- **Key Objectives:**
  - Strengthening supply chains for critical minerals in both countries.
  - Building resilience in the critical minerals sector through cooperation.
- **Focus Areas:** The MOU aims to identify equipment, services, policies, and best practices for critical minerals exploration, extraction, processing, refining, recycling, and recovery.

Critical Minerals

- **Definition: T**hese are the minerals which are **essential for economic development** and national security but the **scarcity and limitation of its geographical availability** leading to supply chain vulnerability and disruption constitute to its criticality.
- **Major Critical Minerals:** The **Report of the Committee on Identification of Critical Minerals** constituted by Ministry of Mines has identified 30 critical minerals,
  - **Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium,**

Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.

- **Top Producers:** According to the **International Energy Agency,** the major producers of critical minerals are **China, Congo, Chile, Indonesia, South Africa, and Australia.** China has global dominance in terms of processing.
- **Usage:**
    - **Advanced Electronics:** They are critical for making **semiconductors and high-end electronics manufacturing.**
    - **Clean Energy Technology:** These minerals are an essential components in many clean energy technologies, **from wind turbines and solar panels to electric vehicles.**
    - **Transport and Communications:** They are also used in manufacturing **fighter jets, drones, and radio sets, Aircrafts** and mainly power the **transition to Electric Vehicles**
    - **Diverse Sectors:** To manufacture advanced technologies in diverse sectors such as **mobile phones, tablets, electric vehicles, solar panels, wind turbines**, fibre optic cables, and defence and medical applications.
    - **Battery and Storage Technology:** These minerals are critical to develop the storage technology in terms of advancements in battery technology like Lithium-Ion.

Significance of Critical Minerals

- **Economic Development:** Essential for industries like electronics, telecommunications, defence, and green technologies.
    - Critical for solar panels, batteries, and **electric vehicles**
    - Can boost **jobs, income**, and **innovation**.

National Security: Vital for defence, aerospace, nuclear, and space applications.

- Ensure use of **reliable, high-quality materials**.

Environmental Sustainability: Crucial for transitioning to clean energy and reducing reliance on fossil fuels.

- Vital for India's goal of **450 GW renewable energy** by 2030

Challenges for India

- **Dependency on China:** India currently relies heavily on China for critical minerals, making it vulnerable to supply chain disruptions and price fluctuations.
- **Limited Domestic Resources:** India has limited domestic resources of critical minerals which makes it difficult to achieve self-sufficiency.
- **Technological Limitations:** India lacks the necessary technology and infrastructure for efficient extraction, processing, and refining of critical minerals.
- **Investment Barriers:** India faces challenges in attracting foreign investment in the critical minerals sector due to regulatory hurdles and infrastructure constraints.
- **Increasing Demand:** Growing demand for minerals due to renewable energy and electric vehicles.

Uranium Enrichment in Iran, amid Global Concerns

Iran launched more than 180 missiles at Israel without warning, in retaliation to an attack that killed topmost Hezbollah leader Hassan Nasrallah. This has led to widespread speculation about how Israel will respond. Tensions in West Asia have reached a significant point after Israel vowed to respond to Iranian missile strikes carried out. These developments have raised concerns about a wider conflict in a region already marked by instability and volatility.

- Since Iran began its nuclear weapons programme in the late-1990s and early-2000s, Israel, along with the US and the UN, has been concerned about its progress. Over the years, Israel has taken steps to disrupt Iran's nuclear development, including such secret operations as sabotage, cyber attacks and even stealing nuclear secrets, in an effort to stop Iran from advancing its nuclear capabilities. Although Israel never admitted it, Iran accused them of being behind the assassination of its top scientist, Mohsen Fakhrizadeh, in 2020.
- Iran has accumulated enough **highly enriched nuclear fuel** to create three bombs. It is also one of the few countries without nuclear weapons that can produce uranium **enriched to 60%,** which is near the 90% level needed for making nuclear weapons.
- In recent years, Russia's relationship with Iran has grown stronger, raising concerns in the US. The US is worried about the possibility of Russia sharing technology and information with Iran, which could boost Iran's nuclear ambitions.
- Israel is thought to have nuclear weapons, but it has never officially confirmed this. This makes it an undeclared nuclear power, according to the **Center for Arms Control and Non-Proliferation.**

WHY ENRICHING URANIUM IS NECESSARY

- Natural uranium is found in many places around the world but, in its raw form, it cannot be used to make nuclear weapons. It is also not useful in most nuclear reactors for producing electricity or creating plutonium. The uranium must first be processed and enriched to make it suitable for these purposes. Plutonium is created for both military purposes, such as building weapons, and for energy production in specific types of reactors.
- Natural uranium is made up of different types, called **isotopes**. Most of it, around **99.3%, is uranium-238**, while only a small part, about 0.7%, is uranium-235. Uranium-235 is special because it is **'fissile'**—meaning it can be split or broken apart easily when hit by slow-moving neutrons, releasing energy

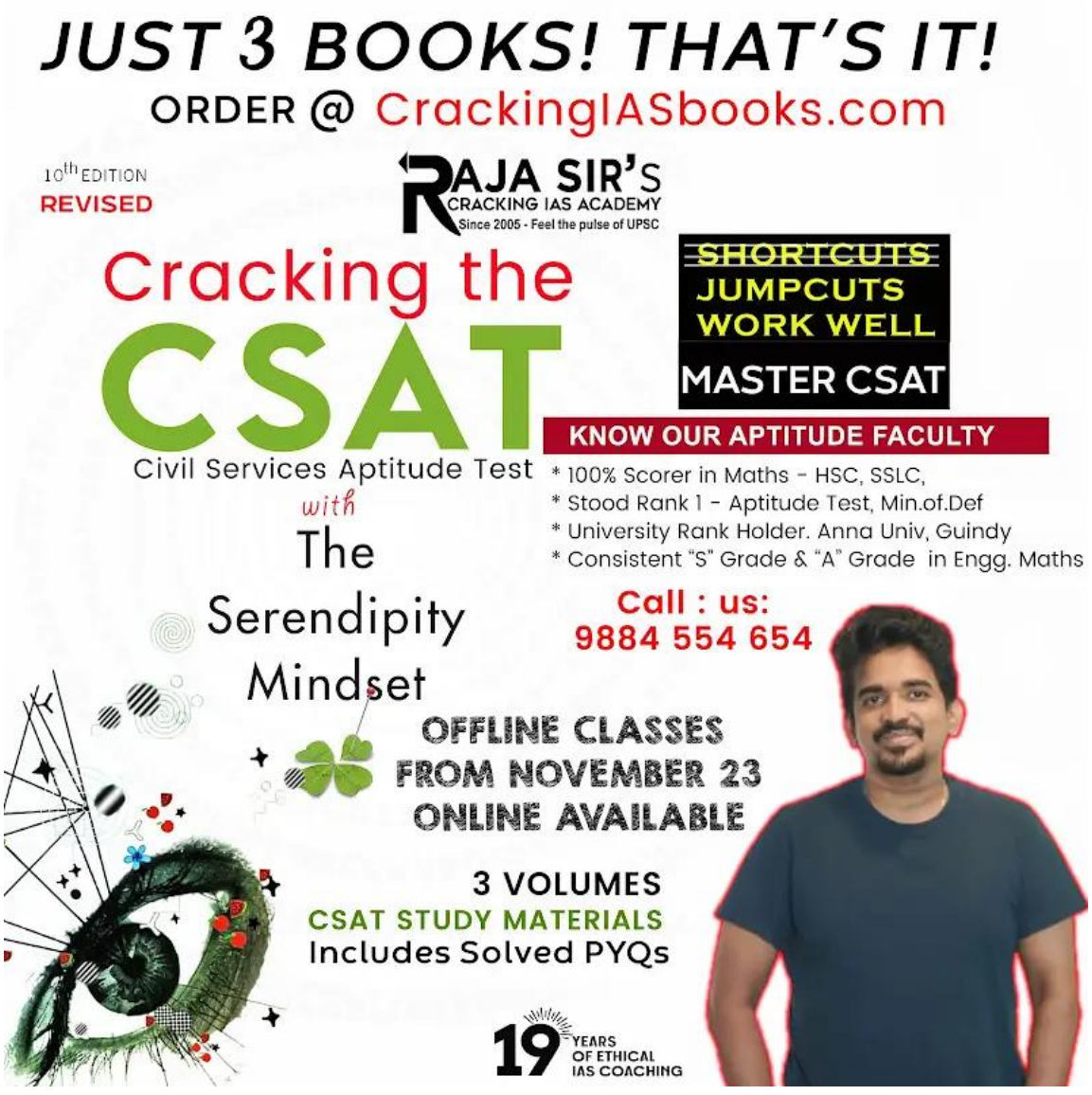
in the process—which makes it useful in nuclear reactions.

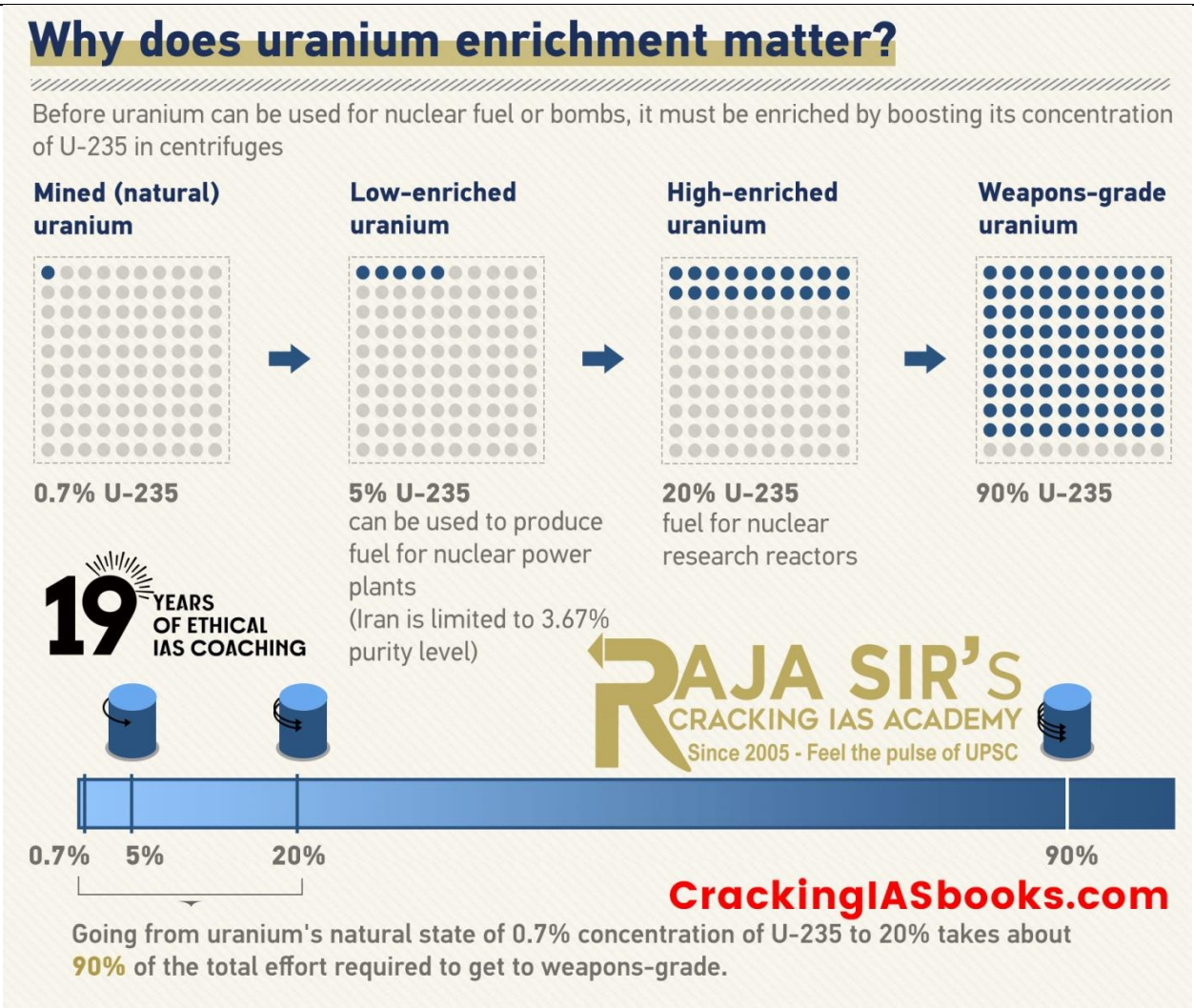
- An isotope refers to different forms of the same chemical element. While all isotopes of an element have the same number of protons, they have different numbers of neutrons in their nuclei. This difference in neutron count does not change their chemical properties much, but it can affect their stability and how they behave in nuclear reactions. For instance, uranium-238 and uranium-235 are isotopes of uranium, with different numbers of neutrons.
- Uranium-235 is the most important type of uranium for use in reactor fuel and making nuclear weapons because it can easily undergo fission. However, in its natural form, there is not enough uranium-235. To make it useful for these purposes, the amount of uranium-235 needs to be increased by separating it from uranium-238. This process is called enrichment.

ENRICHMENT LEVEL THAT REACTORS NEED

- Uranium with enrichment levels higher than 0.7% but below 20% uranium-235 is classified as **low-enriched uranium (LEU)**. Most nuclear reactors used for civil and commercial purposes operate with LEU that typically contains 3-5% uranium-235.
- Examples of LEU used for civil and commercial purposes include generating electricity in power plants, conducting research in nuclear reactors and producing medical isotopes used in diagnostic imaging and cancer treatments.
- Uranium enriched to over 20% uranium-235 is called **highly enriched uranium (HEU).** While all HEU can be used to make weapons, lower enrichment levels require a larger quantity of uranium to reach the critical mass needed to create a bomb.
- Countries with nuclear weapons usually use what is called weapons-grade HEU, which is enriched to 90% or more. This higher enrichment allows for smaller and lighter nuclear weapons, making them easier to transport. In particular, ballistic missiles can only carry nuclear weapons that have been miniaturized.

- Uranium has a density similar to gold and takes up much less space for its weight compared to a metal such as iron (gold: 19.32 g/cm³, iron: 7.87 g/cm³).



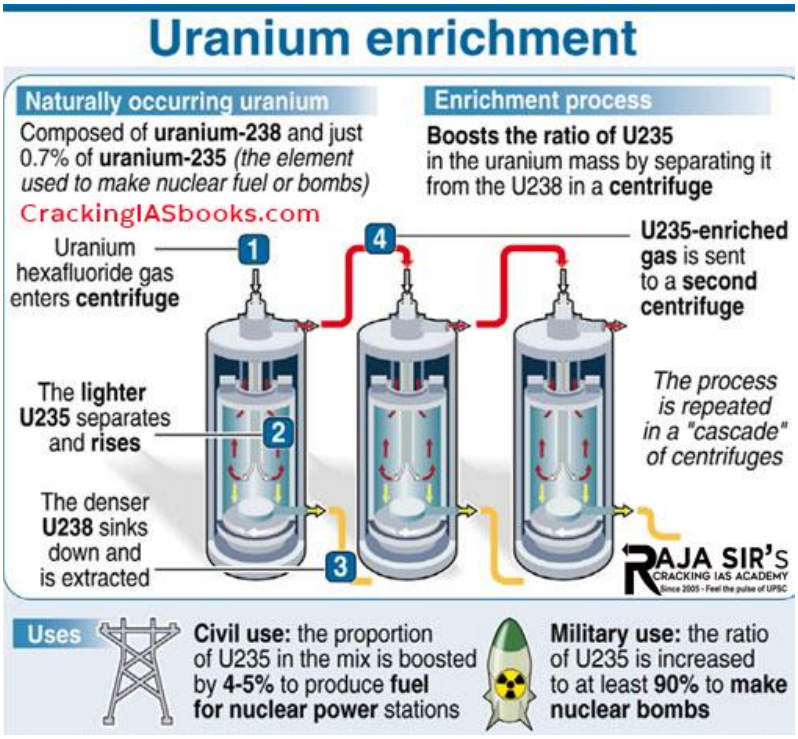


THE PROCESS FOR ENRICHING URANIUM

- Before uranium can be enriched, it must be mined from the ground and milled, followed by chemical processing. Natural uranium ore is extracted from Earth's crust. While uranium is found in many places worldwide, five countries—**Australia, Kazakhstan, Russia, Canada and Niger (in West Africa)**—hold 65% of the known uranium ore reserves.
- After uranium ore is mined, it is crushed to separate the uranium from the rock around it. This process, called milling, results in producing **uranium oxide**

concentrate (U3O8)—commonly known as **yellowcake**. This yellowcake is sent to a conversion facility where impurities are removed and the uranium is mixed with fluorine to create uranium hexafluoride (UF6), a gas that can be used for enrichment.

- Since uranium-235 and uranium-238 are chemically the same, common chemical methods for purification cannot be used to separate them. Enrichment methods take advantage of the small difference in mass—about 1%—between the heavier, more common uranium-238 isotope and the lighter, fissile uranium-235 isotope.
- Various methods have been used to enrich uranium. During the Manhattan Project, the US used electromagnetic isotope separation (EMIS), but it was very energy-intensive and was abandoned after the war due to its inefficiency and high cost. During the Cold War, gaseous diffusion became the main method for enrichment but this, too, required a lot of electricity and large facilities. Laser excitation, a newer technology, has not yet proven to be commercially viable.



THE GAS CENTRIFUGES PROCESS

- Today, the most common and efficient method for enriching uranium is the use of gas centrifuges. In this process, uranium hexafluoride (UF6) gas is spun at high speeds in a series of cylindrical centrifuges. The centrifugal force causes the heavier uranium-238 isotopes to move towards the outer edge, while the lighter uranium-235 isotopes remain closer to the centre.
- This allows for the gradual separation of uranium-235 from uranium-238. **Gas centrifuges are highly efficient** and require much less electricity compared to such older methods as gaseous diffusion, making them the preferred technology for uranium enrichment today.
- The speed of gas centrifuges used for uranium enrichment typically ranges from around 18,000 to 90,000 revolutions per minute (rpm). These high speeds create the necessary centrifugal force to separate the uranium-235 from uranium-238.
- The size of gas centrifuges used for uranium enrichment can vary, but most are tall, narrow cylinders. They typically range in heights of about 3 metres to 12 metres (10 feet to 40 feet) and have a diameter of about 15 centimetres to 20 centimetres (6 inches to 8 inches).
- The exact size depends on the design and the specific technology being used, but they are generally designed to maximize efficiency while maintaining structural integrity under high-speed rotation.

THE RISK OF N-ARMS PROLIFERATION

- Uranium enrichment is a nuclear proliferation risk because the same technology that produces low-enriched uranium (LEU) for reactor fuel can also be used to create highly enriched uranium (HEU) for nuclear weapons. There are no technical limitations stopping countries with enrichment technology from using it to produce weapons-grade uranium—only legal restrictions are in place to prevent it.
- Centrifuges create a special challenge for preventing nuclear proliferation

because it is hard to detect hidden facilities in time and existing centrifuges can be quickly adjusted to produce highly enriched uranium (HEU). At present, countries known to have uranium enrichment capabilities include France, the UK, the Netherlands, Germany, the US, Russia, Argentina, Brazil, India, Pakistan and Iran.

Nepal, India, And Bangladesh Sign Historic Cross-Border Electricity Trade Deal

- This agreement is a significant achievement for Nepal, India, and Bangladesh, as it strengthens not only their economic ties but also their **energy security**.
- In a landmark move towards regional energy cooperation, Nepal, India, and Bangladesh signed a tripartite agreement on October 3 in Kathmandu, to enable cross-border electricity trade. This deal allows Nepal to export its excess hydroelectric power to Bangladesh through India''s transmission network, marking a significant step in South Asian energy collaboration.
- The agreement permits Nepal to supply excess electricity to Bangladesh during the rainy season, specifically from June 15 to November 15 each year.
- Through this deal, Nepal is projected to earn an estimated USD 9.2 million annually.
- Bangladesh with rising energy needs, can benefit from an additional and renewable power source.
- India, playing a crucial role as the transit country, facilitates the transmission of power and enhances regional connectivity.
- This agreement sets the stage for further collaboration in the region, with potential for increased energy trade in the future. It also highlights the importance of utilizing regional resources to meet growing energy needs while promoting sustainable and renewable energy solutions across South Asia.

Jaishankar to visit Pakistan for SCO meeting - What is the organisation —

and what is its significance?

Established: 2001

- The SCO is the successor to the Shanghai Five, formed in 1996 between the People's Republic of China, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan. In June 2001, the leaders of these nations and Uzbekistan met in Shanghai creating SCO.
- Current Members:
    - Presently 10.
    - In 2017, India and Pakistan joined. Iran joined the group in 2023, and Belarus in 2024.

Goals of the SCO are:

- to strengthen mutual trust, friendship and good-neighbourliness between the Member States;
- to encourage the effective cooperation between the Member States in such spheres as politics, trade, economy, science and technology, culture, education, energy, transport, tourism, environmental protection, etc;
- to jointly ensure and maintain peace, security and stability in the region; and
- to promote a new democratic, fair and rational international political and economic international order.
- Internally, the SCO adheres to the "Shanghai spirit", namely, mutual trust, mutual benefit, equality, consultation, respect for diversity of civilizations and pursuit of common development; and externally, it upholds non-alignment, non-targeting at other countries or regions and the principle of openness.

Structure:

- Council of Heads of States : The supreme decision-making body, meets annually.
- Council of Heads of Government : Meets once a year to discuss the strategy of multilateral cooperation and priority areas within the Organization, determine fundamental and topical issues in economic and other spheres, and approve the budget of the SCO.

- In addition to the meetings of the CHS and the CHG, there are also mechanisms for meetings on foreign affairs, national defense, security, economy and trade, culture, health, education, transport etc.
- The Council of National Coordinators is the SCO coordination mechanism.
- Regional Anti-Terrorist Structure (RATS): Based in Tashkent, focused on combating terrorism, extremism, and cyber threats.
- The official languages of the SCO are Russian and Chinese

What relevance does the SCO hold for India?

- On one level, SCO membership allows India to participate in a forum which enhances its scope of cooperation with Central Asian countries, which have not had particularly close relations with India since their formation in 1991. It also matters for maintaining communication with major actors in the region on common security issues.
- For example, an important permanent structure within the SCO is *the Regional Anti-Terrorist Structure (RATS).* It assists members in the preparation and staging of counter-terrorism exercises, analyses key intelligence information coming in from the member states, and shares information on terrorist movements and drug trafficking.
- However, the relevance of the organisation comes into question given the difficulty in managing ties among the partners. India shares tense relationships with China and Pakistan at present. Last year, when the summit was to be held under India's presidency as part of the rotation, it decided to hold a virtual summit instead.

International Medical Device Regulators Forum (IMDRF)

India becomes an **affiliate member of International Medical Device Regulators Forum (IMDRF).**

IMDRF:

- **Nature of Grouping:** It is a **voluntary group** comprising **medical device regulators from various countries.**
- **Establishment:** The IMDRF was formed in **2011**.
- **Goal of IMDRF:** To **accelerate international medical device regulatory harmonisation and convergence.**
- **Foundation of GHTF:** The IMDRF builds upon the **foundational work of the Global Harmonization Task Force on Medical Devices (GHTF),** which previously worked on aligning medical device regulations globally.
- **Current Members:** The IMDRF includes regulatory authorities from the **U.S., Australia, Canada, the European Union, Japan, the United Kingdom, Brazil, Russia, China, South Korea, Singapore**, and the **World Health Organization (WHO).**

India's Path to Membership: In **2024,** the **Central Drugs Standard Control Organization (CDSCO)**, under the **Ministry of Health and Family Welfare** applied for IMDRF affiliate membership, which was approved at the **26th session** in September 2024, Seattle, USA.

Benefits of IMDRF Affiliate Membership

- **Harmonisation and Reduction in Regulatory Compliance:** India's membership **aligns its medical device regulations with global standards, reducing regulatory complexities globally** and improving public health protection.
- **Participation in Open Sessions:** India can now **participate in open sessions** to exchange information, discuss regulatory strategies, and **adopt IMDRF documents for its domestic framework.**
- **Enhanced Domestic Competitiveness: CDSCO's regulatory framework will be strengthened**, enabling it to handle emerging technical challenges.
- **Boosting "Brand India":** The membership will also help Indian medical device

manufacturers **meet global regulatory requirements**, boosting their presence in international markets.

Power Play in the Indian Ocean: India and Maldives Forge a New Strategic Partnership

On October 7, 2024, India and the Maldives signed a landmark agreement focusing on defense, trade, and energy security to enhance regional stability and cooperation

Bolstering Maritime Security in the Indian Ocean

- A key focus of the talks was enhancing maritime security cooperation between India and Maldives. Both nations face common threats, including piracy, illegal fishing, drug trafficking, and terrorism, all of which require coordinated responses. With its **vast Exclusive Economic Zone (EEZ)**, the Maldives is on the front line of these challenges.
- India has committed to providing defense platforms and advanced surveillance systems to bolster the operational capabilities of the Maldives National Defence Force (MNDF). This includes the timely completion of the **MNDF 'Ekatha' harbour project** at **Uthuru Thila Falhu (UTF),** a vital initiative supported by India to enhance Maldives' maritime security infrastructure.
- The agreement goes beyond traditional defense assistance. India and Maldives will also work together on hydrography and disaster response, further cementing their role as natural partners in maintaining stability in the Indian Ocean Region (IOR). Capacity building, training programs, and additional funding for the MNDF are also on the agenda, ensuring that the Maldives is equipped to handle both current and future security challenges.

Driving Trade and Investment: A New Frontier

- On the economic front, both Countries acknowledged the untapped potential for increased trade and investment between their countries. A major step forward is

the initiation of discussions on a Bilateral Free Trade Agreement (FTA) that would simplify trade in goods and services, potentially boosting economic cooperation to new heights.

- The decision to operationalize local currency trade settlements between India and the Maldives marks a significant milestone. By reducing dependency on foreign currencies, both nations aim to strengthen trade linkages and economic resilience. This move is expected to benefit sectors like agriculture, fisheries, and tourism, which remain the backbone of the Maldivian economy.
- In line with Maldives' focus on economic diversification, the two countries will also collaborate on agriculture and fisheries, key areas that hold significant potential for growth. Plans are in place to establish an Agriculture Economic Zone in Haa Dhaalu atoll and a fish processing facility in Haa Alifu atoll, leveraging India's expertise and investment.

Energy Security: A Future Powered by Renewables

- Energy security featured prominently in the discussions, with both leaders agreeing that renewable energy cooperation would be crucial in addressing Maldives' high energy costs and its commitment to achieving its **Nationally Determined Contributions (NDCs)** under the Paris Agreement.
- India, with its expertise in solar power, will partner with the Maldives on various renewable energy projects aimed at driving down energy costs and reducing reliance on traditional energy sources. This collaboration also includes exploring Maldives' participation in India's ambitious **"One Sun, One World, One Grid"** initiative, aimed at interconnecting global solar energy grids.
- Additionally, both sides committed to joint research, capacity building, and exchange of expertise on energy efficiency. These initiatives are expected to foster sustainable development while helping Maldives transition to a greener future.

Deepening Political and Digital Cooperation

- The meeting also paved the way for enhanced political engagement. To strengthen democratic ties, the two nations plan to sign a Memorandum of Understanding that will institutionalize cooperation between their parliaments, including exchanges between parliamentarians and local representatives.
- In the digital domain, India's Unified Payments Interface (UPI) and other digital services will be introduced in the Maldives, boosting e-governance and financial inclusion. The leaders welcomed the launch of the RuPay card in the Maldives, making payments easier for Indian tourists and residents, and vowed to explore further collaborations in the financial and digital sectors.

Health and Human Security: A People-Centric Approach

- Health cooperation remains a critical area of partnership between India and Maldives. Both nations are committed to improving healthcare infrastructure and access to essential services. The establishment of India-Maldives Jan Aushadhi Kendras, offering affordable medicines across the Maldives, is set to enhance health security.
- In addition to healthcare, the two countries will collaborate on mental health services, drug rehabilitation programs, and medical evacuations, further cementing their people-centric approach to development.

The Road Ahead: A Comprehensive Security and Economic Partnership

- The discussions between Modi and Muizzu signal a new chapter in India-Maldives relations, defined by a Comprehensive Economic and Maritime Security Partnership. As India continues to support Maldives in its developmental and security needs, both nations are poised to play a crucial role in maintaining peace and stability in the Indian Ocean Region.

PM Modi attends 21st ASEAN-India Summit in Lao PDR

• Prime Minister Narendra Modi announced a 10-point plan to strengthen India-

ASEAN comprehensive partnership and asserted that ties with the regional grouping were critical to guiding Asia''s future.

• In the meeting, the leaders agreed to create a new **ASEAN-India Plan of Action (2026-2030)** that will guide both sides in realizing the full potential of the ASEAN-India partnership.

• Addressing the 21st India-ASEAN Summit in Vientiane, Modi noted that India-ASEAN trade had doubled to over $130 billion in the past decade and announced a review of the trade in goods agreement to harness the greater economic potential of the partnership.

• He said India was commemorating the 10th anniversary of its Act East Policy, which has given new energy, direction and momentum to the historic relationship between India and the ASEAN nations.

• The 10-point plan to strengthen the India-ASEAN partnership includes celebrating the year 2025 as the ASEAN-India Year of Tourism, doubling the number of scholarships at Nalanda University and providing new grants for ASEAN students at Agricultural Universities in India

What is ASEAN?

• The Association of Southeast Asian Nations (ASEAN) was established on August 8, 1967 in Bangkok by five countries — Indonesia, Malaysia, Philippines, Singapore, and Thailand.

• There are **currently 10 member states**: Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei, Laos, Myanmar, Cambodia and Vietnam.

• In November 2022, ASEAN announced that it has agreed in principle to admit East Timor, also **known as Timor-Leste, as the group's 11th member**. The half-island nation will also be granted observer status at high-level ASEAN meetings.

• The ASEAN Summit is the highest policy-making body in ASEAN comprising the heads of State or government of ASEAN member states. As per regular practice, the

ASEAN Summit Meetings shall be held twice annually.

• The first ASEAN Summit was held in Bali, Indonesia on February 23-24, 1976.

• ASEAN is considered one of the most influential groupings in the region. India and several other countries, including the US, China, Japan and Australia, are its dialogue partners.

India-ASEAN relations

• ASEAN centrality has been, and will remain, an important aspect of **India's 'Act East'** policy which is a central element in the country's foreign policy.

• ASEAN-India dialogue relations have grown rapidly from a sectoral dialogue partnership in 1992 **to a full dialogue partnership in December 1995**. The relationship was further elevated with the convening of the ASEAN-India Summit in 2002 in Phnom Penh, Cambodia. Since then the ASEAN-India Summit has been held annually.

• At the ASEAN-India Commemorative Summit held in December 2012 in New Delhi, the leaders adopted the ASEAN-India Vision Statement and declared that the ASEAN-India Partnership stands elevated to **a 'Strategic Partnership'.**

• In *2022*, ASEAN-India relations **were elevated to 'Comprehensive Strategic Partnership',** that is meaningful, substantive and mutually beneficial.

• India's **bilateral trade with ASEAN economies is expected to reach $300 billion** by 2025, and it is the fifth largest trading partner for India following North America, EU, North-East Asia and GCC-West Asia.

PM Modi attends 19th East Asia Summit

- Prime Minister Narendra Modi attended the 19th East Asia Summit (EAS) on October 11 in Vientiane, Lao PDR.
- The Summit was attended by heads of State/government and High Representatives of the EAS participating countries, the Secretary-General of

ASEAN and Timor-Leste as Observer. The President of the European Council and the Secretary-General of the Shanghai Cooperation Organisation (SCO) attended the Open Session.

- In his address, PM Modi He underlined that **India's participation in East Asia** Summit was an important pillar of its Act East Policy.
- He called for the restoration of peace and stability in Eurasia and West Asia, noting that conflicts in different parts of the world are having the most negative impact on the countries of the Global South.
- Noting that a free, open, inclusive, prosperous and rules-based Indo-Pacific was important for peace and development in the region, he spoke of the similarity and common approach between India's Indo-Pacific Ocean's Initiative and ASEAN Outlook on Indo-Pacific

East Asia Summit

The East Asia Summit **(EAS) is the Indo-Pacific's premier forum for strategic** dialogue. It is the only leader-led forum at which all key partners meet to discuss political, security and economic challenges facing the Indo-Pacific, and has an important role to play in advancing closer regional cooperation.

- **Established in 2005**, EAS allows the principal players in the Indo-Pacific region to discuss issues of common interest and concern, in an open and transparent manner, at the highest level.
- Since its inception, it has played a significant role in the strategic, geopolitical and economic evolution of East Asia.
- It is also an important platform for furthering practical cooperation in the Indo-Pacific by building upon **the convergence between ASEAN Outlook on Indo-Pacific (AOIP) and Indo-Pacific Ocean's Initiative (IPOI).**

There are *six priority areas* of regional cooperation within the framework of the EAS. These are

i) Environment and Energy
ii) Education
iii) Finance
iv) Global Health Issues and Pandemic Diseases
v) Natural Disaster Management
vi) ASEAN Connectivity.

- ***India, being a founding member of the East Asia Summit***, is committed to strengthening the East Asia Summit and making it more effective for dealing with contemporary challenges. **India endorses regional collaboration in all six priority areas.**
- Following the adoption of the *Manila Plan of Action in 2017*, maritime cooperation has been identified as an important area of cooperation under the EAS.
- The EAS calendar culminates in the annual Leaders' Summit, which is usually held alongside ASEAN Leaders' meetings in the fourth quarter of every year. In addition to the Leaders' Summit, meetings of EAS Foreign Ministers and Economic Ministers are held annually.

Members of East Asia Summit

- • The ***EAS has 18 members*** — the ten ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam) along with Australia, China, India, Japan, New Zealand, South Korea, Russia and the United States.
- ASEAN leads the forum, and the chair position rotates between ASEAN Member States annually.
- According to estimates, EAS members represent 54 per cent of the world's population and account for 62 per cent of global GDP.

Genesis of East Asia Summit

- The concept of an East Asia Grouping was first promoted in 1991 by the then Malaysian Prime Minister Mahathir bin Mohamad.
- The final report of the East Asian Study Group in 2002, established by the ASEAN+3 countries (China, Japan and South Korea), recommended EAS as an ASEAN-led development limited to the ASEAN+3 countries.
- However, the ASEAN Ministerial Meeting (AMM) held in Vientiane in July 2005 welcomed the participation of ASEAN, China, Japan, South Korea, Australia, India and New Zealand, in the first EAS.
- The US and the Russian Federation were formally included as members of the EAS at the 6th East Asia Summit held in Bali, Indonesia in November 2011

Key Highlights of the 19th East Asia Summit

- **ASEAN's Central Role**: India emphasised **ASEAN's crucial role** in the **Indo-Pacific regional framework,** aligning with its **Indo-Pacific Vision and Quad cooperation.**
- **Act East Policy**: India highlighted its participation in the **East Asia Summit (EAS)** as a **fundamental component of its Act East Policy**.
- **Development Over Expansionism**: A development-oriented approach was advocated, **contrasting with expansionist strategies** in the region.
- **Support for Nalanda University**: India **expressed gratitude for support in reviving Nalanda University** and **invited EAS countries** to a **Heads of Higher Education Conclave there.**
- **Global Security Challenges**: India highlighted **terrorism, cyber threats, and maritime challenges** as significant global security issues, calling for collective action to address these threats.
- **Acknowledgment**: India thanked the Prime Minister of Laos for hosting the summit and **expressed full support for Malaysia as the new ASEAN Chair.**

World Telecommunication Standardization Assembly (WTSA)

The World Telecommunication Standardization Assembly (WTSA) event will be organized by the International Telecommunication Union (ITU) in New Delhi from October 14 to 24, 2024.

- The **WTSA is held every four years,** with the first assembly being held in 2002.
- It **serves as the governing conference for the ITU Telecommunication Standardization Sector (ITU-T).** The assembly defines the work program, working methods, and structure of study groups for the ITU-T.
- The WTSA plays an essential role in setting global telecommunication standards, which are crucial for ensuring interoperability and encouraging innovation in the telecommunications sector.
- The WTSA 2024 will be held in New Delhi, from October 14 to 24, 2024.
- This marks the **first time the event is being hosted in the Asia-Pacific region,** highlighting India's growing influence in the global telecommunications landscape.

Significance of WTSA 2024

- It highlights India's growing role in the global telecommunications sector and its commitment to advancing ICT standards.
- **The assembly will focus on critical areas such as 6G, artificial intelligence (AI), the Internet of Things (IoT), big data, cybersecurity, machine-to-machine (M2M) communications, and quantum technologies.** These discussions will shape the future of global telecommunications standards.
- The event will bring together over 3,000 leaders and technology experts from more than 190 countries, fostering international collaboration and knowledge exchange.

Refugee rights, the gendered nature of displacement

Displacement

- It refers to the forced movement of people from their homes or communities, which various factors, including conflict, natural disasters, development projects and persecution can cause.
- According to the United Nations High Commissioner for Refugees (UNHCR), by the end of 2023, 11.73 crore people, worldwide had been forcibly displaced due to persecution, conflict, violence, human rights violations or events seriously disturbing public order. Among them, 3.76 crore were refugees.
- With the Israel-Hamas war having escalated since then, the Ukraine-Russia war continuing, and Rohingyas facing fresh threats in Myanmar, the number of refugees worldwide is only expected to multiply significantly.
- Since independence, India has hosted over 200,000 diverse refugee groups. As of January 31, 2022, UNHCR India had 46,000 registered refugees and asylum-seekers, 46% of whom are women and girls.

Negative impact of displacement on people

- Loss of life and livelihood: Many displaced individuals lose family members, homes, land, and sources of income leaving them economically vulnerable.
- Psychological trauma: Exposure to violence, witnessing deaths, sexual abuse, or being forcibly separated from loved ones leads to **post-traumatic stress disorder (PTSD)**, depression, and anxiety.
- Health crises: Refugee camps or temporary settlements can become breeding grounds for diseases due to overcrowding, inadequate sanitation, and lack of healthcare.
- Loss of common property resources: When people lose access to shared resources that are essential for their survival, this affects not only the economic aspect of their lives but also their social and communal relationships.
- Marginalisation: Exacerbates inequalities and reinforces the vulnerability of already disadvantaged groups, including women, children, and ethnic minorities.

- Food insecurity: Malnutrition and hunger become critical issues, particularly for children, pregnant women, and the elderly in displaced communities.
- Social disarticulation: The disarticulation of communities also erodes social cohesion, cultural practices, and traditions, leading to psychological distress and a loss of identity.

Challenges to female refugee

- Gendered responsibilities: Burdened with caregiving for children, the elderly, and family survival, often being the last to flee conflict zones.
- Physical and mental health: Refugee women are affected by a multitude of stressors spanning deaths of partners and children, hardships of camp life, complex alterations in family dynamics, limited access to community networks, and reduced safety.
- Gender-based abuse: Prolonged conflict, shifting gender roles, broken social support systems, and socio-economic challenges expose refugee women to higher risks of gender-based abuse, including transactional sex.
- Psychological and psychosocial conditions: They are twice as likely to develop PTSD and four times more likely to suffer from depression than men.
- A study in Darfur, Sudan found 72% of displaced women experienced PTSD and distress due to trauma and camp conditions, showing their higher risk of mental health issues compared to male refugees.
- Social and gender inequalities: Especially when refugee populations belong to patriarchal societies, lead to the experiences and testimonies of displaced women being dismissed.

Legal framework available to displaced women

Global level:

- The UN Convention on the Rights of Persons with Disabilities (UNCRPD) Recognises 'long-term mental or intellectual impairments which, in interaction

with various barriers, may hinder full and effective participation in society' as 'psychosocial disability' and guarantees a plethora of rights to the affected persons.

- The UNCRPD also recognises that 'women and girls with disabilities are subject to multiple discrimination' and mandates measures to ensure 'full and equal enjoyment by them of all human rights and fundamental freedoms' (Article 6).
- These guarantees are required to be secured to all without any discrimination (Article 5).

India

- India ratified the UNCRPD and enacted the Rights of Persons with Disabilities Act, 2016 (RPWDA). RPWDA does not explicitly use the term 'psychosocial disability,' it recognizes "mental illness" under the RPWDA.
- The RPWDA guarantees rights to persons with disabilities, including healthcare (Section 25) and equal rights for women with disabilities (Section 4).
- The Supreme Court of India has upheld the right to life under Article 21,includes the right to health, for refugees.

Measures to strengthen the protection of displaced women

- Effective policy-making also depends on the collection of disaggregated data on their health conditions, necessitating swift and systematic identification and registration processes.
- India may consider signing the 1951 Refugee Convention and its 1967 Protocol to protect and define refugees'' rights.
- Specific domestic legislation addressing refugees specifically addresses the needs of displaced women, including protection from gender-based violence (GBV), access to healthcare, and economic opportunities.
- Establish safe spaces and services for women and girls in displacement settings to prevent and respond to GBV, including shelters, counselling, and support services.

- To secure the implementation of the aforesaid guarantees, it is crucial to integrate refugees with disabilities into relevant policies and programmes in an accessible manner.

India, Pakistan rule out bilateral talks during SCO Summit

- India and Pakistan have ruled out any bilateral talks between External Affairs Minister S. Jaishankar and his Pakistan counterpart Ishaq Dar on the sidelines of the SCO heads of government summit.
- It will be for **the first time** in nearly nine years that India's foreign minister will travel to Pakistan.
- Pakistan is hosting the SCO Council of Heads of Government meeting on October 15 and 16.
- The **last Indian Foreign Minister to visit Pakistan** was Sushma Swaraj. She had travelled to Islamabad in December 2015 to attend a conference on Afghanistan.
- The ties between India and Pakistan came under severe strain after India's warplanes pounded a **Jaish-e-Mohammed terrorist** training camp in Balakot in Pakistan in February 2019 in response to the Pulwama terror attack.
- The relations further deteriorated after India announced the withdrawal of special powers of Jammu & Kashmir and the bifurcation of the state into two Union Territories on August 5, 2019.
- Pakistan downgraded diplomatic ties with India after New Delhi abrogated Article 370.

India-Pakistan Relations: Initiatives to boost ties

- India and Pakistan have made several positive attempts in the past to improve their relationship and resolve outstanding issues.

Here are **some key initiatives** that aimed to foster better relations:

i) Composite Dialogue Framework (2004-2008): Initiated in 2004, the Composite Dialogue Framework was designed to address multiple issues between the two countries, including peace and security, confidence-building measures (CBMs), Kashmir, economic cooperation, and people-to-people contacts.

- Though contentious issues like Kashmir remained unresolved, the dialogue made progress on less controversial matters, such as economic cooperation, visa liberalisation, and cross-border trade.
- The framework helped maintain diplomatic engagement during periods of tension.

ii) Delhi-Lahore Bus Service (1999): The Delhi-Lahore Bus service was launched in 1999 as part of a peace initiative between Indian Prime Minister Atal Bihari Vajpayee and Pakistani Prime Minister Nawaz Sharif.

- Vajpayee's historic bus journey to Lahore was symbolic of both countries' desire to reduce tensions and improve diplomatic relations. This initiative helped de-escalate tensions for a time, especially after the Kargil conflict, and fostered hope for lasting peace.

iii) Ufa Agreement (2015): The Ufa Agreement was an outcome of a meeting between Indian and Pakistani National Security Advisors in Ufa, Russia. It was intended to restart the dialogue process after a period of heightened tensions.

Important points agreed upon in Ufa included:

- Early meetings between the Director General of BSF and the Director General of Pakistan Rangers to reduce cross-border tensions.
- Discussion on expediting the trial of the Mumbai terror attack, including the sharing of additional information for the case.
- The Ufa meeting was seen as a starting point for a potential new phase of dialogue, although subsequent events prevented sustained progress.
- Confidence-building measures (CBMs) such as increased cross-border trade, easing visa restrictions, and cultural exchanges were also part of diplomatic

efforts to improve ties.

Benefits of strong India-Pakistan ties

i) Economic Opportunities through Trade and Development Projects

- **China-Pakistan Economic Corridor (CPEC):** A peaceful resolution of the Kashmir dispute could transform Kashmir into an economic hub, with access to Central Asia through CPEC. This would benefit both India and Pakistan, as well as the local Kashmiri population.
- **TAPI Pipeline:** The Turkmenistan-Afghanistan-Pakistan-India (**TAPI**) pipeline is a major infrastructure project that could meet the growing energy needs of both India and Pakistan. Better relations could ensure the pipeline's security and success, enhancing energy cooperation.
- **Iran-Pakistan-India Pipeline:** The stalled IPI pipeline could be revived if relations improve, providing both nations with a stable energy supply from Iran.

ii) Peace and Stability in the Region

- Afghanistan's Stability: Both India and Pakistan have a stake in a stable Afghanistan. Cooperation could help combat terrorism and reduce the influence of extremist groups operating along the porous Afghan-Pakistan border.
- Counterterrorism Efforts: Both nations suffer from terrorism, and a cooperative security framework could help tackle extremist groups that threaten both countries.
- **iii) Boost to Regional Cooperation and SAARC**
- • A thaw in relations between India and Pakistan could breathe new life into the South Asian Association for Regional Cooperation (**SAARC),** which has been hampered by tensions between the two nations.
- • Improved ties could enable the region to unlock its potential for economic integration, development, and security cooperation.

iv) Connectivity and Trade

- Improved relations would enable direct road access from India to Afghanistan via

Pakistan, eliminating the need to rely on Iran for access to Afghan markets. This would boost regional trade and open up new economic corridors.

- Cross-border trade could flourish, with both countries benefitting from each other's markets and resources.

What makes peace elusive between India-Pakistan?

- The elusive peace between India and Pakistan can be attributed to a complex interplay of historical, political, and strategic factors. Here are some of the key reasons:

i) Kashmir Conundrum

- The Kashmir issue has been a central and long-standing point of contention between the two nations. It is more than just a territorial dispute; it represents a clash of identities for both countries. The dispute has remained a symbol of the unresolved legacy of partition, making peace between the two countries elusive.

ii) Fractured Internal Dynamics of Pakistan

- Pakistan's internal political instability, marked by a tug of war between the civilian government and the military establishment, has significantly impacted its foreign policy, particularly towards India. The Pakistan Army has developed a vested interest in maintaining hostility with India, as it justifies its political influence and budgetary dominance in domestic affairs. This dynamic has prevented Pakistan from adopting a long-term, stable policy toward India, while the rise of Islamic extremism has further complicated the situation, creating a breeding ground for militancy and instability.

iii) Cross-Border Terrorism

- Pakistan's strategic use of terrorism as a tool against India has been a major mpediment to peace. Pakistan's military doctrine of "bleeding India with a thousand cuts" involves supporting and facilitating terrorist groups that operate within India, particularly in Kashmir. This pattern of cross-border terrorism has often led to violent escalations, such as the Uri attack (2016), the Pulwama

attack (2019), and India's subsequent Balakot airstrike. These events disrupt any ongoing or potential diplomatic efforts aimed at peace.

iv) Boundary Disputes

- Beyond Kashmir, India and Pakistan also have unresolved boundary disputes, particularly along the Line of Control (LoC) in northern Kashmir and the Sir Creek dispute in the west. These issues, though secondary to Kashmir, continue to be sources of tension and have hindered efforts to normalize relations.

v) Water Dispute

- Water has become another flashpoint in India-Pakistan relations, especially concerning the Indus Waters Treaty (**IWT**). Pakistan's involvement in cross-border terrorism has led India to question the fairness of continuing water-sharing arrangements under the IWT.
- Following terrorist attacks, such as the Uri attack, India has threatened to accelerate projects to fully utilise its share of water under the IWT. While **India has not abrogated the treaty, t**ensions over water rights exacerbate the broader hostility between the two countries.

India-Russia working group on the Northern Sea Route (NSR)

The The recent meeting of the India-Russia working group on the **Northern Sea Route (NSR)** marks a significant step in enhancing cooperation in Arctic shipping.

Northern Sea Route (NSR):

- The Northern Sea Route (NSR) is the **shortest shipping route** connecting **Europe and the Asia-Pacific**, spanning approximately **5,600 km** through four Arctic seas.
- **Route Details:** It begins at the **Kara Strait**, between the **Barents and Kara Seas**, and ends at the Bering Strait.
- **Benefits:** The NSR can reduce transit distances by up to **50%** compared to traditional routes like the **Suez Canal,** promoting faster cargo transit.

North Sea

- **Geography:** The North Sea, part of the Atlantic Ocean, is bordered by the UK and Norway to the west, Denmark to the south, and Germany, the Netherlands, Belgium, and France to the east.
    - It connects to the **Atlantic via the English Channel** and **the Baltic Sea through the Kattegat and Skagerrak straits.**
- **Infrastructure:** The **Kiel Canal** links the North Sea to the Baltic, and major rivers such as the **Rhine and Thames** drain into it, contributing to its significance.
- **Economic Hub:** Rotterdam is the busiest port in Europe, highlighting the region's critical role in international trade.



Lok Sabha Speaker Addresses IPU Assembly In Geneva Inter-Parliamentary Union (IPU)

- Recently, Lok Sabha Speaker Om Birla is leading a parliamentary delegation to the **149th Assembly of the Inter-Parliamentary Union (IPU) in Geneva.**

Inter-Parliamentary Union (IPU)

- The IPU is the **global organisation of national parliaments**.
- **Established: 1889, in Paris**, as the **first multilateral political organisation** to promote representative **democracy and world peace**.
- **Headquarters: Geneva**, Switzerland.
- **Membership**: **180 member parliaments** and **15 associate members**.
- **Slogan**: "**For democracy. For everyon**e."
- **Vision**: A world where democracy and parliaments serve people, promoting peace and development.
- **Mission**: Promote **democratic governance, institutions, and values** by working with parliaments and parliamentarians for peace, human rights, gender equality, youth empowerment, climate action, and sustainable development.

Key Functions:

- **Parliamentary Diplomacy**: Facilitates dialogue and cooperation among parliaments to address global issues.
- **Democracy Promotion**: Strengthens parliamentary systems, making them more inclusive (gender-balanced, younger, and more diverse).
- **Human Rights**: Defends the human rights of parliamentarians through a dedicated committee of MPs from across the world.
- **Funding: P**rimarily through **contributions by member parliaments** from public funds.

Structure:

IPU Assembly:

- **Principal statutory body** expressing the views of the IPU.
- **Brings together parliamentarians** to discuss international issues and recommend actions.

Governing Council:

- The plenary **policymaking body**, consisting of **three representatives from each member parliament.**
- Responsible for establishing the IPU's **annual program and budget.**
- **Chaired by the President** of the IPU (**ex-officio President of the Governing Council).**

Executive Committee:

- **17-member body** overseeing **administration,** providing advice to the Governing Council.
- Includes **15 elected members** serving for four-year terms, plus the President of the IPU.

Standing Committees:

- **Three committees assist the Assembl**y in studying and addressing specific issues.

UNIFIL : The UN"s Peacekeeping Mission In Lebanon

UNIFIL (United Nations Interim Force in Lebanon) is a peacekeeping mission established in 1978 to **monitor** the withdrawal of Israeli forces, maintain peace, and support the Lebanese government in regaining control of southern Lebanon

- **UNIFIL was established in 1978** by the United Nations Security Council (UNSC) after Israel's first invasion of Lebanon. It was initially **created following UNSC** Resolutions 425 and 426, which called for the withdrawal of Israeli forces from Lebanese territory.
- The mission **has three main objectives**: to confirm Israel's withdrawal, restore peace and security, and assist the Lebanese government in reasserting its authority in the region.
- Based in southern Lebanon, UNIFIL operates in a region long associated with Hezbollah, a powerful Lebanese group with military capabilities. Although many

peacekeepers have military backgrounds, their role under **UNIFIL is strictly non-combatant.**

- UN peacekeepers are required to remain neutral and can only operate with the permission of the host country. Their duties range from monitoring ceasefires to facilitating political processes and protecting civilians UNIFIL's Presence and Personnel
- UNIFIL **is one of the largest UN peacekeeping missions**, with over 10,000 personnel from 50 countries. As of September 2024, some of the top contributing countries include Indonesia, Italy, India, Nepal, and Ghana, with over 1,000 peacekeepers each. Other nations such as Spain, France, Malaysia, and China also provide significant numbers of troops. The mission also includes approximately 800 civilian staff members who support its global operations.

Operations Along the Blue Line

- UNIFIL operates primarily along the Blue Line, a 120-kilometre boundary established by the UN in 2000 to confirm Israel's full withdrawal from southern Lebanon. This area, spanning 1,060 square kilometres between the ***Litani River and the border,*** is a highly sensitive region due to its proximity to both Hezbollah forces and Israeli military operations. To prevent conflict, both Israel and Lebanon are required to notify UNIFIL of any military activities or security operations near the Blue Line in advance.

India-Canada Bilateral Relations

India decided to withdraw its High Commissioner and other affected diplomats and officers from Canada.

India-Canada Bilateral Relations

- **Foundation of Ties:** India-Canada relations are based on shared values of democracy, cultural diversity, financial engagement, and people-to-people connections.
- **High-Level Exchanges:** In 2015, PM Modi visited Canada, leading to a couple of agreements.
- In 2018, Trudeau visited India, signing 6 agreements in various sectors.
- **COVID-19 Cooperation:** Leaders discussed vaccine collaboration and evacuation of stranded citizens.
- **G-7 Meeting (2022):** The PMs met to enhance bilateral relations.
- **G20 Summit (2023):** Trudeau attended the summit in India and met Modi.
- **Bilateral Mechanisms:** Established dialogues in trade, energy, and foreign affairs, with recent consultations in 2023.
- **Security Cooperation:** Counter-terrorism efforts under a Joint Working Group set up in 1997.
- **Civil Nuclear Cooperation:** An agreement signed in 2010 for non violent nuclear power makes use of, with implementation oversight by a Joint Committee.
- **Energy Cooperation:** Expanded Ministerial degree Energy Dialogue since 2018 to consist of renewables.
- **Space Collaboration:** MoUs signed for satellite tv for pc monitoring and astronomy; ISRO has launched Canadian satellites.
- **Economic Relations:** Total bilateral trade in 2023 reached USD 9.36 billion, with a huge carrier alternate.
- Canadian investments in India exceed CAD 75 billion, with over 600 Canadian businesses running in India.
- **Exports:** Pharmaceuticals, electronic goods, rings, seafood, engineering goods.
- **Imports:** Minerals, pulses, potash, and chemicals.
- **Science and Technology Cooperation:** Multiple MoUs signed for research and technological collaboration.
- **Education:** Largest foreign student demographic in Canada is Indian, with

around 427,000 students.

- **People-to-People Relations:** Canada has a high Indian diaspora (about 1.8 million), contributing to its economic system and society.
- **Cultural Exchanges:** Co-production agreements in movies and joint projects among Canada Post and India Post.
- ICCR chairs installed at diverse Canadian universities to foster cultural cooperation.

Diplomatic row

- In September 2023, Canadian PM Trudeau alleged Indian involvement in the homicide of Hardeep Singh Nijjar, which India rejected.
- India counseled its nationals in Canada and suspended visa services for Canadians.
- **Visa Resumption:** Services resumed in precise classes in October and e-visas for positive classes in November 2023.
- The Ministry of External Affairs stated the "unsubstantiated allegations" sought to shift awareness away from "Khalistani terrorists and extremists who have been provided safe haven in Canada".
- Concerns had been raised about the safety of Indian diplomats, pointing out that the Trudeau Government's moves make a contribution to an atmosphere of extremism and violence.

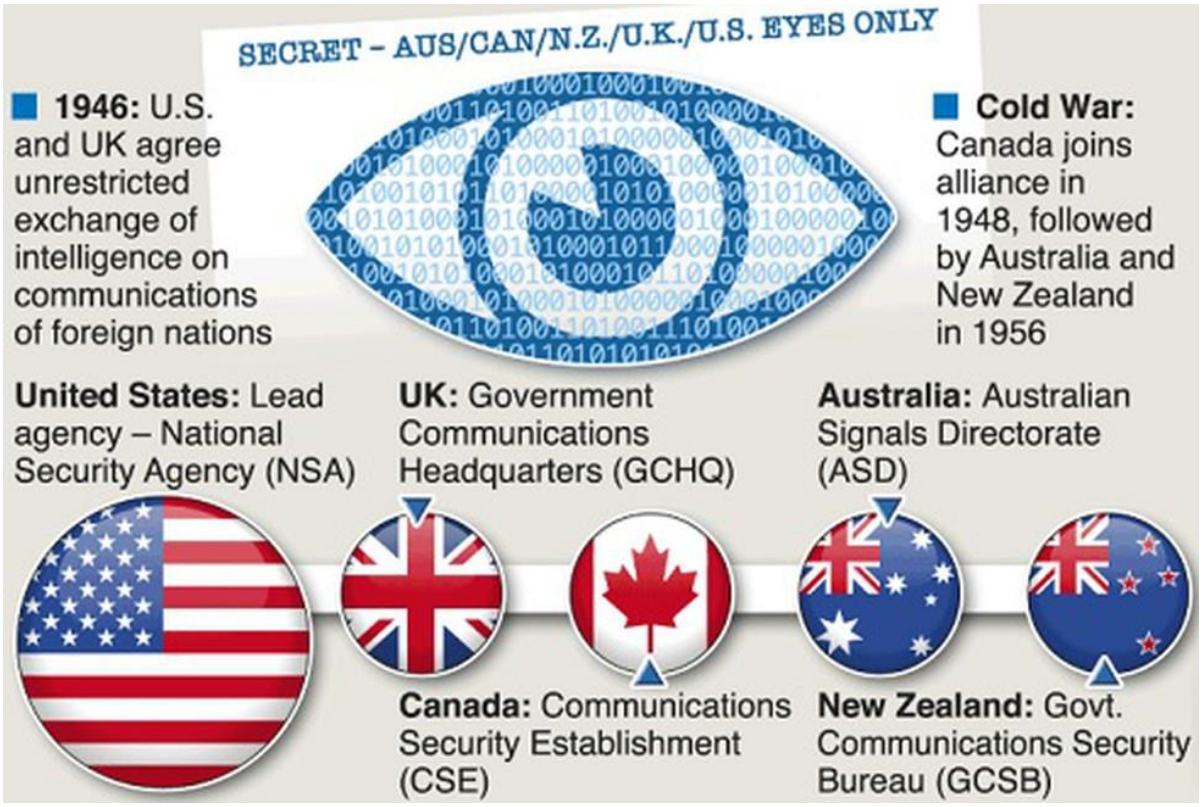
Future Outlook

- The Government of India strongly rejects preposterous imputations and ascribes them to the political agenda of the Trudeau Government that is centered around vote bank politics.
- India indicated it reserves the proper to take in addition moves in response to what it perceives as the Trudeau Government's assistance for extremism and violence towards India.

Five Eye Alliance

1. **Members:** The alliance includes five English-speaking countries — Australia, Canada, New Zealand, the United Kingdom, and the United States.
2. **Purpose:** It is a multilateral intelligence-sharing network, primarily focused on surveillance and signals intelligence (SIGINT).
3. **Classified information:** Intelligence shared is marked as 'Secret—AUS/CAN/NZ/UK/US Eyes Only,' giving the alliance its name.
4. **Background:**
    a. Evolved during World War II to counter the Soviet threat during the Cold War.
    b. The U.S. and U.K. collaborated after breaking German and Japanese codes.
5. **Formation:**
    a. In 1946, the BRUSA Agreement (now UKUSA Agreement) formalized the intelligence-sharing partnership between the U.S. and U.K.
    b. Initially focused on signals intelligence like radio and satellite communications.
6. **Expansion:**
    a. Canada joined in 1948, followed by Australia and New Zealand in 1956, making it a five-nation alliance.
7. **Scope:** The alliance covers six key areas, including traffic analysis, cryptanalysis, decryption, and acquisition of communication-related information.
8. **Significance:** The Five Eyes Alliance is one of the most extensive intelligence-sharing networks in the world, key in modern global surveillance and intelligence operations.

OUR TEST 8. QN. NO.51
Per and polyfluoroalkyl substances are used in 1. Water...2. Stain...
Which of the above statements is/are correct?
Expln...**Given with source link**
UPSC PRELIMS 2024 QUESTION
With reference to **perfluoroalkyl and polyfluoroalkyl substances (PFAS)** .....
1. PFAS are found to be widespread in ..
2 PFAS are not easily degraded ...
3. Persistent exposure to PFAS ....
Which of the statements .. are correct?
70+ QNS DELIVERED
PRELIMS - 2025
IS KILLABLE BY
SKILLING WITH OUR
TEST SERIES.
FROM NOV 17
RAJA SIR'S CRACKING IAS ACADEMY Since 2005 - Feel the pulse of UPSC
PFAs
STAY OUT OF THE DANGER ZONE
ONLINE (ALL INDIA)/OFFLINE (CLASSROOM)
9884 554 654
TOTAL - 30 TESTS - (25 UNIT + 05 FLT)
HIGHLIGHTS
* Explanation pdf with source links
* Discussion session
* Hidden remote questions covered
* Current affairs centric questions
Door No: 1124, 1st street,
G-Block 11th Main Road, Anna Nagar,
Landmark: Tik Tak Cafe,
CHENNAI - 600040.
19 YEARS OF ETHICAL IAS COACHING



India Canada diplomatic row explained

India has ordered the expulsion of six Canadian diplomats, including Acting High Commissioner Stewart Wheeler. It also announced the withdrawal of its own High Commissioner and other diplomats from Canada, citing security concerns.

This comes after Canada identified these Indian diplomats as "persons of interest" in an ongoing investigation into the killing of Khalistan separatist Hardeep Singh Nijjar in 2023.

India-Canada Relation

- **Background**
  - Diplomatic relations between the two countries were established in 1947.
  - Bilateral relation was elevated to a strategic partnership during PM Modi's visit to Canada in 2015.
- **Commercial relations**
  - **Bilateral Trade Relation -**India was Canada's 10th largest trading partner.
- **India's total exports to Canada** added up to US$ 4.10 billion in 2022-23, up from US$ 3.76 billion in 2021-22.
- **India's imports from Canada** added up to US$ 4.05 billion in 2022-23, up from US$ 3.13 billion in 2021-22.
- **CEPA/EPTA negotiations**
  - In March 2022, the two countries had agreed to re-launch the Comprehensive Economic Partnership Agreement (CEPA) negotiations.
  - Both the countries also decided to have an interim agreement or Early Progress Trade Agreement (EPTA) that could bring commercial gains to both.
  - Trade talks were paused in September 2023 following the diplomatic row over the killing of Nijjar.
- **Nuclear Cooperation**

- Canadian aid to India in the nuclear field begun in 1956. However, this relationship deteriorated in 1974 after India conducted **Smiling Buddha nuclear test**.

- Canada was among the first countries to participate in India's nuclear power program.
- CIRUS, the first research reactor to be built in India, was built with the help of Canada.
  - Later, in June 2010, the nuclear cooperation was restored when a Nuclear Cooperation Agreement (NCA) with Canada was signed.
- **People-to-People**
  - Canada hosts one of the largest Indian diasporas in the world, numbering 1.6 million (PIOs and NRIs) which account for more than 4% of its total population.
- In the field of politics, in particular, the present House of Commons (total strength of 338) has 22 Members of Parliament of Indian-origin.

Challenges in India-Canada relations

- **Separatist Khalistani groups**
  - Canada has been providing a safe haven for separatist Khalistani groups, which New Delhi sees as the Liberal Party's pandering to these groups for votes.
- Diaspora Sikhs are well represented in the Trudeau government. Some of them are politically supported by pro-Khalistan groups.
- Jagmeet 'Jimmy' Dhaliwal, whose New Democratic Party supports Trudeau's minority government in Parliament, is viewed with suspicion by the Indian establishment.
  - Last year, New Delhi objected to Canada permitting a Khalistani secessionist referendum in the Sikh diaspora.
- **Canada is slow to act against anti-India elements on its soil**

- Concerns that Canada is slow to act against anti-India elements on its soil have been a constant irritant in the relationship.
- A massive controversy had erupted, in June 2023, over a social media video of a parade float depicting late PM Indira Gandhi's assassination in Canada.

- A female figure was shown in a blood-stained white saree, with the hands up, as turbaned men pointed guns at her.
- The parade seemed to celebrate the assassination of former Prime Minister Indira Gandhi.
  - The parade was allegedly organised by pro-Khalistani supporters days before the 39th anniversary of 'Operation Bluestar' (celebrated on June 6).
- **Other irritants include**
  - Attacks on Indian-origin people;
  - Canadian comments over India's farmer protests and India's cancellation of diplomatic talks in response.

India-Canada Diplomatic row: Background

- **Death of the Khalistan Tiger Force (KTF) chief**
  - Hardeep Singh Nijjar, wanted by the Indian government, was killed in a targeted shooting in June 2023.
- In 2022, the National Investigation Agency (NIA) declared a Rs 10 lakh reward on Nijjar.
- This was after he was accused of conspiring to kill a Hindu priest in Punjab's Jalandhar.
  - Nijjar was shot dead outside a gurdwara in Surrey.
- **Issue raised on the sidelines of G20 Summit**
  - On the sidelines the G20 Summit in Delhi on September 10, Canadian PM and PM Modi had discussed Khalistani extremism.
  - He also raised the issue of foreign interference in this murder and asked

India for cooperation in the investigation.

- On the other hand, during the meeting, PM Modi had expressed his deep concerns to Canadian PM about the ongoing anti-India activities being carried out by extremist elements in Canada.

- **PM Trudeau raises the issue in the parliament of Canada**
  - On September 18, 2023, Trudeau told parliament that Canada was actively pursuing credible allegations, linking Indian government agents to Nijjar's killing.
  - India dismissed Trudeau's assertion as absurd.
  - Each country expelled a diplomat in tit-for-tat moves, with Canada throwing out India's top intelligence officer in the country while India expelled his Canadian counterpart.

Recent Diplomatic Escalation

- **India's Response and Diplomatic Withdrawal**
  - India stated it was withdrawing its diplomats due to safety concerns, accusing the Trudeau government of not ensuring their security.
  - By the evening of October 14, India's MEA summoned Canadian diplomats and informed them of the decision to expel six of their diplomats.
  - These developments followed Ottawa naming India's High Commissioner to Canada and a few other diplomats as 'persons of interest' in the investigation into Khalistani terrorist Hardeep Singh Nijjar's murder.
- **Long-standing Tensions in India-Canada Relations**
  - India has been critical of Trudeau's stance on various issues, including his support for the farmers' protests in India and his perceived leniency towards Khalistani separatist movements.
  - India accused Canada of sheltering extremists and disregarding extradition requests for individuals involved in organized crime and terrorism against India.

- **Canada's Position and Evidence**
    - The Acting High Commissioner of Canada claimed that Canada had presented credible evidence linking Indian agents to Nijjar's murder and urged India to cooperate in the investigation.

Allegations by Canadian Police Against Indian Government

- The Royal Canadian Mounted Police (RCMP) accused Indian government agents of collaborating with the Lawrence Bishnoi gang to spread terror in Canada.
- Lawrence Bishnoi, a gangster from Punjab currently imprisoned in India, is suspected by the Mumbai police to be involved in the recent killing of former MLA Baba Siddiqui.
- Bishnoi's criminal network is reportedly active in Canada, and Canadian authorities allege that the Indian government has used this network for targeting dissidents.

Italy-Albania Migration Pact

1. **Migration pact signed:** Italy's far-right Prime Minister, Giorgia Meloni, and Albanian Prime Minister, Edi Rama, signed a pact in November 2022 to manage asylum claims of migrants.
2. **Asylum processing in Albania:** Under the agreement, migrants intercepted at sea are sent to Albania, where their asylum claims are processed.
3. **Screening criteria:** Only men from "safe" countries such as Bangladesh and Egypt are sent to Albania; vulnerable individuals, including women, children, and men with illnesses or signs of torture, are taken to Italy.
4. **Places in news:**
    a. **Schëngjin**: Port where intercepted migrants arrive in Albania.
    b. **Gjadër**: Location of the former Albanian air force site used to hold migrants while processing their asylum claims.
    c. **Lampedusa**: Southern Italian Island where vulnerable migrants are taken

after screening.

Korean Peninsula

1. **Japanese occupation:** Korea was under Japanese control from 1910 to 1945.
2. **Post-WWII division:** After Japan's defeat, Korea was split along the **38th parallel**. The **USSR** controlled the North, and the **USA** controlled the South.
3. **Korean war:** In **1950**, North Korea, backed by the USSR, invaded South Korea. The war ended with an **armistice in 1953**, creating the **Demilitarized Zone (DMZ)** but no formal peace treaty was signed.
4. **Nuclear development:** North Korea has pursued nuclear weapons, leading to international sanctions.

Present status:

- **Military build-up:** North Korea has ramped up its nuclear program, conducting multiple missile tests, and fortifying its borders.
- **Diplomatic stalemate:** Despite previous peace talks, North Korea declared South Korea as its "primary foe" in 2024, ending hopes for reunification.
- **Nuclear tests:** North Korea has withdrawn from the **Non-Proliferation Treaty (NPT)** and has tested nuclear weapons multiple times.

International Implications

- **Global conflicts:**Rising tensions in the Korean Peninsula coincide with other global conflicts, such as Russia-Ukraine and Israel-Palestine.
- **Major power involvement:**Key stakeholders in the Korean Peninsula, including the U.S., China, and Russia, are involved in a broader strategic competition.
- **Conflict possibilities:**While a major conflict may be avoided due to alliances and nuclear deterrence, incidents or skirmishes are possible.
- **Complex alliances:**North Korea's ties with China and Russia and South Korea's alignment with the U.S. add complexity to ongoing global conflicts.



India's stand:

- **Neutral position**: India opposes North Korean nuclear tests but has maintained a neutral stance on sanctions.
- **Diplomatic relations**: India maintains diplomatic ties with both Koreas. It played a significant role in the **1953 ceasefire** and helped negotiate peace.
- **Strategic partnerships**: India has a **special strategic partnership** with South Korea, playing a role in South Korea's **Southern Policy** and India's **Act East Policy**. India also has diplomatic relations with North Korea.

Way ahead:

- **Diplomatic engagement**: Resume dialogue to reduce military tensions and avoid further escalation.
- **International cooperation**: Leverage diplomatic ties with major players like China, Russia, and the US to mediate peace.
- **Denuclearization talks**: Revive international talks on North Korea's denuclearization.

North and South Korea remain in a delicate and volatile situation, with military tensions rising. A sustained diplomatic effort is crucial for reducing hostility and avoiding a potential conflict, while India can play a supportive role in maintaining regional stability.

India-Mauritius Bilateral Cooperation

In a notable step towards enhancing bilateral relations, India has extended a **Line of Credit (LoC)** worth Rs 487.60 crore to the Government of Mauritius. This financial assistance aims to replace approximately 100 kilometers of outdated water pipelines in the island nation. This marks the **first-ever rupee-denominated Line of Credit** extended by India to any country for project financing under the **Indian Development and Economic Assistance Scheme (IDEAS).**

Key Details of the Line of Credit

- **First Rupee-Denominated Line of Credit:** This LoC is the first-ever rupee-denominated Line of Credit extended by India for project financing under the **Indian Development and Economic Assistance Scheme (IDEAS).**
- Traditionally, India has extended its Lines of Credit in US dollars, but the introduction of a rupee-denominated LOC marks a strategic shift.
- This scheme aims to provide concessional loans to support developmental projects in partner countries.

- **Financing Agency:** The project will be financed by the **State Bank of India (SBI)** on concessional terms, ensuring affordable repayment conditions for Mauritius.
- **Project Objectives:** The primary objective of this financial assistance is to facilitate the replacement of around 100 kilometers of obsolete water pipelines in Mauritius. The existing pipeline infrastructure has been deemed outdated and in need of urgent replacement to ensure efficient water supply and management.
- **Impact on Mauritius**
    - **Infrastructure Improvement:** The project is expected to enhance the reliability and quality of water supply for the residents of Mauritius.
    - **Sustainable Development:** By improving water infrastructure, India aims to contribute to the sustainable development goals of Mauritius, promoting better health and hygiene standards.

India-Mauritius Relationship

- India and Mauritius formally established diplomatic relations in 1948.
- Their shared history and connections go as far back as **1730** through successive **Dutch, French and British occupation.**
- With over 70% of Mauritius'' 1.2 million population being of Indian origin, the two nations enjoy a deep connection that extends beyond formal diplomatic relations.
- The LOC comes at a time when both countries are celebrating the **75th anniversary of the establishment of diplomatic ties.**
- It also aligns with the broader framework of **India's "Act East" policy**, under which India has sought to deepen its engagement with countries across Asia and the Indian Ocean region.

What is IDEAS initiative?

- The IDEAS initiative, under which this LOC has been extended, is India's flagship development assistance programme.
- It aims to support infrastructure, capacity-building, and social welfare projects

across **Asia, Africa, and the Caribbean.**

- By providing concessional loans, India enables recipient nations to tackle pressing developmental challenges while avoiding crippling debt burdens.

India-Mauritius Relationship

- India and Mauritius formally established diplomatic relations in 1948.
- Their shared history and connections go as far back as **1730** through successive **Dutch, French and British occupation.**
- With over 70% of Mauritius'' 1.2 million population being of Indian origin, the two nations enjoy a deep connection that extends beyond formal diplomatic relations.
- The LOC comes at a time when both countries are celebrating the **75th anniversary of the establishment of diplomatic ties.**
- It also aligns with the broader framework of **India's "Act East" policy**, under which India has sought to deepen its engagement with countries across Asia and the Indian Ocean region.

What is IDEAS initiative?

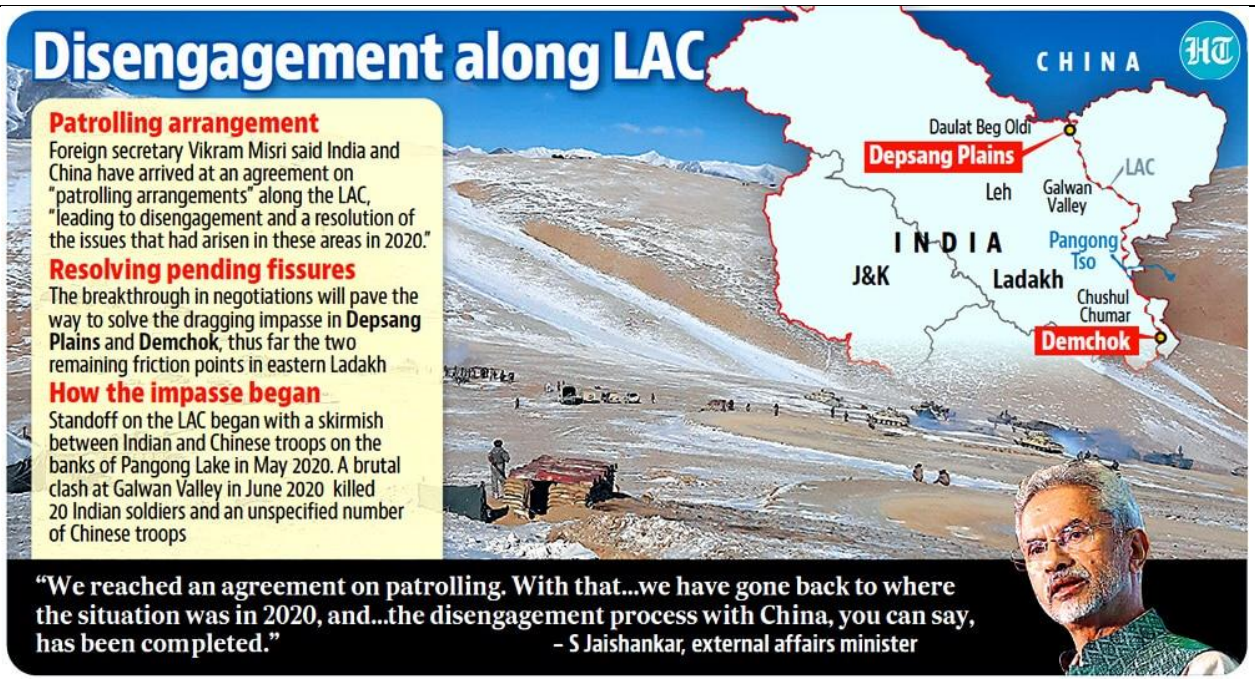
- The IDEAS initiative, under which this LOC has been extended, is India's flagship development assistance programme.
- It aims to support infrastructure, capacity-building, and social welfare projects across **Asia, Africa, and the Caribbean.**
- By providing concessional loans, India enables recipient nations to tackle pressing developmental challenges while avoiding crippling debt burdens.

India-China Border Patrol Agreement

India and China have reached a signiificant agreement to restore patrolling rights to each in the **Depsang Plains and Demchok region**, these are areas where the problems are called **legacy issues**, predating the **2020 Chinese incursions.**

Background (The Galwan Clash Backdrop)

- In a major escalation along the Line of Control, Indian and Chinese troops clashed in the Galwan Valley on June 15, 2020.
- This incident was the first deadly confrontation in the region since 1975 and resulted in casualties on both sides.
- The root cause is an **ill-defined, 3,440km (2,100-mile)-long disputed border**. Rivers, lakes and snowcaps along the frontier mean the line often shifts, bringing soldiers face to face at many points, sparking a confrontation.
- Border infrastructure developments and differing perceptions of the LAC had triggered the clash.
- Following the clash, both sides engaged in de-escalation talks amid heightened tensions in bilateral ties.
- The PLA''s 2020 incursions had severely restricted Indian Army patrols at key points in the **Depsang Bulge and CNN Junction.**
- However, the establishment of buffer zones in areas like **Galwan, Khugrang, Gogra-Hot Springs, and Pangong Tso** helped reduce tensions.



Key Points of the Deal

- The two sides have agreed that patrolling in the following two areas will be carried out up to the old patrolling points along the LAC.
- Depsang Plains in the north of Ladakh
- Demchok in the south of Ladakh
- This means that Indian troops can patrol up to **patrolling point (PP) 10 to 13** in the **Depsang Plains**, and in **Charding Nullah of Demchok.**
- **Ongoing Disengagement Process**: The deal is part of a larger disengagement process that has seen successful pullbacks at several flashpoints, including **Pangong Tso, Gogra, and Hot Springs**. The current focus on **Depsang and Demchok** represents a willingness to address the more challenging aspects of the border dispute.

The Other Friction Points

- Besides Galwan, there are at least four other friction points along the Line of Actu

Control. These are all disputed areas where Indian and Chinese soldiers fought in the 1962 war.

- **Demchok**: Demchok is split by the LAC. India controls the western part. The eastern side is under the control of China, which also claims the western part. The dispute hinges on historical treaties and the precise alignment of the LAC along the Charding Nullah. Recent talks aim at disengagement.

- **Pangong:** About 50 per cent of Pangong Lake area is in Tibet (under Chinese control), 40 per cent in Ladakh and 10 per cent is disputed. Discrepancies in LAC perceptions lead to military standoffs and buffer zones, with ongoing construction and strategic positioning reflecting the tensions and claims by both nations.

- **Hot Springs:** Located near Gogra Post, the Hot Springs area is significant for India due to its strategic location which facilitates surveillance over LAC. India''s control over this region enhances its defence posture, providing vantage points for monitoring movements in Aksai Chin, thus playing a crucial role in border security dynamics.

- **Depsang:** Depsang plains are critical for India due to their strategic access to the Daulat Beg Oldie (DBO) airstrip and the Darbuk-Shyok-DBO road. Control over Depsang prevents Chinese forces from threatening these vital logistics lines, making it essential for India''s northern border defence and military mobility.

Shadow Fleet / Dark Fleet ??

The term "**shadow fleet**" has gained traction in discussions surrounding the **Russia-Ukraine conflict**, particularly regarding the transportation of Russian crude oil.

Western media outlets depict this fleet as a network of tanker ships allegedly "laundering" Russian crude, with implications that countries like India are complicit in circumventing international sanctions.

What Are Sanctions?

- Sanctions are **punitive measures** imposed by one or more countries against another country, entity, or individual to influence behavior, often in response to geopolitical conflicts.
- In the context of **Russia"s invasion of Ukraine**, the U.S. has implemented several sanctions aimed at **limiting Russia"s ability to finance its military operations** through oil sales.

Mechanisms of Sanction Enforcement

- **Asset Seizure and Freezing**: U.S. sanctions target entities and individuals that violate these measures by seizing assets within the U.S. and freezing bank accounts linked to the Western banking system.
- **Price Cap on Oil Sales**: The sanctions dictate that Russia can only sell its crude oil at a maximum price of USD 60 per barrel, a strategy intended to curtail its profits and reduce funding for military actions.

Structure of Global Shipping

- The global shipping industry is multifaceted, comprising various stakeholders, ship owners, and regulatory frameworks.
- **Ownership and Flags**: The industry is dominated by Greek ownership (20% of the global fleet), with significant contributions from China and Japan. Ships are registered under flag states, which ideally indicate their country of origin.
- **Flags of Convenience (FoCs)**: Nations like Panama and Liberia allow ship owners to register vessels under their flags to benefit from lower regulatory scrutiny and tax advantages, obscuring ownership.

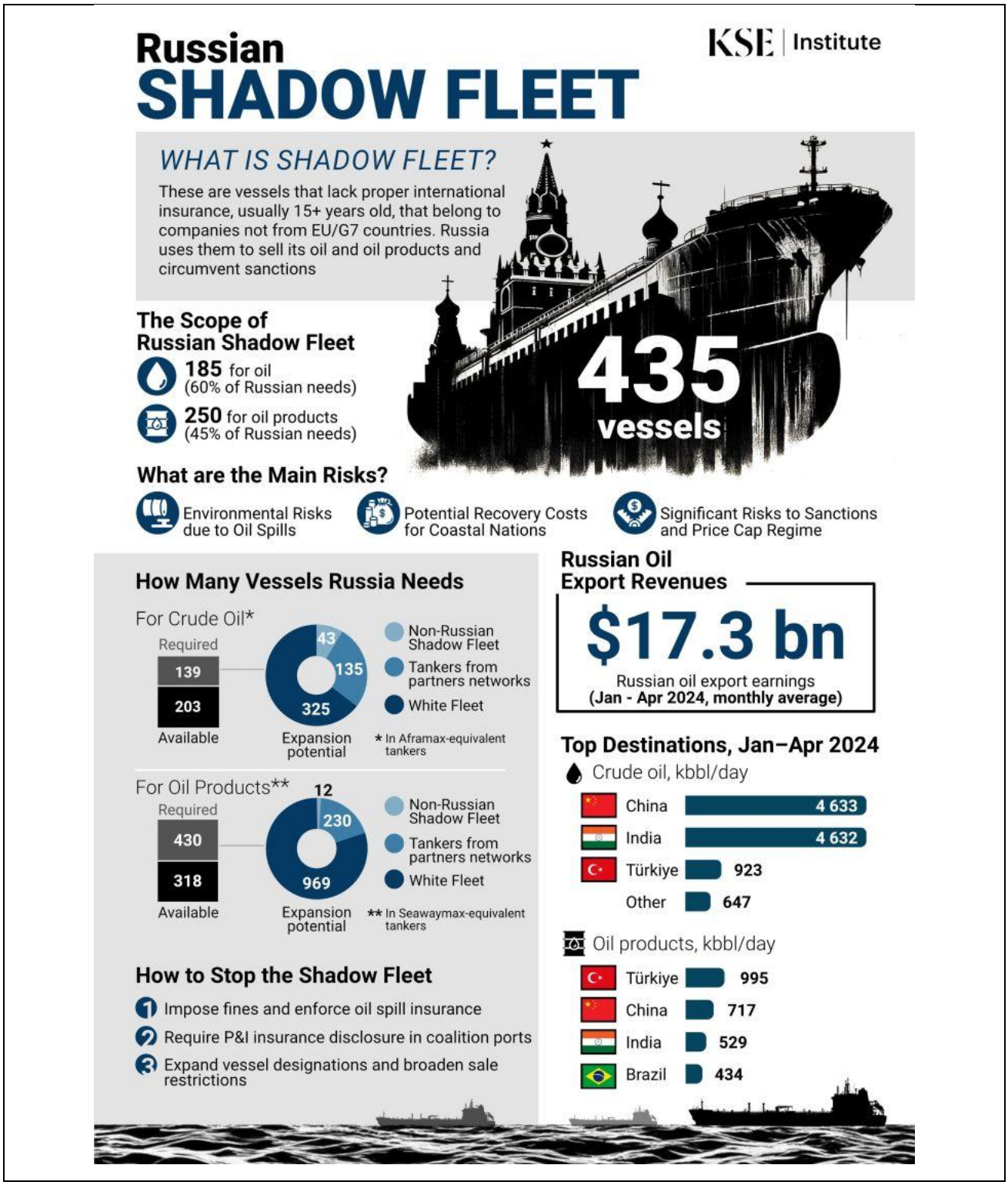
- **Classification Societies**: These organizations certify ships for safety and environmental compliance, facilitating insurance coverage, including Protection and Indemnity (P&I) insurance for liabilities.

Challenges in Enforcing Sanctions-

- **Complex Ownership Structures**: Many vessels operate under intricate ownership models, often involving shell companies that disguise the true ownership and origin of the ships.
- **Flag Switching**: Ships may change their flag to evade scrutiny, utilizing FoCs that do not comply with rigorous international maritime regulations.
- **Insurance Loopholes**: Ship owners can navigate around P&I insurance risks by contracting with European managers or registering under non-compliant jurisdictions.

India"s Role and Accusations-

- **Increased Registration**: Following the sanctions, many Russian vessels sought connections with Indian shipping firms, resulting in a rise in registrations with the Indian Register of Shipping (IRS). Critics argue this links India to the shadow fleet narrative.
- **Dubai as a Hub**: Many Russian vessels shifted operations to Dubai, where Indian entities have a significant presence, raising concerns about the laundering of Russian crude.
- **IRS Defense**: The IRS has stated that its primary responsibility is ensuring vessel safety and that it provides classification services to ships under flags like Liberia and Cyprus, which do not raise immediate red flags.


Russian
SHADOW FLEET
KSE | Institute
WHAT IS SHADOW FLEET?
These are vessels that lack proper international insurance, usually 15+ years old, that belong to companies not from EU/G7 countries. Russia uses them to sell its oil and oil products and circumvent sanctions
435 vessels
The Scope of Russian Shadow Fleet
185 for oil (60% of Russian needs)
250 for oil products (45% of Russian needs)
What are the Main Risks?
Environmental Risks due to Oil Spills
Potential Recovery Costs for Coastal Nations
Significant Risks to Sanctions and Price Cap Regime
How Many Vessels Russia Needs
For Crude Oil*
Required
139
203
Available
43
135
325
Expansion potential
Non-Russian Shadow Fleet
Tankers from partners networks
White Fleet
* In Aframax-equivalent tankers
For Oil Products**
Required
430
318
Available
12
230
969
Expansion potential
Non-Russian Shadow Fleet
Tankers from partners networks
White Fleet
** In Seawaymax-equivalent tankers
How to Stop the Shadow Fleet
1 Impose fines and enforce oil spill insurance
2 Require P&I insurance disclosure in coalition ports
3 Expand vessel designations and broaden sale restrictions
Russian Oil Export Revenues
$17.3 bn
Russian oil export earnings
(Jan - Apr 2024, monthly average)
Top Destinations, Jan–Apr 2024
Crude oil, kbbl/day
China 4 633
India 4 632
Türkiye 923
Other 647
Oil products, kbbl/day
Türkiye 995
China 717
India 529
Brazil 434

CHINA TAIWAN ISSUE AND INDIA

- China strongly objected to Taiwan''s opening of a new **Economic and Cultural Centre (TECC)** in Mumbai.

Details

- **China''s objection to Taiwan opening a new Economic and Cultural Centre (TECC) in Mumbai is rooted in its strict "One-China Principle.**" This principle asserts that there is only one China, with Taiwan being an inseparable part of it, and that the People''s Republic of China (PRC) is the sole legal government of China.

Why Taiwan Opened TECC in Mumbai?

- **The TECC in Mumbai is Taiwan's third office in India, following those in New Delhi and Chennai.** These offices are part of Taiwan's strategy to strengthen economic and cultural ties with India.
- **The center promote cultural exchanges and provide visa services, acting like embassies without formal diplomatic recognition,** they promote Taiwanese culture and strengthen economic partnerships.
- With Taiwan being a major hub for technology and semiconductors, **the TECC aims to enhance trade and investment between the two regions.** Bilateral trade between Taiwan and India has grown significantly, from $2 billion in 2006 to $8.9 billion in 2021.
- **Taiwan's "New Southbound Policy" aims to reduce its economic dependence on China** by strengthening ties with South and Southeast Asian countries, including India.

Why has China objected?

- **China views Taiwan''s international engagements as attempts to assert its independence.** By opening a TECC, Taiwan is seen as enhancing its official

presence abroad, which challenges China's claim over Taiwan.

- **China has reminded India of its commitment to the One-China Principle**, which it claims is essential for stable Sino-Indian relations. China believes that any official interaction between Taiwan and India undermines this principle.
- The roots of this tension go back to the **Chinese Civil War in the early 20th century.** After the war, Chiang Kai-shek's Nationalists retreated to Taiwan, claiming it as the legitimate government of China, while the Communists established the People''s Republic of China (PRC). **China always argues that any recognition of Taiwan is a challenge for its sovereignty.**

Geography of Taiwan

- Taiwan is **located in the East China Sea, between China, Japan, and the Philippines.** This strategic location makes Taiwan an important player in the East and Southeast Asia region.
- The Taiwan Strait is one of the busiest waterways in the world, it is essential for regional trade, therefore, any conflict in this area could disrupt global trade routes; especially affecting Southeast Asian economies.

Political Status

- **Since 1949, after the Chinese Civil War, Taiwan has functioned independently.** The Nationalist Party (Kuomintang) retreated to Taiwan after being defeated by the Communist Party of China.
- Taiwan operates as a separate nation with its own government, president, military, and constitution. However, China views Taiwan as a breakaway province and insists on the "One-China Policy."

International Recognition

- **Only 11 countries officially recognize Taiwan as a sovereign state,** including the United States, which acknowledges the One-China Policy but maintains

unofficial relations with Taiwan.

- Despite limited official recognition, many countries are concerned about potential conflict between China and Taiwan due to its implications for global trade, especially in the electronics industry where Taiwan is a key player.

China-Taiwan Relations

- The conflict traces back to the Chinese Civil War (1945-1949). After the Communist Party, led by Mao Zedong, won the war, the defeated Nationalist Party established a separate government in Taiwan. China asserts that there is only one China and Taiwan is part of it. Taiwan, however, operates independently with its own government and military.
- **China frequently conducts military drills near Taiwan, showing its military capabilities and signaling its willingness to use force if necessary.** Taiwan seeks international recognition and support, however, China pressures countries and international organizations to diplomatically isolate Taiwan.

India and the China-Taiwan issues

Diplomatic Stance

- **India does not officially recognize Taiwan as a separate country due to its commitment to the One-China Policy, however, India maintains informal relations with Taiwan.** Growing tensions between India and China, especially after the 2020 Galwan Valley clashes, have led India to reconsider its strategic partnerships, including with Taiwan.

Economic Relations

- Trade between India and Taiwan has been growing. **In 2023, total bilateral trade was $8.224 billion, with Taiwan exporting $6.013 billion and India importing $2.211 billion.** Taiwanese companies have invested in various sectors in India, including IT, electronics, and manufacturing.



Challenges and Way Forward

- **India's commitment to the One-China Policy limits the scope of its official engagement with Taiwan.** Any clear support for Taiwan could provoke a strong reaction from China. **India must balance its relations with both China and Taiwan to avoid regional conflict and maintain stability.**
- Strengthening economic ties with Taiwan could provide India the technical advancements and investment opportunities, collaborating on regional security issues can help India to counterbalance China's growing influence in the Indo-Pacific region.

Conclusion

- The Indian approach towards the China-Taiwan issue needs to be a balance of maintaining its commitment to the One-China Policy while exploring economic and strategic opportunities with Taiwan.

BRICS Summit 2024

- The 16th BRICS Summit concluded with the adoption of the *'Kazan Declaration',* a comprehensive document outlining key areas of cooperation and the bloc''s unified stance on global issues.

Key Outcomes of the Kazan Declaration

- Under the theme *"Strengthening Multilateralism for Just Global Development and Security",* the Kazan Declaration emphasised the importance of BRICS solidarity and strategic partnerships. The leaders pledged their commitment to fostering peace, ensuring a fairer international order, and promoting sustainable development.

The key-outcomes are as follow:

Geopolitical Concerns

- **Diplomatic Resolutions for International Conflicts**: The summit highlighted the critical need for peaceful resolutions to international conflicts through diplomacy. The declaration underscored the importance of adhering to the United Nations Charter, particularly in relation to the ongoing Ukraine conflict.
- **Concerns Over Palestine**: The situation in Palestine was a focal point of concern, with the declaration noting the severe humanitarian crisis in the **Occupied Palestinian Territory**. The BRICS leaders voiced their grave apprehension regarding the escalation of violence in Gaza and the West Bank, calling for immediate measures to alleviate the situation.
- **Middle East Crisis**: The declaration also addressed the escalating humanitarian crisis in the Middle East, particularly in Southern Lebanon. Leaders condemned the civilian casualties and damage to infrastructure resulting from military actions, urging for a cessation of hostilities.

Global Governance and Multilateralism

- **Role of the G20**: The importance of the G20 in global decision-making processes was emphasized. The leaders recognized the necessity for the G20 to function effectively, advocating for a consensus-driven approach focused on achieving tangible outcomes.
- **Reform of Financial Architecture**: The BRICS nations reiterated their commitment to reforming the international financial architecture to enhance global governance. They called for a more agile and representative multilateral system capable of addressing financial challenges, stressing the need for reforms that promote inclusive growth.
- **Innovative Financial Practices**: The declaration encouraged the exploration of new financial practices, highlighting the **BRICS Interbank Cooperation Mechanism (ICM)** as a means to facilitate innovative financial solutions.

Economic Cooperation and Local Currencies

- **Strengthening Trade in Local Currencies**: A significant aspect of the summit was the agreement to enhance trade and financial settlements in local currencies. The declaration welcomed initiatives aimed at utilizing local currencies for BRICS financial transactions and establishing independent cross-border settlement infrastructures.
- **BRICS Grain Exchange**: The leaders endorsed the initiative to create a BRICS Grain Exchange, which would facilitate commodities trading within the bloc.
- **Expansion of BRICS**: Recognizing the growing interest from nations in the Global South, the leaders established a BRICS Partner Country category. New members, including Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE, are welcomed to join the bloc, indicating a commitment to expanding BRICS influence and partnerships.

Pandemic Preparedness and Environmental Conservation

- **Health Initiatives**:. Leaders supported initiatives related to vaccine research and development, early warning systems for infectious diseases, and the establishment of a BRICS TB Research Network.
- **Addressing Antimicrobial Resistance**: The Kazan Declaration acknowledged the threat posed by antimicrobial resistance **(AMR), welcoming the outcomes of the UNGA** High-Level Meeting on AMR.
- **Conservation of Big Cats**: India''s initiative for an **International Big Cats Alliance** received recognition, with BRICS countries pledging to collaborate on the conservation of endangered species.

BRICS

- BRICS stands for **Brazil, Russia, India, China and South Africa.**
- The group started in 2006, and **Brazil, Russia, India and China** convened for the first BRIC summit in 2009. **South Africa** joined a year later (2010).
- In August 2023, it was expanded to welcome five new members: **Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE.**
- The aim of the alliance is to challenge the economic and political monopoly of the West. The group sets priorities and has discussions once every year during the summit, which members take turns hosting.
- **Rising economic influence of BRICS nations:** BRICS member states now repres **45% of the world''s population**. The BRICS countries account for **35% of global GDP**. The bloc is responsible for about 25% of the world's exports.

UN Peacekeeping

- In recent incidents of global conflicts, the role of UN peacekeeping is very crucial. The **'bystander'** should be brought centre-stage and held accountable alongside the perpetrator for crimes against humanity.

Deatils of UN peacekeeping

- UN Peacekeeping is a joint effort between the **Department of Peace Operations and the Department of Operational Support.**
- It comprised **civilian, police and military personnel.**
- **Purpose**: Helps countries torn by conflict create conditions for lasting peace by providing security, political, and peacebuilding support.
- **Strengths**: Legitimacy, burden sharing, and ability to deploy troops globally; combines military, police, and civilian peacekeepers.
- **Structure**: Guided by the **UN Security Counci**l with mandates specific to conflict situations

Department of Peace Operations

- The Department of Peace Operations is a department of the United Nations charg with the **planning, preparation, management, and direction** of UN peacekeepin operations.
- **Founded**: **March 1992**
- The **first UN peacekeeping mission** was established in **May 1948**.
- The UN Security Council authorised the deployment of a small number of **UN military observers to the Middle East** to form the **United Nations Truce Supervision Organization (UNTSO)**
- To monitor the **Armistice Agreement** between Israel and its Arab neighbours.

UN Charter: Maintaining Global Peace

- **Chapter VI**: Focus on peaceful dispute settlements.
- **Chapter VII**: Authorises Security Council for armed force in aggression cases, member-states provide necessary forces.
- **Chapter VIII**: Promotes regional enforcement, authorised by Security Council.

Principles of UN Peacekeeping

- UN Peacekeeping is guided by **three basic principles:**
- **Consent of the Parties**: Operations require consent to avoid becoming a party to conflict.
- **Impartiality**: Peacekeepers must remain unbiased while implementing mandates.
- **Non-Use of Force**: Force is only used for self-defence or to protect the mandate.

Mandates and Functions

- **Conflict Prevention**: Prevent outbreak or spill-over of conflicts.
- **Ceasefire Stabilization**: Deploy post-ceasefire to stabilise regions.
- **Peace Agreement Implementation**: Assist in implementing comprehensive agreements.
- **Political Transition**: Support democratic and stable governance transitions.
- **Humanitarian aid:** Delivering humanitarian aid, supporting refugee reintegration, and promoting environmental sustainability

Contributions to Conflict Resolution

- **Conflict Prevention:** Deploying peacekeepers in high-risk areas prevents conflicts from escalating (e.g., Cyprus and Lebanon).
- **Ceasefire Monitoring:** Peacekeepers help monitor and verify ceasefires, supporting peace agreements between conflicting parties.
- **Humanitarian Support:** Peacekeepers facilitate humanitarian aid by securing safe corridors and aiding relief organisations.
- **Elections & Governance:** Peacekeepers assist in the establishment of democratic institutions and organise elections (e.g., Timor Leste, Cambodia).
- **Capacity Building**: They support local authorities in post-conflict reconstruction and training local police forces for future stability

Successes and Failures of UN Peacekeeping

Achievements in Peacekeeping

- Since 1948, it has **helped end conflicts and foster reconciliation** by conducting successful peacekeeping operations in dozens of countries, including Cambodia, El Salvador, Guatemala, Mozambique, Namibia and Tajikistan.
- **Successful UN peacekeeping missions:** Cambodia, Mozambique, Sierra Leone, Angola, Timor Leste, Liberia, Kosovo.
- **Recognition**: Awarded the **Nobel Peace Prize in 1988.**

Failures:

- **Rwanda (1994), Bosnia (1995) and Mali (2023)**: UN failed to protect civilians.
- **Recent Failures**: UN's inability to act decisively in Ukraine and Israel-Gaza conflicts.
- **Sexual abuse:** Accused of sexual abuse and exploitation in many countries, including Haiti, Bosnia, Cambodia, East Timor, Iraq, and the Democratic Republic of the Congo

India's contribution in peacekeeping missions

- **Troop contributions:** India has contributed more troops than any other country, with **over 253,000 personnel serving in 49 UN mission**s since 1948.
- As of December 31, 2023, India has **deployed 5,901 troops across 12 UN peacekeeping missions.**
- **Women in Peacekeeping:** In 2007, India became the first country to deploy an all-women contingent to a UN peacekeeping mission.
- Recently, **Major Radhika Sen,** an Indian woman peacekeeper, who served with the **UN mission in Congo**, will be honoured with a **prestigious military gender advocate award.**
- **Leadership**: India has provided and continues to provide force commanders for

UN missions.

- **Support**: India has also provided logistic support, peacekeeper training, and capacity development for the UN, host nations, and partner nations.
- The Indian Army has established the **Centre for United Nations Peacekeeping (CUNPK) in New Delhi** to impart training in peacekeeping operations.
- Trains more than **12,000 troops every year.**
- **Trust Fund:** India was the **first countr**y to contribute to the Trust Fund on **sexual exploitation and abuse**, which was set up in **2016**.
- **Recognition:** Indian peacekeepers have been **praised for their efforts** and high standards of performance.
- **Over 175 Indian peacekeepers** have **died** while serving in UN missions.
- **Commitment:** India's commitment to UN peacekeeping is based on the ancient Indian principle of **Vasudhavia Kutumbakam,** which means "the whole world is my family"

Challenges and Limitations of UN Peacekeeping

- **Veto power:** The **increasing polarization of the P5 members** has led to frequent use of veto power, which can prevent the timely deployment of peacekeepers.
- For example, in 2023, the **US vetoed a resolution calling for humanitarian pauses** in Gaza.
- **Resource Constraints**: The need for adequately trained and well-equipped forces can limit effectiveness.
- **Political Impediments**: The Security Council's veto power can hinder rapid intervention, as seen in the Rwanda genocide.
- **Complex Mandates**: Peacekeepers sometimes face mandates with unclear objectives, making it difficult to act decisively, e.g., in recent conflicts in **Ukraine** and **Gaza**.
- **Changing Nature of Conflicts**: Modern conflicts involve complex urban warfare,

cyber elements, and non-state actors, which traditional peacekeeping isn't equipped to handle.

- **Accusations of Bias**: UN forces sometimes face allegations of partiality, risking their credibility and mandate in the conflict zone.
- **Credibility Crisis:** Historical failures continue to haunt UN peacekeeping's reputation.
- **Regional Alternatives:** Regional organisations like African Union's peace operations in Somalia (ATMIS) are increasingly taking lead roles in peacekeeping operations

Measures for Strengthening UN Peacekeeping

- **Political Solutions and Conflict Resolution**: Enhance diplomatic and political approaches to prevent, manage, and resolve conflicts.
- **Expansion of Security Council Membership**: Proposed to include emerging powers like **India** and **South Africa** to enhance representation and decision-making balance.
- **Limit Veto Power**: Limiting or modifying veto use in **humanitarian crises** could enable faster deployment of peacekeeping forces.
- **Strengthening Mandates**: Empower peacekeeping forces with **clearer mandates** to protect civilians and use force when necessary to prevent large-scale atrocities.
- **Women, Peace, and Security**: Prioritize the integration of the Women, Peace, and Security (WPS) agenda by increasing the number of female peacekeepers and ensuring gender perspectives in all peacekeeping activities.
- **Protection of Civilians and Human Rights**: Strengthen mechanisms to safeguard civilians, especially in volatile conflict zones, by improving operational responsiveness and strengthening partnerships with local communities to enhance trust and security.
- **Safety and Security of Peacekeepers**: Invest in advanced technology, including

surveillance and early-warning systems, and improve training and resources to enhance peacekeepers' safety in high-risk environments.

- **Performance and Accountability**: Establish stringent performance and accountability frameworks to ensure that peacekeeping components meet high standards.
- Regular assessments and transparent reporting mechanisms should be applied to all peacekeeping missions.
- **Effective Partnerships**: Foster collaborative efforts with regional organisations, host governments, and other stakeholders.
- **Ethics and Conduct**: Enforce strict codes of conduct to maintain the credibility and integrity of peacekeeping missions.

UNITED NATIONS DAY

- United Nations Day is celebrated on October 24 every year to observe the establishment of the United Nations (UN) in 1945.
- United Nations Day 2024 marked the 79th anniversary of the **founding of the United Nations (UN) in 1945 on October 24.**
- The day highlights the importance of international cooperation in addressing global challenges such as peace, human rights, and sustainable development.
- The theme for United Nations Day 2024 has not yet been announced. Last year''s theme was "Equality, Freedom & Justice for All."

United Nations

- The UN was established after World War II with the aim of preventing future world wars and succeeded the League of Nations, which was characterized as being ineffective.
- On April 25, 1945, 50 nations assembled in San Francisco, California, to draft the UN Charter, which was adopted on June 25, 1945. The charter took effect on October 24, 1945, when the UN began operations. **As of October 2024, the UN has 193**

sovereign states.

- The organization is **financed by set and voluntary contributions from its member states.**

Objectives

- The UN''s objectives, as outlined by its charter, include:
- Maintaining international peace and security
- Protecting human rights
- Delivering humanitarian aid
- Promoting sustainable development
- Upholding international law

Headquarters and Offices

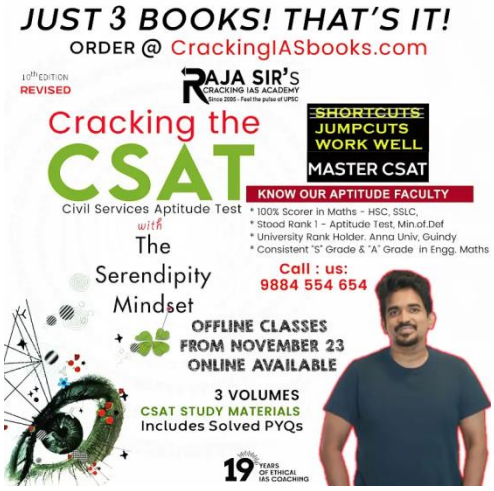
- The UN is **headquartered in New York City,** in international territory with certain privileges extraterritorial to the United States.
- It also has offices in Geneva, Nairobi, Vienna, and The Hague, where the International Court of Justice is headquartered at the Peace Palace.
- **The UN comprises six principal operational organizations:**
- **General Assembly**: Represents all 193 member states, each having one vote.
- **Security Council**: Responsible for maintaining international peace and security, consisting of 15 members, including five permanent members with veto power (China, France, Russia, the United Kingdom, and the United States).
- **Economic and Social Council**: Promotes international economic and social cooperation and development.
- **International Court of Justice**: Settles legal disputes submitted by states and provides advisory opinions on international legal issues.
- **UN Secretariat**: Provides studies, information, and facilities needed by the UN for its meetings and operations.
- **Trusteeship Council**: Established to oversee the administration of trust territories,

suspended since 1994.

Specialized Agencies

The United Nations (UN) has 15 specialized agencies

1. Food and Agriculture Organization (FAO)
2. United Nations Industrial Development Organization (UNIDO)
3. International Civil Aviation Organization(ICAO)
4. World Tourism Organization (UNWTO)
5. International Fund for Agricultural Development (IFAD)
6. Universal Postal Union (UPU)
7. International Labour Organization (ILO)
8. World Health Organization (WHO)
9. International Monetary Fund (IMF)
10. World Intellectual Property Organization (WIPO)
11. International Maritime Organization (IMO)
12. World Meteorological Organization (WMO)
13. International Telecommunication Union (ITU)
14. World Bank
15. United Nations Educational, Scientific and Cultural Organization (UNESCO)



India Launches $25 Million G20 Pandemic Fund

- In a significant move towards enhancing public health preparedness, the Indian government has announced the implementation of a USD 25 million **G20 Pandemic Fund**.

G20 Pandemic Fund

- The G20 Pandemic Fund focuses on developing comprehensive health coverage for livestock, particularly in the context of zoonotic diseases—those that can be transmitted from animals to humans, such as COVID-19.

The Fund aims to bolster India's animal health security through a multifaceted approach:

- **Enhancing Disease Surveillance:** The fund will support the enhancement of disease surveillance systems, including genomic and environmental monitoring, which are crucial for early detection and response to potential outbreaks.
- **Upgrading Laboratory Infrastructure:** Significant investments will be directed towards upgrading and expanding animal health laboratories, thereby improving the country's capacity to diagnose and manage animal diseases effectively.
- **Facilitating Cross-Border Collaboration:** By promoting international cooperation, the initiative seeks to establish an integrated system for monitoring and managing zoonotic diseases, which often cross borders.
- **Building Institutional Capacity:** The project aims to strengthen institutional frameworks at national and regional levels, including the development of disaster management strategies specifically for the livestock sector.
- **Developing Human Capacity**: Training programs will be established to enhance the skills and capabilities of professionals in the animal health field, fostering a more robust response to health crises.
- The fund will be implemented in partnership with esteemed organizations, including the Asian Development Bank (ADB), the World Bank, and the Food and

Agriculture Organization (FAO).

Zoonotic Disease

- Zoonotic disease is a disease that has passed into the human population from an animal source directly or through an intermediary species.
- Zoonotic infections can be bacterial, viral, or parasitic in nature, with animals playing a vital role in maintaining such infections.
- Examples of zoonoses include **HIV-AIDS, Ebola, Lyme disease, malaria, rabies, West Nile fever**, and the current novel coronavirus disease (COVID-19) disease.

India and Spain Sign Multiple agreements

- India and Spain have recently strengthened their bilateral ties through the signing of multiple agreements, particularly focusing on rail transport and customs matters. This development marks a significant step in enhancing cooperation across various sectors, reflecting the growing partnership between the two nations.

Overview of Agreements

1. Rail Transport Cooperation: A key highlight of the recent agreements is the Memorandum of Understanding (MoU) signed for cooperation in rail transport.

This MoU aims to facilitate collaboration in several areas:

- **Planning and Design:** Collaborations extend to strategy, concept, idea and design of railway systems, stations as well as facilities for passengers and cargo transport.
- **Development and Commissioning:** It extends the business scope of the two partnerships in the joint construction and operation of new high-speed railway lines for long-distance passenger transport and new urban and regional railway transportation systems.
- **Technical Assistance:** Spain's railway technologies in signaling, electrification,

and safety concerns will prove beneficial to India as India seeks to upgrade its rail infrastructure.

- The satellite signaling and Telegram agreement was signed between India's National Capital Region Transport Corporation (NCRTC) and Spain's Administrador de Infraestructuras Ferroviarias (ADIF). This partnership is hoped to improve on technical details on how projects will be carried out and training of officials who are involved in these projects.

2. Customs Cooperation: Besides, rail transport India and Spain have agreed to cooperation and mutual assistance in customs issues.

This agreement aims to:

- Improve trade security through access to information concerning customs offenses.
- To enhance efficiency of customs measures, in order to facilitate trade between the two countries.
- The latter is crucial for the development of mutual investments, while it is necessary to adopt a normative base for the establishment of a fast-track mechanism to support such investments.

Significance of the Agreements

- **Economic Impact:** The agreements signify a substantial economic opportunity for both nations. For India, access to Spanish expertise in high-speed rail technologies aligns with its ambitious goal of modernizing its rail infrastructure. The collaboration supports India's "Make in India" initiative by encouraging Spanish firms to localize manufacturing processes within India.
- Spain stands to gain from this partnership by tapping into India's burgeoning market. With two-way trade nearing $10 billion, Spanish companies can explore new business avenues while contributing to India's infrastructural development.
- **Cultural Exchange Initiatives:** The bilateral talks also led to plans for

celebrating 2026 as the 'India-Spain Year of Culture, Tourism, and AI'. This initiative aims to promote cultural exchanges through music, dance, literature, and festivals. Such cultural diplomacy is expected to strengthen people-to-people ties between the two nations.

Conclusion

- The recent agreements between India and Spain represent a pivotal moment in their bilateral relations. By focusing on rail transport and customs cooperation, both countries are not only enhancing their economic ties but also laying the groundwork for deeper cultural connections. As they navigate global challenges together, this partnership could serve as a model for collaborativ international relations moving forward.

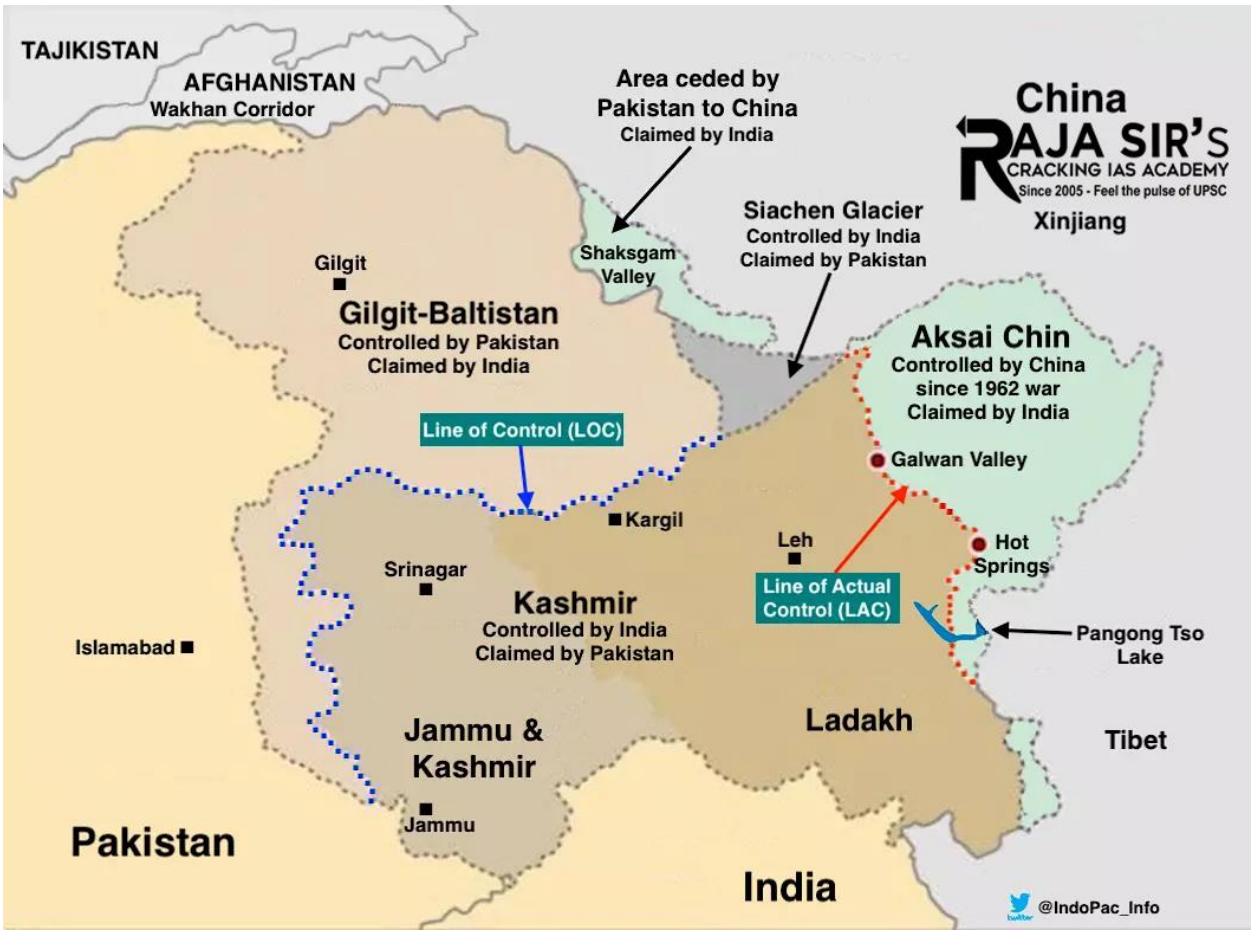
LAC and LOC ?

The border dispute between India and China has seen recent developments, particularly regarding military disengagement along the Line of Actual Control (LAC).

LAC -

- The **Line of Actual Control (LAC)** is the ***de facto*** border between India and China, extending approximately 4,057 km. It separates the Indian-controlled territories in Jammu and Kashmir from the Chinese-occupied region of Aksai Chin.
- The LAC runs through several regions, including **Ladakh, Kashmir, Uttarakhand, Himachal Pradesh, Sikkim, and Arunachal Pradesh.**
- Historically, the LAC emerged from the 1962 India-China war, when both nations'' troops were positioned at this line.
- Over time, it has become a recognized boundary through agreements made in 1993 and 1996, emphasizing that neither side should advance beyond it.
- However, due to the lack of a clear demarcation, encounters between Indian and

Chinese troops frequently occur.



LOC-

- In contrast, the **Line of Control (LOC)** is a military control line between India and Pakistan, spanning about 740 km.
- It divides Jammu and Kashmir into parts controlled by India and Pakistan, and it was established after the first Indo-Pakistani war in 1947.
- Unlike the LAC, the LOC is well-defined, with Indian and Pakistani forces stationed face-to-face along the line, leading to frequent skirmishes.

Key Differences

- **Buffer Zone**: The LAC typically has a buffer zone where both sides patrol without

direct contact, while the LOC is characterized by constant military presence and confrontation.

- **Nature of Control**: The LAC results from historical conflict and lacks clear demarcation, while the LOC is a clearly defined boundary established after wars and agreements.

Line of Control (LOC)	Line of Actual Control (LAC)
India & Pakistan	India & China
Three areas of Kashmir (Azad Kashmir, Gilgit & Baltistan) occupied by Pakistan and two-thirds- Jammu, Ladakh, the Kashmir Valley, administered by India.	Covers three areas of northern Indian states: eastern (Sikkim, Arunachal Pradesh), western (Ladakh, Kashmir) & middle (Uttarakhand, Himachal Pradesh).
Demarcated by the militaries with several activities (face to face confrontation, firings, etc.) which take place. Comprises of Indian and Pakistan army.	Big empty regions and its approx 50 to 100 km distance is maintained between Indian & Chinese armies.
776 kilometer (unofficial)	4,057 kilometer (unofficial)

RAJA SIR'S CRACKING IAS ACADEMY Since 2005 - Feel the pulse of UPSC

United Nations Relief And Works Agency For Palestine Refugees In The Near East

What is the UNRWA, and what role does it play?

- UNRWA is **mandated** by the UN General Assembly to serve 'Palestine refugees'.

This term was defined in 1952 as any person whose "normal place of residence was Palestine during the period 1 June 1946 to 15 May 1948 and who lost both home and means of livelihood as a result of the 1948 conflict. Palestine refugees are persons who fulfil the above definition and descendants of fathers fulfilling the definition.

- In addition, the UN Assembly has also mandated UNRWA to offer services to certain other persons who require humanitarian assistance, on an emergency basis as and when required, in UNRWA fields of operations.
- Notably, the Assembly has mandated the Agency to provide services to persons in the region who are currently displaced and in serious need of continued assistance as a result of the 1967 and subsequent hostilities. These persons are not registered as Palestine refugees.
- Only the ***UN General Assembly can change the mandate of UNRWA***, the definition of a Palestine refugee and whom the Agency is mandated to serve.
- ***UNRWA began operations on May 1, 1950***. It operates in Gaza and the Israeli-occupied West Bank, as well as in Lebanon, Syria, and Jordan — where Palestinian refugees took shelter after their expulsion.
- An estimated 5.9 million Palestinian refugees — most of whom are descendants of the original refugees — currently access the UNRWA's services.
- The UN agency is funded mostly by voluntary contributions from donor states such as the United States, Germany, the European Union, etc. It also gets a limited subsidy from the UN, which is used only for administrative costs.
- UNRWA employs some 30,000 Palestinians. More than 200 of its staff members have been killed in Israeli attacks over the past year

Recently , Israel's parliament passed two Bills to ban the United Nations Relief and Works Agency for Palestine Refugees In The Near East (UNRWA) from operating in Israel and the Palestinian territories. The Knesset also voted to designate UNRWA a terrorist organisation, cutting all ties with the agency.

So why has Israel acted against the UNRWA?

- Israel has also accused some of UNRWA's 13,000 employees in Gaza of participating in the October 7, 2023 attacks on Israel by Hamas.
- Although UNRWA fired nine employees after an investigation, it has denied that it aids armed groups on purpose — the agency has been sharing the list of its employees with Israel for a long time.

What are the two Bills that Israel has passed?

- One of the Bills bars UNRWA from operating any representative office, providing any service, or conducting any activity, directly or indirectly, in Israel's sovereign territory.
- The second Bill cuts all ties between government employees and UNRWA, and takes away the legal immunities of the agency's staff.
- Together, the Bills are likely to stop UNRWA from operating in Gaza and the West Bank as Israel controls access to both these Palestinian territories. They could also force the agency to relocate its headquarters from East Jerusalem.

What can be the impact of these measures?

- Since the beginning of the war, almost all of Gaza's 2 million people have been reliant on UNRWA for basic necessities, including food, water, and hygiene supplies.
- Along with the Palestinian Red Crescent, UNRWA handles almost all UN aid distribution in the territory.
- In the West Bank, UNRWA currently provides services for 19 refugee camps, more than 90 schools, and several health services, including prenatal care.

Brazil not to join China's BRI

- Brazil has decided against joining China's multi-billion-dollar Belt and Road Initiative (BRI), becoming the second country after India in the BRICS bloc not to endorse the mega project.
- Brazil, headed by President Lula da Silva, **will not join the BRI** and instead seek alternative ways to collaborate with Chinese investors, Celso Amorim, special presidential adviser for international affairs.
- Brazil stands apart from many of its South American neighbours by not participating in China's BRI. Despite previous administrations expressing some openness to Chinese investments, Brazil has not signed a Memorandum of Understanding (MoU) regarding the BRI.
- As of December 2023, approximately 150 countries have engaged with the initiative, with Brazil and India notable exceptions among developing nations, especially considering their shared BRICS membership.

Why India opposes BRI?

- India has been more explicit in its rejection of the BRI, citing three main concerns:
- Sovereignty and Territorial Integrity: India has raised issues related to the BRI corridor's implications for sovereignty, particularly concerning projects in Pakistan-occupied Kashmir.
- Debt Trap Diplomacy: India is wary of the BRI pushing smaller economies into unsustainable debt situations and environmental risks.
- Transparency Concerns: India's decision reflects skepticism about the BRI's broader geopolitical motivations and a lack of transparency in its operations.

What is the Belt and Road Initiative (BRI)?

- China's President Xi Jinping launched multi-billion dollar BRI in 2013 to undertake big infrastructure projects in the world which in turn would also enhance Beijing's global influence.

- It aims to link Southeast Asia, Central Asia, the Gulf region, Africa and Europe with a network of land and sea routes.
- China has become a major trading partner for more than 140 countries and regions, it leads the world in total volume of trade in goods, and it is a major destination for global investment and a leading country in outbound investment.
- As a collaborative endeavour, the BRI has been welcomed by the international community both as a public good and a cooperation platform, President Jinping, who has aggressively promoted the BRI, said in a report he presented to the 20th National Congress of the Communist Party of China last month.
- The BRI is seen as an attempt by China to further its influence abroad with infrastructure projects funded by Chinese investments all over the world.
- The $60 billion China-Pakistan Economic Corridor (CPEC), which connects Gwadar Port in Balochistan with Xinjiang province, is the flagship project of Xi's ambitious BRI.
- The 3,000-km long CPEC is a collection of infrastructure and other projects under construction throughout Pakistan since 2013.

The land-based Silk Road Economic Belt envisions six key corridors for development:

- China-Pakistan Economic Corridor (CPEC)
- New Eurasian Land Bridge Economic Corridor
- China-Indochina Peninsula Economic Corridor
- China-Mongolia-Russia Economic Corridor
- China-Central Asia-West Asia Economic Corridor.
- China-Myanmar Economic Corridor

India, Germany hold 7th Inter-Governmental Consultations

Prime Minister Narendra Modi and Germany's Chancellor **Olaf Scholz** co-chaired the seventh round of **Inter-Governmental Consultations (IGC)** in New Delhi.

- It was Scholz's third visit to India as Chancellor. Both leaders appreciated the renewed momentum in bilateral engagement across government, industry, civil society and academia that has played an instrumental role in advancing and deepening the 'Strategic Partnership' between India and Germany.
- Under the motto **'Growing Together with Innovation, Mobility and Sustainability'**, the 7th IGC placed particular emphasis on technology and innovation, labour and talent, migration and mobility, climate action, green and sustainable development as well as economic, defence and strategic cooperation.

What is the purpose of IGC?

- Since May 2000, India and Germany have had a 'Strategic Partnership' which has been further strengthened with the launch of Inter-Governmental Consultations (IGC) in 2011 at the level of Heads of Government. The **IGC framework allows for a comprehensive review** of cooperation and identification of new areas of engagement at the Cabinet level. India is among a select group of countries with which Germany has such a dialogue mechanism.
- As the third and fifth largest economies in the world respectively, Germany and India share a robust economic and developmental partnership. Besides strong economic ties, both countries have a shared interest in upholding democratic values, the rules-based international order, and multilateralism as well as the reform of multilateral institutions.

Highlights of 7th IGC:

i) India-Germany Innovation and Technology Partnership Roadmap: The year 2024 marks the 50th anniversary of the signing of the Inter-Governmental Agreement on Cooperation in Scientific Research and Technological Development which institutionalized the framework of Indo-German cooperation in Science & Technology, research and innovation. Both leaders expressed their appreciation on the successful 50 years of long standing collaboration in science and technology between the two countries and reaffirmed their support to expand it further through launching the 'India-Germany Innovation and Technology Partnership Roadmap' which will serve as a guideline to the public and private sectors and research institutions of the two countries to take forward our cooperation in the areas of renewable energy, startups, semiconductors, artificial intelligence (AI) and quantum technologies, climate risk and sustainable resource management, climate change adaptation as well as agro ecology Both leaders further identified space and space technologies as an important and promising area for future prosperity, development, and possible cooperation.

ii) Mutual Legal Assistance Treaty in Criminal Matters (MLAT): With a view to ensuring closer collaboration to prevent, suppress, investigate and prosecute criminals, including crime related to terrorism, India and Germany concluded the ***Mutual Legal Assistance Treaty in Criminal Matters (MLAT)***. Both leaders agreed that the India-Germany MLAT is an important milestone in strengthening security cooperation between the two countries that will enable sharing of information and evidence, mutual capacity building and sharing of best practices between the two countries.

iii) Agreement on the Exchange and Mutual Protection of Classified Information: Both sides concluded the Agreement on the Exchange and Mutual Protection of Classified Information thereby creating a legal framework for cooperation and collaboration between Indian and German entities and providing guidance on how classified information should be handled, protected and transmitted.

iv) Green Urban Mobility Partnership: Signed a Joint Declaration of Intent to renew and further elevate the partnership in accordance with a shared vision to promoting in India sustainable urban mobility for all, recognising the importance of green and sustainable urbanisation for inclusive social and economic development and the strong results of the **Green Urban Mobility Partnership since its establishment in 2019.**

v) Green and Sustainable Development Partnership (GSDP): Both governments aim to substantially enhance bilateral, trilateral and multilateral cooperation in climate action and sustainable development. Both sides acknowledged the progress achieved thus far under the Indo-German Green and Sustainable Development Partnership (GSDP).

During the 6th IGC, both governments had announced the GSDP, which serves as an umbrella for bilateral formats and joint initiatives in this field. This partnership, guided by shared commitments, seeks to accelerate the implementation of the goals outlined in the **Paris Agreement and the SDGs.**

vi) MoU on Disaster Mitigation: In furthering cooperation in the field of research in disaster mitigation, tsunami warnings, coastal hazards, early warning systems, disaster risk reduction and oceanography, polar sciences, biology and biogeochemistry, geophysics and geology, both governments welcomed the signing of the Memorandum of Understanding between Indian National Centre for Ocean Information Services (INCOIS) and Helmholtz-Zentrum Potsdam - Deutsches GeoForschungsZentrum, and between National Centre for Polar and Ocean Research (NCPOR) and AlfredWegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung (AWI).

ECONOMICS

India's core sectors slipped to a nine-month low

Output levels in India's core sectors **slipped to a nine-month low in August 2024**, even as year-on-year growth slipped 1.8%, marking the first contraction in three and a half years.

Index of Industrial Production

- IIP is an indicator that **measures the changes in the volume of production** of industrial products during a given period.
- It is compiled and published **monthly by the National Statistical Office (NSO)**, Ministry of Statistics and Programme Implementation.
- It is a **composite indicator** that measures the **growth rate of industry groups** classified under:
    - **Broad sectors,** namely, Mining, Manufacturing, and Electricity.
    - **Use-based sectors**, namely Basic Goods, Capital Goods, and Intermediate Goods.
- **Base Year: 2011-2012.**
    - The government is aiming to adopt a **new base year** for the IIP **by 2026-27.**
    - The **proposed** new base year is **2020-21**.

Eight Core Sectors

- The main or the key industries **constitute the core sectors of an economy**. In India, there are eight sectors that are considered the core sectors.
- The **eight core sector industries** in decreasing order of their **weightage**: Refinery Products> Electricity> Steel> Coal> Crude Oil> Natural Gas> Cement> Fertilisers.
- They **comprise 40.27%** of the **weight of items** included in the **Index of Industrial Production (IIP).**

India's current account deficit (CAD) widened

India's current account deficit (CAD) widened marginally to $9.7 billion (1.1% of GDP) in Q1 FY25 from $8.9 billion (1% of GDP) in the year-earlier period and a surplus of $4.6 billion (0.5% of GDP) in Q4FY24, as per Reserve Bank of India (RBI) data.

Key Highlights of the RBI Data

- **Merchandise Trade Deficit:** The **primary reason for the CAD widening** was the rise in the merchandise trade deficit to $65.1 billion in Q1 FY25 from $56.7 billion in Q1 FY24.
- **Services Receipts Growth:** Net services receipts **rose to $39.7 billion** from $35.1 billion a year ago, with increases in exports of computer, business, travel, and transportation services.
- **Private Transfer Receipts:** Remittances by Indians abroad **increased** to $29.5 billion in Q1 FY25, up from $27.1 billion in Q1 FY24.
- **Primary Income Outflows:** Net outgo on the primary income account **rose to $10.7 billion**, reflecting higher payments on investment income.
- **Foreign Direct Investment (FDI):** FDI inflows **increased** to $6.3 billion in Q1 FY25, compared to $4.7 billion in Q1 FY24.
- **Foreign Portfolio Investment (FPI):** FPI inflows moderated significantly to $0.9 billion, down from $15.7 billion in Q1 FY24.
- **External Commercial Borrowings (ECBs):** ECB inflows **decreased** to $1.8 billion from $5.6 billion a year ago.
- **Non-Resident Deposits:** Net inflows from NRI deposits **increased** to $4.0 billion, compared to $2.2 billion in Q1 FY24.
- **Foreign Exchange Reserves:** Foreign exchange reserves saw an accretion of $5.2 billion in Q1 **FY25, lower than** $24.4 billion in Q1 **FY24.**

What is the Current Account Deficit and Its Trends?

- Current account deficit is the difference between exports and imports of goods and services.
    - It is a key indicator of the country's external sector.
- **Components:** It is the sum of Balance of Trade (Export minus Imports of Goods and Services) + Net Factor Income from Abroad (Interest income and Dividends, etc) and Net Transfer Payments (Eg- Foreign Aid)
- **Formula**: Current Account = Trade Balance+Net factor income+Net transfer payments
- **"Twin deficit" :** The situation in which one nation has a current account deficit (trade deficit) and Fiscal deficit at the same time.

Fiscal Deficit= Total Expenditure- Total Receipts (excluding borrowings).

Causes of Current Account Deficit

Implication of Current Account Deficit

- **Depreciation of Rupee:** A large current account deficit for a continued period of time can lead to depreciation of rupee, and the demand for foreign currency (especially dollars) will see a rise.
- **Inflation:** Depreciation of rupee, as a result of continued deficit in the country's current account, will see prices of imported goods becoming costlier, and in turn pushes the country towards inflation.
- **Elevated Interest Rates:** It will affect the investment & consumption cycle of the economy.
- **Economic Growth:** Persistent CAD affects economic imbalances which further hinders sustainable growth prospects of the country.
- **Trade Balance:** Due to Current account deficits Competitiveness & stability of Domestic Industries will get affected.

Ways to Moderate India's Current Account Deficit

- Reduce the price of commodities.
- Appreciation of rupee.
- Lessen debt taken from developed nations.
- Reduce foreign ownership of assets.
- Improve the quality of imported goods.
- Reduce non-essential imports of gold, mobiles, and electronics.
- Increase value of exports.

Balance of Payment and Its Components

- **Definition:** Balance Of Payment (BOP) is a bookkeeping system that summarises the country's economic transaction with other countries of the world for a particular period.
- **Impact**: BoP keeps track of the trade and investments and transfers in a country with the rest of the world.
- **Components:** The BoP is composed of **Capital and Current Accounts.**

	Current Account	**Capital Account**
Definition	The current Account is the account that records the goods exports and imports, as well as trade in services and transfer payments.	Capital Account is the account that keeps track of Borrowing and Lending of Capital assets and non-financial assets between the countries.
Components	The current account is made up of visible trade(Goods), invisible trade (Services), transfer payments, net factor income, and remittances	The current account is made up of borrowings, lendings and investments.
Impact	The current account of a country	The capital account of a country

	keeps track of the country's transactions with other countries.	keeps track of the country's investment and loans with other countries.

Cruise Bharat Mission

- **Nodal Ministry:** The Ministry of Ports, Shipping, and Waterways
- This mission will be implemented in three phases
    - **Three-Phase Implementation:**
        - **Phase 1 (Until October 2025)**
        - **Phase 2 (2025-2027)**
        - **Phase 3 (2027 – 2029)**
- **Key Objectives:**
    - Increase cruise passengers to **1 million by 2029.**
    - Create **400,000 jobs** in the cruise tourism sector.
    - Develop world-class cruise infrastructure.

Key Measures:

- **Infrastructure Development:** Building new cruise terminals, marinas, and destinations.
- **Financial Incentives:** Establishing a special purpose vehicle (SPV), levying a cruise development cess, and providing financial support for infrastructure development.
- **Regulatory Reforms:** Easing cabotage regulations and developing technical standards for cruise infrastructure.
- **International Cooperation:** Establishing Cruise Alliances with neighboring countries.
- **Skill Development:** Formulating cruise-specific National Occupational Standards (NOS) to promote youth employment.

MONETARY POLICY COMMITTEE

The central government reconstituted the Monetary Policy Committee (MPC) ahead of the monetary policy review of the Reserve Bank of India (RBI) on October 7-9.

Key Points About the Monetary Policy Committee (MPC):

- Establishment:
    - The MPC was constituted under the Reserve Bank of India Act, 1934, following amendments made in 2016.
    - Its creation was part of the RBI's transition to an inflation-targeting framework, enhancing transparency and accountability in monetary policy formulation.

  Objective:
    - The primary mandate of the MPC is to maintain price stability while keeping in mind the objective of economic growth.
    - It is tasked with setting the repo rate, the key policy rate, to control inflation within the prescribed target.
- Composition: The MPC consists of 6 members:
    - 3 members from the RBI:
        - The Governor of RBI, who acts as the Chairperson.
        - The Deputy Governor in charge of monetary policy.
        - One officer of the RBI nominated by the central bank.
    - 3 external members appointed by the Government of India. These are experts in economics or related fields, selected for a tenure of four years and are not eligible for reappointment.
- Decisions are made by a majority vote, with each member having one vote. In case of a tie, the RBI Governor has the casting vote.

Mandate and Inflation Targeting:

- The MPC's mandate is to maintain inflation within the range of 4% ± 2%. This means the inflation target is set at 4%, with an upper tolerance limit of 6% and a lower limit of 2%.

- The committee usually meets bi-monthly (once every two months) to review the economy and set the policy interest rate, which influences inflation and growth. The MPC is required to meet at least four times in a year according to RBI Act 1934.

Rationale for the MPC:

- Prior to the MPC's establishment, monetary policy decisions were made solely by the RBI Governor. The MPC institutionalizes a democratic decision-making process, bringing multiple perspectives from both within and outside the RBI.
- It helps in reducing discretionary control and fosters a more objective, rule-based approach to monetary policy.

Role in Inflation Control:

- The MPC's primary tool to manage inflation is the repo rate—the rate at which the RBI lends to commercial banks.
- By increasing or decreasing the repo rate, the MPC influences liquidity and demand in the economy, which in turn affects inflation and economic growth.

Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)

Prime Minister Narendra Modi released 18th instalment of the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme on 5th October 2024 in Washim, Maharashtra.

The *Pradhan Mantri Kisan Samman Nidhi* (PM-KISAN), launched on February 2, 2019, has become a transformative force for India''s agricultural sector. Under this scheme, every eligible farming family receives an annual benefit of ₹6,000, distributed in three equal installments of ₹2,000 every four months.

This amount is directly transferred to the beneficiaries'' bank accounts through the *Direct Benefit Transfer* (DBT) mechanism, making it one of the largest and most transparent DBT schemes globally.

Key Highlights of PM-KISAN:

1. **Massive Outreach and Digital Integration:** PM-KISAN is a flagship initiative leveraging India''s digital infrastructure. Through a seamless process of enrollment, authentication, and disbursement, the scheme reaches millions of farmers, eliminating intermediaries and ensuring that support goes directly to those who need it. This has been a game-changer in terms of accountability and efficiency, significantly reducing the scope for corruption and delays.
2. **Financial Assistance at Critical Intervals:** The installments of ₹2,000 are structured to provide farmers with timely financial support every four months, aligning with the crop cycle. This enables farmers to make crucial investments, such as buying seeds, fertilizers, and maintaining crop health, at key junctures in the farming season, helping optimize yields.
3. **Relief from Moneylenders:** PM-KISAN has empowered farmers by reducing their dependence on traditional moneylenders who often charged exorbitant interest rates. The timely financial aid helps farmers avoid the debt trap, fostering more sustainable and self-reliant farming practices.
4. **Inclusive and Equitable Support:** The scheme is designed to include small and marginal farmers, a group often left out of traditional financial support mechanisms. By ensuring that even the most vulnerable farmers receive this assistance, PM-KISAN plays a crucial role in narrowing the income disparity between different farmer categories, contributing to inclusive growth in the agriculture sector.

Key Technological Highlights of PM-KISAN:

1. **Integration with Multiple Digital Platforms:** The *PM-KISAN portal* has been seamlessly integrated with key national platforms such as:
    a. *UIDAI* (Unique Identification Authority of India) for Aadhaar authentication,
    b. *PFMS* (Public Financial Management System) for financial transfers,

c. *NPCI* (National Payments Corporation of India) for secure payments,
d. *Income Tax Department* for income verification.

These integrations ensure that all processes related to the scheme are secure, efficient and transparent, providing real-time benefits directly to farmers' bank accounts.

1. **Easy Access and Grievance Redressal:** Farmers can now register grievances or seek assistance directly through the PM-KISAN portal. For a more personalized experience, they can also use the 24x7 helpline to address their issues promptly.
2. **Kisan e-Mitra (AI-Powered Chatbot):** A significant innovation under the scheme is the *Kisan e-Mitra*, a voice-based AI chatbot. This platform allows farmers to raise queries and get real-time solutions in their native language. Currently, it supports 11 languages, including Hindi, English, Odia, Tamil, Bangla, Malayalam, Gujarati, Punjabi, Kannada, Telugu, and Marathi, ensuring inclusivity across India's diverse linguistic landscape.
3. **Doorstep Services with Common Service Centres and IPPB:** To make the scheme even more accessible, over 5 lakh *Common Service Centres (CSCs)* across the country have been onboarded. These CSCs bring the scheme's services directly to farmers' doorsteps, making it easy for them to register, update their details, or seek assistance.

Additionally, the integration of the *Indian Post Payments Bank (IPPB)* with the PM-KISAN scheme facilitates the opening of Aadhaar-linked bank accounts for beneficiaries. This service ensures that farmers, even in the remotest areas, can access banking services without hassle.

1. **Introduction of Agri Stack:** The Government of India is now introducing *Agri Stack*, a technological framework designed to provide comprehensive services to farmers. Through Agri Stack, every farmer will receive a unique *Farmer ID*, linked to their Aadhaar. This Farmer ID will be connected with land and crop information, ensuring more personalized and proactive governance. Agri Stack will not only enhance the delivery of PM-KISAN but will also open doors for farmers to access various other government schemes and services. This digitized

system is expected to ensure 100% coverage and saturation of farmers, offering them a one-stop solution for multiple farming-related services.

With these technological interventions, PM-KISAN has truly evolved into a model of efficiency, empowering farmers and driving India's agricultural sector towards sustainability and inclusivity. The scheme's modernization marks a significant shift towards smart, digitally-enabled farming practices for the future.

NATIONAL STATISTICAL COMMISSION (NSC)

Recently, Former Chief Statistician Pronab Sen remarked that National Statistical Commission (NSC) is reasserting its authority and this could lead to a process of depoliticising data.

National Statistical Commission (NSC) – Key Points:

- Establishment:
  - The NSC was established in 2006 on the recommendation of the Rangarajan Commission (2001), which identified the need for reforms in the Indian statistical system. The intention was to improve the reliability, credibility, and timeliness of statistics in India for better policy-making.
  - It is not yet provided with statutory status.
- Objective:
  - The NSC was set up to reduce the undue influence of the government on data generation and ensure the production of objective and unbiased statistics.
  - It works to set standards and promote transparency in the collection and dissemination of official statistics.
- Composition: The NSC consists of –
  - The Commission consists of a part-time Chairman (with the status of a Minister of State) and four part-time Members (with the status of a Secretary to the Government of India) and an Ex officio member.
- Functions:

- Policy Formulation: The NSC advises the government on statistical policies, methodologies, and priorities in data collection.
- Coordination: It promotes coordination between Central and State agencies to ensure standardization in statistical procedures and quality.
- Monitoring: The NSC reviews the performance of statistical agencies, ensuring data quality and identifying areas for improvement.
- Capacity Building: The commission also focuses on strengthening human resources in the statistical domain through training and research.

Importance:

- The NSC plays a crucial role in maintaining the integrity and independence of statistical data, which forms the backbone for policy formulation, economic planning, and evaluation of programs.
- It also addresses concerns about the credibility of data, especially with respect to GDP growth, unemployment, and inflation figures, which are critical for economic governance.

National Mission on Edible Oils – Oilseeds (NMEO-Oilseeds)

The Union Cabinet has approved the **National Mission on Edible Oils – Oilseeds** (NMEO-Oilseeds) to **enhance domestic oilseed production** and promote self-reliance in edible oils under the **Atma Nirbhar Bharat initiative.**

Key Features of the Mission

- **Implementation Period:** 2024-25 to 2030-31
- **Total outlay:** Rs 10,103 crore
- **Focus on Primary and Secondary Oilseeds:**
  - **Key Primary crops:** Rapeseed-Mustard, Groundnut, Soybean, Sunflower, and Sesamum
  - **Secondary sources:** Cottonseed, Rice Bran, and Tree Borne Oils (TBO).
- **Production Targets:**

- **Increase primary oilseed production** from 39 million tonnes (2022-23) to 69.7 million tonnes by 2030-31
- Together with **NMEO-OP (Oil Palm),** the aim is to increase domestic edible oil production to **25.45 million tonnes** by 2030-31.

- **Strategies to Increase Oilseed Production:**
  - Adoption of **high-yielding, high oil content s**eed varieties
  - **Expansion into rice fallow areas** and promotion of **intercropping .**
- **Formation** of over **600 Value Chain Clusters** across 347 districts, covering over 10 lakh hectares annually.
- Creation of **65 seed hubs** and **50 storage units** to improve **seed infrastructure.**
- **'SATHI' ('Seed Authentication, Traceability & Holistic Inventory) Portal:** Introduction of a **5-year rolling seed plan** through the Portal, to enable **states to form advance tie-ups** with **seed-producing agencies** like cooperatives, FPOs, and seed corporations.

Government Measures to Promote Self-Sufficiency in Edible Oils:

- **NMEO-Oil Palm:** Launched in 2021 with a Rs 11,040 crore outlay to boost domestic oil palm cultivation.
- **PM-AASHA (Pradhan Mantri Annadata Aay Sanrakshan Abhiyan):** Provides **MSP to oilseed farmers** through **price support and deficiency payment.**
- **Import Duty**: A **20%** duty on edible oils protects domestic producers and encourages local cultivation.

International Energy Efficiency Hub

The Union Cabinet approved India joining the International Energy Efficiency Hub.

- **BEE's Role:** The Bureau of Energy Efficiency (BEE) will implement India's participation and align it with national goals.

International Energy Efficiency Hub

- **Established in 2020:** The Hub was created as a successor to the International Partnership for Energy Efficiency Cooperation (IPEEC), where India was a member.
- **Member Countries:** Sixteen countries, including the U.S., China, and Germany, are already members as of July 2024.
- **Objectives of the Energy Efficiency Hub**
    - **Foster Collaboration:** Promote cooperation to improve global energy efficiency.
    - **Facilitate Knowledge Sharing:** Encourage sharing of best practices among countries, organizations, and the private sector.
    - **Increase Visibility:** Raise awareness of energy efficiency issues worldwide.

Impact of India Joining Hub

Access to Resources: India will gain access to global expertise and best practices in energy efficiency.

Sustainable Development: Joining the Hub enhances India's efforts towards a low-carbon economy and energy security.

Global Contributions: India will collaborate with other nations to promote energy-efficient technologies and tackle climate change.

Weeds Cause ₹92,000 Crore Loss in Crop Productivity

A study commissioned by the **Federation of Seed Industry of India (FSII)** has found that weeds are causing a **₹92,000 crore** ($11 billion) loss in crop productivity annually**.**

Federation of Seed Industry of India (FSII)

- FSII is a 40-member association of R&D based plant science industry, engaged in the production of high-performance quality seeds for food, feed and fibre in the country.

- Member companies are engaged in research-based breeding applications and seed technologies, enabling farmers to adopt technology driven farming solutions to improve agricultural productivity in a sustainable manner, minimising pre and post-harvest losses.
- It is affiliated to International associations including **International Seed Federation (ISF) and The Asia and Pacific Seed Association (APSA)**.
- **Vision: To Increase focus and investment in seed research undertaken by the member companies and promote t**heir innovative products for improving farm productivity.
- **Mission:** Aims to contribute towards realising the vision of doubling the farmers' Income.

Findings of the Research

- **Losses in Crop Productivity**: Weeds are responsible for approximately **25-26% yield loss in kharif crops** and **18-25% in rabi crops** across India, causing significant financial damage to the agricultural sector.
- **Crops and Regions Covered**: The study focused on **seven key crops**, including **rice, wheat, maize, cotton, sugarcane, soybean, and mustard**, across **30 districts in 11 states**. The researchers gathered insights from **3,200 farmers, 300 dealers**, and officials from **Krishi Vigyan Kendras** and the Agriculture Department.**Lack of innovation in weed control:** It highlights the need for new, technology-driven weed control strategies to combat this issue effectively

What are weeds?

- Weeds are **unwanted and undesired plants** that negatively impact human welfare by interfering with the use of land and water resources.
- In agricultural lands, forests, aquatic systems, etc., weeds compete with desirable and beneficial plants.
- These weeds consume the nutrients given to the crops, reducing the nutrients

available to the crops and impeding their growth.

- **Examples of weeds:** Amaranth, Bermuda grass, Bindweed, Broadleaf plantain, etc.

Benefits of Weeds

- **As Food And Medicine** :Leaves or roots of a number of weeds, including the dandelion and lamb's quarter, can be utilised as food or herbal medicine.
- Many weeds have medicinal properties and are used in medicine such as Phyllanthus niruri (jaundice), Eclipta alba (Scorpion sting), Cynodon dactylon (Asthma).
- **Weeds as indicators**:Weeds can be used to identify good and bad soils.
- Colonum grows in rich soils, whereas Cymbopogon grows in poor light soils and Sedges grow in poorly drained soils.
- Weeds can indicate conditions like water levels, soil compaction, and pH;

· **Raw Materials:** Weeds can be used to make paper mache, bio-gas, and consumable proteins; Fragrant oils, etc.

Classification of Weeds

- **Annual Weeds:** Weeds that live only for a season or a year and complete their life cycle in that season or year are called annual weeds.
  - **Eg.**Boerhavia erecta
- **Biennials**: It completes the vegetative growth in the first season, flower and set seeds in the succeeding season and then dies.
  - **Eg.** Alternanthera echinata
- **Perennials:** Perennials live for more than two years and may live almost indefinitely. They adapted to withstand adverse conditions.
  - **Eg.** Sonchus arvensis

Impact of weeds

- **Reduces Crop Production:** Weeds compete with the main crop for space, light, moisture, and soil nutrients, resulting in yield loss.
- **Affects Crop Quality :**They contaminate the product, lowering crop quality.'
- **Act as Hosts for Diseases:** They may attract many unwanted pathogens affecting the crop plants.

Recommendations for Weed Management

The report highlights various weed management practices that could reduce costs by **40-60%** compared to traditional methods.

Some of the techniques of weed Management are:

- **Herbicide Use**: Employing herbicides for more effective and efficient weed control.
- **Mechanisation**: Utilising machinery for weed removal to reduce reliance on manual labour.
- **Crop Rotation**: Rotating crops to break weed cycles.
- **Cover Cropping**: Using cover crops to suppress weed growth.
- **Biological Control**: Introducing natural weed control mechanisms using biological agents.
- **Herbicide tolerant variety:** DSR and ZT wheat are innovative herbicide-tolerant varieties that offer significant benefits to farmers.
- These varieties replace traditional water-intensive practices like puddling and transplanting with chemical herbicides, reducing water consumption and labour costs.

Report on Weed Management Challenges

- The report, titled **"Weed Management – Emerging Challenges & Management Strategies"**, was released by the **Indian Council of Agricultural Research**

(ICAR) in collaboration with FSII

- It highlights that weeds are a major cause of crop losses, competing with crops for resources from the **preparatory tillage stage** through to the **post-harvest stage**.
- **Cost of Weed Control**: The average cost of weed control per acre varies between **₹3,700 and ₹7,900**, depending on the crop and region.

Business- Ready Index

- The B-READY index is a **successor to the Ease of Doing Business rankings**, which were discontinued in 2021 due to irregularities.
- It is a ground-breaking initiative that aims to focus on **quantitatively assessing** the **business environment across world economies.**
- It envisages taking into consideration more diverse factors while arriving at the rating.
- Global financial institutions and multi-national companies will use the B-Ready framework as a benchmark to understand the regulatory and policy environment of a country.
- It will be published annually, taking into consideration three main pillars: regulatory framework, public services, and efficiency.
- The index incorporates digitalization, environmental sustainability, and gender equality into each indicator, ensuring a holistic and forward-thinking approach to business evaluation.
- It tracks **ten parameters** covering a firm's lifecycle from starting, operating, closing, and reorganising.
- The index will expand in three stages, covering 54 economies initially and reaching up to **180 countries by 2026.**

An Annual Review by IRENA

A report by the **International Renewable Energy Agency (IRENA)** and the

International Labour Organization (ILO) highlighted the achievements of India's RE sector.

Key Findings

- The renewable energy (RE) workforce increased to 16.2 million globally in 2022 from 13.7 million.
- An estimated 1.02 million jobs in India will be related to renewable energy in 2023.
- Hydropower was India's largest employer in the renewable sector, providing around 453,000 jobs and accounting for 20% of the global total, second only to China.
- India added 9.7 GW of solar PV capacity in 2023 and ranked fifth globally for new installations and cumulative capacity, which reached 72.7 GW by the end of the year.
- India is the second-largest PV manufacturer globally after China. In 2023, India had a cumulative installed wind power capacity of 44.7 GW, ranking fourth globally.

International Renewable Energy Agency (IRENA)

- It is an **intergovernmental organisation** mandated to facilitate cooperation, advance knowledge, and promote RE adoption and sustainable use. It was first suggested by **1980 Brandt Report activities.**
- It is the **first** international organisation to focus **exclusively** on **RE**. It has **observer status** with UN.
- As of July 2022, 168 states and the EU are members of IRENA. **India** is a **founding Member**.
- **HQ: Abu Dhabi**.
- United Nations General Assembly declared **January 26** as the **International Day of Clean Energy**

National Agriculture Code (NAC)

- The Bureau of Indian Standards (BIS) has begun working on a National Agriculture Code (NAC), similar to the **National Building Code and National Electrical Code.**

Features of the NAC

- Covers all aspects of agriculture, including crop selection, **land preparation, irrigation, soil health, plant health, harvesting, processing, storage, and sustainability.**
- Includes standards for input management, such as **fertilizers, pesticides, and weedicides.**
- Addresses emerging areas like **natural farming, organic farming,** and IoT.
- Provides guidance for farmers, agriculture universities, and officials.

Objectives of the National Agriculture Code (NAC)

- **Provide Clear Recommendations:** Create a national code with guidelines for farming practices, considering different climate zones, crop types, and the country's diverse farming conditions.
- **Encourage Quality in Farming:** Help policymakers, agriculture departments, and regulators include NAC standards in their schemes, policies, and regulations to improve quality in Indian agriculture.
- **Guide for Farmers:** Offer a simple guide to help farmers make better decisions in their farming activities.
- **Combine Existing Standards:** Link existing Indian standards with recommended farming practices to ensure they work together smoothly.
- **Focus on Modern Farming:** Cover modern topics like SMART farming, sustainability, traceability, and keeping records to support efficient and eco-friendly farming.
- **Support Learning and Training:** Help agriculture extension services and

organizations run training programs to teach farmers and spread better farming practices.

Timeline for NAC

- BIS has formed working panels for specific areas, including university professors and R&D organizations.
- BIS plans to train farmers on NAC standards, with universities organizing training programs.
- The tentative deadline for the NAC is set for **October 2025.**
- BIS has initiated the development of Standardized Agriculture Demonstration Farms (SADFs) in selected agricultural institutes.

What is Standardized Agriculture Demonstration Farms (SADF)?

- SADFs are **experimental site**s to test and implement agriculture practices and new technologies based on Indian Standards.
- BIS plans to collaborate with agricultural institutes through Memorandums of Understanding (MoUs) to develop these farms.
- 10 prominent agriculture institutes have been identified, with two MoUs already signed, including one with GBPUAT in Pantnagar.

Bureau of Indian Standards (BIS)

- BIS is the official body responsible for setting standards in India.
- **Formation:** It was formed under the BIS Act of 2016 to oversee and ensure uniformity in standards.
- **Main Functions:** BIS focuses on standardization, marking, and quality certification of products.
- **Purpose:** The goal is to promote consistent quality in goods and related activities across the country.


SHORTCUTS
JUMPCUTS
WORK WELL
RAJA SIR'S CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC
MASTER CSAT
RAJA SIR - APTITUDE FACULTY
9884 554 654
* 100% Scorer in Maths - HSC, SSLC,
* Stood Rank 1 - Aptitude Test, Min.of.Def
* University Rank Holder. Anna Univ, Guindy
* Consistent "S" Grade & "A" Grade in Engg. Maths
OFFLINE / ONLINE CLASSES FROM NOVEMBER 23
* CSAT BOOKS WITH SOLVED PYQs
* Crispy Classes with brisky tecnics
* Tests followed by discussion
19 YEARS OF ETHICAL IAS COACHING


IAS GOOGLE
Redefining your Google
Led by Raja Sir's Cracking IAS
National Agriculture Code (NAC)
Overview of the NAC
Purpose and Scope
Key Objectives
Establish guidelines for land use and agricultural practices.
Promote equitable access to resources for farmers.
Legislative Framework
Historical Context
Milestones in Development
Initial agricultural policies in the early 2
Major reforms in the 1980s addressing sustainability.
Influence of Global Trends
Key Provisions of the NAC
Land Use Regulations
Zoning Laws
Zoning laws dictate how land can be utilized, balancing agricultural needs with environmental protection.
Land Tenure Security
Provisions for land tenure security
Support for Farmers
Subsidies and Grants
Financial support through subsidies
Extension Services
Technical training and extension servic
Economic Impact
Contribution to National Economy
Employment Generation
Agriculture is a significant source of employment, particularly in rural areas, contributing to poverty alleviation.
Export Opportunities
The NAC supports the development of export-oriented agricultural products, enhancing trade balances.
Challenges Faced
Resource Limitations
Limited financial and human resources can hinder effective enforcement of the NAC provisions.
Market Access Issues
Farmers often face barriers to market access, impacting their ability to benefit from NAC initiatives.
Environmental Considerations
Sustainable Practices
Conservation Techniques
Encouragement of conservation tillage and crop rotation to enhance soil health and reduce erosion.
Biodiversity Protection
Regulations aimed at protecting biodiversity through the promotion of native crops and sustainable livestock practices.
Climate Change Adaptation
Research and Development
Investment in research for climate-resilient crops and farming techniques is a key focus area.
Risk Management Strategies
Implementation of risk management strategies to help farmers cope with climate-related challenges.
Stakeholder Involvement
Role of Government
Policy Formulation
Government agencies are responsible for formulating policies that align with the NAC's objectives.
Monitoring and Evaluation
Regular monitoring and evaluation of agricultural practices ensure compliance with NAC regulations.
Participation of Farmers
Feedback Mechanisms
Establishing feedback mechanisms allows farmers to voice concerns and suggest improvements to the NAC.
Cooperative Models
Encouraging cooperative models among farmers can enhance resource sharing and collective bargaining power.
RAJA SIR'S Cracking IAS Academy
Since 2005 - Feel The Pulse of UPSC
19 YEARS OF ETHICAL IAS COACHIN

Passive Mutual Fund

Securities and Exchange Board of India (SEBI) introduced the liberalised **Mutual Funds Lite (MF Lite)** framework for passively managed schemes.

Mutual Funds Lite (MF Lite)

- It presents diversified investment opportunities for retail investors through less risky schemes and enhance market.
- **Easier Entry for New Players**: It lowers entry barriers, allowing more companies to offer passive mutual funds by **relaxing net worth, profitability, and track record requirements.**
- **Simplified Role for Trustees:** SEBI reduces oversight for trustees managing passive funds, lowering compliance costs due to the simpler nature of passively managed schemes.
- **Faster Approval Process:** It streamlines the approval process, cutting down on paperwork, enabling companies to launch funds faster.
- **Options for Existing AMCs:** Existing companies can either manage passive funds under MF Lite or continue with their current setup, benefiting from regulatory flexibility.
- **Impact on Investors:** Investors will gain access to more passive investment products, potentially improving returns, lowering costs, and boosting liquidity

Mutual Funds?

- A mutual fund is a pool of money managed by a professional Fund Manager. It is a trust that collects money from a number of investors who share a common investment objective and invests the same in equities, bonds, money market instruments and/or other securities.
- They are ideal for investors who either lack large sums for investment, or for those who neither have the inclination nor the time to research the market, yet

want to grow their wealth.

Passive Mutual Fund

- Passive mutual funds are investment funds that aim **to replicate the performance of a specific market index** rather than trying to outperform it
- They usually track a benchmark index, say **BSE Sensex** or **Nifty50,** and **try to mimic their performance.**
- **Actively managed funds:** Fund managers make buy-and-sell decisions based on market analysis and research
- **Passive mutual funds** :Follow a buy-and-hold strategy based on an index.

Pros and Cons of Passive MF:

Pros	Cons
• **Easily tracked:** Since the underlying constituents of the benchmark indices are publicly available, passively managed schemes can be easily tracked and therefore less risky.	• **No Outperformance:** Designed to match, not to beat, the market. It limits the potential for higher returns that active fund managers might achieve.
• **Predictability:** Since they follow an index, the returns of passive funds are predictable, reflecting the overall market or sector they track.	• **Lack of Flexibility:** Must stick to th index even during market downturns which may expose investors to losses

Why fair returns for farmers are elusive?

- A series **of RBI working papers on food inflation says** that tomato, onion and potato farmers get a raw deal despite seasonal spikes in prices. In contrast, those growing pulses or rearing poultry are better off..
- The four RBI working papers focused on the value chains of vegetables — tomato, onion and potato (**collectively known as TOP crops**), fruits — grapes, bananas and mangoes, livestock — milk, poultry meat and eggs, and pulses — gram, tur and moong.
- In the case of fruits and vegetables, **farmers get a low to moderate** share in the range of 31% -43% in the consumer rupee. In case of pulses and livestock, farmers' realisation is much higher at 65% – 75% of the consumer rupee.
- During periods of high inflation, middlemen and retailers capture a significant portion of the price paid by consumers for fruits and vegetables, this results in lower earnings for farmers.

Reasons for the lower realisation in case of tomato, onion & potato

- A key reason for the farmers' lower realisation in case of TOP vegetables is that it **lacks an efficient value chain system** and is highly fragmented.
- This is due to the perishable nature of the crop, regional and seasonal concentration, **lack of adequate storage facilities**, and presence of a large number of intermediaries. Agricultural Produce Marketing Committees (APMCs) markets are administered by respective states, which fix mandi fees, official commission charges, and user charges.

A better deal for dairy & poultry farmers

- On an average, 70% and 75% of the consumer rupee goes back to the dairy and egg farmers, respectively, whereas 56% of the consumer rupee goes back to the farmers and integrators in the poultry meat value chain.
- The livestock sector exhibits seasonal variation in production as well as

consumption. In the case of the egg value chain, farmers' share of the consumer rupee varies from 69% in summer to 89% in winter due to seasonality in the demand. Religious festivals also adversely impact demand for meat and eggs.

- Despite milk being a perishable commodity, farmers' share in the consumer rupee is higher due to efficient value chains developed by dairy cooperatives and private organised players who procure milk from the farmers at the village level and store it in chilling plants.

Price realisation in pulses

- Farmers get a larger share of the consumer rupee for pulses as compared to vegetables and fruits as these have a relatively longer shelf life. This renders pulses stock as an important determinant of price movement. Recent years have seen price spikes due to demand-supply gap, despite the country being the largest producer of pulses in the world. When domestic production falls, the government stabilises supply and price pressures by liberalising imports. It also ensures continued remunerative prices for farmers through assured procurement at minimum support price (MSP) to create buffer stocks. India imports mostly tur, urad and masoor (lentils) and imports would be around 15% of the total consumption of 26-27 million tonne.

How can the value chains be improved?

- In order to **enhance incomes of TOP farmers,** the working papers have suggested allowing private mandis (wholesale markets) besides stepping up electronic linking of the government's digital wholesale market — **National Agriculture Market (e-NAM) — with the thousands of APMCs** and their sub-yards to enable farmers and traders to trade online. As mostly small and marginal farmers grow vegetables, scaling up farmer collectives via Farmers Producers Organisation (FPOs) and empowering them with incentives may help increase their bargaining power.

- **Relaunching of potato futures trade in commodity exchanges** and launching **futures trading in onion especially** for the rabi variety can be explored for optimal price discovery. The operational efficiency of the dairy industry can be improved by creating a more efficient value chain through dynamic milk procurement methods, strengthening of the cooperative and organised sectors, besides creating a feed bank and increasing fodder productivity.

India's Forex Reserves Top $700 bn, India becomes 4th country to cross this mark

India is now the **fourth-largest economy globally** to have forex reserves exceeding $700 billion, following **China, Japan, and Switzerland.**

Factors which led to rise in India's Forex Reserves

- **Investment Boost:** Since 2013, India has strengthened its forex reserves through improved macroeconomic conditions, attracting foreign investments.
- **Foreign Inflows:** In 2024, foreign inflows have reached $30 billion, primarily driven by local debt investments included in a J.P. Morgan index. **RBI Interventions:** The recent increase was partly due to $4.8 billion in dollar purchases by the RBI and $7.8 billion from valuation gains linked to the U.S. Treasury yields, the dollar's strength, and rising gold prices.
- **Market Stability:** Adequate forex reserves help reduce currency volatility, providing the Reserve Bank of India (RBI) with the capability to intervene if necessary.
- **Controlled Volatility:** The RBI has managed the rupee's volatility, keeping it stable among emerging market currencies.

Foreign Exchange Reserves

- Foreign Exchange Reserve are assets denominated in a foreign currency that are held on reserve by a central bank.

- Reserve Bank of India Act and the Foreign Exchange Management Act, 1999 set the legal provisions for governing the foreign exchange reserves.

Composition of Forex of India (in descending order)

- Foreign Currency Assets
- Gold Reserves
- Special Drawing Rights (SDR)
- Reserve Position in IMF

Foreign Currency assets (FCA):

- Foreign Currency Assets (FCA) that is the most important component of the RBI's foreign exchange reserve are the assets like US Treasury Bills bought by the RBI using foreign currencies.
- The FCA is the largest component of India's forex reserve.

Special Drawing Rights (SDR):

- An international reserve asset, created by the IMF in 1969;
- It is neither a currency nor a claim on the IMF.
- Rather, it is a potential claim on the freely usable currencies of IMF members.
- Value of the SDR: It is based on a basket of five currencies: Dollar, Euro, Renminbi, Yen and Pound Sterling.

Reserve Tranche:

- A Reserve Tranche is a portion of the required quota of currency each member country must provide to the IMF.
- It can be utilized by the country for its own purposes without a service fee or economic reform conditions.

Significance of foreign currency reserves

Economic Crisis Liquidity: In crises, central banks can exchange foreign currency for local currency, ensuring companies remain competitive in imports and exports.

Currency Depreciation: Japan, using a floating exchange rate, purchases US treasuries to keep the yen lower than the dollar, enhancing export competitiveness.

International Finance Obligation: Forex reserves help meet international financial commitments, such as paying debts and financing imports.

Internal Project Funding: Foreign currency reserves can be utilized to finance domestic infrastructure and industry projects.

Reassurance to Investors: Holding forex reserves can instill confidence in foreign investors during times of unrest or uncertainty.

Portfolio Diversification: Central banks diversify their reserves by holding various currencies and assets, mitigating risk from declining investments.

PM GatiShakti National Master Plan completes 3 years of transforming India''s Infrastructure landscape

- PM GatiShakti has successfully laid the groundwork for seamless, multi-modal connectivity and accelerated economic growth. The PM GatiShakti has redefined how India plans and executes large-scale infrastructure projects. By harnessing geospatial data from 44 Central Ministries and 36 States/UTs, the platform has significantly improved inter-ministerial coordination and streamlined project execution.
- PM Gati Shakti incorporates the infrastructure schemes of various Ministries and State Governments such as Bharatmala, Sagarmala, inland waterways, dry/land ports, and UDAN. PM Gati Shakti incorporates the infrastructure schemes of various Ministries and State Governments such as **Bharatmala, Sagarmala, inland waterways, dry/land ports, and UDAN.**

Key Achievements:

On boarding Whole of the Government on the Single platform

- PM GatiShakti has integrated 44 Central Ministries and 36 States/UTs with more than 1600 data layers, making it a crucial tool for planning and executing infrastructure projects.
- To date, over 200 big-ticket infrastructure projects have been evaluated by the Networking Planning Group (NPG) from the perspective of the principles of the PM GatiShakti viz. integrated planning & development of multimodal infrastructure, last-mile connectivity to economic and social nodes, intermodal connectivity, enhance logistics efficiency and synchronised implementation of projects.
- **Social Sector Impact**: Extending the PM GatiShakti to the Social Sector Ministries, the focus is on increasing the usage of the PM GatiShakti for social development, identifying social gaps (schools, hospitals, anganwadis) using, and developing applications and planning tools for capturing data. This has enabled better infrastructure planning in essential areas such as primary healthcare, education, postal services, and tribal development, ensuring that even remote and underserved areas are part of India's infrastructure growth story.
- **PM GatiShakti State Master Plans (SMPs)**: All 36 States/UTs have developed the PM GatiShakti State Master Plan (SMP) portals, aligned with the PM GatiShakti National Master Plan platform to synchronise infrastructure assets and enhance regional development. This unified approach has helped States streamline their capital investment for accelerating infrastructure development. Over 533 projects have been mapped by States/UTs on the PM GatiShakti portal.
- **EXIM and Trade Facilitation**: Aligned with the National Logistics Policy (NLP), the PM GatiShakti has been instrumental in addressing critical infrastructure gaps, reducing logistics costs, and improving India's logistics performance. According to the World Bank''s ''Logistics Performance Index Report (2023) India's rank (38) has improved by six places from 44 in 2018.

- **Regional Workshops and Stakeholder Engagement**: Following the spirit of cooperative federalism, over the last three years, five regional workshops have been conducted, covering all 36 States/UTs to facilitate knowledge sharing, best practices, and project demonstration by Central and States Governments. These engagements have played a key role in strengthening local adoption and ownership of the GatiShakti framework.
- **Driving Sustainable, Data-Driven Development**: The PM GatiShakti's data-driven approach is powered by GIS-based tools and a real-time monitoring system that enables faster and more informed decision-making. The platform ensures that projects are aligned with national priorities and completed on time, minimising delays and reducing cost overruns. This integration is key to meeting India's Net Zero by 2070 commitments, as the platform promotes the use of green infrastructure and sustainable logistics solutions.
- **Training and Capacity Building**: As the PM GatiShakti is a new initiative with an advanced GIS platform, DPIIT has undertaken the task to train officials for build their capacities. The PM GatiShakti National Master Plan (PMGS NMP) has seen significant progress in capacity building through the institution of courses and workshops. A course on the PM GatiShakti, available on the iGoT platform, has already been completed by over 20,000 officials. Additionally, all Central Training Institutes (CTIs) have integrated a course module on the PM GatiShakti into their regular officers'' training curriculum. The resource persons and master trainers from DPIIT and BISAG-N conduct regular sessions on the PM GatiShakti across various CTIs and ATIs, including institutions like Lal Bahadur Shastri National Academy of Administration (LBSNAA), Sardar Vallabhbhai Patel National Police Academy (SVPNPA), and Sushma Swaraj Institute of Foreign Service (SSIFS). There have also been approximately 150 interactive training sessions on the PM GatiShakti with Ministries/Departments, and States/UTs, engaging over 1,000 officials.
- **Extending PMGS to the Districts**: As India moves forward, the PM GatiShakti is

expected to continuously evolve to keep playing a pivotal role in expanding multi-modal infrastructure, developing Smart Cities, and enhancing the country's industrial capabilities through Industrial Corridors and Mega Investment Regions. Building upon the vision of the PM GatiShakti National Master Plan and the significant usage demonstrated by Central Ministries/Departments as well as States/UTs, a **PM GatiShakti District Master Plan (PMGS DMP)** portal is being developed with technical support of BISAG-N (Bhaskaracharya National Institute for Space Applications and Geoinformatics) for collaborative planning at the District level by State/District authorities. The NMP platform's emphasis on cross-sectoral cooperation and emerging technologies such as AI and IoT will further revolutionise infrastructure management and planning.

- Taking PMGS to international level and for promoting the use of PM GatiShakti and Geospatial technology in the integrated planning of infrastructure, diplomatic engagements are underway with countries in the neighbourhood and other developing countries like Nepal, Bangladesh, Sri Lanka**,** Madagascar, Senegal and Gambia.
- The government is also considering providing access to non-government users for the data (non-sensitive and shareable) relevant to the planning of the infrastructure and developmental activities by the sector. Such access to the data shall be provided in the most secure manner.
- As India celebrates three years of the PM Gati Shakti, the initiative continues to fulfil its promise of creating a modern, interconnected infrastructure network that is key to ***India"s Atmanirbhar Bharat vision.***

Union Government releases tax devolution of ₹1,78,173 crore to State Governments, including one advance instalment of ₹89,086.50 crore in addition to regular instalment due in October, 2024

- Prime Minister The Union government released tax devolution of Rs 1,78,173 crore to states, including one advance instalment of Rs 89,086.50 crore in

addition to regular instalments in view of the festive season.

- Uttar Pradesh received Rs 31,962 crore, the largest share among all states.
- • Advance instalment released in view of upcoming festive season and to enable states to accelerate capital spending and finance their development/welfare-related expenditure.

Tax devolution

- Tax devolution is the distribution between the Union and states of the net proceeds of taxes.
- Currently, 41 per cent of taxes collected by the Centre is devolved to states on a regular instalments.
- The releases of states' share (tax devolution) is as ***per the accepted recommendations of the Finance Commission*** for its award period.
- One of the core tasks of a Finance Commission as stipulated in Article 280(3)(a) of the Constitution is to make recommendations regarding the distribution between the Union and the states of the net proceeds of taxes from the divisible pool.
- The divisible pool is that portion of gross tax revenue which is distributed between the Centre and states. The **divisible pool consists of all taxes**, except surcharges and cess levied for specific purpose, net of collection charges.
- This is the most important task of any Finance Commission, as the share of states in the net proceeds of Union taxes is the predominant channel of resource transfer from the Centre to states.
- The sharing of revenue has provided states with sufficient stability of unconditional revenue to pursue their diverse development objectives.

What is the Finance Commission?

- The Finance Commission is constituted by the **President under Article 280** of the Constitution, mainly to give its recommendations on distribution of tax

revenues between the Union and the states and among the states themselves.

- The Fifteenth Finance Commission was constituted on November 27, 2017 against the backdrop of the abolition of the Planning Commission (as also of the distinction between Plan and non-Plan expenditure) and the introduction of the Goods and Services Tax (GST), which has fundamentally redefined federal fiscal relations.
- In November 2020, the Fifteenth Finance Commission, led by chairman N.K. Singh, submitted its report for the period 2021-22 to 2025-26 to the then President Ram Nath Kovind.
- In November 2023, the Union Cabinet cleared the Terms of Reference of the 16th Finance Commission to suggest the ratio for devolution of taxes between the Centre and states and also review financing disaster management initiatives, for five years beginning April 1, 2026.
- On December 31, 2023, the government appointed former vice chairman of NITI Aayog Arvind Panagariya as the chairman of the 16th Finance Commission.
- The panel will make its recommendations available by October 31, 2025, covering an award period of five years commencing on April 1, 2026.

Sitharaman reviews performance of Regional Rural Banks in northeast

Union Minister for Finance and Corporate Affairs Nirmala Sitharaman chaired a meeting in Itanagar to **review performance of seven Regional Rural Banks (RRBs**) of the northeast region covering the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.

• Given the crucial role of RRBs in supporting the rural economy, Sitharaman asked them to increase credit disbursement under various flagship schemes of the government such as MUDRA, PM Vishwakarma, etc in the Northeast region.

• The minister was apprised about the improvement in the financial performance of the RRBs of the northeast and their technology upgradation ever since the regular review

was initiated in 2022.

Regional Rural Banks (RRBs)

• The RRBs were established under the provisions of the ordinance promulgated on September 26, 1975 and Regional Rural Banks Act, 1976.

• RRBs were **established in 1975** on the recommendation of the Narasimham Working Group with the particular objective of catering to the financial inclusion needs of the small and marginal farmers, agricultural labourers, artisans and weaker sections of the society.

• The first five Regional Rural Banks were established on October 2, 1975 with the objective to create an alternative channel to cooperative credit structure with a view to ensure sufficient institutional credit for rural and agriculture sector.

• The first RRB was Prathama Bank, with head office in Moradabad, Uttar Pradesh. It was sponsored by Syndicate Bank and had an authorised capital of Rs 5 crore.

• The RRBs, with focus on serving the rural areas, are an integral segment of the Indian banking system.

• Post amalgamation, the number of RRBs has come down from 196 in FY 2004-05 to 43 now.

• **Sponsored** by the Commercial Banks, the equity of RRBs are held by the central government, concerned state government and the sponsor bank in **the proportion of 50:15:35.**

• These banks are envisaged to be state-sponsored, regionally based and rural-oriented.

• The purpose of establishment of the RRBs is **to develop the rural economy** by providing credit and other facilities to the small and marginal farmers, agricultural labourers, artisans and small entrepreneurs.

• Currently, 43 RRBs are operating through a network of over 21,000 branches covering 702 districts of the country.

Role of RRBs

• Nearly **70 per cent of the total Indian population** reside in rural areas, laying a larger impact on the economic situation of the country. Consequently, there is a need for a robust and efficient banking system in rural areas, offering customised products and timely credit at affordable rates, unlike traditional moneylenders providing loans at very high interest rates.

• RRBs play a vital role in the growth and development of rural and backward areas in a developing country like India.

• RRBs have a mandate to ensure rural development and foster financial inclusion.

• RRBs cater to a more scattered population that demand smaller ticket loans, and these banks operate under strict operational and lending norms.

The contributions being made by RRBs:

(i) Of the total loans extended by the RRBs, about 46 per cent goes to agriculture. About 90 per cent of loans are extended to the priority sector. Of the total loans, about **79 per cent is extended to weaker sections.**

(ii) RRBs play a significant role in extending micro credit. They account for 30 per cent of the Self-Help Group accounts and 26 per cent of the loan amount. About 19 per cent of total Kisan Credit Cards have been issued by the RRBs.

(iii) Share of RRBs in total accounts/enrolments under government sponsored schemes like Pradhan Mantri Jan-Dhan Yojana (PMJDY), Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY), Pradhan Mantri Suraksha Bima Yojana (PMSBY), Atal Pension Yojana, etc varies from 12 per cent to 19 per cent.

(iv) About 92 per cent of the branches of RRBs are in rural and semi-urban areas. Though RRBs have 14 per cent of total bank branches in the country, their share in

total number of rural branches is about 29 per cent. In the rural areas of aspirational districts, RRBs have about 40 per cent of the rural branches. Moreover, many RRBs have branches in remote areas and they are providing financial services to vulnerable sections.

(v) In rural areas, the share of deposit accounts of RRBs is about 26 per cent and RRBs have the highest average balance in PMJDY accounts amongst all categories of banks. In the northeast region, RRBs cater to the banking needs of about 38 per cent of the rural people. As against the overall rural credit-deposit ratio of 64 per cent for all the banks, RRBs have a rural credit-deposit ratio of 75 per cent.

What is Codex Alimentarius?

India participated in the 44th session of the **Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU)** held in Dresden, Germany .

- During the conference, India provided valuable insights on nutrient reference values for persons aged 6-36 months. It also extended support to frame harmonised guidelines for probiotic foods and food supplements.
- Playing a pivotal part in creating harmonised guidelines for probiotics, India highlighted that the current Food and Agriculture Organisation (FAO)/ World Health Organisation (WHO) documents on probiotics are two decades old and need revision in light of scientific advancements.
- Additionally, India emphasised the lack of international harmonisation in probiotic regulation guidelines, which may impede global trade practices.
- The committee agreed to revisit these guidelines.

Codex Alimentarius

- International food trade has existed for thousands of years but until not too long ago, food was mainly produced, sold and consumed locally. Over the last century,

the amount of food traded internationally has grown exponentially, and a quantity and variety of food never before possible travels the globe today.

- The international trade in food is now worth over $1.6 trillion annually.
- **The Codex Alimentarius, or "Food Code",** is a collection of standards, guidelines and codes of practice developed by consensus and based on the most robust up-to-date science available.
- It includes standards for all the principal foods, whether processed, semi-processed or raw, for distribution to the consumer.
- The Codex Alimentarius includes provisions in respect of food hygiene, food additives, residues of pesticides and veterinary drugs, contaminants, labelling and presentation, methods of analysis and sampling, and import and export inspection and certification.
- Public concerns about food safety issues often place Codex at the centre of global debates.

How a Codex Standard is developed?

- The procedures for preparing standards are well defined, open and transparent.
- A national government or a subsidiary committee of the Commission usually makes the proposal for a standard to be developed. They then prepare a discussion paper that outlines what the proposed standard is expected to achieve, and then a project document that indicates the time frame for the work and its relative priority.
- The Commission reviews the project document and decides whether the standard should be developed as proposed.
- The preparation of a proposed draft standard is arranged by the Commission Secretariat and circulated to member governments, observer organisations and other Codex committees for two rounds of comments and special advice.
- Standards can take several years to develop. ***Once adopted by the Commission, a Codex standard is added to the Codex Alimentarius.***

- Codex standards are based on sound science provided by independent international risk assessment bodies or ad-hoc consultations organised by FAO and WHO.
- Codex standards and related texts are voluntary in nature. They need to be translated into national legislation or regulations in order to be enforceable.
- Codex standards ensure that food is safe and can be traded.
- The texts contained in the Codex Alimentarius are considered the benchmark standards for international commerce in food, and as such are recognised by the **World Trade Organisation (WTO).**
- They facilitate cross-border exchange while preventing and helping to resolve trade disputes. Codex texts are not mandatory but governments frequently use them as the basis for national legislation.
- The texts are adopted by the Codex Alimentarius Commission.

Who decides on standards in Codex?

- Since its beginnings in 1963, the Codex system has evolved in an open, transparent and inclusive way to meet emerging challenges.
- The Codex Alimentarius Commission and its subsidiary bodies are committed to elaborate as necessary of Codex standards and related texts to ensure that they are consistent with and reflect current scientific knowledge and other relevant information.
- Each member of the Codex Alimentarius Commission is responsible for identifying, and presenting to the appropriate committee, any new scientific and other relevant information which may warrant revision of any existing Codex standards or related texts.

Codex Alimentarius Commission

- The Codex Alimentarius Commission emerged following a four-year process and met for the first time in Rome from June 25 to July 3, 1963. That inaugural

meeting is taken as the date that Codex came into being.

- It was **established by the Food and Agriculture Organisation** of the United Nations (FAO) and the **World Health Organisation (WHO)** to protect consumer health and ensure fair practices in the food trade.
- The Codex Alimentarius Commission **is based in FAO in Rome**.
- It currently comprises **188 member countries** and one member organisation (The European Union). There 240 Observers, of which 60 are inter-governmental organisations, 164 are non–governmental organisations and 16 are United Nations agencies.
- The Commission meets in regular session once a year alternating between Geneva and Rome.
- The programme of work of the Commission is **funded through the regular budgets** of WHO and FAO with all work subject to approval of the two governing bodies of the parent organisations.**Codex Alimentarius and India**
- The **National Codex Contact Point (NCCP) of India** has been constituted by the Food Safety and Standards Authority of India (FSSAI) for keeping liaison with the Codex Alimentarius and to coordinate Codex activities in India.
- NCCP for India coordinates and promotes Codex activities in India in association with the National Codex Committee and facilitates India's input to the work of Codex through an established consultation process.

What are Codex subsidiary bodies?

- **There are four kinds of Codex subsidiary bodies:**

  i) General Subject Committees which establish standards and guidelines applicable to all foods.

  ii) Commodity Committees which prepare standards for specific commodities.

  iii) FAO/WHO Coordinating Committees, through which regions or groups of countries coordinate food standards activities in the region, including the development of regional standards.

iv) Ad hoc Intergovernmental Task Forces, which are time-limited and prepare standards and guidelines on specific issues.

RBI, Maldives Monetary Authority enter into currency swap pact

- The Reserve Bank of India (RBI) has **entered into a currency swap agreement** with the Maldives Monetary Authority (MMA) under the **SAARC Currency Swap Framework 2024-27.**
- Under the agreement, the MMA is eligible for financing support from the RBI amounting to $400 million under the US Dollar/Euro Swap Window and Rs 30 billion (Rs 3,000 crore) under the INR Swap Window.
- The agreement would be valid till June 18, 2027.
- The **SAARC Currency Swap Framework** came into operation on November 15, 2012, to provide a backstop line of funding for short-term foreign exchange liquidity requirements or short-term balance of payments stress till longer term arrangements are made.

What is a Currency Swap Agreement?

- The term **"swap" means exchange**.
- A currency swap ***between two countries*** is an agreement or contract to exchange currencies (either the countries' own currencies or any hard currency) with predetermined terms and conditions.
- Currency swaps are often **conducted between two central banks.**
- For a central bank like the RBI, the main purpose of a currency swap is to obtain foreign currency from the issuing foreign central bank under predetermined conditions (such as exchange rate and currency volume).
- In addition to supporting the domestic currency and foreign exchange market, another key purpose of a currency swap is to **maintain the value** of the foreign exchange reserves held by the central bank.

What is the purpose of currency swap?

- The **primary purpose** of currency swaps is **to avoid turbulence** and risks in the foreign exchange market and exchange rates.
- Central banks and governments engage in currency swaps with foreign counterparts to ensure adequate foreign currency during times of scarcity.
- Both central banks and governments work towards this objective using similar mechanisms.
- Turbulence often occurs when a country faces foreign currency scarcity, which can lead to a currency crisis and steep depreciation of the domestic currency.
- In such scenarios, if the central bank or government (e.g., the RBI/government of India) can obtain sizable foreign currency by exchanging domestic currency, it ensures the availability of foreign currency.
- This helps **avoid turbulence in the foreign exchange market**, depreciation of the domestic currency, and currency crises.

Beyond currency or exchange rate stability, currency swaps between governments have supplementary objectives such as:

i) Promoting bilateral trade.
ii) Maintaining the value of foreign exchange reserves with the central bank.
iii) Ensuring financial stability by protecting the health of the banking system.

It is desirable for developing countries like India to reach currency swap agreements with countries like the USA, UK, EU, and Japan, whose currencies are hard currencies used in international trade.

- Currency swap agreements ***can be bilateral or multilateral***. The earliest currency swap was between the US Federal Reserve and the Central Bank of France, signed on February 28, 1962.

Currency swap agreements are usually categorised into five types based on the

nature and status of the currencies swapped:

i) Exchange cash for cash vs cash for securities.

ii) Exchange conditional vs unconditional swaps.

iii) Exchange reserve currencies on both sides.

iv) Exchange reserve currency for non-reserve currency.

v) Exchange non-reserve currencies on both sides.

GDP Base Year Revision

Recently, the Ministry of Statistics and Programme Implementation (MoSPI) brought together many economists and forecasters to discuss the revision of the base year for India's Gross Domestic Product (GDP).

- It underscores the importance MoSPI places on wider consultation, especially given the criticism and debates surrounding previous base year revisions.
- The previous base year revision in 2015 changed the base year from 2004-05 to 2011-12 but faced criticism due to perceived flaws in the methodological changes.

Previous Base Year Revision Controversies

- **Methodological Concerns**: Previous revision of base year replaced computing GDP of the private corporate sector (PCS) directly from the audited balance sheets of the Ministry of Corporate Affairs (MCA) database and the use of PCS data for estimating manufacturing sector GVA.
    - It mostly discarded the Index of Industrial Production (IIP) and Annual Survey of Industries (ASI) data in the process.
- **Single Deflator Criticism**: Many experts questioned the single deflator used to calculate real GDP growth from nominal GDP growth, rather than the internationally standard technique of double deflation.
    - Single deflator involves deflating the nominal value-added in each sector by various price indices e.g., CPI, WPI while double deflation involves

deflating output by output prices and inputs by input prices.
    - The GDP price deflator measures the change in the value of all of the goods and services produced in an economy when inflation is taken into account.
- **Discrepancies in GDP Estimates**: While overall GDP growth seems robust, consumption appears weak and this is a sign of serious measurement problems.
    - Also, there is a discrepancy between production methods and the expenditure methods of calculating GDP.
    - Weak consumption may indicate underreported economic activities or problems calculation of inflation in GDP calculations.
- **Under-reporting of Data**: In the last three decades, there has been significant growth in the number of registered companies, particularly in the services sector, especially finance.
    - However, their contribution to domestic output is unclear because many do not file their audited balance sheets with the Registrar of Companies (RoC).
- **Underestimating Unorganised Sector**: The 2015 revision of base year faced criticism for the use of balance sheets of the unorganised sector to calculate GDP, instead of taking value-added figures from the producing units.
    - It means a lower coverage for informal sector producers, who are not listed as companies.
- **Averaging Problem**: Averaging production and expenditure sides is acceptable in advanced countries but not in developing countries, as India does not measure the two sides of GDP independently.
    - Also, the data on the expenditure side of which consumption is a part is quite poor.

Base Year

- Base Year: A base year is a **specific reference year** against which Gross Domestic Product (GDP) figures for subsequent and prior years are calculated.

- Need for a Base Year: It provides a stable reference point and serves as a benchmark for measuring economic performance and allows for comparisons over time.
    - By pegging GDP figures to a specific year, analysts can accurately interpret trends and shifts in economic performance.
- Features of a Base Year: The base year should be a normal year i.e., it must not experience any abnormal incidents such as droughts, floods, earthquakes, pandemic, etc. Also, it should not be too distant in the past.
- Reasons for Revising the Base Year:
    - Additionally, evolving data compilation methods may require the incorporation of new classification systems and data sources.
    - As such, revisions ensure that the GDP figures reflect the current economic reality.
    - These changes have a ripple effect on a wide array of economic indicators, including trends in public expenditure, taxation, and public sector debt.
    - Fluid Nature of Indicators: The indicators for computing GDP are dynamic and can change over time due to shifts in consumer behaviour, economic structure, and commodity composition.
    - Impact on Economic Indicators: When new data sets are incorporated through base year revisions, it can lead to adjustments in GDP levels.
    - International Standard Practice: United Nations-System of National Accounts 1993 requires countries to revise computation practices from time to time.
- Frequency of Base Year Revisions: The base year should ideally be **revised every 5 to 10 years to keep national accounts in line** with the latest available data.
- History of Base Year Revisions: Since the first national income estimates were published in 1956 with FY 1949 as the base year, India has revised its base year seven times.
    - The most recent revision changed the base year from FY 2005 to FY 2012.

Considerations for the New Base Year

- Formation of the Advisory Committee: In June 2024, MoSPI set up a **26-member Advisory Committee on National Accounts Statistics (ACNAS)** to decide the base year for GDP data, under the chairmanship of Biswanath Goldar.
    - The committee will also take a call on the alignment of GDP with other macro indicators like the WPI, CPI, and IIP.
- Potential Base Years: The committee is leaning towards 2022-23 as the new base year for GDP, although 2023-24 is also under consideration.
    - Year 2016 (Demonetisation), 2017-18 (ripple effects of GST) and 2019-21 (Covid-19) are not considered because of abnormal changes in the economy.
- Utilising GST Data: Discussions are underway regarding the inclusion of the Goods and Services Tax (GST) database for GDP calculations to include new databases to capture a better picture of the economy.
- Methodological Improvements: The advisory committee is also considering changing the composition of indices e.g., inclusion of ASUSE (Annual Survey of Unincorporated Sector Enterprises) and exploring the double deflation method to improve GDP measurement accuracy.

In light of past controversies surrounding India''s GDP base year revisions, the current initiative by MoSPI to engage experts and establish an advisory committee underscores the necessity for a transparent and methodologically sound approach. The inclusion of updated data sources and rigorous methodologies aims to enhance the accuracy and reliability of GDP estimates.

Sustainable Agriculture to Recover Groundwater

According to the Indian Institute of Technology Gandhinagar, Gujarat, replacing around 40% of the area currently sown with rice with other crops could help recover 60-100 cubic kilometers of groundwater lost in northern India since 2000.

- Key Highlights:
  - Such unsustainable cropping patterns, if left unchecked, could significantly strain the already overexploited groundwater resources, further aggravating water security challenges.
  - The prevailing agricultural practices, particularly those centered around rice cultivation, heavily depend on groundwater resources for irrigation.
  - A continued rise in global temperatures have contributed to the depletion of groundwater reserves, with estimates indicating a potential loss ranging between 13 to 43 cubic kilometers.
  - The nexus between agricultural practices and groundwater depletion underscores the urgent need for adaptive strategies in cropping patterns to mitigate the impending ecological crisis.
- Impact of Climate Change:
  - The 2018 Special Report by the ***Intergovernmental Panel on Climate Change (IPCC) on Global Warming of 1.5℃ warns*** that, if current trajectories persist, global warming is expected to reach 1.5°C between 2030 and 2050, with a potential rise to 3°C by 2100.
  - In comparison, maintaining the existing cropping patterns under global warming scenarios of 1.5 to 3°C would result in a far lower recovery of groundwater, estimated between 13 to 43 cubic kilometers.
- Recommendations:
  - It recommends shifting towards cereals in Uttar Pradesh and oilseeds in West Bengal as alternatives to rice cultivation.
  - These findings carry significant policy implications, suggesting that optimal crop patterns must be identified for sustainable groundwater management in irrigated regions of northern India while safeguarding farmers'' livelihoods.
  - The report emphasises the urgent need to alter crop patterns, particularly in Punjab, Haryana, and Uttar Pradesh, to enhance groundwater

sustainability while maintaining farmers'' profitability.

- These findings carry significant policy implications, suggesting that optimal crop patterns must be identified for sustainable groundwater management in irrigated regions of northern India while safeguarding farmers'' livelihoods.

Note:

- Heavy Reliance: Groundwater accounts for 62% of irrigation, 85% of rural water supply, and 45% of urban water consumption .
- Depletion Rates: India''s groundwater depletion rate could triple by 2080, primarily due to climate-induced over-extraction .
- Over-Extraction: Several regions, including Rajasthan, Punjab, Haryana, and Delhi, extract more groundwater than can be replenished, with withdrawal rates exceeding 100% of available resources.
- Geographical Disparities: The Indo-Ganga-Brahmaputra plains contain 60% of India's groundwater resources but cover only 20% of the country.
- Agricultural Dependency: Over 60% of irrigated agriculture relies on groundwater, putting immense pressure on resources, particularly in agricultural hubs .

Challenges Related to Sustainable Agriculture in India

- Water Scarcity: Over-reliance on water-intensive crops and inefficient irrigation methods have resulted in groundwater depletion and water shortages.
- Climate Change: Unpredictable weather patterns, rising temperatures, and increasing frequency of extreme events such as floods and droughts negatively impact crop yields and agricultural sustainability.
- Fragmented Landholdings: Small and fragmented farms make it difficult to adopt sustainable agricultural practices, mechanization, and efficient resource use.
- Overuse of Chemical Inputs: Excessive use of chemical fertilizers, pesticides, and herbicides has led to soil and water pollution, harming ecosystems and long-term

agricultural productivity.

- Inadequate Policy Support: Insufficient government policies and incentives specifically promoting sustainable farming practices limit the transition to eco-friendly agriculture.

Government Initiatives Related to Sustainable Agricultural Methods

- Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)
- National Mission on Sustainable Agriculture
- Paramparagat Krishi Vikas Yojana (PKVY)
- Sub-mission on AgroForestry (SMAF)
- Rashtriya Krishi Vikas Yojana

Road ahead

- Promote Water-Efficient Practices: Adoption of water-efficient technologies such as drip irrigation and rainwater harvesting, along with crop diversification towards less water-intensive crops, to address water scarcity issues.
- Enhance Farmer Training and Awareness: Conduct widespread training programs and workshops to educate farmers on sustainable agricultural practices such as organic farming, agroforestry, crop rotation, and integrated pest management.
- Strengthen Policy and Incentive Support: Formulate and implement stronger policies that incentivize sustainable farming practices through subsidies, grants, and tax exemptions for adopting eco-friendly technologies and inputs.
- Improve Access to Technology and Markets: Facilitate access to modern sustainable agricultural technologies and create efficient supply chains and market linkages for farmers to sell organic and sustainably grown produce at fair prices.
- Encourage Research and Innovation: Invest in research and development focused

on sustainable agricultural methods, climate-resilient crops, and affordable eco-friendly inputs, while promoting collaboration between government institutions, research bodies, and farmers.

Yield Curve

- Government securities (**G-Sec**) are debt instruments (bonds) that governments issue to raise capital. The value at which the G-Sec is issued is regarded as its face value, and the value at which the G-Sec is traded in the **secondary market** is referred to as its market value.
- Bond Yield is the **return received by the investor** on the capital invested in a particular bond. The yield of a bond depends on its market value.
- If the market value increases above the face value of the bond (the price at which it was purchased in the primary market when it was issued), then the rate of returns on the bond purchase in the secondary market decreases. This phenomenon is often known as the softening of bond yields.
- On the other hand, if the market value decreases below the face value of the bond, then the rate of returns on purchasing the bond in the secondary market increases. This phenomenon is known as the hardening of bond yields.

A yield curve is a graph that depicts yields on bonds ranging from short-term debt such as one month to longer-term debt such as 30 years.

Types of Yield Curve & their interpretation

- The yield on bonds depends upon the risk involved. The higher the risks, the higher the yields.
- **Normal Yield Curve**: Normally, the yield on short-term maturity bonds is lower than that of long-term maturity bonds. This can be attributed to increased risk in the longer term (say 30 years). A normal yield curve indicates that yields on longer-term bonds may continue to rise, responding to periods of economic expansion.

- **Inverted Yield Curve**: When there are signs of a slowdown in an economy, it would mean that the economy faces risk in the short term. However, the economy may return to normalcy in the long term. Hence, the yield on short-term bonds becomes higher than the yields of long-term bonds. (Inverted Yield Curve). Hence, an inverted yield curve points towards a probable economic recession.

The Problem with Free Food

- The world has made tremendous progress in increasing food production by large-scale adoption of better seeds, more irrigation, and higher doses of fertilisers and pesticides. Farm machinery has become more efficient.
- All this could not have been done without increasing incentives to farmers — input subsidies, higher prices for their produce, or a mix of some of the two.

Government Initiatives

- **National Food Security Act (NFSA), 2013:** It was to cover roughly two-thirds of the Indian population in providing rice, wheat or coarse grains (5kg/person/month) at Rs 3/kg, Rs 2/kg, and Rs 1/kg, respectively.
    - These prices could be revised upwards after three years of the Act, keeping in view the ballooning magnitude of food subsidy on account of this Act, and the overall finances of the government.
- **Targeted PDS:** Under that scheme, the antyodaya (most vulnerable) people got free food, while those above that had to pay at least half the minimum support price (MSP) being paid to the farmer, and those above the poverty line had to pay 90% of MSP.

Challenges with Food Security Schemes

- **Fiscal Burden:** Huge beneficiary base as the scheme covers roughly 66% of the population, whereas the Rangarajan Committee estimated the headcount poverty ratio at about 29%. This wide coverage puts a huge fiscal burden on the

government. As a result, food subsidy is the largest subsidy in the Union budget.

- **Reduces Fiscal Space for Capital Investments:** Along with fertiliser subsidy, it cuts down much more rational and productive investments in agri-food space, such as in agri-R&D, precision agriculture, micro-nutrients, women's education and sanitation. These investments are almost 10 times more effective in ensuring the food and nutritional security of our people than free food and highly subsidised fertilisers and power.
- **Incentivises Corruption:** Subsidies, when they are abundant and almost open-ended, become an instrument of corruption. ICRIER research shows that a substantial part (almost 25-30%) of these two subsidies, food and fertilisers, never reaches the intended beneficiaries. If one looks at the inefficiency in the use of these two subsidies, and adds that to the leakages, the overall loss easily goes to 40-50% of the total amount of resources being spent on them.



Nobel Prize in Economics 2024

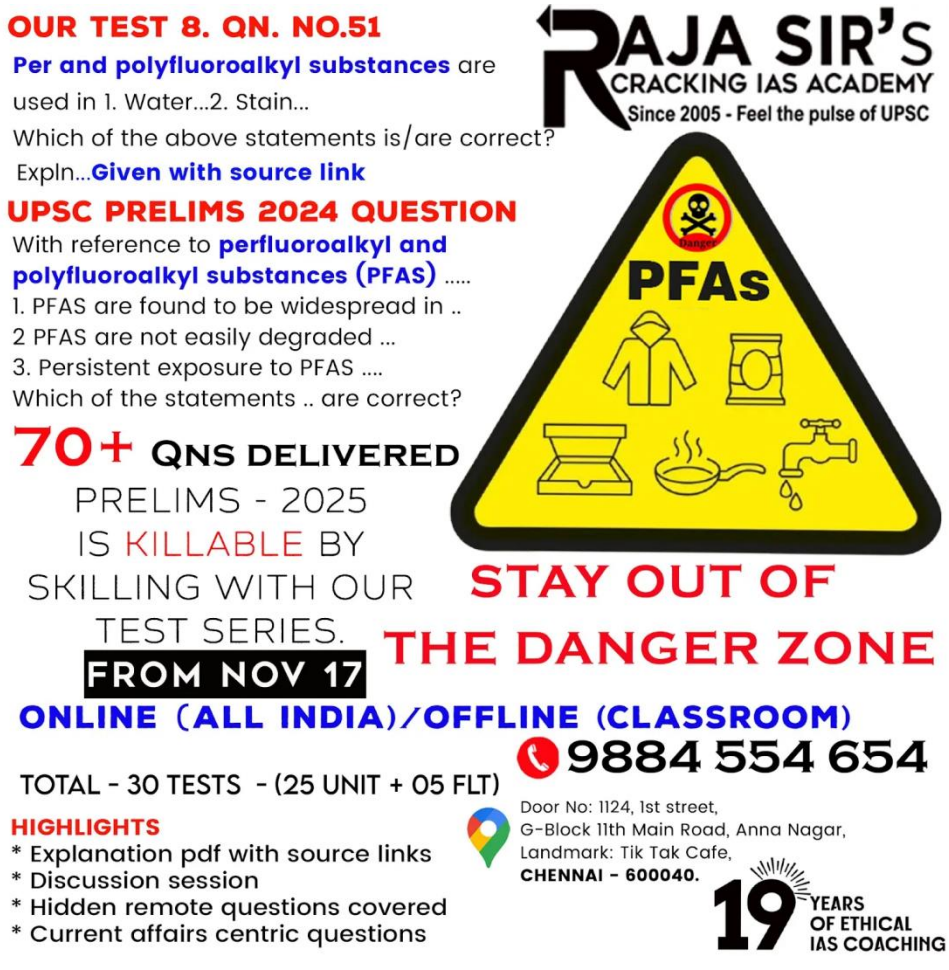
The 2024 Economics Nobel was awarded to U.S. economists Daron Acemoglu, Simon Johnson and James A. Robinson "**for studies of how institutions are formed and affect prosperity.**" The prize committee credited the winners for enhancing our understanding of **the root causes of why countries fail or succeed.**

Significance of the work of this year's economics Nobel prize winners:

- Three economists who have studied why some countries are rich and others poor and have documented that freer, open societies are more likely to prosper.
- The work by Daron Acemoglu, Simon Johnson and James A. Robinson "**demonstrated the importance of societal institutions** for a country's prosperity,".
- Acemoglu and Johnson work at the Massachusetts Institute of Technology, while Robinson does his research at the University of Chicago.
- In their work, the economists studied institutions that **European powers** such as Britain and Spain put in place when they colonized much of the world starting in the 1600s. They brought different policies to different places, giving later researchers a "**natural experiment**" to analyze.
- Colonies that were sparsely populated offered less resistance to foreign rule and therefore attracted more settlers. In those places, colonial governments tended to establish more inclusive economic institutions that "incentivized settlers to work hard and invest in their new homeland. In turn, this led to demands for political rights that gave them a share of profits,".
- In more densely populated places that attracted fewer settlers, the colonial regimes limited political rights and set up institutions that focused on "**benefiting a local elite at the expense of the wider population," .**
- "Paradoxically, this means that the parts of the colonized world that were

relatively the most prosperous around **500 years ago are now those that are relatively poor,**" it added, noting that India's industrial production exceeded the American colonies' in the 18th century.

- The economics prize is formally known as the **Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel.** The central bank established it in 1968 as a memorial to Nobel, the 19th-century Swedish businessman and chemist who invented dynamite and established the five Nobel Prizes.
- Though Nobel purists stress that the economics prize is technically not a Nobel Prize, it is always presented together with the others on Dec. 10, the anniversary of Nobel's death in 1896.





Why is the quality of institutions so important?

- Institutions are the **"rules of the game"** that define the incentives that individuals face when dealing with each other. For example, institutions that stop the State from seizing the property of honest citizens would give citizens the incentive to work hard without the fear of expropriation and that in turn would lead to economic prosperity.
- Institutions that legalize expropriation, on the other hand, would affect individual incentives negatively and cause economic stagnation.
- Now, Acemoglu and Johnson argued that institutions can either be "inclusive" or

"extractive".

- Inclusive institutions are **characterized by secure private property rights** and democracy while extractive institutions are marked by insecure private property rights and the lack of political freedom. They tried to empirically demonstrate that inclusive institutions lead to long-run economic growth and higher living standards while extractive institutions lead to economic degradation and poverty.
- To this end, they studied the institutions that colonists set up in different colonies and the impact that they had. When a colonial power did not want to settle in a country for various reasons (such as higher mortality rates due to geography), it set up institutions that were extractive in nature. **Example is the case of Britishers in India**.
- But in countries where colonists wanted to settle for the long-run, they set up inclusive institutions that encouraged investment and long-term growth over short-term plunder. This may have been the case in the United States where the British set up institutions that promoted long-term prosperity.
- It should be noted that institutions can also include factors like culture, which influence **the more explicit "rules of the game" expressed** by political and economic institutions.

If inclusive institutions are so good for growth, why don't we have more of them?

- Rulers face different choices in their respective countries. When the rulers of a country are able to safely extract resources for their personal gains through extractive institutions, the laureates argue, they have little reason to bring in political and economic reforms (or inclusive institutions) that can benefit the wider population over the long run.
- In such cases, **extractive institutions** prevail for a really long time as long as the masses do not revolt against the status quo.

Reserve Bank Climate Risk Information System (RB-CRIS)

- This is an initiative of RBI which **aims to enhance climate risk assessments by providing high-quality, standardized data to all.**

It comprises two **parts.**

- The **first part will be a web-based directory, listing various data sources, (meteorological, geospatial, etc.).**
  It will be publicly accessible on the RBI website.
- The **second part will be a data portal which will consist of processed data in standardised formats.**
  Only the regulated entities will have access to the data in a phased manner.

Need for the CRIS

- Climate change is emerging as one of the significant risks to the financial system.
- **Climate risk assessments are crucial for regulated entities to ensure the stability of their balance sheets and that of the financial system.**
- Such an assessment requires high-quality data relating to local climate scenarios, climate forecasts, and emissions.
- There are various gaps in the available climate-related data such as **fragmented and varied sources, differing formats, frequencies and units.**
- **To bridge these gaps Climate Risk Information System is needed.**

Draft disclosure framework on climate-related financial risks

- The Reserve Bank of India (RBI) released a draft disclosure framework on climate-related financial risks on February 28, 2024.
- The framework **requires regulated entities (REs) to disclose information on the following four areas: governance, strategy, risk management, and metrics and targets.**

- The framework is **aligned with international standards set by the Task Force on Climate-Related Financial Disclosures.**

The framework''s goals are to:

- Increase transparency and accountability in financial institutions
- Help stakeholders understand the risks and how REs are addressing them
- Align with India''s net-zero goals by 2070.

Applicability

- The framework is mandatory for Indian banks, financial institutions, and top NBFCs.
- Disclosure requirements
- The requirements for disclosures vary based on the size and complexity of the regulated entities (REs) operations.

Minimum Support Prices

- **Recent revision in MSP for Rabi crops:** Wheat, Rapeseed & Mustard, Lentil (Masur), Barley, Gram, and Safflower.

Minimum Support Price:

- **Definition:** MSP is the guaranteed price paid to farmers for their produce when purchased by the government, ensuring they receive a minimum income.
- **Determination:** MSP is recommended by the Commission for Agricultural Costs and Prices (CACP) based on factors like cost of production, demand and supply, and market trends.
- **Approval process:** The final decision on MSP is made by the Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister.
- **Crops under MSP:** MSP is announced for 22 crops, including 14 Kharif, 6 Rabi, and 2 commercial crops. Fair Remunerative Price (FRP) is set for sugarcane.

- **Types of Production Costs:**

  CACP uses three cost projections:

  - **A2:** Paid-out costs for inputs like seeds, labor, and fertilizers.
  - **A2+FL:** Includes unpaid family labor.
  - **C2:** Comprehensive cost including rent and capital interest, used as a benchmark reference.
- **Budget 2018-19:**

  The MSP is set at 1.5 times the All-India weighted average cost of production, ensuring farmers receive fair returns for their produce.

World Energy Outlook 2024

Key Findings	
Clean Energy Growth	More than **50% of global electricity** to be generated by **low-emission sources** before 2030.
Renewable Energy Addition	**560 GW** of renewables capacity added in 2023.
Investment in Clean Energy	Nearly **$2 trillion annually** on clean energy projects, double the investment in fossil fuels.
Nuclear Power's Role	Renewed interest in **nuclear power** to support clean energy transition.
Electricity Demand Drivers	Growth driven by **industry, electric vehicles (EVs), air conditioning**, and **AI-linked data centers**.
Renewable Power Capacity Projection	Expected to rise from **4,250 GW to nearly 10,000 GW** by 2030.

China's Role in Renewables	**60%** of global new renewable capacity in 2023 added by China.
Solar Power in China	By 2030, China's **solar power generation** will exceed the **total electricity demand of the U.S.** today.
Carbon Emissions	Global CO2 emissions set to peak "imminently"; energy-related CO2 emissions hit a **record high** last year.
Global Temperature Rise	Current policies put the world on track for a **2.4°C rise** by 2100, exceeding the **Paris Agreement goal**.
Challenges in Developing Countries	**Policy uncertainty** and **high capital costs** are hindering clean energy adoption in developing nations.
COP28 Renewable Energy Target	World pledged to **triple renewable energy capacity** by 2030, but current progress falls short.
CO_2 Emissions and Energy Demand	Two-thirds of increased energy demand in 2023 was met by **fossil fuels**, slowing the decline of coal usage.

"Scam se Bacho" Campaign

- **Aim:** To combat rising online scams and cyber fraud by fostering digital safety and vigilance across India.
- **Partnership:** Collaboration between **Meta** (formerly Facebook) and key government ministries, including:
    - Ministry of Electronics and Information Technology (MeitY)
    - Ministry of Home Affairs (MHA)
    - Ministry of Information and Broadcasting (MIB)
    - Indian Cyber Crime Coordination Centre (I4C)

- **Ministry:** Led by the Ministry of Information and Broadcasting (MIB).
- **Coverage:** National initiative, aimed at India's over 900 million internet users.
- **Features:**
    - A whole-of-government approach to raising **awareness on cyber safety**.
    - Focus on **educating citizens** to prevent cyber threats and scams.
    - Leverages Meta's global expertise in online safety to empower Indian users.
    - Support from the highest levels of government to align with **Digital India's** cybersecurity goals.

Indian Development and Economic Assistance Scheme

IDEAS scheme:

- **Origin:** Launched in **2003-04** as the **"India Development Initiative,"** later renamed as IDEAS Scheme.
- **Aim:** To promote India's political, economic, and strategic interests by providing developmental assistance to developing countries.
- **Ministry:** The scheme is administered by the **Ministry of External Affairs (MEA)** with support from **Exim Bank.**
- **Features:**
    - Provides Lines of Credit (LoCs) to developing countries for projects in **infrastructure, water, education**, and other key sectors.
    - Projects funded are typically recommended by MEA and are aimed at bolstering socio-economic development in partner countries.
    - The financing includes **concessional terms** to reduce the burden on developing nations.
    - The scheme **fosters diplomatic goodwill**, strengthening India's ties with countries in the Global South.

Centre Hikes MSP for Rabi Crops 2025-26

- The Indian government has announced a significant increase in the Minimum

Support Prices (MSPs) for **key rabi crops for the 2025-26 marketing season**. This decision, made by the Cabinet Committee on Economic Affairs (CCEA) under Prime Minister Narendra Modi, aims to provide farmers with better returns and support agricultural sustainability.

Overview of MSP Increases

- The MSP for wheat has gone up by Rs 150 per quintal which translated into an increase of 6.59 per cent of the previous year's price of Rs 2,275 per quintal. Minimum selling price MSP is now at Rs 2,425 per quintal. This adjustment is important because **wheat is the second largest crop in India after paddy** and is a very essential crop.
- In addition to wheat, other rabi crops have also seen increases in their MSPs:
- **Barley:** It has raised by Rs 130 to Rs 1,980 per quintal.
- **Gram:** Raised by Rs 210 to Rs 5,650 per quintal
- **Lentil (Masur):** Increased by Rs 275 to Rs 6, 700 per quintal
- **Rapeseed and Mustard**: Have been raised by Rs 300 to Rs 5,950 per quintal
- **Safflower:** Raised to Rs 5,940 per quintal across the earlier raise of Rs 140.
- These are as follows: 2.41 – 7.03 % demonstrate the government interest in ensuring farmers get appropriate prices for their produce.

Implications of the MSP Hike

- The government being desirous that the MSPs should be established at bare minimum 1.5 times the all India weighted average cost of production. In the case of the wheat this translates into an expected profit margin of about 105% this will encourage farmers to continue producing this important grain.

Regional Impact

- **Uttar Pradesh** tops other states as the **largest producer of wheat in India**, with **Madhya Pradesh and Punjab as second and third producers**, respectively. With

the increase of MSP, these areas are expected to benefit from the policy because most of the households in these regions depend on wheat farming.

- However, sources of risk and uncertainty in the accomplishment of procurement targets and effective support of farmers across the marketing season have not yet been fully eliminated. The government is aware of these problems and is still trying to find out ways to improve the procurement process and farmers' participation.

Conclusion

- In conclusion, the recent hike in MSPs for rabi crops signifies a robust commitment from the Indian government towards farmer welfare and agricultural sustainability.



Global Public Debt

- Global public debt is set to surpass USD 100 trillion this year, signalling urgent calls for stronger fiscal measures from major economies, according to a recent report from the **International Monetary Fund (IMF).**

What Is Global Public Debt?

- Global public debt refers to the **total amount of money that governments around the world owe to creditors.**
- This debt can include domestic and foreign loans, bonds, and other forms of borrowing. Public debt is usually expressed as a percentage of a country's **Gross Domestic Product (GDP)**, which measures the economic output of a nation.
- A **rising public debt ratio** can indicate that a country is borrowing more than it is producing, raising concerns about its long-term financial health.

Causes of Rising Global Public Debt

- **COVID-19 Pandemic**: The pandemic forced governments to implement expansive spending strategies to support their economies. This included financial aid for businesses, unemployment benefits, and healthcare spending, leading to increased borrowing.
- **Economic Stimulus**: Major economies, particularly the U.S. and China, have engaged in substantial fiscal stimulus plans to boost growth. This has contributed significantly to the rise in global debt levels.
- **Inflation and Interest Rates**: As inflationary pressures ease and central banks lower borrowing costs, governments have more incentive to borrow. However, the need for long-term fiscal sustainability remains pressing.
- **Aging Populations and Security Issues**: Challenges like an aging population and increasing security concerns further strain public finances, requiring governments to borrow more to meet these needs.

Impact of Rising Global Public Debt

- **Economic Stability**: High levels of public debt can jeopardize economic stability, making it more challenging for governments to respond to future crises. The IMF warns that without decisive action, future debt levels may exceed current projections, requiring significant fiscal adjustments.
- **Government Bond Markets**: Escalating borrowing levels have already led to sell-offs in government bond markets, raising borrowing costs for countries. This can create a cycle of increasing debt as governments struggle to finance their obligations.
- **Fiscal Policies**: The IMF has recommended that governments prioritize their spending, reform entitlements, and find new revenue sources to stabilize their finances. Delaying these necessary adjustments could lead to more severe economic challenges in the future.
- **Vulnerable Households**: As governments make fiscal adjustments, it is crucial to protect vulnerable households from the impacts of austerity measures. Well-designed fiscal policies can support economic growth while ensuring that the most affected populations receive assistance.

GST Overhaul Needed Before 2026 Cess Repayment

- The Goods and Services Tax (GST) system in India, introduced in 2017, was heralded as a landmark reform aimed at simplifying the tax structure and enhancing compliance. However, as the compensation cess repayment deadline approaches in 2026, it has become increasingly clear that an overhaul of the GST framework is essential.
- **Introduction to GST:** This was followed by the introduction of the GST to replace a complex structure of indirect taxes comprising a variety of state and central taxes. They were; the formation of one market destination; the improvement of tax collection; and the generation of more revenues for both central and state governments. The implementation of GST intended to

rationalise the system of tax to eliminate the concept of tax on tax.

- **Compensation Cess:** In order to compensate those revenue losses which states may encounter in course of exercising GST, the compensation cess came into force. This cess is collected from certain products and services which fall under the 28% tax bracket. The money that accrued from this cess was expected to help offset states' revenue losses for five years until March, 2026. Nonetheless, this mechanism is viewed as unsustainable and unequitable.

Current Challenges Facing the GST System

- **Revenue Shortfalls:** Currently there are cited instances of states suffering some form of stagnation or even decline in their GST revenues. Compensation cess has become more or less a routine to finance many States' demand, and causes fiscal imbalance. The situation has tied a company's financial prospects to this cess causing a potentially catastrophic business model when the cess might be removed one day.
- **Complexity of Compliance:** However, in trying to rectify the problem of complex taxation, the GST system has brought in its wake a complicated multi-tax slab structure—currently varying between 0 percent and 28 percent. It is this plurality that causes confusion amongst the business, especially the SMEs as they are caught up in the copious filing requirement.
- **Inequitable Distribution of Revenue:** The distribution of GST revenue between the states has been more or less unequal. Regions with lower levels of economic activity disappoint in terms of revenue, therefore deepening the inequality between states. This has distorted the principle of cooperative federalism that was supposed to be propounded by the GST.
- **Technical Glitches and Administrative Burdens:** The GST portal has faced numerous technical glitches that hinder timely filing and compliance. Additionally, businesses encounter delays in receiving **Input Tax Credit (ITC) refunds**, further complicating their financial management.

Implications of Compensation Cess Repayment

- **Financial Strain on States:** State excise departments are preparing for the financial pinch as the deadline for compensation cess repayment draws near. The end to this revenue source may result in fiscal doom for many states, mainly those which largely depend on these revenues to fund their activities.
- **Need for Sustainable Revenue Sources:** As the legal tenure of compensation cess is going to end, it has become mandatory for the states to search for some other sources of revenues. There is a need to have a sustainable taxation system, one which does not cause hardships to consumers or firms.

Proposed Reforms

- **Rationalisation of Tax Slabs:** Among all the reforms essential, there is the urge to reform the tax slabs in an efficient manner. Lowering the number of slabs and bringing standard rates can make the work of field officers easy besides helping businesses to avoid litigation instances and improving upon the general tax collection. Although the authorities have mooted a maximum rate of 18%, increasing competitiveness in India would be beneficial to international learners and reduce the compliance issues that the sector faces .
- **Streamlining Compliance Processes:** Reducing the workload of SMEs concerning the simplification of compliance measures is the rationale. Some of the measures include; cutting down the number of returns filed by small businesses and permitting those with low turnover to file the returns on a quarterly basis.
- **Enhancing Technology Infrastructure:** It is rightly proposed that technology investment greatly enhances efficiency in the context of GST implementation. Reconfigurations to fix the technical issues of the GST portal will enhance ease in the operations and monitoring of compliance.
- **Strengthening Cooperative Federalism:** Thus to solve the problems of regional

disparities in revenue generation, there is needed close cooperation between the central and state governments. There is a need to come up with a better and fairer distribution mechanism that will enable states to have what it takes to facilitate developmental processes.

- **Revisiting Compensation Mechanisms:** In any change process, it is essential to review the payment regime which states receive after cessation. It may be possible to establish a more transparent structure for fiscal devolution which takes into account the differential needs of different states primarily based on the differential economic conditions prevalent across states and hence ensuring fiscal stability but which does not need recourse to cesses.

Economic Freedom of the World Report

Recently, The **Fraser Institute** published the **Economic Freedom of the World 2024** Annual Report

- The report measures **the degree** to which **people in 165 jurisdictions** around the globe **are allowed to make their own economic choices.**
- **Cornerstones of Economic Freedom:** Personal choice, Voluntary exchange, Freedom to enter markets and compete, and Security of the person and Privately-owned property.
- **Ranking:** The **most-economically free jurisdictions** were:
- **Hong Kong (1st)**,
- Singapore (2nd), Switzerland (3rd), New Zealand (4th), the United States (5th), Denmark and Ireland (tied for 6th), Canada (8th), and Australia and Luxembourg (tied for 9th).
- **India is ranked 84th.**
- India is closely followed by Nepal in 86th place and Bhutan at 98th.
- China ranks 104th, while Sri Lanka is positioned at 123rd.
- Bangladesh occupies 127th, and Pakistan is ranked 134th.

21st Livestock Census in India

- The Union Government launched the 21st Livestock Census in New Delhi.

What is the Livestock Census?

- Conducted every five years, the Livestock Census is a nationwide headcount of domesticated animals, poultry, and stray animals.
- It aims to gather detailed information about the species, breed, age, sex, and ownership status of these animals.
- Since **its inception in 1919**, a total of 20 censuses have been carried out, with the most recent one conducted in 2019.
- The enumeration for the 21st census is scheduled to take place from October 2024 to February 2025.

Which Animals Will Be Counted?

The census will encompass a diverse range of animals, with data collected on 16 species, including: Cattle, Buffalo, Mithun, Yak, Sheep, Goat, Pig, Camel, Horse, Ponies, Mule, Donkey, Dog, Rabbit, Elephant

- In total, the census **will account for 219 indigenous breeds** recognized by the ICAR-National Bureau of Animal Genetic Resources (NBAGR). Additionally, it will also include a headcount of various poultry birds such as chickens, ducks, turkeys, geese, quails, ostriches, and emus.

Objectives of the Livestock Census:

- The livestock sector plays a pivotal role in the Indian economy, providing employment opportunities in rural areas and contributing significantly to the Gross Value Added (GVA) of the agricultural sector. It accounts for about 30% of the GVA in agriculture and around 4.7% of the overall economy.

Findings from the 2019 Livestock Census:

- The last census revealed a total livestock population of approximately 535.78 million in India, broken down as follows:
- Cattle: 192.9 million
- Goats: 148.88 million
- Buffaloes: 109.85 million
- Sheep: 74.26 million
- Pigs: 9.06 million
- Together, other animals constituted just 0.23% of the total livestock population.

Commitment to Reducing Inequality (CRI) Index 2024

- The Commitment to Reducing Inequality ***(CRI) Index 2024*** provides a comprehensive evaluation of government policies aimed at addressing economic inequality across 164 countries.
- Released by Oxfam and Development Finance International, the index highlights a troubling trend: a significant majority of nations have regressed in their commitment to reducing inequality since the last assessment.
- Specifically, 84% of countries have decreased their investments in essential public services such as education and health, while 81% have weakened their tax systems' effectiveness in addressing inequality.
- Alarmingly, 90% of the countries surveyed have seen a deterioration in labor rights and minimum wage protections.
- The report underscores that nearly nine out of ten countries are implementing policies that may exacerbate economic disparities, particularly in the context of austerity measures imposed by international financial institutions like the IMF and World Bank.
- As global leaders grapple with rising inequality, the CRI Index serves as a critical tool for assessing governmental accountability and guiding policy reforms necessary to foster equitable growth and social justice.

India Set to Establish Its First Coal Exchange

- India is poised to establish its first coal exchange, a significant development aimed at modernizing the coal market and enhancing trade efficiency.

Overview of the Coal Exchange

- **Purpose and Functionality:** As mentioned above the proposed coal exchange is an attempt at creating an on-line trading forum where the sellers and the buyers can agree on the price of coal as the object of sale. Information on this platform is expected to be provided by market forces to achieve price discovery by efficiency. The exchange shall work under the provisions of the Coal Controller Organisation to comply with the legal formalities required.

Key Features:

- **Online Trading Platform:** The exchange will offer a technological platform that will also enhance the sourcing and selling of the commodity.
- **Clearing and Settlement Mechanism:** This feature will contribute to improved reliability of transactions by ensuring that trade is followed by an efficient settlement process.
- **Market-Driven Pricing:** The exchange operations doing this because it seeks to open up market factors in an attempt to lower prices.

Government Initiatives

- **Action Plan for 2024-25:** The setting up of the coal exchange is one of the strategic steps the Ministry of Coal has in its implementation plan for Financial Year 2024-25. This plan envisages measures to further deregulate the coal market and make assured availability of dry fuel in the market. The note for consideration of establishing the exchange has been prepared in draft form and has already triggered round-table inter-sectoral discussions suggesting that the

government is serious about this idea.

- **Cabinet Approval Process:** The last but one note regarding the coal exchange has been signed by the Minister of Coal, and now it will be taken to the higher level of the Cabinet. Such approval is necessary for the purpose of establishing the right legal and regulatoryxf structures that will enable the exchange to operate.

Market Implications

- **Impact on Coal Trade:** In introducing a coal exchange, participation in coal trading is expected to have grown significantly. This may encourage more sellers and buyers to engage in the transactions and should prevent a scarcity of buyers, but instead might leave liquidity of the market improved. To that end, this initiative may as well make it easier to access coal and to stabilize prices as well as supply should be equal with demand.
- **Potential for Imports:** However, Minister Reddy said that in the event that India required the coking coal, India would not hesitate to import from countries like Russia. This flexibility is critical, since it enables India to satisfy its industrial requirements, while at the same developing domestic production possibilities.

Challenges Ahead

- While the establishment of a coal exchange presents numerous opportunities, several challenges must be addressed:
- **Infrastructure Development:** Robust digital infrastructure is the main cornerstone for successful online trading platforms. Key will be ensuring that people have reliable internet and technological support in regions.
- **Regulatory Framework:** Forever trading activities have to be controlled through a complete logistics framework which will protect the participants interests and the market integrity.
- **Market Acceptance:** In order to encourage participation from various

stakeholders in the coal industry, there needs to be good outreach and education about how trading on an exchange will provide benefits.

Conclusion

- The establishment of India's first coal exchange marks a pivotal moment in the country's energy sector. By modernising coal trading practices through an online platform, India aims to enhance efficiency, transparency, and accessibility in its coal markets. As this initiative progresses, it will be essential for stakeholders to collaborate closely to address potential challenges and maximise the benefits of this new trading environment.

World Economic Outlook

- The **International Monetary Fund (IMF)** maintained its June growth rate projection for India at **7% for FY25** in its latest released **World Economic Outlook (WEO).**

Key Highlights of the World Economic Outlook

- **Global Growth Projections:** Global growth is projected to be **3.2% for both 2024 and 2025.**
- The global economy has shown resilience despite inflation and external challenges.
- **Inflation Trends:** The battle against inflation is nearly won. Inflation peaked at **9.4% in Q3** of 2022.
- It is **expected to fall to 3.5% by the end of 2025**, nearing central bank targets in most countries.

Geopolitical and Economic Risks:

- **Geopolitical conflicts (e.g., in the Middle East)**, which could disrupt commodity markets.

- Rising trade tensions and shifts toward **protectionist policies.**
- A **potential reduction in migration to advanced economies**, which could unwind some of the supply gains helping to ease inflation.
- These factors could **reduce global output by 1.6% by 2026.**

Fiscal Challenges and Debt Management:

Urgent need to stabilize debt dynamics and rebuild fiscal buffers, especially in the United **States and China.**

- Current fiscal plans are not sufficient to stabilize debt in several countries.
- Delayed action on debt reduction could lead to disorderly adjustments.
- Excessively abrupt fiscal tightening could harm economic activity.
- **Warning on Market Pressures:** High debt levels combined with high interest rates pose a risk.
- If fiscal policies are not credible, market pressures may force abrupt and uncontrolled adjustments.
- Countries must act proactively to avoid being at the mercy of market forces.
- **Triple Policy Pivot:** The IMF suggests a three-part policy approach to respond to the global economic challenges:
- **Neutral monetary policy stance:** A shift towards balanced monetary policies, which many countries are currently adopting.
- **Fiscal consolidation:** Building fiscal buffers after years of loose fiscal policy.
- **Structural reforms:** To boost growth and productivity, address the ageing population, and tackle the climate transition

Key Highlights On Indian Economy

- This outlook highlights **India's position as one of the fastest-growing major economies,** though there are **challenges to sustaining high growth rates amid global uncertainties.**

- India's **growth rate at 7%** remains higher than global growth projections, with the world economy projected to grow at **3.2% for 2024 and 2025.**
- For the following year, FY 2025-26, the growth rate is expected to be **6.5%.**
- The decline from 8.2% in 2023 is attributed to the **exhaustion of pent-up demand** from the pandemic period, as the economy reconnects with its potential.
- In contrast, the U.S. economy is expected to grow at **2.8% this year and 2.2% next year.**

IMF

- **Established** in the aftermath of the Great Depression of the 1930s at **Bretton Woods Conference in 1944.**
- It is one of the **United Nations (UN) specialised agencies.**
- **Main objectives:** Include supporting global monetary cooperation, securing financial stability, facilitating international trade, promoting high employment and sustainable economic growth, and reducing poverty.
- **Economic surveillance** : IMF keeps track of the economic health of its member countries, alerting them to risks on the horizon and providing policy advice.
- **Lender of last resort:** Lends to countries with **balance-of-payments difficulties.**
- It also **provides technical assistance and training** to help countries improve economic management.
- **Headquarter :** Washington, DC.
- **Reports by IMF:** Following reports are usually prepared **twice a year April and October.(Global Financial Stability Report, World Economic Outlook)**

IMF Quota Subscription

- **Quota Subscription**: Each IMF member contributes a financial amount based on its economic size and wealth.
- **Quota Review:** Quotas are reviewed every five years and are linked to each

country's wealth and economic performance.

Quota Formula:

1. GDP (50%)
2. Openness (30%)
3. Economic Variability (15%)
4. International Reserves (5%)

- **Richer Countries:** Countries with larger economies, like the U.S., contribute more to the IMF. The U.S. has the largest quota, reflecting its economic dominance.
- **Special Drawing Rights (SDR):** Quotas are denominated in Special Drawing Rights (SDRs), an international reserve asset created by the IMF.
- **SDR Value:** Determined from a weighted basket of major global currencies, including: U.S. Dollar ,Euro ,Japanese Yen ,Chinese Yuan ,British Pound

Quota's Role:

- **Loanable Funds Pool:** Quotas contribute to a pool of funds that IMF members can borrow from.
- **Borrowing and Voting Power:** The size of a country's quota influences how much it can borrow and its voting power in IMF decisions.
- **Reserve Tranche Position:** Reserve Tranche (also called "Gold Tranche") is a portion of a member's quota that can be accessed without stringent conditions or service fees.
- **Calculation:** The Reserve Tranche Position is the difference between the IMF's holdings of a country's currency and the country's IMF quota.

India's FTA Strategy

- Recent discussions surrounding Free Trade Agreements (FTAs) in India have prompted a reconsideration of existing strategies, particularly in light of

government procurement policies. As India celebrates initiatives like **"Make in India**," the need to reassess the implications of FTAs on domestic industries becomes increasingly critical.

Understanding Free Trade Agreements (FTAs)

- **Definition and Purpose:** The Free Trade Agreements are treaties between two or more countries to lower barriers of trade and to foster economic cooperation among the said countries. These agreements usually entail phasing out or cutting tariffs and quotas on goods and services that will be exchanged between signatory countries.
- **Current Scenario in India:** India has conducted a number of FTA negotiations, including with the European Union (EU) and United Kingdom (UK). But reports this week suggest a change of approach, with the Department of Commerce favoring a more cautious approach to ongoing negotiations. In part, the change results from worries about the effects FTAs may have on domestic industries and government procurement practices.

The Role of Government Procurement

- **Importance of Government Procurement:** Government procurement refers to the buying of goods and services by government agencies from private companies. It is essential to this process to support local industries; foster innovation; and ensure that public funds are used wisely. Government procurement in India has effectively been a vehicle for promoting domestic manufacturing through government tenders that favor the local suppliers.

Current Policies Supporting Domestic Industries

- General Financial Rules: Rule 153 permits mandatory procurement from specific categories of bidders in order to advance domestically produced goods.
- Public Procurement Policy for Micro and Small Enterprises (MSEs): Requires that central ministries and departments procure a minimum of 25% annually from

MSEs.

- Public Procurement (Preference to Make in India) Order, 2017: It seeks to create a reliable market for manufacturers enforcing 'Make in India' motives.
- These policies have led to significant procurement figures, such as ₹82,630.38 crore from MSEs during the fiscal year 2023-24.

Challenges Posed by FTAs

- **Impact on Government Procurement Flexibility:** This is one special worry about FTAs because they often require countries to treat foreign suppliers as they would domestic ones for contracts with the government. In recent decades, however, globalization has grown at such a dramatic pace that this has restricted the possibility of local industries' top priority when contracts are being awarded by governments. Let us take for instance, the provision contained in the FTAs negotiated by developed countries, which limit the flexibility countries have in applying procurement as a tool of economic development.
- **Specific Concerns for India:** In India's case, while some FTAs have government procurement related information exchange provisions, negotiations can give rise to an aspirational demand for more limited market access that would undermine the already existing protections for local suppliers. For instance, the UK and the EU could both seek to further extend access now available in, for instance, agreements such as that with the UAE.

The Need for a Rethink

- **Strategic Pause on Negotiations:** The current pause in FTA negotiations offers Indian policymakers an opportunity to reconsider their policies with respect to government procurement. Keeping in mind that many of the developed nations have been able to leverage the use of procurement policies to increase domestic production and underpin vulnerable sectors during economic downturns, this is all the more pertinent.

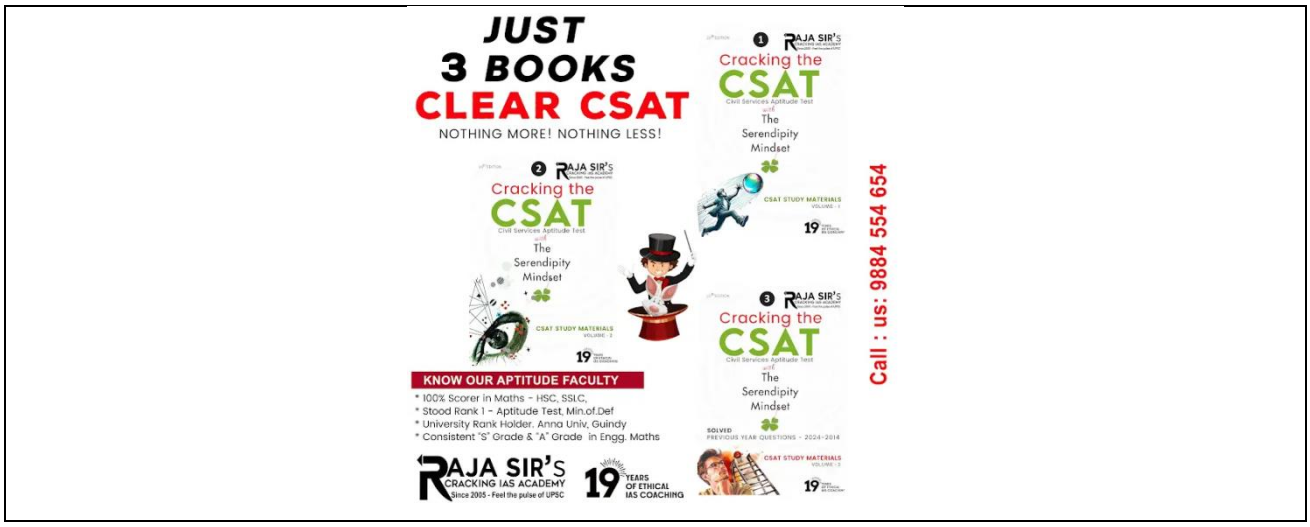
- **Learning from Global Practices:** Countries like the United States have successfully initiated the local economies through the tool of government procurement. The American Recovery and Reinvestment Act of 2009 required that projects financed under stimulus occurred must do so using domestically produced material. Such examples point how keeping robust government procurement policies while opening to some international trade agreements might be an opportunity.

Potential Benefits of FTAs

- **Access to New Markets:** Despite concerns about domestic impacts, FTAs can provide Indian exporters with access to larger markets. For instance, the EU's public procurement market was valued at €473 billion in 2022, while the UK's was around £110 billion in 2021. However, it is crucial to note that historically, non-EU suppliers have received minimal contracts from these markets—often less than 0.5%.
- **Enhancing Competitiveness:** Engaging in FTAs can also encourage Indian companies to enhance their competitiveness through exposure to international standards and practices. This can lead to improved efficiency and innovation within domestic industries.

Conclusion

- India's approach to Free Trade Agreements must be carefully calibrated to balance international commitments with domestic priorities. As negotiations progress or pause, it is essential for policymakers to consider how government procurement can serve as a strategic tool for promoting local industries while still engaging meaningfully with global trade partners. The current rethink presents an invaluable opportunity for India to refine its FTA strategy, ensuring that it aligns with national economic goals while safeguarding domestic interests.


JUST
3 BOOKS
CLEAR CSAT
NOTHING MORE! NOTHING LESS!
Cracking the CSAT
The Serendipity Mindset
CSAT STUDY MATERIALS
KNOW OUR APTITUDE FACULTY
* 100% Scorer in Maths - HSC, SSLC.
* Stood Rank 1 - Aptitude Test, Min.of.Def
* University Rank Holder, Anna Univ, Guindy
* Consistent "S" Grade & "A" Grade in Engg. Maths
RAJA SIR'S CRACKING IAS ACADEMY
19 YEARS OF ETHICAL IAS COACHING
Call : us: 9884 554 654

Bihta dry port

- The dry port in Bihta is being seen as the Bihar government''s big initiative to boost exports.

Details of Bihta dry port

Partnership Model	• **Public-Private Partnership (PPP).**
Commissioning Status	• Fully commissioned and approved.
Approving Authority	• Department of Revenue, **Union Ministry of Finance.**
Managing Entity	• **Pristine Magadh Infrastructure Private Limited** in collaborat with Bihar state industry department.
Rail Connectivity	• Connected to gateway ports across India.
Ports Connected	• Kolkata and Haldia (West Bengal), Visakhapatnam (Andhra Pradesh), Nhava Sheva (Maharashtra), Mundra (Gujarat).
Geographical Coverage	• Bihar, Jharkhand, Uttar Pradesh, Odisha.
Economic Role	• Supports transportation of goods to and from eastern India.

What is a dry port?

- **A dry port, or inland container depot (ICD),** provides a logistics facility away from a seaport or airport for cargo handling, storage, and transportation. It acts as a bridge between sea/air ports and inland regions, facilitating efficient movement of goods. The **best part of a dry port is that** it handles customs clearance **procedures, reducing congestion at seaports/airports**.
- There are over 330 dry ports operational in India. The **first dry port in India** was opened in **Varanasi** in **2018**.

Inland Ports in India:

- **PPP in Dry Ports in India**

Inland Port	Location	Specific Fact
Tughlakabad ICD	Tughlakabad, Delhi	Largest inland conta depot in Northern In
Dadri ICD	Dadri, Uttar Pradesh	Key hub for containe transportation in NC
Loni ICD	Loni, Uttar Pradesh	Significant dry port f handling export-imp cargo.
Sanand ICD	Sanand, Gujarat	Located near key industrial regions of Gujarat.
Whitefield ICD	Whitefield, Bengaluru	Critical for cargo movement in South India.

Concor ICD	Tughlakabad, Delhi	Managed by Container Corporation of India (CONCOR).
Dighi ICD	Pune, Maharashtra	Facilitates trade for Pune''s industrial belt.

MORMUGAO Port

- Mormugao Port Authority has gained global recognition by being listed as an incentive provider on the **Environment Ship Index (ESI) portal,** acknowledged by the International Association of Ports and Harbours (IAPH).
- It is a port on the **western coast of India**, in the coastal state of **Goa**. Commissioned in **1885** on the site of a natural harbour, it is **one of India''s oldest ports.** It has a naturally protected **open-type harbour,** that lies on the southern part of the mouth of the **river Zuari**. This harbour is also protected using a breakwater and a mole built from the **outer end of the breakwater and running parallel to the wharf**.

Environment Ship Index (ESI)-

- It identifies seagoing ships that **perform better in reducing air emissions** than required by the current emission standards of the International Maritime Organization, the Environmental Ship Index. The **ESI evaluates the amount of nitrogen oxide (NOX), sulphur oxide (SOX)** that is released by a ship and includes a reporting scheme on the greenhouse gas emission of the ship. **The ESI is a good indication of the environmental performance** of ocean-going vessels and will assist in identifying cleaner ships in a general way.

Mormugao Port Authority (MPA)

Historical	• **Mormugao Port was commissioned in 1888. With the rise**

Background	**mining as a key industry in Goa, it was developed as an iron ore terminal.**
Major Port Designation	• Mormugao Port was declared a Major Port in 1964.
Iron Ore Traffic Growth	• Iron ore traffic growth, especially due to Japanese demand during their industrial reconstruction, contributed to the port''s dramatic growth.
Strategic Development Plans	• In 1965, a Perspective Plan was established to develop Mormugao Port for deep-water access and high-capacity loading to compete with Brazil and Australia in the iron ore market.
Green Transition	• The Harit Shrey program, launched in October 2023, offers discounts on port charges to vessels that use green fuel and emit no nitrogen oxides and sulphur oxides.

Details of Zuari River

- It is the largest river in the state of Goa, India. It is a **tidal** river that originates at **Hemad-Barshem** in the **Western Ghats**. The Zuari is also referred to as the **Aghanashani** in the interior regions.

Tributaries:

- The **tributaries of Zuari include** the Kushawati River, Guleli River, and Uguem River.

International Association of Ports and Harbours (IAPH)

- It is the global trade association for seaports worldwide.
- It was formed in **1955 and is now recognized as the NGO representing** ports

worldwide. With over 200 ports in membership, as well as numerous national port representative bodies, it now has consultative status with **5 UN agencies**, including **UNCTAD and the IMO.**

- **Membership**- The IAPH membership is divided into 3 regions:
  (African/European, American and Asian/Oceanian.)
- **Headquarters**- **Tokyo**.

Rs 1,000 Crore Venture Capital Fund Initiative for Space sector

- Prime Minister Narendra Modi, has approved the establishment of a **Rs.1,000 crore Venture Capital (VC) Fund dedicated to supporting India's space sector**. This pioneering initiative, developed under the aegis **of IN-SPACe** (Indian National Space Promotion and Authorization Center), aims to propel the growth of space startups, strengthen India's space economy, and position the country as a global leader in space technology.
- The establishment of this fund aligns with the government's broader vision of promoting innovation, ensuring economic growth, and fostering self-reliance in high-tech industries, thus supporting the goals of Atmanirbhar Bharat

Objectives and Strategic Vision of the Fund

- The Rs. 1,000 crore VC Fund is structured to align with India's strategic vision for the space sector and supports the goals set forth in the 2020 space reforms. The fund is designed to address the unique needs of private companies operating in the high-risk, high-reward field of space technology.

The fund aims to achieve the following objectives:

- **Capital Infusion:** The capital fund is expected to encourage additional funding for later-stage development, instilling market confidence and providing early-

stage financial support critical for growth.

- **Talent Retention and Domestic Development:** Many Indian startups relocate abroad due to better financial opportunities. The fund will work to retain talent within India, preventing brain drain and fostering the growth of homegrown space companies.
- **Five-Fold Expansion of Space Economy:** The government aims to grow India's space economy by five times over the next decade, supporting the establishment of India as a major global player in space technology.
- **Technological Advancements:** Investment in innovation will help advance space technology, supporting the development of sophisticated solutions for both domestic and international markets.
- **Boosting Global Competitiveness:** Enabling Indian companies to develop unique space-based solutions will reduce dependency on foreign technology and allow for stronger competition on a global scale.
- **Supporting Atmanirbhar Bharat:** By investing in indigenous startups, the fund underscores India's commitment to self-reliance, fostering a robust domestic space economy with fewer dependencies on external technology.
- **Creating a Vibrant Innovation Ecosystem**: The fund seeks to foster a dynamic space innovation ecosystem by nurturing startups and fostering collaborations between various sector. This environment encourages the development of new ideas, products, and technologies, stimulating a continuous cycle of innovation in the Indian space industry.
- **Driving Economic Growth and Job Creation**: By supporting startups and entrepreneurs in the space sector, the fund is expected to boost economic activity, leading to the creation of thousands of direct and indirect jobs. It will enable companies across the supply chain to scale operations, thus enhancing India's competitive position in the global space economy.
- **Financial Implications and Deployment Structure**
- The Rs. 1,000 crore VC Fund will be deployed strategically over five years,

supporting startups in various stages of growth

Expected Impact on Employment and Economic Growth

- One of the primary goals of the fund is to create a robust ecosystem that promotes job creation and enhances India's standing in the space technology sector. The fund is expected to:
- **Generate Direct Employment:** Jobs in engineering, data analysis, software development, manufacturing, and other technical fields are expected to increase. Each investment could potentially generate hundreds of direct job opportunities within these high-skill areas.
- **Indirect Employment Opportunities:** Additional employment will also be generated in fields associated with logistics, professional services, and supply chain management. These jobs will arise from the increased demand created by scaling businesses and manufacturing units.
- **Strengthening India's Space Workforce:** By fostering a skilled workforce in the space sector, the fund aims to build a sustainable talent pool, enhancing India's global standing and driving innovation through skilled professionals.
- The fund will not only create jobs but also drive economic growth by expanding the space ecosystem and building an innovation-centric economy that supports self-reliance and sustainable development.

Role of IN-SPACe

- The Indian National Space Promotion and Authorization Center (IN-SPACe) was established **in 2020** as part of the government's comprehensive space sector reforms. Its purpose is to promote and oversee private sector involvement in space activities, serving as a key facilitator for space startups and businesses.
- IN-SPACe has been instrumental in initiating reforms that align with the government's goals of enhancing space technology, increasing private participation, and expanding India's share in the global space economy.

- The VC Fund was proposed by IN-SPACe to address the critical lack of risk capital in the high-tech space sector, which is essential to sustain growth and enable Indian companies to compete internationally.

Positioning India as a Global Space Economy Leader

- At present, the Indian space economy is valued at approximately USD 8.4 billion, constituting a 2% share of the global space market. The government envisions scaling the space economy to USD 44 billion by 2033, including US $11 billion in exports amounting to 7-8% of the global share. This growth is anticipated to be driven by private sector participation, including a promising pipeline of around 250 startups currently operating across various segments of the space economy in India.
- Many countries have recognized the strategic importance of the space sector and established space-focused VC funds to drive innovation, foster private-sector participation, and strengthen national capabilities. Examples include 30 million GBP Seraphim Space Fund of UK, 86 million Euro Primo Space Fund of Italy, US $6.7 billion Space Strategic Fund of Japan and Neo Space Group (NSG) by Public Investment Fund (PIF), Saudi Arabia. Through its VC Fund, India aims to adopt a similar approach, supporting its startups and fostering a strong space innovation ecosystem while driving the local development of space technology and related services.

Indians Lose ₹120 Crore to Digital Arrest Scams in Q1 2024

What are Digital Arrest Scams?

- Digital arrest scams involve ***fraudulent individuals*** posing as government officials who contact victims via phone or video calls through platforms like WhatsApp and Skype.
- The scammers typically accuse the victims of involvement in illegal activities, such as drug trafficking or handling suspicious packages.

- To make their deception convincing, these scammers often use elaborate setups that mimic police stations and wear costumes that include official badges.
- They employ intimidation tactics, making victims believe they are under "digital arrest."
- The pressure builds during lengthy calls where the scammers outline dire consequences for non-compliance, culminating in demands for money as a means to secure the victim's release or to stop the supposed legal proceedings

Government Response to Counter Digital Arrest Scams

- **Establishment of I4C: The** Indian Cybercrime Coordination Centre was created under the Ministry of Home Affairs to address the growing menace of cybercrime, including digital arrest scams.
- **Blocking of Scammer IDs:** In collaboration with tech companies like Microsoft, I4C has successfully blocked over 1,000 Skype IDs associated with these fraudulent activities.
- **Awareness Campaigns:** The government has launched initiatives to educate the public about the risks of such scams. Prime Minister Narendra Modi emphasized the role of educational institutions in spreading awareness.
- **Inter-Ministerial Committee:** In response to a spike in transnational organized cybercrime, particularly from Southeast Asian countries like Cambodia, the government has formed a committee comprising various law enforcement and intelligence agencies to tackle these threats.
- **Reporting Mechanisms:** Citizens are encouraged to report suspicious calls immediately by using the cybercrime helpline (1930) or by filing complaints on the official cybercrime website (http://www.cybercrime.gov.in). Local police should also be informed to aid in investigations.
- **Proactive Measures by CERT-IN and Law Enforcement:** India's Computer Emergency Response Team (CERT-IN) has flagged thousands of fraudulent accounts and blocked video-calling IDs, SIM cards, and associated bank

accounts used by these scammers

Computer Emergency Response Team (CERT-In)

- Information Technology Act, 2000 (the "IT Act"): Empowers the Central Government to appoint the **CERT-In** to report cybercrime incidents.
- **Established in** : 2004
- **Functional organization of:** Ministry of Electronics and Information Technology.
- **Functions of CERT-In :**
- Issue guidelines, advisories, vulnerability notes and whitepapers relating to information security practices, procedures, prevention, response and reporting of cyber incidents.
- **Legally mandatory to report on cyber security incidents:** It is mandatory for service providers, intermediaries, data centers and corporate bodies to report cyber security incidents to CERT-In within a reasonable time of occurrence of the incident
- **Powers :** CERT-In is empowered to call for information and issue directions to service providers, intermediaries, data centers, body corporates, and any other person.

India's coking coal imports

- India's coking coal imports have surged to a **six-year high,** reaching 57.89 million tonnes in FY 2023-24, a 6% increase from 54.45 million tonnes in FY 2022-23.
- This rise is attributed to a combination of falling seaborne prices and heightened demand from the steel sector, driven by ongoing infrastructure projects.
- Despite being **the second-largest crude steel producer globally**, India continues to rely heavily on imports, particularly from Australia, which supplies about 60% of its coking coal.
- The government aims to enhance domestic production while diversifying import sources to mitigate supply risks.

Challenges of India''s Fertilizer Sector

- The ongoing crises in Ukraine and Gaza have raised concerns about the **stability of global fertilizer markets**, directly impacting India, one of the world''s largest agricultural producers.

Current State of India''s Fertilizer Sector

- India''s fertilizer sector is grappling with a significant supply-demand imbalance.
- Despite being one of the **largest consumers of fertilizers globally**, the country relies heavily on imports to meet its agricultural needs.
- The recent report by the **Standing Committee of Parliament on Chemicals and Fertilizers** indicated that domestic production is insufficient to meet the demand for fertilizers, particularly for **Di-Ammonium Phosphate (DAP) and Muriate of Potassium (MOP).**

Current Import Fertilizer Scenario: The Standing Committee''s August 2023 report shed light on the dependency on imports. It noted that:

- Approximately 20% of India''s urea requirement is met through imports.
- About 50-60% of DAP and 100% of MOP needs are satisfied through foreign sources.
- The dependence on imports is especially concerning given the geopolitical tensions in regions like Eastern Europe and West Asia, which could disrupt supply chains and inflate prices.

How Has India’s Fertilizer Production Changed?

- In the 2021-22 agricultural year, India consumed around 579.67 lakh metric tonnes (LMT) of major chemical fertilizers, compared to 629.83 LMT in 2020-21. Production figures reveal a persistent shortfall:

Urea: Produced 250.72 LMT; consumed 341.73 LMT.

DAP: Produced 42.22 LMT; consumed 92.64 LMT.

MOP: Entirely imported; no domestic production.

- The production of chemical fertilizers has seen only marginal growth over the past seven years, with an increase of about 50 LMT from 2014-15 to 2021-22. Despite the establishment of new urea plants under the 2012 investment policy, India's production capacity still falls short of its requirements.

Challenges Facing the Sector

- **Dependence on Imports**: The significant reliance on imports for key fertilizers like DAP and MOP exposes India to global market fluctuations and geopolitical instability.
- **Production Capacity Constraints**: Existing fertilizer manufacturing facilities are not sufficient to meet domestic demand, leading to shortfalls and increased reliance on imports.
- **Rising Prices**: The ongoing crises in Ukraine and Gaza are causing oil prices to rise, directly affecting the cost of fertilizers and impacting farmers'' operational costs.

Required Measures

- Experts and policymakers recommend several strategic measures to enhance India''s fertilizer sector:
- **Increase Domestic Production**: There is an urgent need to expand the production capacity of indigenous fertilizer plants. Investments should be encouraged in both public and private sectors.
- **Policy Initiatives**: The government must create a conducive environment for investments in fertilizer manufacturing, including incentives for private players.
- **Adoption of Sustainable Practices**: Encouraging the use of alternatives like nano urea and promoting natural farming methods can help reduce dependence on chemical fertilizers.
- **Improving Supply Chain Resilience**: Developing robust supply chains for raw materials and fostering partnerships with other nations can mitigate the risks

associated with global supply disruptions.

- **Investment in Research and Development**: Innovating new fertilizer technologies and enhancing the efficiency of existing fertilizers can significantly improve agricultural productivity.

What are Fertilisers ?

- Fertilisers are basically food for crops, containing nutrients necessary for plant growth and grain yields.
- ***Balanced fertilisation*** means supplying these following nutrients in the right proportion, based on soil type and the crop's own requirement at different growth stages.
- **Primary** (N, phosphorus-P and potassium-K)
- **Secondary** (sulphur-S, calcium, magnesium)
- **Micro** (iron, zinc, copper, manganese, boron, molybdenum)
- India is among the **world's largest buyers of fertiliser**, besides **China, Brazil, ar the US.**

India imports four types of fertilisers:

- Urea
- Diammonium phosphate (DAP)
- Muriate of potash (MOP)
- Nitrogen-phosphorous-potassium (NPK)

Fertilizer Consumption

- Overall fertilizer consumption in the country rose 2.6% to 60 million tonne in 202 24,
- DAP consumption increased to 105.31 lakh MT from 92.64 lakh MT in 2021-22.
- However, NPK consumption in the country exhibited a declining trend, falling to 107.31 lakh MT from 125.82 lakh MT in 2020-21.
- Total urea consumption during 2022-23 year was nearly 35.7 million tonne.

- In 2023-24, India's consumption of conventional urea is estimated to decline by 2.5 million tonne due to increase in the demand of nano urea (liquid form of the farm chemical) ,government's efforts to curb use of agricultural chemicals through natural farming
- **Integrated Nutrient Management (INM):** This approach advocates for soil test-based balanced and integrated utilization of chemical fertilisers along with organic sources like Farm Yard Manure (FYM), city compost, vermi-compost and bio-fertilisers.
- Paramparagat Krishi Vikas Yojana (PKVY): Cluster formation, training, certification and marketing are supported under the scheme to a farmer towards organic inputs.

What is Nutrient-Based Subsidy (NBS) scheme?

- The NBS (Nutrient-Based Subsidy) scheme, introduced in 2010, is designed for fertilisers other than urea.
- Urea, being the most widely used fertiliser, is **not covered under the NBS scheme**. Its pricing and subsidy are handled separately by the government.
- **Market-determined MRPs**: Unlike urea, NBS fertilisers have **market-determined MRPs**. Companies selling these fertilisers set their prices.
- **Fixed per-tonne subsidy:** Under NBS, the government provides a subsidy based on the nutrient content of the fertiliser. It fixes a subsidy per kilogram for nitrogen (N), phosphorous (P), potassium (K), and sulphur (S) components in the fertilisers.
- However, in the last two years, non-urea fertilisers under the NBS scheme have been informally regulated.
- Starting April 2023, the **Department of Fertilisers** has set **maximum profit margins** over costs to decide if the maximum retail prices (MRPs) are fair. Companies charging higher prices won''t receive subsidies from the government under the NBS scheme if their prices exceed these set margins.

Government Initiatives and Schemes in Fertilizer Sector

- **Neem Coating of Urea**
  - **Mandatory Coating**: All domestic producers are required by the Department of Fertilisers (DoF) to produce 100% Neem Coated Urea (NCU).

Benefits:

1. Enhances soil health.
2. Reduces the need for plant protection chemicals.
3. Decreases pest and disease occurrences.
4. Increases crop yields, especially for paddy, sugarcane, maize, soybean, and Tur/Red Gram.
5. Minimises misuse for non-agricultural purposes.
6. Slow nitrogen release improves Nitrogen Use Efficiency (NUE), reducing the amount of NCU needed compared to standard urea.

- **New Urea Policy (NUP) 2015**

Objectives:

1. Maximise domestic urea production.
2. Enhance energy efficiency in urea production units.
3. Reduce the government's subsidy burden.

- **New Investment Policy (NIP) 2012**
  - Announced in January 2013 and amended in 2014, the policy encourages fresh investments in the urea sector to make India self-reliant in urea production.
- **Policy on Promotion of City Compost**
  - **Policy Approval**: The DoF's 2016 policy promotes city compost use by providing a Market Development Assistance of ₹1,500 to increase production and consumption.
  - **Sales and DBT**: Compost manufacturers can sell directly to farmers in

bulk, and fertiliser companies marketing city compost are covered under Direct Benefit Transfer (DBT) for Fertilisers

IDiGi Framework

The US, Japan, and South Korea released the **DiGi Framework** to bolster digital infrastructure in India, focusing on 5G, data facilities, AI, and smart cities.

The ***DiGi Framework*** will support projects throughout India's records and communications technology (ICT) sector, concentrated on critical areas like 5G, Open RAN, submarine cables, optical fiber networks, data centers, smart cities, e-trade, AI, and quantum technology.

- This collaboration among the U.S., Japan, and South Korea and Indian private zone companions objectives to enhance connectivity, enhance digital infrastructure, and enhance technological innovation across those sectors in India.
- It similarly reflects the shared dedication to develop digital transformation and sustainable improvement in India and the Indo-Pacific region.
- **Digital Public Infrastructure (DPI)**
- It encompasses the foundational digital structures and services that permit efficient, inclusive, and obvious public carrier shipping. It refers to the shared digital systems and services that help public provider delivery at scale.
- It consists of digital identity structures, payment structures, records alternate frameworks, and different foundational technology, and characterized by its interoperability, open standards, societal scale, and strong governance frameworks.
- India has turned out to be the first country to establish all three foundational **Digital Public Infrastructures (DPIs)**, together referred to as the India Stack. This complete digital framework consists of:
- **Digital Identification (Aadhaar):** Providing a completely specific digital

identification for residents.

- **Real-time Rapid Payment System (UPI):** Enabling rapid and seamless digital bills.
- **Data Sharing Architecture (Data Empowerment and Protection Architecture, DEPA):** Facilitating strong and consent-based records sharing.

Significance

- **Financial Inclusion:** UPI revolutionized digital bills, allowing millions to access financial services seamlessly and cost effectively. This has extended economic inclusion, enabling even those without formal banking access to participate inside the digital financial system.
- **Efficient Governance and Service Delivery:** Aadhaar has simplified public service delivery by verifying identities digitally, decreasing duplication, and preventing fraud. This efficiency supports packages which include direct benefit transfers, which reach beneficiaries faster and reduce leakage.
- **Economic Growth and Innovation:** DPI has spurred innovation and entrepreneurship with the aid of growing open digital frameworks accessible to fintech, health tech, and different digital provider carriers. It enables the private sector to construct fee-delivered services, fostering process creation and economic boom.
- **Data Empowerment and Privacy:** Through DEPA (Data Empowerment and Protection Architecture), people can share information securely and with consent, promoting data sovereignty. This empowers residents to govern and take advantage of their records while ensuring privateness protection.

Key Challenges Associated With DPI

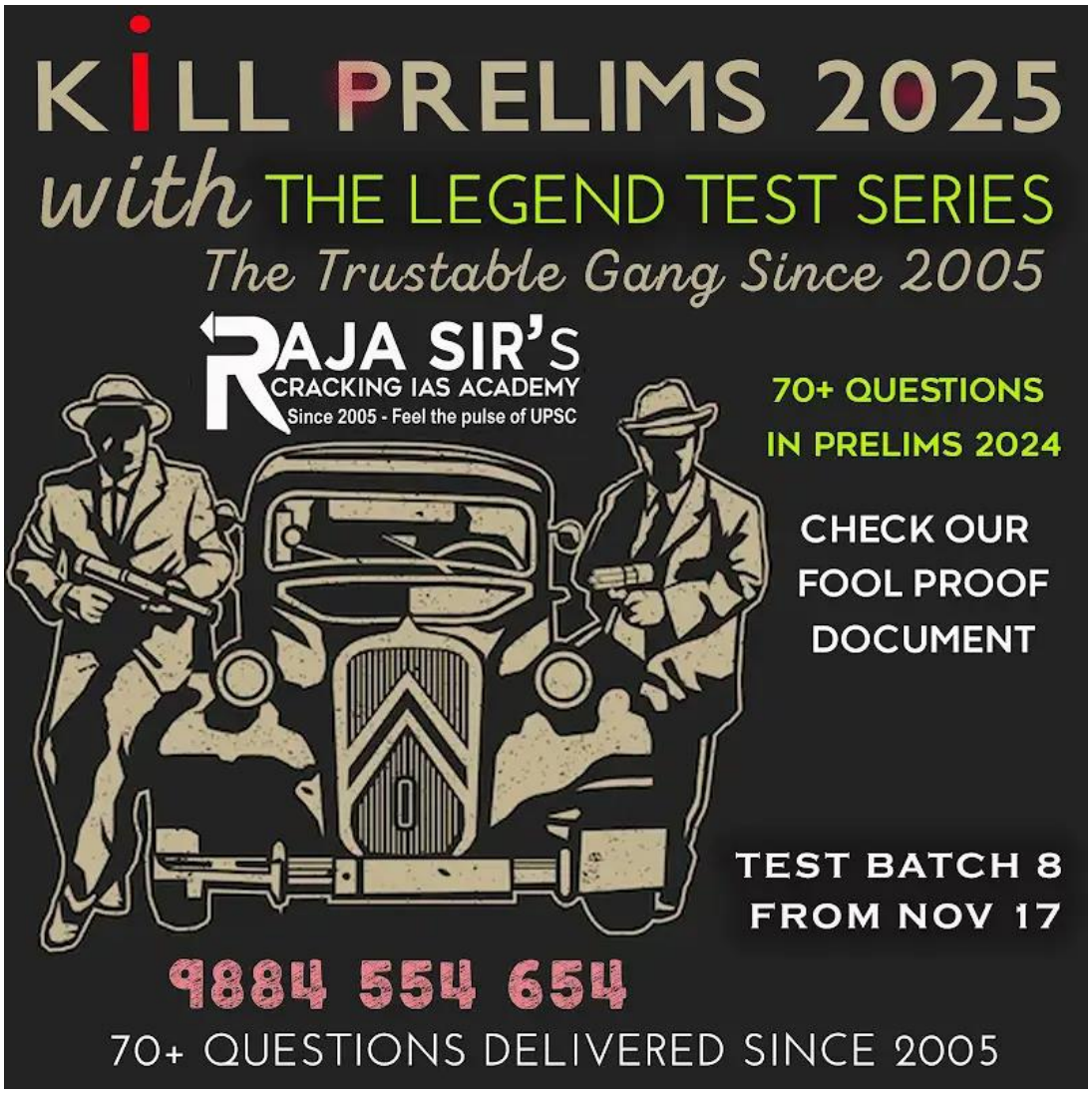
- **Privacy and Security Concerns:** Ensuring the safety of private records and preventing cyber threats is paramount. Privacy violations, identification theft, and data-pushed control are significant risks.
- **Digital Divide:** Bridging the gap among people with access to digital technology and people without is a major challenge. It consists of addressing troubles of affordability, digital literacy, and infrastructure availability in remote areas.
- **Institutional Change:** Implementing DPI calls for large modifications within public institutions, which includes updating guidelines, education team of workers, and adapting to new technologies.
- **Funding and Investment:** Securing adequate funding and investment for DPI projects is critical. This includes now not only preliminary setup costs but also ongoing upkeep and enhancements.

Realising the Full Potential of DPI: Strategic Steps

- **Integrating Impact Assessments:** To ensure that DPI initiatives are powerful and inclusive, it is crucial to combine effect checks into their layout. It includes evaluating the social, financial, and environmental influences of DPI projects from the outset.
- By doing so, policymakers can discover capacity issues early and make important modifications to decorate the blessings and mitigate any poor effects.
- **Ensuring Data Privacy and Security:** As DPI structures handle significant amounts of touchy data, ensuring strong statistics privacy and security measures is paramount. It consists of imposing strong encryption requirements, regular safety audits, and transparent records governance guidelines.
- Protecting user data now not most effective builds accept as true with but

additionally safeguards in opposition to capability misuse and cyber threats.

- **Promoting Inclusivity and Accessibility:** For DPI to be clearly transformative, it has to be accessible to all segments of society, consisting of marginalised and underserved communities.
- **Fostering Public-Private Partnerships:** Collaboration between the private and public sectors can accelerate the development and adoption of DPI.



International Monetary and Financial Committee (IMFC)?

- Union Minister for Finance & Corporate Affairs Nirmala Sitharaman attended the 50th meeting of the International Monetary and Financial Committee (**IMFC**) that took place in Washington, D.C.
- Sitharaman said that in 2024 the global economy has shown remarkable resilience. While output is nearing its potential in some major economies, headline inflation has generally moderated and moved closer to the central banks' targets.
- She said that several downside risks, including growing geo-political tensions and medium-term global growth prospects, are a concern due to their continued weakness.
- Several IMFC members discussed the global macroeconomic and financial impact of current wars and conflicts, including with regard to Russia, Ukraine, Israel, Gaza, Lebanon, and in other places.
- They acknowledged, however, that the IMFC is not a forum to resolve geopolitical and security issues which are discussed in other fora.

International Monetary and Financial Committee (IMFC)

- The International Monetary and Financial Committee (IMFC) is responsible for advising and reporting to the International Monetary Fund (IMF) Board of Governors as it manages and shapes the international monetary and financial system.

It also:

i) Monitors developments in global liquidity and the transfer of resources to developing countries.

ii) Considers proposals by the Executive Board to amend the Articles of Agreement.

iii) Deals with unfolding events that may disrupt the global monetary and financial system.

iv) Advises on any other matters that may be referred to it by the Board of Governors.

- Although the IMFC has no formal decision-making powers, in practice, it has become a key instrument for providing strategic direction to the work and policies of the IMF.
- The **IMFC meets twice a year** during the IMF Spring and Annual Meetings. The Committee discusses matters affecting the global economy and advises the IMF on the direction of its work.
- A number of international institutions, including the World Bank, participate as observers in the IMFC's meetings.
- At the end of the meetings, the Committee issues a statement summarizing its views. These statements provide guidance for the IMF's work program during the half year leading up to the next Spring or Annual Meetings.
- There is ***no formal voting*** at the IMFC, which generally operates by consensus.
- The size and composition of the IMFC mirrors that of the Executive Board. The IMFC has 24 members who are central bank governors, ministers, or others of comparable rank and who are usually drawn from the governors of the IMF's 191 member countries.
- The group is currently chaired by Mohammed Aljadaan, Saudi Arabia's Minister of Finance. He was selected to head the Committee for a term of three years effective January 4, 2024.

Urban GDP Declines

Recent economic assessments reveal a contrasting landscape in India's GDP growth, characterized by a notable uptick in rural demand while urban areas face emerging challenges. The Finance Ministry's latest review indicates a complex interplay between these two sectors, crucial for understanding the broader economic trajectory.

Rural Demand Resilience

Positive Indicators from Rural Areas: A strong outcome in rural demand is mainly owed to good monsoon results, which has boosted agricultural production.

Factors Supporting Rural Growth

- **Agricultural Productivity:** Better rainfall has helped increase crop production hence increasing farmers' disposable income.
- **Increased Spending:** Having noticed the better financial situation of rural households, the expenditure on fast moving consumer goods and other necessities has also increased.
- **Government Initiatives:** Other factors that have on an equal measure caused this increased AML activity include; The government's attempt at offering rural development schemes.

Urban Areas: New Points of Concern

- **Softening Urban Demand:** In stark contrast, urban areas are witnessing a decline in consumer sentiment and demand. There are several concerning trends:
- **Decline in FMCG Sales:** In terms of volumes, sales to urban customers especially in the FMCG sector have declined owing to decreased consumer purchasing capacity.
- **Automobile Sales Contraction:** A lower automobile production of 2.3% in the first half of FY25 evidences slumping urban demand mainly because of reduced sell-off in the last quarter.
- **Housing Market Slowdown:** Slower sales and new launch housing arise further proof of the difficulties that affect the urban segment.
- **Contributing Factors to Urban Decline**
- **Consumer Sentiment:** It is apparent that the consumer confidence has eased, due to a number of effects of economic factors.
- **Weather Impact:** Excessive rain has reduced the number of people

walking around the commercial areas – a factor that impacts on sales.

- **Seasonal Purchase Patterns:** B2C consumers often avoid large purchases during some periods of the year, copious to some calendar seasons.

Economic Outlook and Risks

Mixed Signals for Future Growth: While the Finance Ministry expresses cautious optimism regarding rural demand, it remains wary of overall consumption trends in urban areas. The ongoing festive season may provide a temporary boost to urban consumer demand; however, early indicators suggest that recovery may not be straightforward.

Risks to Economic Stability: Several external factors pose risks to India's economic stability:

- Geopolitical Conflicts: Escalating tensions globally can disrupt trade and investment flows.
- Geo-economic Fragmentation: Shifts in international economic alliances may affect India's market dynamics.
- Financial Market Valuations: Elevated valuations in advanced economies could lead to negative wealth effects domestically, impacting household spending on durable goods.

Conclusion

The current economic landscape presents a dichotomy between rural resilience and urban challenges. While rural areas benefit from favorable agricultural conditions and increased spending, urban centers face significant headwinds that could dampen overall GDP growth.

Policymakers must navigate these complexities carefully to sustain economic momentum and address the emerging concerns within urban markets. The interplay between these sectors will be critical as India strives to achieve its growth targets amidst evolving global dynamics.

What is NAFED?

- Deepak Agarwal, a 2000-batch Indian Administrative Service (IAS) officer of Uttar Pradesh cadre, has been appointed as Managing Director of National Agricultural Cooperative Marketing Federation of India (NAFED).
- National Agricultural Cooperative Marketing Federation of India Ltd (NAFED) is an **apex organisation** of marketing cooperatives for agricultural produce in India.
- It was established in **1958** under the Multi-State Cooperative Societies Act.
- NAFED was founded with the goal to promote the trade of agricultural produce and forest resources across the nation.
- There are over 900 members in NAFED, represented by chief executives of apex level marketing/consumer cooperative/other national level federations, state level marketing/ tribal/commodity federations and primary cooperative marketing/processing societies.
- Agricultural farmers are the main members of NAFED.
- The activities of NAFED add to the betterment of agriculture and post harvest of the produce.
- NAFED **procures stocks directly from the farmers** in regulated mandis in open auction through the cooperative infrastructure thereby providing them a ready market, fair price and preventing their exploitation at the hands of private traders.
- Also, whenever there is a glut in market due to bumper production when prices tend to crash, ***NAFED undertakes procurement at the Minimum Support Price*** (MSP) under the Price Support Scheme in case of 16 notified commodities (pulses, oilseeds, copra, dehusked coconut, cotton) thereby providing remunerative prices to farmers for their produce.
- NAFED also plays a ***crucial role in price stabilisation*** of essential commodities like onion and pulses through creation of national buffer on the direction of the government of India.

The objectives of the NAFED are:

i) To organise, promote and develop marketing, processing and storage of agricultural, horticultural and forest produce.

ii) Distribution of agricultural machinery, implements and other inputs.

iii) Undertake inter-state, import and export trade, wholesale or retail as the case may be.

iv) To act and assist for technical advice in agricultural production for the promotion and the working of its members, partners, associates and cooperative marketing, processing and supply societies in India.



India's heavy reliance on imports for critical minerals

- **Definition of Critical Minerals:** These minerals are essential for national security and economic stability and are used across industries like electronics, defense, energy, and healthcare, supporting India's industrial growth and technological advancements.
- **China's Dominance:** China is the leading global supplier **for six of the twelve minerals identified as crucial for India by 2030.**
- Recently, The **Institute for Energy Economics and Financial Analysis (IEEFA)** report reveals India's heavy reliance on imports for critical minerals.

Highlights of the report

- **Import Dependency**: India remains highly reliant on imports for critical minerals, especially **lithium, cobalt, and nickel,** with a **full (100%) dependency on foreign supplies** for these key resources.
- **Import Strategy & Trade Risks**: The report emphasizes that India needs a strategic import plan to mitigate trade risks and maintain international partnerships for essential mineral security.
- **Key Minerals Assessed: IEEFA** examined India's status in importing and securing five critical minerals—cobalt, copper, graphite, lithium, and nickel—highlighting the country's 100% reliance on imports for several of these, primarily from limited global sources

Critical Mineral Mission

- The Union Finance Minister of India, announced the creation of Critical Mineral Mission for sourcing mineral resources beneficial to the nation's economy.
- **Mission Objectives:** Emphasise the development of the new capacities, the recycling of critical minerals and incentivising the acquisition of overseas assets.
- **Legal Framework:** The Mines and Minerals (Development and Regulation) Act of

1957 was amended in 2023 to remove six minerals from the atomic list and open it for exploration for private sectors

Measures to be taken:

- **Diversification of sources:** The report advocates for identifying new resources globally, expediting domestic production, and forging partnerships with mineral-rich countries like Australia, Chile, Ghana, and South Africa to diversify supply.
- **Graphite Imports**: India heavily relies on China for synthetic and natural graphite and could consider partnerships with top-producing nations like Mozambique, Madagascar, Brazil, and Tanzania, particularly under Global South cooperation.
- **Copper and Nickel Sourcing**: With India's imports of copper cathodes and nickel sulfates concentrated from Japan and Belgium**,** diversifying suppliers, such as considering the U.S. (a major copper producer), may enhance supply stability.
- **Lithium & Nickel Oxides**: Current imports are less concentrated but largely sourced from Russia and China, posing potential trade risks.
- **Domestic Refining & Processing**: Increasing domestic refining capacity, especially for lithium, could enable India's integration into the global supply chain.
- This includes government-backed initiatives like auctions for critical mineral mining blocks and support for refining technology.

Passenger Terminal & a Cargo Gate at Petrapole Land Port

- Union Home Minister has inaugurated the newly constructed passenger terminal building and a cargo gate named 'Maitri Dwar' at the Land Port in Petrapole, on the India-Bangladesh border in West Bengal.

Petrapole Land Port

- **Location:** Petrapole, Uttar 24 Parganas district, West Bengal, on the India-Bangladesh border.

- **Largest Land Port in South Asia**: Serves as a vital gateway for trade and commerce between India and Bangladesh.

Passenger Terminal Features:

- It facilitate international trade and crossings for citizens of both countries.
- Capacity to handle **20,000 passengers per day**.
- Houses immigration, customs, and security services under one roof.

Maitri Dwar Cargo Gate:

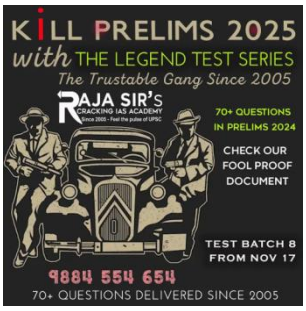
- The 'Maitri Dwar' cargo gate is a joint facility agreed upon by both India and Bangladesh

Land Port Authority of India (LPAI)

- **Constitution**: Established under the **Land Ports Authority Act, 2010**.
- **Purpose**: Development and management of facilities for cross-border movement of passengers and goods at designated points along international borders.
- Responsible for creating, upgrading, maintaining, and managing border infrastructure.
- Manages several Integrated Check Posts (ICPs) across India's borders.

Composition:

- **Chairperson and Members** are appointed by the Central Government.
- **Tenure:** Five years or until the age of 60, whichever comes first.
- **Nodal Ministry**: **Ministry of Home Affairs**.



Union Home Ministry has issued an alert against illegal payment gateways

- The **Indian Cyber Crime Coordination Centre** (I4C) under the Union Home Ministry has issued an alert against illegal payment gateways created using mule bank accounts by transnational organised cyber criminals facilitating money laundering as a service.
- Digital payments are transactions that occur via **digital or online modes**. This means both the payer and the payee use electronic mediums to exchange money.
- The meaning of digital payment is equivalent to an **electronic payment**. Digital payments use a digital device or platform to move money between payment accounts. They can be partially, primarily, or fully digital.

Payment Gateway?

- A payment gateway is a merchant service provided by an e-commerce application service provider that authorizes credit card or direct payment processing **for e-businesses, online retailers, bricks and clicks**, or traditional **brick and mortar**.
- The payment gateway may be provided by a bank to its customers but can be provided by a specialised financial service provider as a **separate service, such as a payment service provider**.

Types of Digital Payments In India:

- **Banking Card:** Indians widely use banking cards, debit/credit cards, or prepaid cards as an alternative to cash payments. **In 1981, the Andhra Bank launched the first credit card in India**.
- **Unstructured Supplementary Service Data(USSD):** The unstructured supplementary service data (USSD) was launched for those sections of India's population which **do not have access to proper banking and internet facilities**.
- **Aadhaar Enabled Payment System (AEPS):** The Aadhaar Enabled Payment System (AEPS) is a bank-led model for digital payments initiated to leverage the presence and

reach of Aadhar. Under this **system, customers can use their Aadhaar-linked accounts to transfer** money between two Aadhaar-linked bank accounts.

- **Unified Payments Interface (UPI):** The UPI is a payment system that culminates numerous bank accounts into a single application, allowing money transfers between parties. **Compared to NEFT (national electronic funds transfer), RTGS (real-time gross settlement), and IMPS (immediate payment service),** the UPI is considered a well-defined and standardised process across banks.
- **Mobile Wallets:** Mobile wallets are a type of wallet where you can carry cash in a digital format. **Often, customers link their bank accounts** or banking cards to their wallets to facilitate secure digital transactions.

Digital Payment Examples:

- **Mobile payment apps**: Apple Pay, Google Pay, Paypal and Samsung Pay
- **Digital cards:** Credit, debit, or prepaid cards issued to a customer's mobile or digital wallet
- **National Electronic Toll Collection (NETC) FASTag: This interoperable solution uses Radio Frequency Identification (RFID) technology to allow individuals to make toll payments while their vehicle is in motion.**
- **Contactless payments:** Credit, debit, or prepaid cards with **near-field communication (NFC) technology, or mobile wallets** that use **magnetic security transmission (MST)** technology as qualified as contactless payments.
- **Bank transfers:** Direct transfers, also known as **ACH transfers**, are usually inexpensive or free and take one to three business days to execute.
- **Biometric payments:** Mobile apps and other digital payment agents use **biometric verification** to authenticate transactions. For example, **smartphones can send information** with a payment request that includes biometric information.

CARIN (Camden Assets Recovery Inter-Agency Network)

- India is included in the Steering Committee of the Asset Recovery Interagency Network-Asia Pacific (ARIN-AP).
- It is an informal cooperative network of experts and practitioners **to track and seize criminal assets** across borders in the Asia-Pacific region.
- It was officially launched at the inaugural meeting held in Seoul, South Korea in November 2013.
- It is a part of a larger framework called **Global CARIN** (Camden Assets Recovery Inter-Agency Network), which includes over 100 jurisdictions worldwide.

CARIN (Camden Assets Recovery Inter-Agency Network)

- It is an **informal network of law enforcement and judicial practitioners** specializing in asset tracking, freezing, seizure, and confiscating.
- It operates as an interagency network with each member state represented by a law enforcement officer and a judicial expert, such as a prosecutor or investigating judge, depending on the legal system.
- It has 28 member countries and 9 observers, and it focuses on combating cross-border financial crimes including money laundering, corruption and asset recovery.
- The Secretariat is located in South Korea.

India's Role and Its Significance

- India, through the Directorate of Enforcement (**ED) has joined ARIN-AP''s Steering Committee.** It influences the network''s decisions and operations.
- By joining the committee, India will play an active role in shaping the strategies, sharing best practices and Improving regional cooperation on asset recovery.
- **India to assume ARIN-AP's Presidency in 2026,** this opportunity will provide India a leadership role, and also provide a stronger influence over regional policies on asset recovery.
- **India to host the** ARIN-AP Annual General Meeting (AGM) in 2026**,** it will be an

opportunity to highlight progress in combating economic crimes and strengthen its position as a global player in financial law enforcement.

How ARIN-AP Works?

- It is structured to **promote easy communication and data sharing among its members.** It worked through contact points in each jurisdiction which allow **informal information exchange on criminal activities and assets.**

It speeds up the asset recovery process by allowing agencies to track assets, both removable and immovable, without waiting for formal legal agreements. For example, if India needs to track assets linked to an economic crime in another member country, the ED can request information informally through the network before Initiating formal actions through bilateral or multilateral treaties.

ENVIRONMENT

Eco-Sensitive Zones & Western Ghats

The Karnataka government has asked the Union Ministry of Environment, Forest and Climate Change (MoEF&CC) to withdraw the sixth draft notification issued by it for declaration of Eco-Sensitive Area (ESAs) of the Western Ghats.

Background

- On **July 31, 2024**, MoEF&CC reissued the draft notification for the **sixth time in a decade**, proposing to classify parts of the Western Ghats in six states as ESAs.
- Objections and suggestions were called for **within a 60-day period**.
- Karnataka **rejected the Kasturirangan Committee report** in a Cabinet meeting on **September 26**.

- The government argues that implementing the report would cause hardships to **1,499 villages** across **33 taluks** in **10 districts** of Karnataka, affecting lakhs of residents.

Ecologically Sensitive Areas (ESAs)

- **Eco-Sensitive Areas (ESAs)**are **located within 10 kms** around Protected Areas, National Parks and Wildlife Sanctuaries.
- It acts as a transition zone for areas which have less protection to areas which have high protection.
- These are **notified by the Ministry of Environment, Forest and Climate Change (MoEFCC**) under Environment Protection Act 1986.
- Established since 2002, **ESZs** act as **buffer zones**, providing an additional layer of wildlife protection by serving as **"shock absorbers,"** facilitating a smooth transition from strictly protected zones to areas with more relaxed conservation regulations.
- It is also known as Ecologically Fragile Areas (EFAs).

Conservation Efforts for Western Ghats

- Government has taken various measures to conserve biodiversity with the establishment of Protected Area network, tiger reserves and biosphere reserves.
  - Nearly 10% of the total area of Western Ghats is currently covered under protected areas.
- The government has also taken initiative to demarcate Ecologically Sensitive Areas (ESA) for promotion of environment-friendly and socially inclusive development.

Madhav Gadgil Committee (2011)

- **Classification of Ecologically Sensitive Zones (ESZs):** The report proposed classifying 64 percent of the Western Ghats, spread over six states, into **three**

categories – ESZ 1, ESZ 2, and ESZ 3.

- **Ecologically Sensitive Area (ESA)**: The **entire Western Ghats region** was recommended to be designated as an Ecologically Sensitive Area.
- **Developmental Activities:** The report called for a halt to almost all developmental activities like mining, construction of thermal power plants, and dams in ESZ 1.
- **Bans and Restrictions**: Genetically modified crops, plastic bags, Special Economic Zones, new hill stations, and changes in land use from farmland to non-farm land were to be prohibited.
    - The diversion of rivers to protect the ecology of the region and conversion of public lands into private lands were also discouraged.
- **Bottom-to-Top Governance:** The report suggested a decentralised approach to governance with more power given to local authorities.
    - It recommended the establishment of a **Western Ghats Ecology Authority under the Environment (Protection) Act, 1986,** to manage the region's ecology and ensure sustainable development.
- **Ban on Single Commercial Crops:** The report called for a **ban on growing single commercial crops** like tea, coffee, cardamom, rubber, banana, and pineapple in the Western Ghats, as they had negative environmental impacts.

Dr. K Kasturirangan Committee (2013)

- **Reduced Ecologically Sensitive Area:** It has designated **only 37% of the Western Ghats** as ecologically sensitive.
- **Categorization of Regions:** The panel split the Western Ghats into **two categories – cultural regions (human settlements) and natural regions (non-human settlements)**.
- It proposed designating cultural lands as an **Ecologically Sensitive Area.**
- **Categorization of Activities:** The report introduced a classification of activities into three categories – red, orange, and green.

- **Red Category:** Activities, such as mining, stone quarrying, were recommended to be banned.
- **Orange Category:** Activities would be regulated and allowed with appropriate permissions.
- **Green Category:** All agricultural, horticultural, and certain commercial activities were allowed.

About Western Ghats

- **Older than the Himalaya mountains**, the mountain chain of the Western Ghats represents geomorphic features of immense importance with unique biophysical and ecological processes.
- **Location:** Stretches **1,600 km (990 mi)** along the **western coast o**f the Indian peninsula.
- **Coverage**: 160,000 km² (62,000 sq mi) across **six states:** Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.
- **Local Names:**
  - **Sahyadri**: In Maharashtra
  - **Nilgiri Hills:** In Karnataka and Tamil Nadu
  - **Anaimalai Hills and Cardamom Hills**: In Kerala
- **Formation and Geology:**
  - **Formation:** Created during the **break-up of the supercontinent Gondwana** in the **late Jurassic and early Cretaceous periods.**
  - **Geological Evidence:** The mountains were formed when India **separated from Africa** and rose along the west coast.
  - **Composition**: The **Deccan Plateau** is made of **basalt rocks**, influencing the rise of the Western Ghats.
- **Topographical Variation: Higher in elevation** (average elevation about 1,500 m) and more **continuous compared to the Eastern Ghat**s, with height increasing from north to south.

- **Protected Areas in the Western Ghats:** Protected Areas Includes **two biosphere reserves**, **13 National Parks**, several wildlife sanctuaries, and many Reserve Forests.
- Major Protected Areas include **Nilgiri Biosphere Reserve and Silent Valley National Park**
- **Recognition:** Western Ghats was declared as a **world heritage site in 2012** by the United Nations Education, Scientific and Cultural Organisation (UNESCO).
    - It is one of the eight **'hottest hotspots'** of biological diversity in the world.

Ocean Warming Rate Doubles Since 2005: Report

Oceans have been warming nearly twice as fast since 2005 due to human-caused climate change, according to the **Copernicus Marine Service report.**

More on the Report

- Oceans, which cover 70% of the Earth's surface, play a crucial role in regulating global climate.
- **Continuous Rise in Ocean Temperature:**
    - Ocean warming has been ongoing since the 1960s but has sharply increased since 2005.
    - The warming rate has nearly doubled, from 0.58 watts per m^2 to 1.05 watts per m^2 over the past two decades.
- **Ocean Warming Reflects Global Warming:** Ocean warming is seen as a clear indicator of global warming.
    - It absorbs 90% of excess heat from the atmosphere caused by carbon dioxide and other greenhouse gases, as reported by the IPCC.

About Ocean Warming

- The ocean absorbs extra heat from greenhouse gases, causing the water temperature to increase.
- **Reasons for Ocean Warming**

- **Greenhouse Gas Emissions:** Burning fossil fuels, cutting trees, and industrial activities release gases like carbon dioxide (CO2) and methane (CH4) that trap heat, making the atmosphere and oceans warmer.
- **CO2 Absorption:** The ocean absorbs excess CO2 from human activities. While this helps reduce climate change, it also causes ocean warming.
- **Solar Radiation:** Changes in solar energy can also increase ocean temperatures over long periods, but it's a small factor compared to human activities.

- **Rising sea surface temperatures:**

Implications:

- Marine biodiversity loss
- Weak reef ecosystem
- Disruption of food web
- Disruption of ocean currents

Key Findings of the Report

- **Status of warming of oceans**
  - **Marine Heatwaves:** In 2023, 20% of the world's oceans experienced severe marine heatwaves, affecting marine life and ecosystems.
  - **Longer Marine Heatwaves:** The average duration of marine heatwaves has doubled since 2008, from 20 days to 40 days annually.
  - **Permanent Heatwave in the Arctic:** Parts of the Arctic, particularly the north-east Barents Sea, have entered a state of permanent marine heatwave.
- **Impact of Ocean warming (CMS report)**
  - **Severe Weather Events:** Warmer oceans fuel storms, hurricanes, and extreme weather by influencing global weather patterns.
  - **Mass migration:** Marine heatwaves can cause mass migration and

mortality of species, disrupting ecosystems and nutrient distribution.

- **Sea Ice Loss and Record Temperatures:** 2023 saw the lowest sea ice levels on record in the polar regions.
  - In August 2022, the Balearic Islands recorded their warmest coastal waters in 40 years at 29.2°C.
- **Coral Bleaching**: Warmer water causes **corals to lose algae** that they need to survive, leading to **coral bleaching** and making them more prone to diseases, which harms **coral reefs**.
- **Sea Level Rise**: Warmer oceans cause **water to expand** and **polar ice to melt**, raising **sea levels**. This leads to **coastal erosion** and makes **coastal areas more vulnerable**.
- **Disruption of Marine Food Webs**: Rising temperatures change the **distribution of marine species**, disrupting the **food chain** and impacting **fisheries** and **communities** that depend on them.
- **Increased Ocean Acidity:** Ocean acidity has increased by 30% since 1985 due to climate change, primarily from burning fossil fuels.
  - This increasing acidity threatens marine species like corals, mussels, and oysters, affecting their ability to form skeletons and shells.
    - It damages fragile ecosystems, and disrupts the flow of nutrients in the ocean.

Role of Oceans in the Global Carbon Cycle (CMS Report)

- **Oceans as a Carbon Sink**: Oceans play a significant role in absorbing **human-made CO2**, helping to **moderate climate change**.
- **CO2 Uptake Since the 1980s**: According to the **IPCC**, oceans have absorbed abo **20-30% of carbon dioxide emissions** caused by humans since the 1980s.
- **Annual Absorption**: Each year, oceans absorb around **25% of the CO2** released from **fossil fuels**, **cement production**, and **land-use changes**.

Sustainable Development Goals (SDG) and Ocean Acidification

- **SDG 14.3**: **Minimising ocean acidification** is one of the goals under the **Sustainable Development Goal 14: Life Below Water**.
    - This involves promoting **scientific cooperation** to address the issue.
- **Monitoring Efforts**: The **Intergovernmental Oceanographic Commission (IOC)** of **UNESCO** is responsible for monitoring ocean acidity (pH).
    - It follows **scientific best practices** to ensure **accurate data collection** and **reporting** from selected sampling locations.

Mudumalai Tiger Reserve

A survey of herpetofauna in Mudumalai Tiger Reserve (MTR) identified **33 new reptile species and 36 new amphibian species.**

- It is the first time record of these species in the region.
- **Current Species Count**:
    - **Total reptiles**: 55 species (including previously recorded species)
    - **Total amphibians**: 39 species (including previously recorded species)
- **Threatened Species**:
    - **16 species** classified as **"threatened"**
    - **3 species** classified as **"near threatened"** according to the International Union for the Conservation of Nature (IUCN).

Notable Discoveries

- **Critically Endangered Amphibians:**
    - Cave Dancing Frog (Micrixalus spelunca)
    - Indraneil's Night Frog (Nyctibatrachus indraneili)

Mudumalai Tiger Reserve (MTR)

- Located in Tamil Nadu at the trijunction of three states – Karnataka, Kerala and

Tamil Nadu.

- Part of Nilgiri Biosphere reserve.
- **Flora**
  - Tall grasses commonly known as 'Elephant Grass'.
  - Timber Species – Teak, rosewood.
    - Giant bamboo is also found there.
- **Fauna**
  - Home to **Tiger and Asian elephant** (flagship species).
  - Live diverse species such as **spotted deer, common langur, wild dog, Indian Gaur, and Malabar Giant Squirrel.**
  - **Birds-** Malabar pied hornbill, Malabar laughing thrush, and other rare birds are found here.

Nature's new nest: India's 1st oxygen bird park opens its wings at Maharashtra''s Jamtha

Oxygen Bird Park (Amrit Mahotsav Park) is an eco-initiative developed by the National Highways Authority of India (NHAI) near Jamtha, along the Nagpur-Hyderabad National Highway-44. Covering a total area of 8.23 hectares, including 2.5 hectares dedicated to social forestry, the park is designed to serve both as a natural bird habitat and as a recreational space for locals and tourists. The project, which integrates environmental sustainability and recreational facilities, was formally approved in March 2023 with a development cost of ₹14.31 crores.

Overview of the Park:

- The park is an eco-initiative by the **National Highways Authority of India (NHAI).**
  - It is also known as **Amrit Mahotsav Park.**
  - NHAI operates under the **Ministry of road transport and highways.**
- **Purpose:** Serves as a natural habitat for birds and a recreational space for locals

and tourists.

- **Vision**
  - To create a space for observing bird varieties and recreational activities for citizens.
  - To provide a safe habitat for local and migratory birds, mimicking natural ecosystems.
- **Features**
  - **Amenities:** Ticket counter, food court, restrooms, walking paths, jogging/cycling tracks, amphitheater, watchtowers, and children's play area.
  - **Landscaping:** Thoughtfully designed green spaces with an irrigation system and utilities
  - **Solar Energy:** Utilizes solar panels for lighting and waterfeatures, promoting environmental sustainability.
  - **Oxygen Park Feature:** Focus on planting fast-growing trees to combat air pollution and create a healthier environment.

Ecological Features

- **Rare and Endangered Trees Area:** Showcases native endangered species like the Indian Bael and Yellow Flame of the Forest.
- **Lotus/Lily Pad Pond:** Home to lotus and water lilies, providing habitats for waterbirds and recharging aquifers.
- **Reed Bed:** Ideal habitat for migrating birds such as waterhens and reed warblers.
- **Bambusetum:** Features native bamboo species to reduce pollution and improve soil quality.
- **Plantation Area:** Includes native trees and shrubs to attract wildlife and enhance air quality.

Palm Plantation: Planting native palms to provide nesting sites for birds and small

mammals.

PM opens bio-gas plants, Assam gets 4

Recently, Prime Minister Narendra Modi inaugurated the construction of four Compressed Bio-Gas (CBG) plants in **Assam**

Biogas

- It is a renewable fuel.
- formed when animal or food waste is broken by the microorganism in the state of lack of oxygen.
- Biogas is primarily made up of hydrocarbons which are flammable and can be used to generate heat and energy.
- **Main Component:** Methane is the primary gas in biogas (around 45% – 75% by volume)

Compressed Bio- Gas

- CBG is a renewable fuel made from organic waste materials like **agricultural residue, animal dung, food waste, and municipal solid waste.**
- The production process involves anaerobic digestion, where waste materials decompose without oxygen.
- This process produces methane-rich biogas which is more than 90%.
- **Properties and Uses:** CBG has properties similar to Compressed Natural Gas (CNG) and can be used as an eco-friendly fuel for vehicles, industries, and other commercial applications

CBG Blending Obligation (CBO)

- This is the initiative of the government to promote the consumption and production of CBG.
- It mandates blending of CBG with compressed natural gas and piped natural gas

in the city gas distribution.

- **Voluntary phase:** CBG blending obligation will be voluntary until the financial year of 2024- 25.
- **Mandatory phase**: From 2025- 26, CBO will become mandatory.
- **Blending requirements:** In FY 2025- 26, CBO will require 1% blending of CBG with total CNG and PNG.
    - The blending % will increase to 5% by year FY 2028 -29

Government Initiative

- **Sustainable Alternative Towards Affordable Transportation initiative:** launched by The Ministry of Petroleum and Natural Gas (MoPNG) in 2018.
    - MoPNG associated with Public Sector Undertaking (PSU) and Oil Marketing Companies (OMC) for launching SATAT. .
- **Objective:** The aim of this initiative was to set up plants for compressed biogas and to make biogas accessible for use as automotive fuel.

Challenges of CBG Plants

- **High Costs:** Setting up plants needs a lot of money, which can slow down growth.
- **Technical Needs:** Advanced technology and knowledge are needed for plants to work well.
- **Waste Collection Problems:** Collecting and transporting organic waste can be difficult, especially in remote places.
- **Private Sector Issues:** Working with private companies can be tricky in terms of coordination and management.
- **Regulatory and Policy Framework for CBG :** Well-defined and supportive policies are crucial for the growth of the Compressed Bio-Gas (CBG) sector.
    - Inconsistent rules and a lack of standardization can slow down the development of the sector.

- **Health Hazards:** Unscientific waste disposal can lead to diseases like dengue and malaria.
    - Air pollution from burning biomass is linked to chronic diseases such as asthma, cancer, and heart diseases

Benefits of CBG Plants

- **Waste to Energy:** Turns organic waste into clean energy which helps in waste management.
- **Impact of Environment:** Reduces carbon emissions for better air quality and climate action.
- **Job Growth:** Creates local jobs for plant construction and operation.
- **Eco-friendly:** CBG is a sustainable alternative to conventional fuels, helping to reduce environmental pollution.
- **Energy Independence**: It decreases reliance on imported natural gas and crude oil, supporting energy security.

Ecomark Rules notified by Ministry of Environment, Forest and Climate Change

In alignment with the 'LiFE' (Lifestyle for Environment) Mission announced by Prime Minister Sh. Narendra Modi in 2021, the Ministry of Environment, Forest and Climate Change has notified the Ecomark Rules***. It replaces the Ecomark scheme of 1991.***

- "Eco-labelling of products enables consumers to make informed purchase decisions as well as encourage manufacturers to transition to the production of environment-friendly products, leading to the promotion of green industries," the notification said.
- This move is in line with the principle of 'LIFE (Lifestyle for Environment)'. It aims to promote lower energy consumption, resource efficiency and conservation, and circular economy, and to prevent misleading

information on the environmental aspects of products.

- The notification prescribed granting a special mark to a product that has a licence or a certificate of conformity with Indian Standards granted under the Bureau of Indian Standards Act and/or a mandate of the Quality Control Orders and that fulfils the criteria as prescribed in the rules.
- These include products that reduce pollution by minimising or eliminating the generation of waste and environmental emissions; products that are recyclable or made from recycled material or both; products that reduce the use of non-renewable resources, including non-renewable energy sources and natural resources; and products that reduce the use of any material that has adverse impacts on the environment.
- While developing criteria for the grant of 'Ecomark' to a product, the production process, including the source of raw material, will be considered.
- Apart from this, the use of natural resources, environmental impact, the effects and extents of emissions or waste arising from the production process, the utilisation of waste and recycled materials, the suitability for recycling, and the use of non-hazardous substances in place of hazardous substances will also be considered.
- An application for 'Ecomark' will be required to be made to the Central Pollution Control Board (CPCB). After that, the Board will, either by itself or through a verifier, verify whether the product complies.
- Once this is done, a report will be prepared. Once the Board is satisfied that the product meets the conditions mentioned in the guidelines, it may grant 'Ecomark'. This mark will be valid for 3 years or until there is a change in criteria, whichever is earlier. The certificate can be renewed.

Products for the grant of 'Ecomark':

- Cosmetics: Skin powder, including that for infants; tooth powder and toothpaste;

skin cream; hair oil; shampoo; soap; hair cream; nail polish; aftershave lotion; shaving cream; cosmetic pencil; lipstick; etc.

- Soaps and detergents
- Food items: Edible oils, tea, and coffee
- Electric/electronic goods: TV, fridge, food mixers, geysers; electrical/steam iron, toasters, coolers, fans, etc.
- Textiles

India and Brazil to collaborate on SAF, leverage biofuel expertise to decarbonise aviation

India and Brazil, in a joint statement, emphasised increased cooperation to promote biofuels, including sharing regulatory and policy experience to create frameworks encouraging investment in **sustainable aviation fuel** (SAF) production.

The joint statement was issued after the meeting of India's Minister of Petroleum & Natural Gas, H S Puri, with Brazil's Minister of Mines & Energy, Alexandre Silveira.

- The sides noted that India and Brazil, as two leading biofuel producers, are well-positioned to collaborate on production and use of SAF by leveraging their existing ethanol and biodiesel production infrastructure, growing aviation market and vast feedstock potential, including their agricultural resources.
- In the context of SAF, the sides noted that currently SAF remains the major mature and viable pathway to decarbonise the aviation sector. At the same time, SAF only accounts for 0.3 per cent of the current fuel use for aviation.
- The sides recognised the role that India-Brazil partnership in SAF can play in deployment and development of the sector by leveraging and catalysing regional value chains to ramp up SAF production, trading, distribution and certification, which inter-alia will support enhancement of availability, affordability and reliability of the biofuel.

- Both countries noted that the modes for such cooperation could include leveraging ethanol production from all sources.
- "Promote technology exchange, joint research, and development initiatives, in order to optimise SAF production processes as well as share regulatory and policy experience, with a view to create frameworks that encourage investment in SAF production," the joint statement said.
- Cooperation in R&D to enhance the Technology Readiness Level (TRL) of production pathways and collaboration in multilateral forums, such as the International Civil Aviation Organisation (ICAO), to promote the development of SAF.
- India and Brazil also discussed collaboration in deep and ultradeep explorations in the Indian offshore Acreages. The two sides also initiated a discussion on cooperation in the area of critical minerals and their value chains.
- In the oil and gas sector, the sides recognised the trust reposed by Indian companies, which has resulted in Brazil being one of the largest destinations for investments by Indian oil and gas companies in the world.
- The sides also reaffirmed their commitment to identifying new possible mechanisms for increasing the presence of Indian companies in the country, including through new investment opportunities in producing assets. The sides, while recognising the complementarities in the trade sector, committed to identifying ways of enhancing the trade between the two countries, including through innovative mechanisms.

Leopard population in Odisha's forests jumps by 22% to 696 in two years

The **All Odisha Leopard Estimation 2024**, released recently, estimates the State's leopard population to range between 668 and 724, with a median count of **696**.

All Odisha Leopard Estimation 2024

- **Key Highlights:**
  - **Leopard Population Increase**: Odisha's leopard population has risen by 22% between 2022 and 2024, from 568 to 696 leopards.
  - **2024 Leopard Estimation**: The All Odisha Leopard Estimation 2024 reported a range of 668 to 724 leopards, with a median of 696.
  - **Comparison to Previous Census**: In 2018, NTCA estimated the population at 760 leopards; however, it dropped to 568 by 2022.
  - **Statewide Monitoring**: The estimation was conducted across 47 forest divisions using both field surveys and camera traps.
  - **Melanistic Leopards:** Rare melanistic leopards **(black panthers)** were recorded in Odisha.
    - **Melanism** is a common trait in leopards, causing their **entire skin and spots to turn black**. It's caused by a **recessive mutation in the ASIP (agouti signalling protein) gene.**

Estimation Techniques:

- **Camera Traps**: Leopards were identified using camera traps, focusing on their unique rosette patterns.
- This technique is widely used in **national leopard population assessment**s.
- **Field Survey**: Indirect evidence, including pugmarks, scats, scrapes, and vocalisations, was used to track leopard presence.
- **Important Habitats:**
- **Similipal Tiger Reserve**: Largest leopard population in the state. This landscape is vital for leopard dispersal to nearby wildlife sanctuaries like Hadagarh and Kuldiha.
- **Satkosia Landscape**: Holds the second-highest leopard population in the state.
- **Hirakud Wildlife Division**: Including Debrigarh Wildlife Sanctuary, it has a significant leopard population.
- **Leopard Presence in Non-Protected Areas**: 45% of leopards live outside

protected areas in territorial forest divisions.

- **Leopard Population in India: Fifth Cycle Leopard Population Estimation (2022)**
- **Released: In 2024 by Ministry of Environment, Forest and Climate Change**
- **Involved Organisations**: The **National Tiger Conservation Authority (NTCA)** and **Wildlife Institute of India (WII)**, along with State Forest Departments,
- **Coverage of the survey**: Leopard Population concentrated on **roughly 70% of the animals' predicted habitat** and encompassed **18 states** in India.
- The estimation covered the **main areas for tiger conservation**—forested habitats—within **18 tiger states.**
- **High Himalayan (above 2000 m)** and **non-forested areas** were not included.
- **Methodology:** To estimate l**e**opard abundance, **photo-captures** were combined with **spatial data on prey**, **habitat,** and **anthropogenic** factors using a likelihood-based **spatially explicit capture mark-recapture (SECR)** covariate framework.
- **Population Estimate: 13,874 leopards** are thought to exist in India, a stable number when compared to the **2018 estimate** (**12852**).
- **Geographical Trends:** The population of **Central India** is constant or slightly increasing, although areas such as the **Shivalik hills and Gangetic plains** are declining.
- The selected areas are **growing at a rate of 1.08% annually** overall.
- **Distribution by State:** With 3907 (2018: 3421) leopards, **Madhya Pradesh has the highest** population in the nation. It is **followed by Maharashtra** (2022: 1985; 2018: 1,690), **Karnataka** (2022: 1,879; 2018: 1,783), and **Tamil Nadu** (2022: 1,070; 2018: 868).
- **Environment:** The tiger reserves or locations with the **greatest concentration** of leopards are **Satpura (AP), Panna (MP), and Nagarjunasagar Srisailam (AP**).
- **Declining Population: Arunachal Pradesh, Assam, and West Bengal** recorded a combined 150% increase to 349 large cats.

- **Uttarakhand** reported a 22% fall in big cat numbers, presumably due to poaching and man-animal conflict.

Facts on Indian Leopard

- The **Indian Leopard (Panthera pardus fusca)** is a leopard **subspecies** that is widespread throughout the **Indian subcontinent.**
- They are the **smallest of the big cats.**
- They are noted for their capacity to **adapt to a range of environments.**
- They are **strong and agile predator**s capable of **climbing trees** and dragging their victim to safety.
- **Conservation status**: **Vulnerable (IUCN Red List).**
- **Appendix I of CITES** and **Schedule I of the Wildlife (Protection) Act, 1972.**

PM E-DRIVE Scheme

The Scheme aims to accelerate EV adoption and establish essential charging infrastructure across the country, promoting cleaner and more sustainable transportation.

As part of the scheme, the Ministry of Heavy Industries (MHI) introduced e-vouchers for EV customers to avail of demand incentives.

The e-vouchers streamline the process of accessing incentives, providing a seamless experience for both consumers and manufacturers. During the event, a live demonstration showcased dealers generating e-vouchers for customers.

The major components of the scheme are as under:

- ***Subsidies/Demand Incentives***: ₹3,679 crore allocated for e-2Ws, e-3Ws, e-ambulances, e-trucks, and emerging EVs, supporting 24.79 lakh e-2Ws, 3.16 lakh e-3Ws, and 14,028 e-buses.
- ***E-Voucher Introduction***: Aadhaar-authenticated e-vouchers for EV buyers, generated at purchase and sent to registered mobile numbers. Signed e-voucher essential for dealer submission and OEM reimbursement.

- ***E-Ambulances***: ₹500 crore allocated for deployment. Standards will be set in consultation with MoHFW and MoRTH.
- ***E-Buses***: ₹4,391 crore for procurement of 14,028 e-buses via CESL in 9 major cities. Preference to buses replacing scrapped STU buses.
- ***E-Trucks***: ₹500 crore for incentivizing e-trucks, with scrapping certificates from RVSF mandatory for incentives.
- ***Public Charging Stations***: ₹2,000 crore outlay for installing 22,100 fast chargers (e-4Ws), 1,800 for e-buses, and 48,400 for e-2Ws/3Ws in high EV penetration cities and highways.
- ***Test Agency Modernization***: ₹780 crore for upgrading MHI test agencies to handle new EV technologies.

Guardians of the Flock: Wolves may be villains in Bahraich, but are sacred beings for Koppal's Kuruba shepherds

- The Indian grey wolf (***Canis lupus pallipes***) has been in the news for all the wrong reasons. Ten deaths—those of nine children and one woman —have been presumed to have occurred due to wolf attacks in Bahraich in Uttar Pradesh.
- However, hundreds of kilometres from ***Bahraich***, *in the rugged landscapes* of central Karnataka, a unique relationship has flourished between local shepherds and an unlikely ally—wolves.
- The Indian grey wolf, with its keen instincts, is believed to target and prey upon the weaker, sicker individuals, essentially acting as nature's culling system.
- The ***Kurubas*** *are nomadic graziers* who "Traditionally, believe that wolves help maintain the health of our flocks by preying on weak or diseased sheep.
- Karnataka's Kurubas have contributed in their own significant way to wolf conservation in India. The ***Bankapur Wolf Sanctuary***, declared in 2021, is India's second protected area dedicated exclusively to *Canis lupus pallipes* after the **Mahuadanr Wolf Sanctuary** established in erstwhile undivided Bihar in 1976 (today in Jharkhand).

Indian Grey Wolf :

- It is a subspecies of grey wolf that ranges from Southwest Asia to the Indian Subcontinent.
- It **travels in smaller packs** and is less vocal than other variants. They are nocturnal and hunt from dusk to dawn.
- **Appearance:** It is intermediate in size lies between the Tibetan and Arabian wolf, and lacks the former's luxuriant winter coat due to its living in warmer conditions.
- **Habitat:** The Indian wolf inhabits areas dominated by **scrub, grasslands and semi-arid pastoral** agro-ecosystems.
- They live in **warmer conditions.**
- **Distribution:** It has a wide distribution range that extends from the Indian subcontinent to Israel. There are about 3,000 animals in India, some in captivity.

Conservation Status

- **IUCN:** Least concern
- **CITES :** Appendix 1
- **Wildlife (Protection) Act of 1972** : Schedule I
- **Threat:** Habitat loss and depletion of prey species etc

National Wildlife Week is celebrated from October 2 to October 8

Big cats have drawn attention in India as government is steering ahead with multiple initiatives like cheetah reintroduction and big cat alliance.

- India is home to five of the seven big cats: the tiger, lion, leopard, snow leopard, and cheetah, except for the puma and jaguar

Tiger (Panthera Tigris)

- Panthera tigris tigris, the continental tiger, and Panthera tigris sondaica, the Sunda tiger, are the two recognised subspecies of tigers.

- According to the fifth cycle of the All India Tiger Estimation 2022 summary report, India is home to about 3,167 tigers, accounting for more than 70 per cent of the world's wild tigers.

Steps taken towards conservation

1. Indian Board for Wild Life (IBWL)
2. Project Tiger: It was a centrally sponsored scheme launched in 1973.
3. The Wildlife Crime Control Bureau and the National Tiger Conservation Authority (NTCA) were established as statutory agencies after the amendments in the Wildlife (Protection) Act in 2006.
4. International Big Cats Alliance (IBCA)

Lion (Panthera Leo)

- Most sociable when compared to other big cat species, they are found in parts of sub-Saharan Africa, a tiny population of Asiatic lions in India's Gir National Park, and a severely endangered subpopulation in West Africa.
- Because of their remarkable adaptability, lions can live in a broad range of environments, such as semi-arid desert regions, dense shrubbery, dry forests, and floodplains. They usually like open savannas since it is simpler for them to stalk their prey there.
- August 10 is World Lion Day — an annual event started by Big Cat Rescue, the largest accredited big cat sanctuary in the world.

Conservation efforts

1. Project Lion: It was announced on August 15, 2020, 'Project Lion' is a pivotal initiative aimed at securing the future of Asiatic lions through comprehensive, long-term conservation efforts. The project focuses on creating and maintaining a sustainable environment where lions can survive.
2. Greater Gir Concept: The concept involves developing additional habitats for lions beyond Gir National Park and Wildlife Sanctuary. There are various other wildlife

sanctuaries suitable for lions like Girnar, Pania, and Mitiyala

Leopard (Panthera Pardus)

- There are nine species of leopards, which are found in both Asia and Africa.
- The leopard, the smallest of the big cats, is well known for its ability to adapt to a variety of settings. This species is a nocturnal mammal, they can hunt at night.
- The leopard is not among the species for whom a "species-specific conservation program" has been defined because there is no evidence that the species is at risk of going extinct in the country.
- The "**Status of Leopards in India, 2022**" report states that there were **13784** leopards in India in 2022 compared to 12,852 in 2018.
- According to the report, Central India and Eastern Ghats have the highest population of leopards (8,820), followed by the Western Ghats (3,596), and the Shivalik Hills and Gangetic Plains (1,109). The maximum population of leopards is found in Madhya Pradesh (3907) followed by Maharashtra (1985), and Karnataka (1879).

Snow leopard (Panthera uncia)

- Known as "Ghost of the Mountains", they can climb steep hills while their rear legs help them to leap over six times of their own length of the body. They have a long tail which helps them in balancing their body.
- The mountainous regions of twelve Asian countries—Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Tajikistan, and Uzbekistan—make up the habitat range of the snow leopard.
- Snow Leopards are found in Ladakh, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh**.**

Cheetah (Acinonyx jubatus)

- Cheetahs can walk with a long stride because of their long, slender limbs, solid

foot pads, and flexible spine. They have a body specially designed to enable them to achieve peak speeds. It can accelerate from 0 to 100 km/h in 3 seconds, making it the only cat without retractable claws.

- They have quirky eyesight which helps them to find prey in the daytime. The species prefer grasslands found in Asia and Africa.
- The Indian government officially declared the cheetah extinct in 1952. Earlier in 2022, the Government of India decided to introduce the Cheetah, the only large carnivore species that went extinct in Independent India.
- The re-introduction of the African Cheetahs was done to Kuno National Park and later Gandhi Sagar Wildlife Sanctuary. Both are situated in Madhya Pradesh. The landscape of these sanctuaries looks like Maasai Mara, a reserve known for its savanna wilderness in Africa

Black panthers (Panthera Pardus)

- Black panthers are "melanistic" members of the Panthera genus rather than being a separate species. Panthera also includes lions, tigers, leopards, jaguars, and snow leopards.
- Melanism is defined as the occurrence of individuals that are darker in pigmentation. There can be two reasons behind it: polymorphisms within species or consistent variation between closely related species. This melanism provides superior camouflage only in the densest and darkest forests.

Jaguar and Puma

- These big cats are not native to India and are mainly found in the region of South America.
- Jaguars are distinguished swimmers, they are the largest cat in South America.
- WWF has been tracking the populations of the Jaguars in the Napo-Putumayo Corridor, a forest spanning through Colombia, Ecuador, and Peru.
- Puma (Puma concolor), sometimes referred to as a mountain lion, cougar, or

panther, is the biggest of the "small cats."

- They can be found in woods, prairies, wetlands, and deserts, among other types of environments. These mountain lions prefer to live in isolation which does not mean that they do not communicate with each other.

INTERNATIONAL BIG CAT ALLIANCE (IBCA)

Recently, the Union cabinet approved the proposal of India to become a member country of the International Big Cat Alliance (IBCA) by signing and ratification of the Framework Agreement on the establishment of the International Big Cat Alliance (IBCA).

International Big Cat Alliance

- The Union cabinet in its meeting held on February 29 approved the establishment of International Big Cat Alliance with Headquarters in India with a one-time budgetary support of ₹150 crore for a period of five years from 2023-24 to 2027-28.
- So far four countries have become member of IBCA including India, Nicaragua, Eswatini and Somalia.
- All UN member countries are eligible for becoming the member of IBCA

Objectives:

- A multi-country, multi-agency coalition of big cat range and non-range countries, conservation partners, scientific organizations, business groups, and corporates.
- Aims to establish networks, synergies, and a centralized repository of best practices, personnel, and financial resources to strengthen big cat conservation efforts.
- Focused on arresting the decline of big cat populations and reversing the trend.

Mission:

- Foster mutual cooperation among countries for big cat conservation.
- Support knowledge sharing, capacity building, networking, advocacy, finance, and research.
- Integrate big cat conservation with sustainable development and climate

resilience.

Approach

Multipronged Strategy:

- Broad-based linkages in areas like knowledge sharing, capacity building, research, advocacy, and technical support.
- Education and awareness campaigns targeting youth and local communities.
- Use big cats as symbols for sustainable development and livelihood security.

Synergies and Partnerships:

- Collaborative platform for sharing gold-standard conservation practices.
- Access to centralized technical know-how and financial resources.
- Strengthen species-specific transnational initiatives on conservation.
- Align biodiversity policies with the UN Sustainable Development Goals (SDGs).

Sectoral Integration:

- Promote biodiversity integration into agriculture, forestry, tourism, and infrastructure.
- Support sustainable land-use practices, habitat restoration, and ecosystem-based conservation approaches.
- Contribute to climate change mitigation, food security, clean water, and poverty reduction.

Governance Structure:

- Assembly of Members, Standing Committee, and Secretariat.
- Governance framework modeled on the International Solar Alliance (ISA). Director General (DG) appointed by MoEFCC as Interim Head, until formal appointment during IBCA Assembly.

Halari donkeys are considered to be intelligent animals which work closely with human beings

Halari donkeys are **endangered**, with a population of **fewer than 500.**

- **Origin**: Native to the **Halar region of Gujarat**, India, particularly in the **Jamnagar and Dwarka districts.**
- **Physical characteristics:**
    - They are **white with black muzzles and hooves**.
    - They have a **strong build** and are **large in size**
    - Appearance: Typically white, larger, and more resilient than other donkey breeds.
- **Social behaviour:** Form **close bonds with humans** and often work closely with their owners.
- **Milk:** Its milk is known for its **sweetness and high lactose content.**
    - It is used to make **milk powder and cosmetic products**.
    - The milk powder can fetch **high value in the international market.**
- **Conservation:** The **National Bureau of Animal Genetic Resources and the Sahjeevan Trust** are involved in the breeding and conservation of Halari donkeys.

IUCN Status: Endangered.

- **Demand**: There is demand from other parts of the country to **set up Halari donkey dairies.**

DISTINCT FROM OTHERS



- Halari donkeys are shorter than horse but taller than other normally seen donkey breeds. They look almost like a small horse and have snow white fur. The breed has existed in the Halar region for more than 200 years.
- A litre of donkey milk can cost up to Rs 7,000, the costliest in the world.
- In ancient Egypt, Cleopatra bathed in donkey milk to preserve her legendary beauty and youth
- Donkey milk is rich in vitamins, polyunsaturated fatty acids and contains anti-ageing, antioxidant and regenerating compounds which keep the skin hydrated and prevent wrinkles
- In Ayurveda, it used to treat skin diseases like eczema and psoriasis
- Globally, many firms sell cosmetic products like soaps, skin gels, face wash made from donkey milk as niche products
- Bharwad and Rabari communities used these donkeys to carry luggage during migration

BREED NAMED AFTER A REGION: The donkey breed has derived its name from Jam Sri Halaji Jadeja, said to be the ninth generation grandfather of Jam Sri Rawalji Lakhaji Jadeja, the founder of the Halar region in Saurashtra. Halar was first established with this name by Jam Shri Rawalji Lakhaji, a Jadeja Rajput, in 1540.

10th Wild Ass Population Estimation (WAPE)

Key Findings:

The population of wild asses in Gujarat was estimated at **7,672** as per the **10th Wild Ass Population Estimation (WAPE)**.

- This marks a **26.14% increase** from the **6,082** recorded in the 2020 estimation.
- **Surendranagar district** had the highest number of wild asses at **2,705**, followed by **Kutch (1,993)**, **Patan (1,615)**, **Banaskantha (710)**, **Morbi (642)**, and **Ahmedabad (7)**.

Indian Wild Asses:

- A subspecies of the **Asian Wild Ass**, known scientifically as **Equus hemionus khur**.
- Identified by **distinctive white markings** on the anterior part of the rump, posterior part of the shoulder, and a **stripe down the back bordered by white**.
- **Distribution:** The **world's last population** of Indian Wild Asses is **restricted to the Rann of Kachchh** in Gujarat, India.
- **Habitat:** Inhabit **desert and grassland ecosystems**

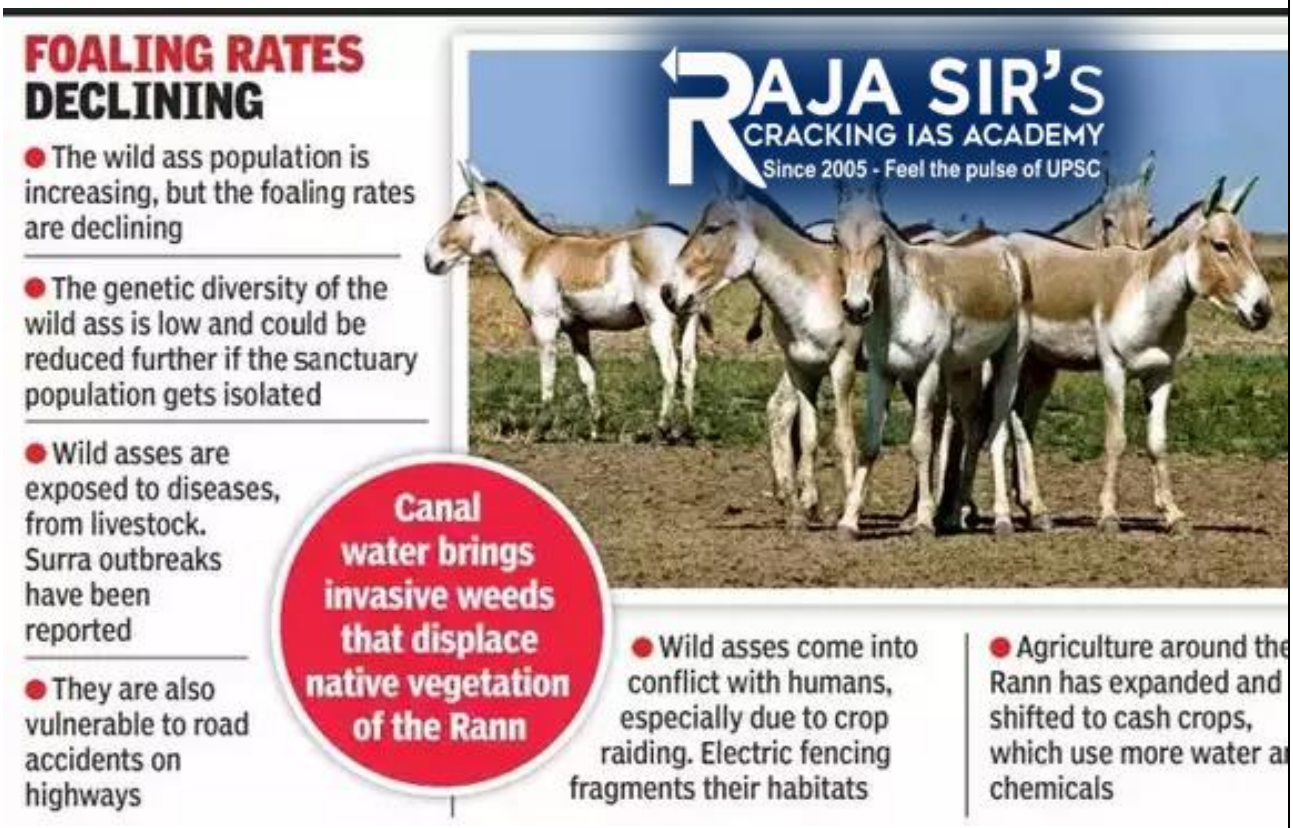
Conservation Status:

- **IUCN**: Listed as **Near Threatened**.
- **CITES**: Listed under **Appendix II**.
- **Wildlife Protection Act (1972)**: Classified under **Schedule-I**.
- **Worldwide Species:** There are **three species** of wild ass:
- **One in Africa: Equus africanus**
- **Two in Asia**: **Equus hemionus** and **E. kiangs**.

Wild Ass Sanctuary:

- Located in the **Little Rann of Kutch**, Gujarat.
- The only place where the **Indian Wild Ass**, locally called **Khacchar**, is found.

- The sanctuary is home to **Rabari and Bharwad tribes**.



- **Topology**:
  - It can be considered a large **ecotone**, a transitional area between marine and terrestrial ecosystems.
  - It is a continuum of a **dry area of dark silt** with **salt encrustation.**
  - It is dotted with about **74 elevated plateaus** or **islands**, locally called '**bets**'.
  - During the **monsoon**, **large parts are flooded** to depths of up to 2m.
- **Flora:**
  - It is **full of dry thorny scrub,** and there are **no large trees except on the fringes** and bets.
  - Some of the plants and trees that are found in this sanctuary are **Morad, Unt morad**, Theg, Dolari, Khijdo, Kerdo, Mithi jar, Kheri pilu, Akado, etc.

- **Fauna**:
    - Besides Indian Wild Ass, the other mammals found here include **Blackbuck, Nilgai, Bluebull,** Hare, Wolf, Foxes, **Desert C**at, Indian fox, **Jackal**, **Hyena**, Wild boar, etc.
    - There is rich birdlife, including the **Houbara bustard**, **Sandgrouse**, **Pale harrier, Black-shouldered kite,** Pelican, etc.

Nilgiri tahr

In a significant breakthrough for conservation efforts, a newly colonised habitat of Nilgiri Tahr has been discovered in Pasumalai.

- Surrounded by shola forests and abandoned coffee estates, the area has potential grassland cover atop hillocks and cliffs, providing the Tahr with necessary escape terrains – critical for their survival.
- The Nilgiri tahr (Nilgiritragus hylocrius) is a unique species of mountain ungulate endemic to the Nilgiri Hills and the southern portion of the Western and Eastern Ghats in the states of Tamil Nadu and Kerala in southern India.

Physical Description

- Appearance: Nilgiri tahrs are stocky goats with short, coarse fur and a bristly mane. Males are larger and darker than females, with both sexes having curved horns.
- They develop a light grey area on their backs, earning them the nickname "saddlebacks".

Habitat and Distribution

- Location: The Nilgiri tahr inhabits the open montane grassland habitats of the

South Western Ghats montane rain forests ecoregion, at elevations ranging from 1,200 to 2,600 meters .

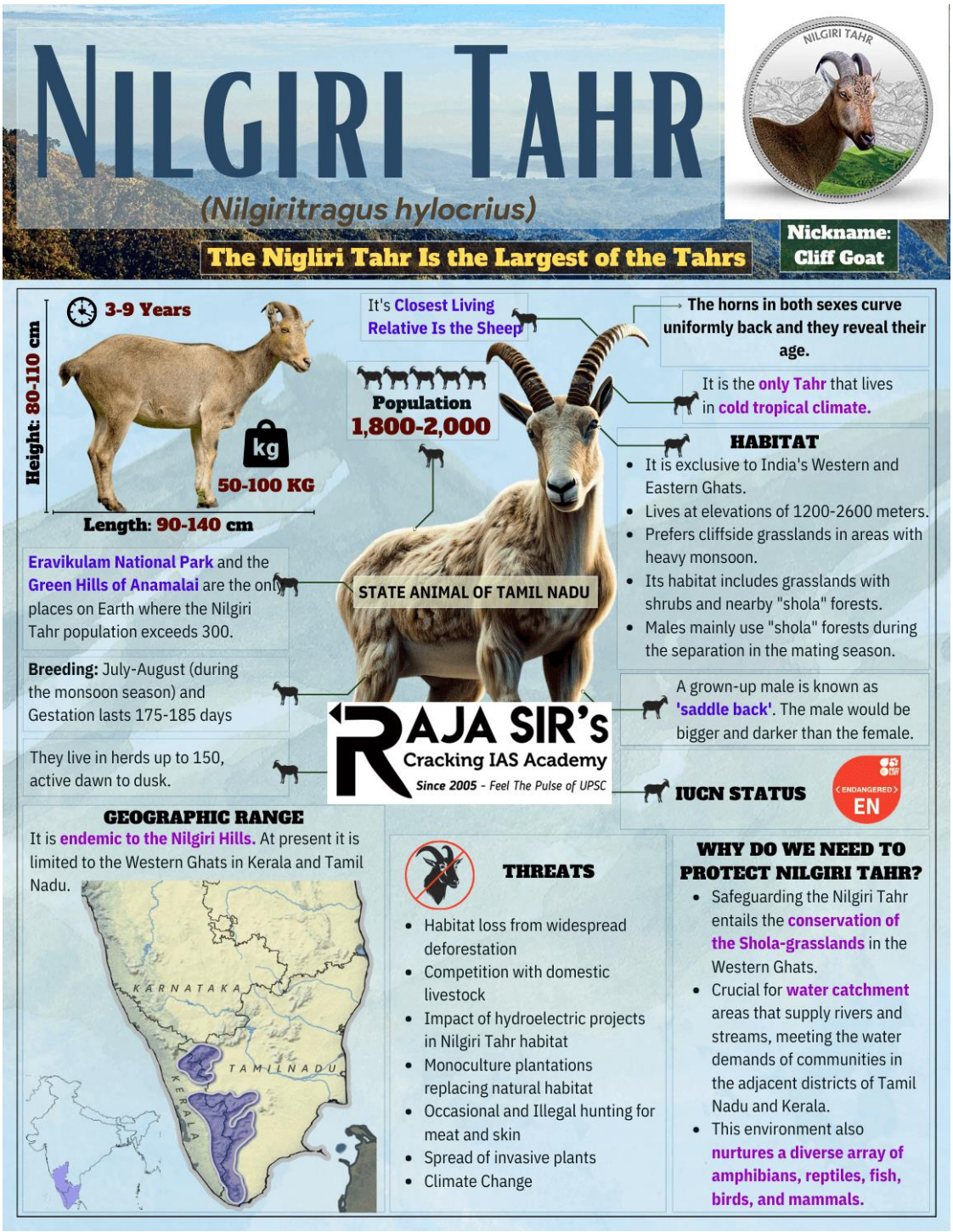
Range:

- The Nilgiri tahr can be found only in India.
- Historically, they were found along the entire stretch of the Western Ghats, but now they are confined to small fragmented pockets.
- Currently, the Nilgiri tahr distribution is along a narrow stretch of 400 km in the Western Ghats between Nilgiris in the north and Kanyakumari hills in the south of the region.
- Though there are smaller populations found in the Palani hills, Srivilliputtur, and the Meghamalai and Agasthiyar ranges, only two well-protected, large populations are documented — one from the Nilgiris and the other from the Anamalais, including the high ranges of Kerala.
- The Eravikulam National Park in Anamalai hills, Kerala, is home to the largest population of the Nilgiri tahr, with more than 700 individuals.
- Diet: Nilgiri tahrs are primarily grazers, feeding on a variety of grasses, herbs, and shrubs.
- Behavior: They are well-adapted to their rugged, mountainous habitat, with cloven hooves that help them climb rocks and steep slopes.

Conservation Status

- Threats: The Nilgiri tahr faces several threats, including habitat loss due to deforestation, competition with domestic livestock, hydroelectric projects, and monoculture plantations. Occasional hunting for their meat and skin also poses a threat.
- **Species is listed as Endangered in the IUCN Red List of Threatened Species** and is protected under Schedule I of the Wildlife (Protection) Act of India, 1972.
- The Nilgiri tahr is the only mountain ungulate in southern India amongst the 12

species present in India. It is also the state animal of Tamil Nadu.



Battery Lifecycles and Environmental Implications

The demand for batteries continues to grow across various sectors, the environmental implications of their life cycles have become a critical concern. Traditionally, improving battery lifespan and recycling had much of the focus.

- Today, an equally promising solution *is emerging—battery rejuvenation.* This innovative approach not only extends battery life but also contributes to the circular economy, reducing environmental damage and conserving resources.
- ***Battery rejuvenation,*** *particularly through the innovative Electro-Chemical Battery Enhancement Process (EBEP) for lead-acid batteries, offers a sustainable solution to extend battery life and reduce environmental impact by effectively addressing sulphation."*
- The industry has been revolutionised with a breakthrough in the battery rejuvenation process – **Electro-Chemical Battery Enhancement Process (EBEP).** This process is specifically designed for lead-acid batteries.
- This process restores batteries often considered at the end of their lifecycle, **bringing them back to near-full capacity in a cost-effective and environmentally** responsible manner. By addressing the root cause of most battery failures—sulphation—this technology holds the potential to revolutionise how battery systems are managed and sustained **Rejuvenation: Extending Battery Lifespan**
- **Battery rejuvenation goes far beyond repair**; it is a systematic process aimed at recovering lost capacity and performance. For lead-acid batteries, **sulphation is often the culprit of their demise:** lead sulphate crystals accumulate on battery plates, blocking electrochemical reactions necessary to store and release energy efficiently. Eventually, this buildup considerably decreases their capacity to hold a charge over time.
- The **EBEP process is specifically designed** to dissolve these hard sulphate crystals and restore the battery's plates, thereby reviving its voltage, internal

resistance, and overall performance. It works on batteries across all categories—AGM, VRLA, GEL, or flooded—and can even bring back to life those that have been discarded as non-functional.

This restoration process involves:

1. **Screening and Diagnostics:** A rigorous evaluation to identify batteries suitable for rejuvenation, ensuring that only those with sound plates are restored.
2. **Hydration and Restoration:** Batteries are hydrated and then subjected to a charging process using a patented waveform current that dissolves sulphate deposits, restoring the battery's health.
3. **Final Testing:** Once restored, the batteries undergo a quality control check to ensure they meet all operational standards before being reintroduced into service.

- This comprehensive approach not only revives individual batteries but also significantly extends their lifespan—by at least a year or more—preventing premature replacements and reducing the environmental impact of frequent battery disposal

Economic and Environmental Benefits with Circular Economy

- Rejuvenating batteries offer numerous financial and environmental advantages. From an economic standpoint, rejuvenation is far less expensive than replacement, helping companies and consumers alike save capital expenditure while still maintaining reliable performance from their battery systems.
- **Reducing demand for raw materials such as lead and lithium** (which are both costly to mine and harmful to the environment) through delaying new purchases has an additional environmental benefit: less raw material extraction.
- **Environmentally speaking**, battery rejuvenation provides a more sustainable alternative to disposal. Lead-acid batteries present major environmental risks when they're improperly discarded – harmful chemicals leach into soil and groundwater, and recycling processes release greenhouse gases.

- **Rejuvenation extends the** battery's operational lifespan, reducing the frequency of disposals, thus decreasing both toxic waste generation as well as emissions caused by recycling processes.
- **Rejuvenated batteries fit easily within the larger framework** of the circular economy, an economic model designed to maximise resource conservation and limit waste by prolonging product and material lifespans and recycling them back into use rather than going straight from usage to disposal.
- By recycling rejuvenated batteries back into use instead, less strain is placed on our environment and natural resources.

Aligning with Global Sustainability Goals

- As the global push for sustainability intensifies, rejuvenation technologies like **EBEP provide a practical solution for industries striving** to reduce their environmental footprints. The lead-acid battery market, in particular, can benefit immensely from such innovations, as the vast majority of batteries fail prematurely **due to sulphation—a problem that EBEP directly addresses.**
- The **rejuvenation process aligns with global regulatory trends** that emphasise responsible battery management. In regions like the European Union, where strict recycling standards are enforced, rejuvenation offers an additional layer of sustainability by pre-emptively extending the useful life of batteries before they reach the recycling stage. This complements efforts to reduce hazardous waste while enhancing resource efficiency.
- Furthermore, rejuvenation supports the broader transition to cleaner energy systems. By rejuvenating batteries, companies can ensure systems remain operational for longer, thus enhancing the overall stability and efficiency of renewable energy grids.

Future of Battery Technology: Restoration as the Norm

- As industries innovate, battery rejuvenation will undoubtedly increase. While

research into cutting-edge battery technologies – like solid state and lithium-ion alternatives – remains important, rejuvenation offers an immediate scalable solution for managing existing battery systems. Instead of solely relying on new chemistries, industries can optimise current technologies through rejuvenation processes like EBEP.

In the end, battery rejuvenation stands to become an essential component of sustainable energy management. By prolonging lead-acid battery lifespan and mitigating environmental harm while fitting into circular economies such as **EBEP's circular economy model,** rejuvenation technologies such as this offer an immediate solution to meet rising global energy storage demands. As economies transition toward more responsible practices, adopting rejuvenation battery technologies such as these will be essential in driving both economic efficiency and environmental stewardship.

India's potent black carbon emissions from kerosene lamps make up 10% of total residential emissions

- India's reliance on kerosene-based lamps as a secondary lighting source leads to **release of 12.5 gigagrammes (Gg) per year of a potent climate pollutant called black** carbon. This accounts for about 10 per cent of the total residential black carbon emissions, which includes cooking, heating and lighting..
- Roughly 30 per cent of rural households rely on kerosene lighting during power cuts as a secondary light source, with the figure reaching as high as 70 per cent in the eastern regions .

Black Carbon Emissions in India

- India releases **12.5** gigagrams **(Gg) of black carbon annually** due to kerosene-based lighting.
- This **accounts** for **10% of total residential black carbon** emissions (from

cooking, heating, and lighting).

Rural Dependency on Kerosene Lamps:

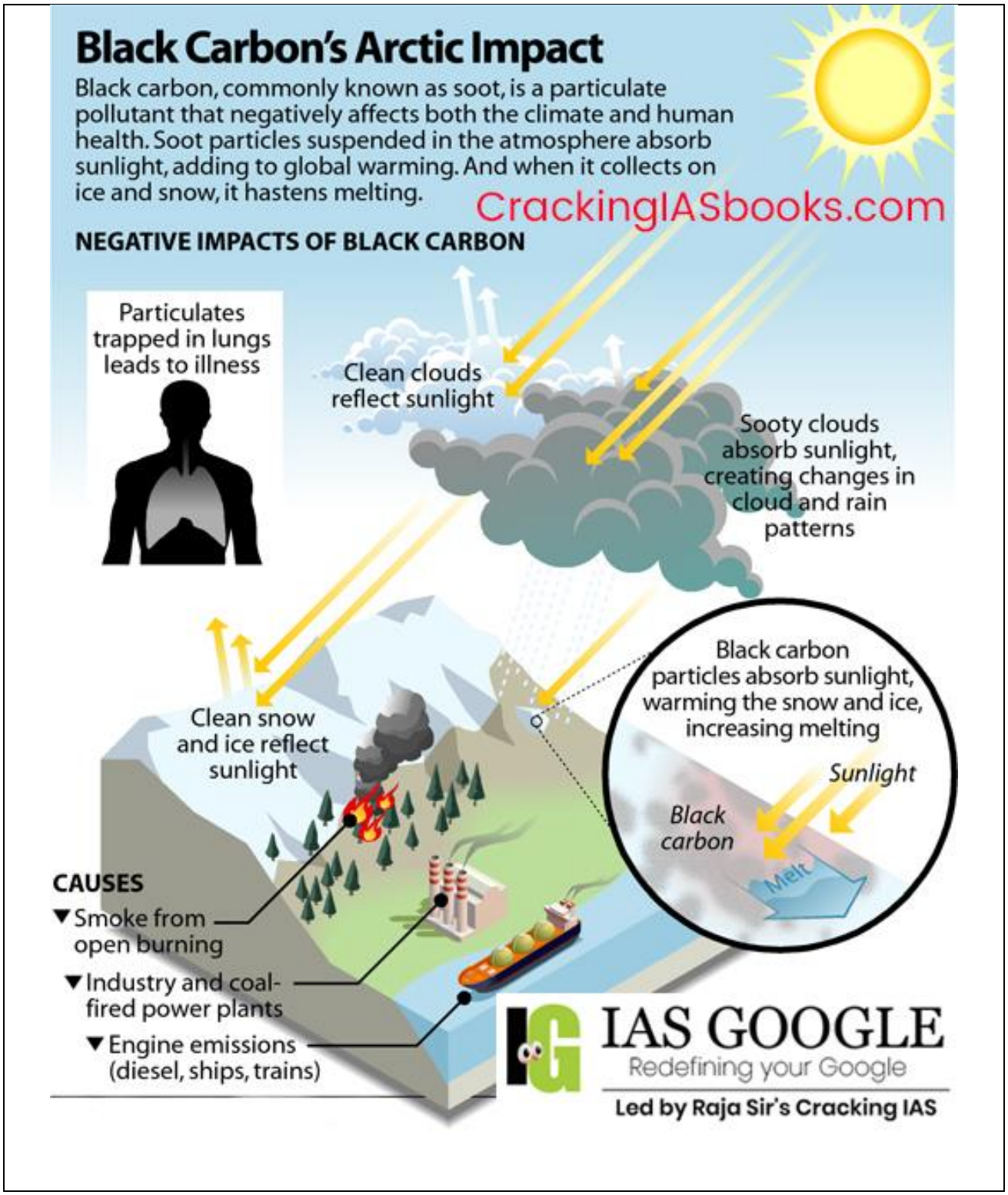
- **30% of rural** households use kerosene lighting during power cuts.
- The figure reaches as high as **70% in eastern regions** of India.

Regional Emission Contributions:

- **Eastern India** contributes **60% (7.5 Gg)** of black carbon emissions from secondary lighting sources.
- **Bihar** alone emits over **3 Gg per year** from kerosene lighting

Key Government Initiatives to Reduce Black Carbon Emissions in India

- **Saubhagya Scheme:** Helped reduce kerosene consumption by expanding access to electricity.
- **Pradhan Mantri Ujjwala Yojana:** LPG connections to women of Below Poverty Line families, helped to reduce Black carbon emission.
- **SATAT Scheme:** Sustainable Alternative Towards Affordable Transportation (SATAT), has been launched to set up 5000 Compressed Biogas (CBG) production plants and make CBG available in the market for use.
- **FAME Scheme**: Faster Adoption and Manufacturing of Electric Vehicles (FAME) phase-2 scheme
- **National Clean Air Programme:** Under the Programme, the government has revised its target to achieve a **40% reduction in particulate matter concentrations** in the cities covered by the initiative by **2026**, exceeding the previous goal of a **20-30%** reduction by 2024.


Black Carbon's Arctic Impact
Black carbon, commonly known as soot, is a particulate pollutant that negatively affects both the climate and human health. Soot particles suspended in the atmosphere absorb sunlight, adding to global warming. And when it collects on ice and snow, it hastens melting.
CrackingIASbooks.com
NEGATIVE IMPACTS OF BLACK CARBON
Particulates trapped in lungs leads to illness
Clean clouds reflect sunlight
Sooty clouds absorb sunlight, creating changes in cloud and rain patterns
Clean snow and ice reflect sunlight
Black carbon particles absorb sunlight, warming the snow and ice, increasing melting
Sunlight
Black carbon
Melt
CAUSES
Smoke from open burning
Industry and coal-fired power plants
Engine emissions (diesel, ships, trains)
IAS GOOGLE
Redefining your Google
Led by Raja Sir's Cracking IAS

Black Carbon

- Black carbon is a **short-lived climate pollutant,** less than a week, but is **highly potent.**
- It contributes to **global warming and air pollution**.
- **Sources:** Black carbon is emitted from a **variety of sources**, including: **Vehicles, Non-road mobile machinery, Ships**, **Coal or wood burning stoves**, Forest fires, Agricultural waste burning.
- Though **kerosene has a lower burn rate than biomass,** the **emissions factors** of the former are **higher than the latter** .

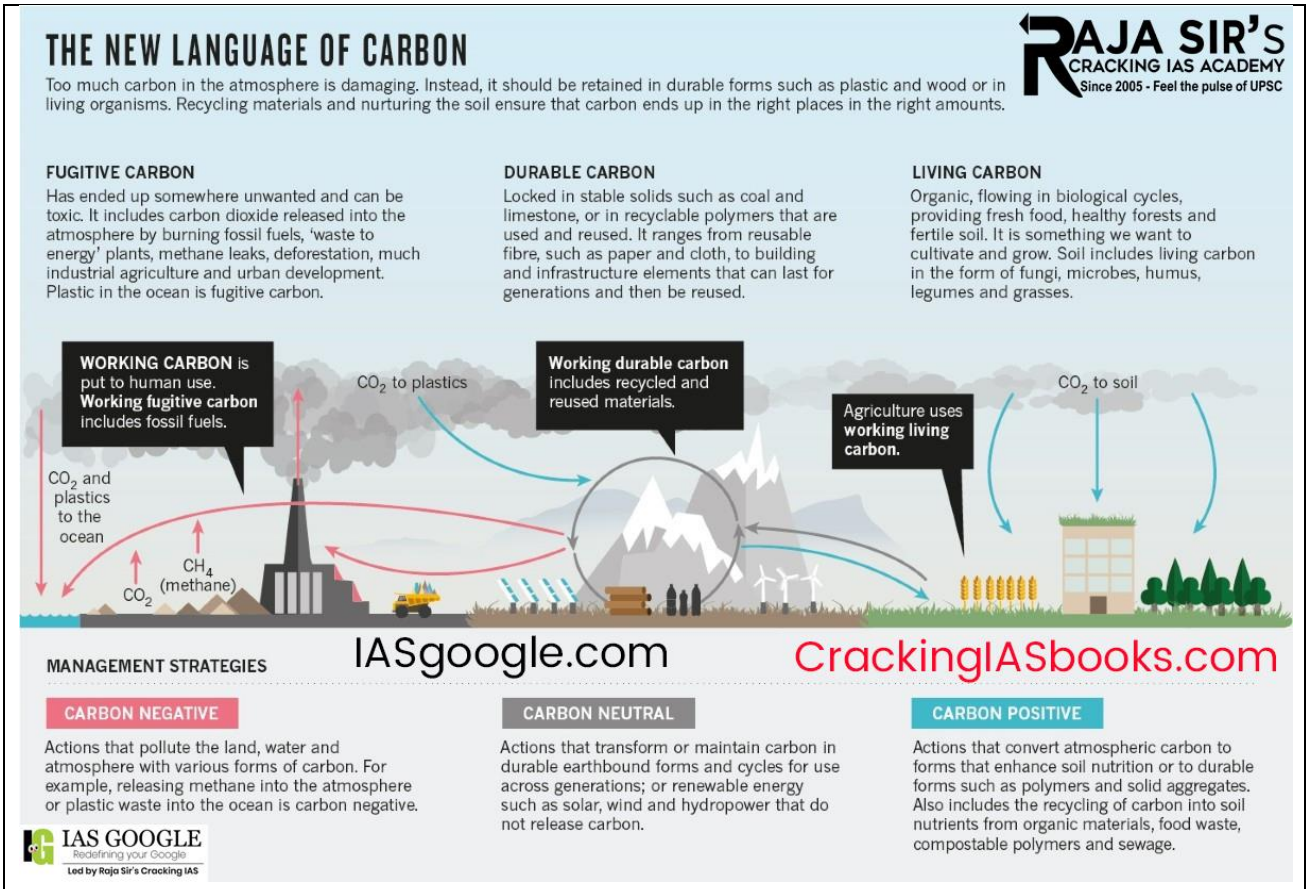
Impacts of Black Carbon

Climate change

- Black carbon is a **major contributor** to climate change, **absorbing solar radiation** and **releasing heat into the atmosphere.**
- It's the **second most important contributor to global warmin**g, after **carbon dioxide.**
- **Global warming potential**: Black carbon's 20-year potential is **700-4,000** times that of CO2
- Black carbon emissions can also **accelerate the melting of snow and ice**, which can increase the impacts of global warming in the Arctic.

Air pollution

- Black carbon is a **component of particulate matter (PM)**, which is the most **harmful air pollutant** to health.
- Black carbon particles are **very fine** and can **enter the bloodstream** and reach other organs.
- **PM2.5**, a type of **fine particulate matter**, can cause **damage to the lungs, heart,** and **brain**.



Waste Management and Waste to Energy

Traditional to Modern Waste Management: Key Insights

The Industrial Revolution (mid-18th century) marked the beginning of large-scale waste generation due to industrial production.

- Traditional waste management involved direct disposal into landfills, oceans, or remote areas, which is now unsustainable due to environmental impacts.
- **Definition of Waste:** According to the UN Statistical Division, waste refers to materials that are no longer useful for production, transformation, or consumptio

and are meant for disposal.

- **Global Waste Generation:** Currently, global waste production is 1.3 billion tonnes annually and is projected to rise to 2.2 billion tonnes by 2025, making waste management a critical global concern
- **Big cities are yet** to clear any land in half of their legacy landfill sites, with only 38% of the total dumped waste being remediated so far. It underscores the need for more effective strategies and resources to overcome the obstacles in waste remediation, and draws attention to the significance of waste-to-energy technologies.
- While **waste remediation involves processes that clean up and rehabilitate** contaminated land, waste-to-energy technologies convert non-recyclable waste materials into usable forms of energy, such as electricity or heat.

Waste-to-Energy Technologies:

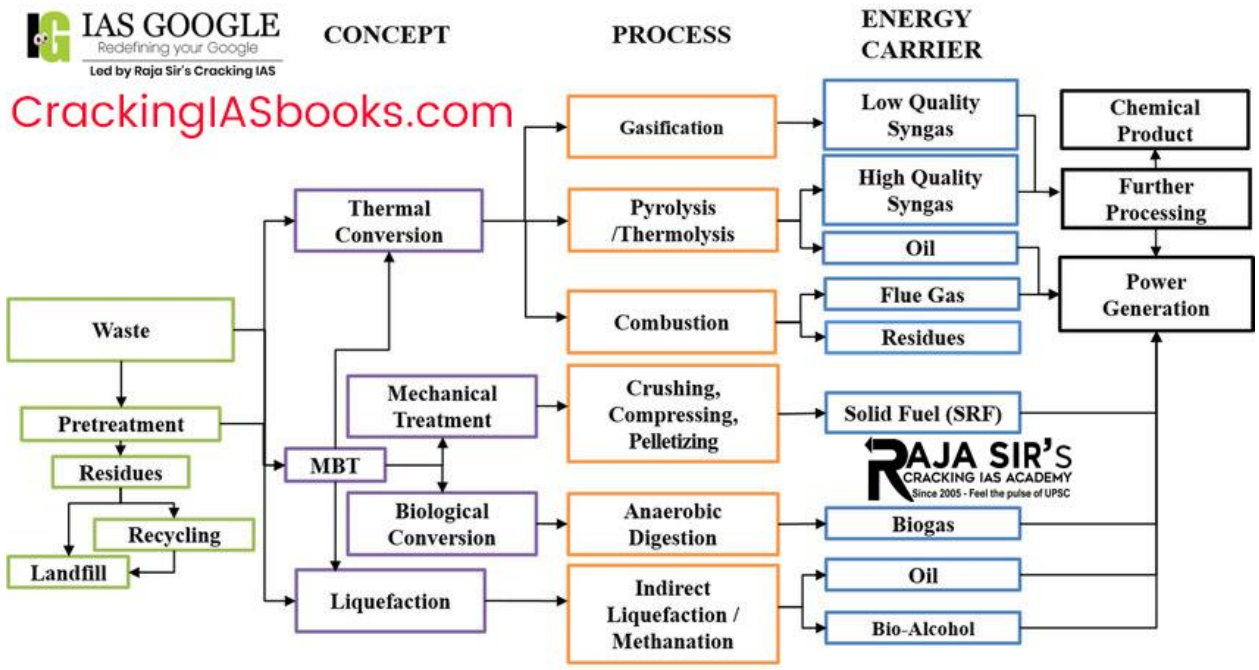
- Waste-to-energy technologies serve two purposes:

(a) managing large-scale waste generated from household, municipal and industrial activities and,

(b) meeting the rising energy demands. Simply put, 'waste-to-energy refers to a series of technologies that convert non-recyclable waste into some usable forms of energy'.

- They **align with UN SDG 7** (Affordable and Clean Energy) and **SDG 11 (**Sustainable Cities and Communities) and promote the circular economy.





Conversion Processes:

- **Thermochemical Technologies**: Include incineration, pyrolysis, and gasification for energy recovery from waste.
- **Incineration:** Common method for treating heterogeneous waste by burning it at high temperatures in a specific kind of furnace called incinerators. This technique is appropriate for wastes with high caloric value as well as for non-hazardous municipal waste.
- **Pyrolysis:** Breaks down waste without oxygen to produce fuels (char, pyrolysis oil, syngas). It is an old technology that was used to produce charcoal from wood.
- **Gasification**: Decomposes carbon-rich waste to produce syngas. Pyrolysis and gasification are better suited for homogenous waste types.
- **Biochemical Technologies**: Use biological processes for organic waste (kitchen/garden).
- **Anaerobic Digestion**: is appropriate for organic waste where micro-organisms break down material in the absence of oxygen. One of the end-products is biogas.

This method can occur naturally or can be engineered in bio-digesters and sanitary landfills.

- **Landfilling**: Composting and landfilling involve burying of waste accompanied by deploying landfill gas recovery systems. Although landfilling is less expensive, it is environmentally detrimental due to the release of toxic and obnoxious gases.

Waste-to-Energy in India:

- The first plant was established in Delhi in 1987. As of 2022, India has 12 operational plants.
- Despite policies from the Ministry of New and Renewable Energy, power generation from waste remains minimal, **at just 554 MW (0.1% of total energy generated**).
- There is a perception that waste-to-energy plants have failed in India. Commonly cited reasons are administrative delays in getting approval as well local opposition This happened in the case of the Bandhwari plant proposed in Gurugram in Haryana in 2021. Other reasons include extremely heterogeneous, unsegregated and poor quality of waste which requires excessive pre-treatment and increases the fuel requirement making the entire process expensive and unviable.
- Global best practices (e.g., Denmark's hedonistic sustainability) could be adapted in India.

Darjeeling's Padmaja Naidu Himalayan Zoological Park has been selected for the prestigious (WAZA) Conservation Award 2024.

The Red Panda Program of Darjeeling's Padmaja Naidu Himalayan Zoological Park has been selected as a finalist for the prestigious **World Association of Zoos and Aquariums (WAZA) Conservation Award 2024.**

Why Selected?

- Padmaja Naidu Himalayan Zoological Park has undertaken several habitat

restoration initiatives between 2022 and 2024 nine captive-bred red pandas (seven females and two males) were released into Singalila National Park in West Bengal.

Padmaja Naidu Himalayan Zoological Park

- **Location:** Darjeeling, West Bengal, India.
- **Established**: Founded in 1958, the zoo is situated at an altitude of 7,000 feet.
- **Specialization**: Breeding animals adapted to alpine conditions

Notable Breeding Programs:

- Red Pandas
- Snow Leopards
- Himalayan Wolves
- **Global Affiliation:** The zoo is a member of the **World Association of Zoos and Aquariums (WAZA)**, demonstrating its commitment to global conservation standards.
- **Legacy**: Named after **Padmaja Naidu,** the daughter of **Sarojini Naidu,** the zoo honors her contributions to Indian society.

Red Panda

- It is a small **endangered mammal.**
- Red pandas have dense reddish-brown fur, a black belly and legs, white-lined ears, a mostly white muzzle, and a ringed tail
- **Scientific name:** Ailurus fulgens
- It is also known as the **lesser panda.**

Conservation status: They are classified as

- **Endangered (IUCN 3.1)**
- **listed in** C**ITES Appendix I.**
- **Listed under Schedule I of the Indian Wildlife (Protection) Act, 1972**
- It is th**e state animal** of sikkim.

- It is found in India, Nepal, Bhutan, and the northern mountains of Myanmar and southern Chin
- In India, it is found in Sikkim, West Bengal, Meghalaya and Arunachal Pradesh
- **Diet**: Herbivores
- In India, two subspecies are found
- Himalayan red panda (Ailurus fulgens) ,Chinese red panda (Ailurus styani)

World Association of Zoos and Aquariums (WAZA)

- **Global Alliance for Conservation:** WAZA is a worldwide organization that brings together zoos, aquariums, and wildlife experts to protect animals and their habitats.
- **Promoting Cooperation:** WAZA encourages collaboration between zoos, aquariums, wildlife experts, universities, and regional associations to support animal care and conservation.
- **Focus on Conservation:** The organization helps manage species conservation and improve the care of animals in captivity.
- **Ensuring High Standards:** WAZA promotes the highest care and management standards among its member zoos and aquariums.

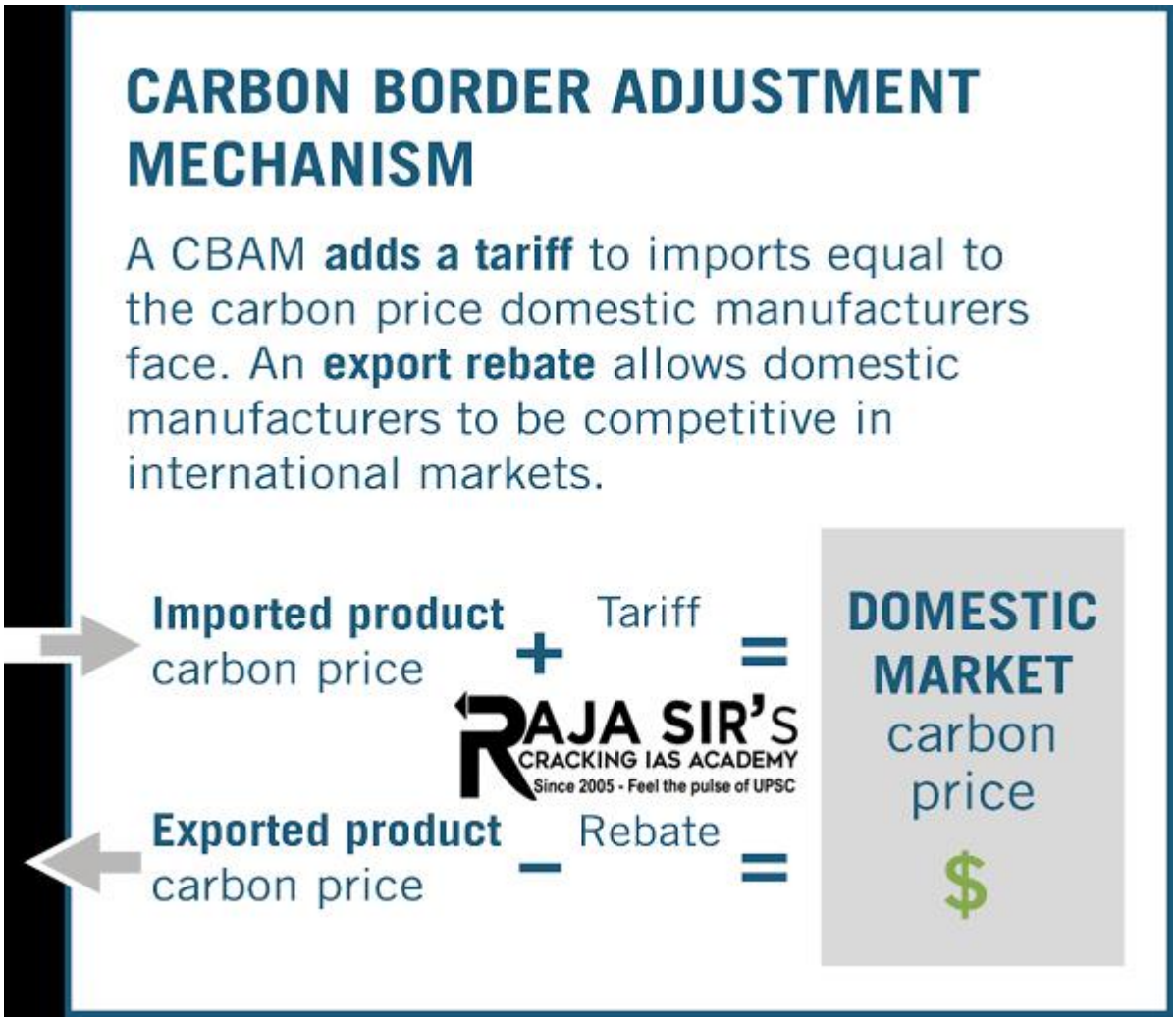
Carbon Border Adjustment Mechanism (CBAM) and Deforestation rules are'unilateral' and 'arbitrary'

- Finance Minister called out the European Union's initiatives such as the Carbon Border Adjustment Mechanism (CBAM) and Deforestation rules as 'unilateral' and 'arbitrary.
- She highlighted that the European Union's decision to impose a carbon tax on Indian products such as steel and cement is aimed at hurting Indian industries.
- The levy is a pretence to convert the EU's own "dirty" steel into green at another's cost.

- India has decided to retaliate against EU steel tariffs, which have led to trade losses of $4.41 billion from 2018 to 2023.

Carbon Border Adjustment Mechanism (CBAM)

- It is part of the EU's **"Fit for 55 in 2030 package"** .
- It aims **to achieve the target of a 55% reduction** in greenhouse gas (GHG) emissions by 2030, compared to 1990 levels.



Fit for 55 in 2030 package" .

- The overall goal of the European Union (EU) in its efforts to control climate

change is to achieve climate neutrality by 2050.

- To achieve this goal, the Climate Law has been enacted to ensure that all EU policies aim at climate neutrality.
- This law was implemented in July 2021 through the 'Fit for 55 Package'. The number 55 symbolizes the target of reducing GHG at least 55% by 2030 compared to 1990 levels.
- This package includes legal tools to implement this goal in the fields of climate, energy, land use, traffic and taxes .

Arguments favouring CBAM

- **Promotes decarbonisation globally:** The CBAM provides an incentive for countries to reduce their carbon emissions. For example, if a country wants to export steel to the EU, the policy imposes an extra cost if the steel is produced using carbon-intensive processes. This encourages manufacturers to adopt cleaner, less carbon-intensive methods of production.
- **Prevents carbon leakage:** CBAM prevents "carbon leakage", the phenomenon where companies transfer their operations to countries with less stringent emissions regulations. For example, if a cement manufacturer moves from the EU to a country with fewer regulations, it might increase emissions. The CBAM discourages this by imposing a border tax on carbon-intensive imported goods.
- **Level playing field for businesses:** The CBAM helps create a level playing field between domestic businesses in the EU and foreign companies. For instance, a European aluminium producer that follows strict emission rules would be at a disadvantage if competitors from other countries with less stringent rules could sell their products in the EU without any penalties. CBAM ensures foreign producers are also subject to a carbon cost, ensuring fairness.
- **Revenue generation for climate initiatives:** CBAM will generate revenue through border taxes on carbon-intensive goods. This can be used to fund climate initiatives or capacity-building measures in developing countries or Least

Developed Countries (LDCs) if the EU decides to allocate it in this manner.

- **Stimulates innovation in clean technologies:** CBAM can stimulate innovation in clean technologies. Faced with a potential CBAM charge, industries may be motivated to invest in new technologies to reduce their carbon emissions. For instance, the fertiliser industry might accelerate research into low-carbon or carbon-free production processes to lower their CBAM costs.
- **Encourages other countries to adopt carbon pricing:** CBAM may encourage other countries to implement their own carbon pricing mechanisms. The aim is to avoid CBAM charges, as goods from countries with equivalent carbon pricing mechanisms are exempt. This could potentially lead to the broad adoption of carbon pricing, further facilitating global decarbonisation.

Arguments against CBAM

- **Discrimination against developing countries:** One key concern about the CBAM is that it could unfairly disadvantage developing countries and least developed countries (LDCs), which might lack the capacity to meet its requirements. For example, a steel producer in a developing country might not have the resources to reduce its carbon emissions to EU standards, which could put it at a disadvantage in the international market.
- **Contradiction with multilateral agreements:** CBAM may contradict existing multilateral climate and trade agreements, including the Paris Agreement and World Trade Organization (WTO) principles. For instance, the Paris Agreement calls for 'Common but Differentiated Responsibilities', allowing countries at different stages of development to set their own emissions targets. CBAM doesn't offer such differentiation, possibly violating this principle.
- **Potential for trade disputes:** CBAM could spark trade disputes, as it appears to contravene the WTO's non-discrimination principles. Countries could challenge the CBAM at the WTO, arguing it discriminates against 'like' goods based on their carbon content.

- **Complicated implementation:** The implementation of CBAM could be complex and challenging, particularly for countries with less administrative and institutional capability. For example, the need to establish rules of origin to account for carbon content for every part and component at the point of origin would be a formidable task for countries involved in complex global value chains.
- **Possibility of retaliatory measures:** There's a risk that countries affected by the CBAM might respond with retaliatory measures, such as their own carbon border taxes. This could escalate into a trade war, complicating international trade and potentially harming global economic growth.
- **Questionable justification:** Some critics question the basic premise of the CBAM, arguing there's insufficient evidence of significant carbon leakage to justify it. Critics contend that other factors, such as labor costs, regulatory transparency, and stability, often carry more weight in companies' location decisions than environmental regulations.

CBAM affect other countries' carbon pricing mechanisms

- **Undermining other carbon pricing mechanisms**: The CBAM can undermine other countries' carbon pricing mechanisms by setting a global price standard. As the CBAM only recognizes the EU Emission Trading System and equivalent mechanisms, countries using different forms of climate regulation may find their efforts devalued.
- **Imposing additional burden on developing countries**: Many developing countries lack the institutional capacity to set up a comprehensive accounting and reporting system for carbon emissions, a requirement under the CBAM. This imposes an additional burden on these nations and could potentially hamper their own climate action initiatives.
- **Questioning "Equivalence":** The concept of "equivalence" becomes tricky with the introduction of CBAM. Countries that have opted for different forms of climate regulation under their Nationally Determined Contributions (NDCs) may

struggle to ensure "equivalence" in terms of carbon pricing, potentially leading to an uneven playing field. This will in turn create trade inequities.

- **The challenge of "Extraterritorial Effects":** The CBAM raises critical questions regarding extraterritorial effects, given that it implicitly assumes or enforces compliance with EU norms on countries outside its jurisdiction. This could lead to tensions in international climate agreements and trade relations.

India is worried about the CBAM

- **Potential impact on key industries:** India, being a major global producer of steel and aluminium, is concerned about the impact of CBAM on these industries. The CBAM might put Indian producers at a disadvantage as they may find it more challenging to meet the EU's carbon standards.
- **A barrier to free trade:** India is currently in the process of negotiating a Free Trade Agreement (FTA) with the EU. There's a worry that while tariffs are being eliminated under the FTA, the CBAM could act as a non-tariff barrier, impacting the expected benefits of the agreement.
- **Transparency concerns:** India also raises concerns over the transparency of the carbon tax calculation under CBAM. The EU's one-size-fits-all approach may not take into account factors like per capita pollution, forest cover, and sustainable living, which are relevant in the Indian context.
- **Risk of retaliation and trade disputes:** Lastly, India, like many other countries, might consider retaliatory measures against the EU's CBAM. This could lead to trade disputes and potentially harm relations between India and the EU.
- **How is India planning to tackle CBAM?**
- **Conducting sectoral analysis:** The Indian government plans to undertake a sector-by-sector analysis to assess the impact of the CBAM on its industries. This detailed examination will aid in determining targeted action plans for each potentially affected sector.
- **Engaging relevant departments:** India is roping in multiple departments, such

as the Climate Change Finance Unit of the Department of Economic Affairs and the Steel Ministry, to collaboratively analyze the potential issues and formulate suitable solutions.

- **Incorporating CBAM into FTA Negotiations:** India is considering including CBAM discussions in the ongoing negotiations for a Free Trade Agreement with the EU. This approach aims to ensure that while tariffs are being eliminated under the FTA, the CBAM doesn't pose additional barriers to trade.
- **Demanding transparency:** India is keen to ensure that the EU provides transparency in how the carbon tax under the CBAM is calculated for different sectors. It insists that factors like per capita pollution, forest cover, and sustainable living practices should also be considered in the assessment.
- **Building alliances with developing nations:** In its strategy to tackle the CBAM, India is also planning to join forces with other developing nations, such as South Africa. This collective approach will help present a united front in discussions and negotiations with the EU, strengthening their stance and addressing common concerns effectively.

Implications of CBAM

- **Adverse Impact:** India is among the top 8 countries that will be adversely affected by the CBAM.
- Few of its core sectors such as steel will be greatly affected by the CBAM.
- **India exports 27%** of its iron, steel, and aluminium products worth $8.2 billion to the EU
- **Costlier Export:** The EU carbon tariffs could raise costs of Indian exports by 20% to 35%, particularly affecting iron, steel, and aluminium.
- **Complex process** : Indian exporters are concerned about the burdensome requirements of the CBAM, which involve submitting nearly **1,000 data points** regarding production methods.
- **Other regulations**: **EU's Deforestation Regulation**, could disrupt supply chains

and increase transition costs for compliant countries.

- The EU has proposed delaying the implementation of the Deforestation Regulation by one year due to pushback from several countries.

India's Commitment to Green Transition

- India is advancing its green transition through initiatives like the **Production Linked Incentive (PLI)** scheme for emerging sectors, including green energy.
- The government is committed to meeting its **2070 climate targets**, with interim milestones set for 2030.
- There are ongoing efforts to explore new **blended finance** options to support funding for green projects, fostering a conducive environment for sustainable investments.

Road ahead

- **Adopting uniform carbon pricing:** To avoid the complexities related to the CBAM, countries should work towards a global agreement on uniform carbon pricing. This will not only create a level playing field but also avoid potential disputes.
- **Capacity building in developing countries:** Given the difficulties in accounting and reporting the carbon emissions of production processes, efforts should be made at a global level to build the institutional capabilities of developing nations and least-developed countries.
- **Balancing trade and climate action:** There is a need for better coordination and balance between trade policies and climate action commitments. Policies need to be designed such that they do not contradict but complement each other.
- **Revisiting multilateral agreements:** Existing multilateral agreements on trade and climate change may need to be revisited and potentially revised to align them with new climate realities and mechanisms like the CBAM.
- **Establishing clear rules of origin:** If carbon border adjustments become widespread, there will be a need for clear, transparent, and fair rules of origin to

account for the carbon content of goods, especially in complex global value chains.

Living Planet Report of the World Wildlife Fund's (WWF)

The global wildlife populations have declined by 73 per cent in the last 50 years per biennial the **Living Planet Report** of the World Wildlife Fund's (WWF).

This decline, observed between 1970 and 2020, is a clear indication that our planet's biodiversity is under immense threat, with severe consequences for ecosystems and human survival.The LPI, developed by the Zoological Society of London, monitors nearly 35,000 population trends across 5,495 species, exposing the grim reality: our natural world is in peril, and the systems we depend on are rapidly deteriorating.

Key findings of the report

- **Vulture Population Crisis:** The **White-rumped vulture**, **Indian vulture**, and **slender-billed vulture** in India are facing particularly severe declines, highlighting a critical conservation issue
- **Drivers of Decline:** The report highlights that wildlife population declines are primarily driven by habitat loss, degradation, climate change impacts, and invasive species.
- **Decline in Ecosystems:** Freshwater ecosystems experienced the highest decline at **85%**, followed by terrestrial ecosystems at **69%** and marine ecosystems at **56%**.
- **Regional Impacts:** In the **Asia Pacific**, pollution exacerbates threats, leading to an average decline of **60%** in wildlife populations. The steepest declines are observed in **South America, the Caribbean, Africa, Asia**, and the **Pacific**, while **Europe** and **North America** show lower negative trends.
- **Species at Risk in India:** Specific species in India, including mammals, birds, bees, amphibians, and freshwater turtles, are experiencing significant declines.

WWF

- **Founded:** In 1961 with h**eadquarters at** Gland, Switzerland.
- **Mission:** To preserve wilderness and reduce human environmental impact.
- Publications: The Living Planet Report, published biennially since 1998, utilizes the Living Planet Index and ecological footprint calculations.
- **Key Initiatives of WWF:**
- **Earth Hour:** A global event to encourage energy conservation.
- **Debt-for-nature swaps:** Forgiving part of a developing nation's debt in exchange for investments in conservation.
- **Healthy Grown Potato:** An eco-brand promoting sustainably grown potatoes through integrated pest management.

DUST-DRIVEN OCEAN FERTILIZATION

- Dust carried by wind from drought-stricken southern Africa caused a bloom of marine phytoplankton off the southeast Madagascar coast.

Ocean Fertilization

- **Ocean fertilization or ocean nourishment is a type of technology for carbon dioxide removal** from the ocean based on the purposeful introduction of **plant nutrients to the upper ocean** to increase marine food production and to **remove carbon dioxide from the atmosphere**.
- Ocean nutrient fertilization, **for example iron fertilization**, could stimulate photosynthesis in phytoplankton. The phytoplankton would convert the ocean''s dissolved **carbon dioxide into carbohydrate,** some of which would sink into the **deeper ocean before oxidizing**.
- More than a **dozen open-sea experiments** confirmed that adding iron to the ocean increases photosynthesis in phytoplankton by up to 30 times.

Iron Fertilization

- Iron fertilization is the intentional introduction of **iron-containing compounds**

(like iron sulfate) to **iron-poor areas** of the ocean surface to **stimulate phytoplankton production**.

- This is intended to enhance biological productivity and/or **accelerate carbon dioxide (CO2) sequestration** from the atmosphere. Iron is a trace element necessary for photosynthesis in plants.
- It is **highly insoluble in sea water and in a variety of locations** is the limiting nutrient for phytoplankton growth. Large algal blooms can be created by supplying iron to iron-deficient ocean waters. These blooms can nourish other organisms.

Sources of Dust

- The primary sources of dust are large desert regions, **such as the Sahara in Africa, the Gobi in Asia, and** the **deserts of Australia**. Winds lift dust particles into the atmosphere, where they can travel thousands of kilometers across continents and oceans.
- The most well-studied dust transport is from the **Sahara Desert to the Atlantic Ocean**, including regions as far away as the Caribbean and the Amazon basin.

Nutrient Content of Dust

- Dust contains various essential nutrients, **including iron, phosphorus, and silicon.** Iron is particularly crucial for ocean fertilization because it is a limiting nutrient in many parts of the ocean.
- In regions like the **Southern Ocean and the North Pacific**, where nitrogen and phosphorus are abundant but iron is scarce, the deposition of **iron-rich dust** can **boost phytoplankton productivity.**

Mechanism of Ocean Fertilization

- When dust settles on the ocean surface, iron and other nutrients dissolve in seawater and become available to phytoplankton.
- **This fertilization stimulates the growth of these microorganisms**, leading to an increase in primary production.
- **Phytoplankton, through photosynthesis**, absorb carbon dioxide from the

atmosphere, thus playing a critical role in the global carbon cycle. The enhanced growth of phytoplankton can lead to **increased sequestration of carbon as they die and sink to the ocean floor**, trapping carbon in the deep ocean for long periods.

Impact on Marine Ecosystems

- **Enhanced Phytoplankton Growth:** Dust-driven ocean fertilization can lead to phytoplankton blooms, particularly in high-nutrient, **low-chlorophyll (HNLC) regions** where iron is the limiting factor. This enhances the marine food web, supporting higher trophic levels, including zooplankton, fish, and marine mammals.
- **Carbon Sequestration:** The increase in phytoplankton growth facilitates greater carbon capture from the atmosphere. This process, known as the "**biological pump,**" has implications for mitigating the effects of climate change.
- However, the efficiency of this process in **long-term carbon sequestration** is still a subject of scientific research.
- **Nitrogen Fixation:** Certain types of phytoplankton, such as **cyanobacteria**, are nitrogen fixers, meaning they can **convert atmospheric nitrogen into a form usable by other marine organisms**.
- **Algal Blooms:** While dust deposition can have positive effects on marine productivity, excessive fertilization can lead to harmful algal blooms (HABs).
- These blooms can **deplete oxygen levels in the water, causing dead zones** where marine life cannot survive.

Regional Impact

- **North Atlantic:** The **Sahara Desert is the largest source of dust to the North Atlantic Ocean**. This dust provides significant iron input to the Atlantic, influencing phytoplankton productivity and carbon cycling.
- **Southern Ocean:** Dust from Patagonia and **Australia fertilizes the Southern**

Ocean, a key region for global carbon sequestration. Here, iron is often the limiting nutrient for phytoplankton growth, making dust input particularly important.

- **Pacific Ocean:** The **Gobi Desert is a major source of dust to the North Pacific Ocean**. Dust-driven fertilization in this region can affect marine productivity, particularly in areas where iron is the limiting nutrient.

What Is Climate Change?

- Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large **volcanic eruptions. But since the 1800s**, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.
- Burning **fossil fuels generates greenhouse gas emissions** that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.

Climate Change and Dust Transport:

- Climate change is likely to affect both dust production and transport patterns. Changes in temperature, precipitation, and wind patterns may alter the amount of dust available for ocean fertilization. Additionally, **human activities, such as land-use changes, deforestation, and desertification, can influence the amount of dust generated from arid regions**.
- On the other hand, increased ocean fertilization through dust deposition has the potential to mitigate some effects of **climate change by enhancing carbon sequestration in the oceans**. However, the relationship between dust-driven ocean fertilization and climate change is complex, and there are uncertainties regarding the **long-term impact on global carbon cycling**.

Artificial Ocean Fertilization:

- There has been growing interest in artificially replicating the process of ocean fertilization as a geoengineering solution to combat climate change. Proponents argue that adding iron to the ocean could enhance **phytoplankton growth and carbon sequestration, potentially reducing atmospheric CO2 levels.**
- However, this approach is controversial due to the potential unintended consequences, including disruption of marine ecosystems, **creation of dead zones, and the uncertain long-term efficacy of carbon sequestration.**
- **International regulations, such as the London Protocol**, currently restrict large-scale iron fertilization experiments in the ocean due to the potential environmental risks.

Conclusion

- Dust-driven ocean fertilization plays a significant role in regulating marine ecosystems and the global carbon cycle. While natural dust deposition contributes to **ocean productivity and carbon sequestration**, the implications of altering this process, either through climate change or artificial means, remain a topic of ongoing research.

Coastal Flooding: Varied Impact on Tree Species

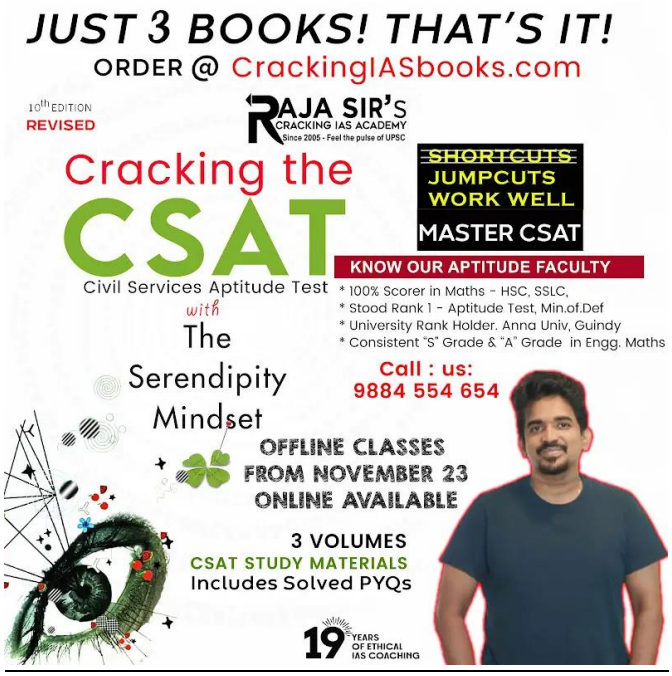
The Coastal flooding is increasingly recognized as a significant environmental challenge, particularly in the context of climate change and rising sea levels. Recent research has highlighted that different tree species respond variably to coastal flooding, which can have profound implications for forest ecosystems and coastal management strategies.

The Impact of Coastal Flooding on Tree Species

- **Variability in Species Response:** Research carried out by the researchers has shown that the rise of sea level has various impacts on different tree species hence the different ecological effects**. The inner structure and outer part of the**

trees have significant effects of impacts of saline water inundation. The flood tolerant ability of the plants varies in relation to water salinity whereby plants that have high tolerance to saltwater tend to cope well during flood while others may have stunted growth or high mortality rates.

- **Mechanisms of Damage:** Coastal flooding primarily harms trees through two mechanisms: **salt stress** and **waterlogging**.
- **Salt Stress:** Nowadays, when the seawater invades the territories of coastal regions, it enlarges the salinization of the ground. Plants, especially those that are not **halophytes** can undergo osmotic stress where they cannot easily take up water and nutrients due to high salt concentrations. This can result in leaf burn, reduced photosynthesis and overall tree decline will also be evident.
- **Waterlogging:** Water logged extreme can fill the root zone and make it difficult for roots to respire due to lack of oxygen enriched air. This affects trees with small root bases because they cannot easily obtain all the oxygen they require. This condition can lead to root rot as well as result in increased tree death rate even for the trees that are affected.



Species-Specific Responses

Tolerant Species: Hurricane exposure is another great element of storms and they are hugely featured along the coast and some tree species respond to them in quite a unique manner. For instance:

- **Mangroves:** These trees are special since they **grow in septic** conditions and can withstand flooding conditions for a long time. Other than holding the coastal areas, their root systems are particularly important as they offer support essential to the life of a number of sea creatures.
- **Cypress Trees:** Some species of cypress are known to be able to grow in waterlogged conditions because of their special adaptations to anaerobic conditions in the soil.

Sensitive Species: On the other hand, most of the native tree species are relatively sensitive or have reduced capacity or ability to cope with the stress which accompany coastal flooding:

- **Pine Trees:** Some species of pine trees can be impacted negatively if the soil salinity increases and if the water table rises, for instance, there will be stunted growth, and a tree will be susceptible to diseases and pests.
- **Deciduous Trees:** Most of the broad-leaved deciduous trees are **not well equipped** to survive the saline conditions hence high mortality rates especially among flood-affected areas.
- **Ecological Implications**

Enduring coastal flooding amazingly influences tree species and has many ecological consequences. That shifts in species can potentially lead to changes in the architecture of habitats, which would subsequently affect other diverse services that ecosystems provide namely the water purification, carbon storage and prevention of erosion.

- **Biodiversity Loss**

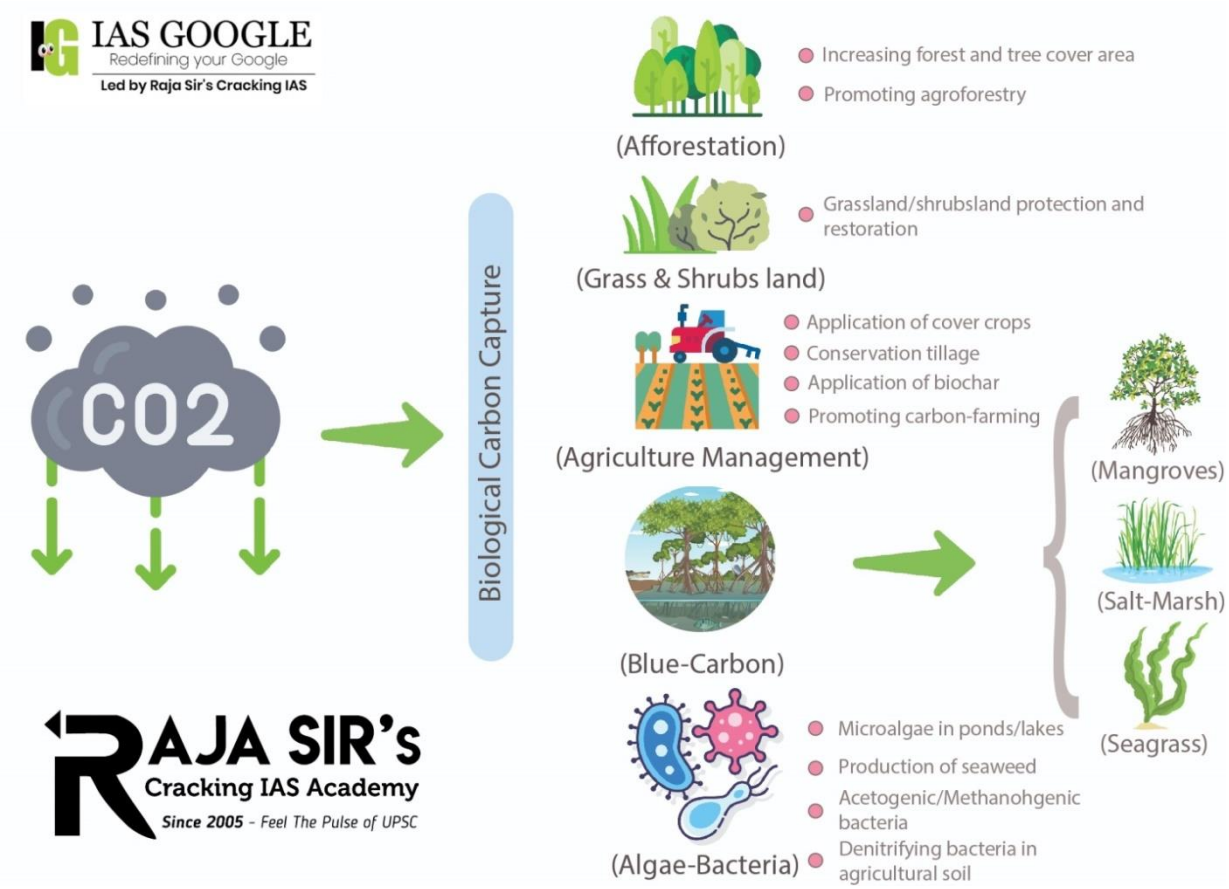
This is because extinction of more sensitive species will make the overall diversity in the coastal ecosystems to reduce progressively. This loss can in turn affect food chains and vice reduce the ability of these ecosystems to recover from other environmental impacts

in future.

- **Carbon Sequestration**

Specific tree species are equally important when it comes to carbon storage, and if these trees are threatened by floods, then carbon emissions are likely to rise, and this is not good news for climate change.

Understanding how different tree species respond to coastal flooding is essential for effective conservation and management strategies. As climate change continues to impact coastal regions, prioritizing the protection of resilient species while addressing the vulnerabilities of sensitive ones will be crucial for maintaining healthy coastal ecosystems.



Butterflies in Kaziranga

1. **Species diversity:** Kaziranga is home to 446 butterfly species, making it the second-most diverse butterfly hub in India.
2. **Newly recorded species:** 18 new species, including Burmese Threering, Glassy Cerulean, and Peacock Oakblue, have been documented.
3. **Butterfly conservation:** The first-ever Butterfly Conservation Meet-2024 highlighted the importance of butterfly conservation and raised awareness of Kaziranga's butterfly diversity.

Kaziranga National Park:

1. **Location:**
    a. Situated in Golaghat and Nagaon districts of Assam.
2. **UNESCO World Heritage Site:**
    a. Declared a national park in 1974 and a UNESCO World Heritage Site, housing two-thirds of the world's one-horned rhinoceros' population.
3. **Biodiversity:**
    a. Hosts a variety of fauna, including royal Bengal tigers, leopards, capped langurs, and migratory birds.
    b. Known for its tall elephant grass, water lilies, and wet alluvial grasslands.
4. **Flora and Fauna:**
    a. Famous for elephant grasses, rattan cane, and aquatic plants like water hyacinths.
    b. Important species include Bengal florican and western hoolock gibbon, India's only ape species.
5. **Ecological importance:**
    a. Largest undisturbed area in the Brahmaputra Valley floodplains, offering critical habitats for diverse wildlife.

"The Unjust Climate" report

India's rural poor, particularly those trapped in **multidimensional poverty**

Key findings of FAO's "The Unjust Climate" report:

- **Poverty reduction with ongoing challenges:** India has reduced rural poverty from 42.5% in 2005/06 to 8.6% in 2022/24, but transitory poverty remains, driven by extreme weather events.
- **Gender disparities:** Female-headed households experience 8% more income loss from heat stress and 3% more from floods, worsening existing gender inequalities.
- **Vulnerability of rural poor:** Poor households face 5% greater income loss due to heat stress and floods than wealthier households, reflecting the economic disparity in climate impacts.
- **Maladaptive coping strategies:** Rural poor resort to harmful strategies like selling livestock, increasing their vulnerability to future climate shocks**.**
- **Worsening child labour and unpaid work:** Climate extremes worsen child labour and unpaid work for women, perpetuating long-term social inequalities.

Policy Recommendations:

- **Anticipatory social protection:** Scaling up social protection programs ahead of extreme weather events can prevent households from resorting to adverse coping mechanisms like selling off productive assets.
- **Workforce diversification:** Investing in skills development and vocational training can help rural households diversify from climate-sensitive work, enhancing their resilience to income shocks.
- **Gender-transformative approaches:** Addressing gender norms and improving women's access to non-farm employment is critical for income diversification and climate resilience.

- **Participatory agricultural extension:** Group-based agricultural experimentation helps rural farmers adapt to changing conditions, promoting shared learning and reducing individual risks.
- **Access to adaptive technologies:** Public investments in climate-resilient agricultural technologies are essential for supporting land-constrained households and improving rural livelihoods.

About the Food and Agriculture Organization (FAO):

- **Established:** FAO is a specialized agency of the United Nations, established in October 1945, making it the oldest permanent specialized UN agency.
- **Mandate:** The FAO's mission is to defeat hunger by improving nutrition, increasing agricultural productivity, raising rural living standards, and contributing to global economic growth.
- **Key functions:**
    - **Research:** Conducts research and provides technical assistance in agriculture, forestry, fisheries, and land and water resources.
    - **Education:** Operates educational programs, seminars, and training centers for agricultural development.
    - **Data and Statistics:** Maintains global statistics on production, trade, and consumption of agricultural commodities.
    - **Publications:** Publishes reports such as The State of the World's Forests and The State of Food Security and Nutrition.
- **Headquarters**: Located in Rome, Italy.
- **Membership:** FAO has 194 member states, along with the European Union as a member organization.
- **Funding**: It receives 100% funding from its member countries.
- **Relief operations:** FAO does not directly manage food relief during conflicts or scarcity; such operations are usually overseen by the World Food Program (WFP).
- **Key reports:** FAO publishes various important reports like SOFO, SOFIA, SOCO,

and SOFI, addressing global issues in forests, fisheries, agriculture, and food security.

Coogee Beach

Tar balls:

- **Formation:** Result from **oil spills**, forming when oil mixes with seawater, sand, and debris, creating a hardened substance.
- **Size & texture:** Vary from small pebbles to fist-sized, with smooth or rough surfaces depending on environmental exposure.
- **Environmental impact:** Pose significant hazards to marine life and human health due to toxic components like **polycyclic aromatic hydrocarbons (PAHs)**.

Location in the news:

- **Coogee Beach, Sydney**: On October 15, 2024, black, ball-shaped debris, potentially tar balls, were discovered along the length of the beach.

National Green Hydrogen Mission

- **Budget:** Outlay of ₹19,744 crore up to FY 2029-30 for green hydrogen initiatives.
- **Objectives:**
  - Establish India as a global hub for green hydrogen production, utilization, and export.
  - Foster decarbonization across industries, especially steel, mobility, and energy sectors.
- **Pilot Projects:**
  - Focus on demonstrating green hydrogen use in sectors like steel, mobility, and shipping.
  - Three sanctioned steel sector projects with financial support of ₹347 crore.
- **SIGHT (Strategic Interventions for Green Hydrogen Transition):**
  - Incentivizes the domestic manufacturing of electrolysers.
  - Promotes the production and usage of green hydrogen.

- **Expected Outcomes by 2030:**
  - **Green Hydrogen Production:** At least 5 MMT per year.
  - **Renewable Energy:** Addition of around 125 GW of capacity.
  - **Investment:** Over ₹8 lakh crore in green hydrogen.
  - **Employment:** Creation of 6 lakh jobs.
  - **Reduction in fossil fuel imports:** Exceeding ₹1 lakh crore.
  - **GHG Emissions:** Averting nearly 50 MMT of annual greenhouse gas emissions.
- **Phase-wise Implementation:**
  - Phase I (2022-26): Focuses on demand creation and deployment in existing hydrogen-using sectors.
  - Phase II (2026-30): Expands to new sectors with commercialization of green hydrogen

Oceans on Brink

Key Findings

1. **Limited protection**: Only 2.8% of oceans are effectively protected; 8.3% are designated MPAs, but most lack enforcement.
2. **Slow progress**: Since COP15, protected areas increased by just 0.5%, making the 30% target unlikely.
3. **Blue-washing:** Countries like the UK declare large MPAs, but less than 1% are managed effectively.
4. **Regional disparities:** Latin America, Caribbean, North America, and Europe show gaps between declared and managed MPAs.
5. **Few leaders:** Only 14 countries have met the 30% target; Palau and the UK have effectively safeguarded significant portions.

Impact

1. **Climate regulation:** Oceans absorb 90% of heat from human activities and 30%

of global CO2 emissions. Weak protection undermines this function.

2. **Biodiversity loss:** Poorly managed MPAs leave species vulnerable to overfishing and habitat destruction.
3. **Livelihoods at risk:** Coastal communities dependent on oceans for fishing and tourism face jeopardized food security and income.
4. **Economic costs:** Inaction increases disaster response costs and the burden of ecosystem restoration.

Challenges

1. **Weak enforcement:** MPAs exist on paper but lack proper monitoring.
2. **Geopolitical barriers:** Weak governance in international waters hinders protection.
3. **Economic vs. conservation:** Industrial activities like mining often take precedence.
4. **Lack of funding:** Developing nations lack resources to manage MPAs; promised financial aid is slow.
5. **Delayed agreements:** The High Seas Treaty, crucial for protecting international waters, faces slow progress.

Solutions

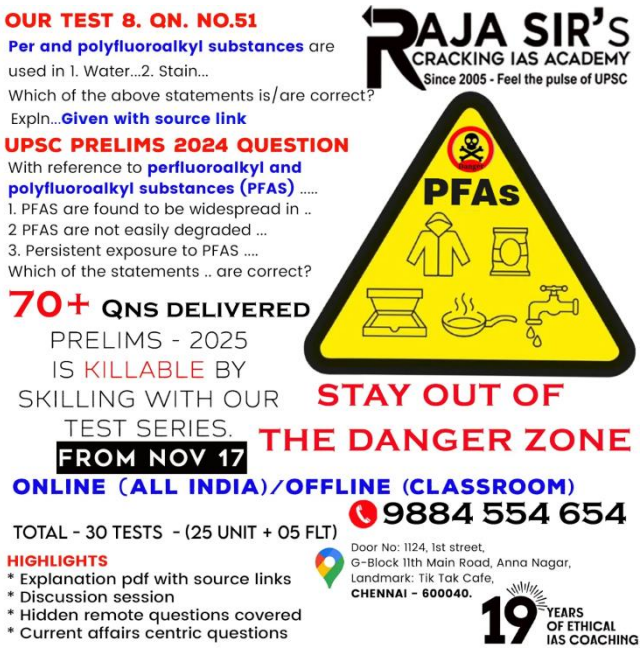
1. **Expand MPAs:** Increase both the number and size of MPAs, following Panama's example of expanding Banco Volcán.
2. **Strengthen management:** Enforce proper management of MPAs; the UK's Blue Belt Programme is a model.
3. **Incorporate Indigenous knowledge:** Communities play a key role in conservation, as seen in Canada's Gitdisdzu Lugyeks MPA.
4. **Deliver financial aid:** Developed nations must meet funding commitments for conservation.
5. **Improve monitoring:** Better data collection is needed to assess and enhance

MPAs.

Best Practices

1. **Community-based conservation:** Engaging locals, as seen in Mozambique, helps reduce reliance on fishing.
2. **Indigenous knowledge:** Incorporating traditional knowledge improves ecosystem management.
3. **Adaptive management:** Flexible MPA management, like the Blue Belt Programme, allows for continuous improvement**.**
4. **Scalable models:** Panama's Banco Volcán provides a model for scalable MPA expansion.
5. **Public-private partnerships:** Collaboration with private stakeholders brings funding and technology to marine protection

Achieving the **30×30 target** is crucial for marine ecosystems and the planet. While progress has been slow, effective strategies and models exist. Governments must act by expanding MPAs, ensuring management, providing financial support, and fostering global cooperation.



Pyrocystis noctiluca

- It is a specific **bioluminescent phytoplankton** species which is capable of **inflating its size** during its migration.
- This species can expand to **six times** its original size of a **few hundred microns**, aiding its **buoyancy.**

Key Facts Related to Vertical Migration of Phytoplankton:

- **Vertical Migration:** Many plankton travel from the **cold, dark depths of the ocean** to the **surface**, then **drift back down** into the darkness in a continuous cycle called **vertical migration**.
- The movement mechanism of **single-celled phytoplankton,** especially those without swimming appendages, remains largely **unexplained.**
- **Density Dynamics of Phytoplankton:** Phytoplankton are generally **5%-10% denser than seawater,** which poses a challenge for their ability to remain near the surface for photosynthesis.
- Pyrocystis noctiluca cells behave like **little submarines** which can control their **density** so they can choose where they want to reach the ocean's surface.
- **Ballooning Mechanism:** The research team utilised a **"gravity machine"** which can **alter water pressure and density,** mimicking the ocean's depths.
- The team found that **inflated cells** were less dense than the surrounding seawater, allowing them to **float** toward the surface **despite gravity.**
- **Inflation During Cell Division:** The inflation process **occurs naturally** during the phytoplankton's cell cycle.
- When a **single cell divides**, an internal structure called a **vacuole** acts as a **flexible water tank,** taking in freshwater and causing the **new cells to swell**.
- This **inflation** allows the lighter **daughter cells to float upward**, reaching the nutrient-rich surface waters.
- The entire cell cycle of **Pyrocystis noctiluca** lasts approximately **seven days**, which aligns with the vertical pursuit of **light and essential nutrients.**

What are Planktons?

- Plankton are **microscopic organisms** that play a crucial role in marine ecosystems, serving as the **foundation** of the entire **marine food web**.
- An organism is classified as **plankton** if it is carried by tides and currents and **lacks the ability to swim** against these forces.

Types of Plankton:

- **Phytoplankton**: **Plant-like organisms** that perform **photosynthesis**, converting sunlight into energy, and are vital for producing oxygen and absorbing carbon dioxide. E.g., **Cyanobacteria, Blue-green algae, diatoms, dinoflagellates**.
- Phytoplankton depend on nutrients like **phosphate, nitrate, and calcium** from their environment to thrive.
- **Zooplankton**: **Animal-like organisms** that include microscopic animals (such as **krill and sea snails**) and weak swimmers like **jellyfish**. E.g., Radiolarians, Foraminiferans, **cnidarians, crustaceans, chordates, and molluscs.**
- **Size of Planktons:** Plankton can vary in size, from **microscopic organisms** to larger species like **crustaceans and jellyfish**.
- **Role in the Marine Food Web:** Phytoplankton form the base of the marine food web, supporting various marine life.
- **Zooplankton** primarily **feed on phytoplankton** and, in turn, serve as food for larger marine animals, creating a **critical food chain link.**
- **E.g., Krill** are a major component of the diet of **humpback, right, and blue whales.**
- **Migration Patterns:** During the **day**, zooplankton drift to **deeper waters** to evade predators, but at **night**, they **rise to the surface** to feed on phytoplankton**.**
- This process is considered the **largest migration** on Earth; so many animals make this journey that it can be **observed from space**.
- **Habitat:** Plankton inhabit both **saltwater and freshwater ecosystems**.
- **Clearer waters** typically indicate **fewer plankton**, while more **turbid waters (cloudy or muddy)** are often **richer in plankton.**

Ranthambore Tiger Reserve

The Rajasthan forest department has stopped the construction of a major complex, inside the buffer zone of critical tiger habitat of the Ranthambore Tiger Reserve.

- **Violation: The construction was deemed illegal as it was located within the critical tiger habitat.**
- **Environmental Concerns of construction**
    - **Tiger Habitat:** Ranthambore Tiger Reserve is a critical habitat for tigers, and any construction within the reserve is considered a violation of the **Forest Conservation Act 1980.**
    - **Dense Tiger Reserve:** RTR is the third most dense tiger reserve in India, with 71 tigers and cubs.

Ranthambore Tiger Reserve

- **Location:** Sawai Madhopur district, Rajasthan.
- **Establishment:** Established as a Sawai Madhopur game sanctuary in 1955.
    - Game sanctuary is the protected area for the conservation of wildlife, particularly game animals that are hunted for sports.
    - Declared as a **national park in 1980.**
- The reserve is a part of the larger Ranthambore Tiger Reserve, which includes **Kailadevi Sanctuary and Sawai Mansingh Sanctuary.**

Area and Topography

- **Area:** The reserve spans approximately 1,334 square kilometers, with the core zone covering 392 square kilometers.
- **Topography:** The park features rugged hills, plateaus, grasslands, forests, lakes, and rivers.
- **Ranthambore Fort:** The famous Ranthambore Fort, a UNESCO World Heritage Site, adds to the park's appeal.

Flora and Fauna

- **Flora:** The reserve has a diverse ecosystem with dry deciduous forests, grasslands, and scrublands. Dominant tree species include **dhak, banyan, pipal,** and various acacias.
- **Fauna:** The **Bengal tiger** is the primary attraction.
    - Other wildlife includes l**eopards, sloth bears, hyenas, deer, nilgai, wild boar, and Indian foxes.**

Ratapani Wildlife Sanctuary and Tiger Reserve

- Since 2015, 14 leopards, 7 tigers, and a bear have died on railway tracks in Madhya Pradesh, prompting the state wildlife department to raise concerns over the **Barkheda-Budni railway line project**, a 26.5 km track passing through **Ratapani Wildlife Sanctuary and Tiger Reserve.**

Ratapani Wildlife Sanctuary and Tiger Reserve

- The Ratapani Wildlife Sanctuary, located on the **Vindhya Hills,** features a **rocky forest and an aquatic environment.**
- **Existence:** The sanctuary was first notified in 1976 and then extended in 1983.
- **Background:** The proposal to declare Ratapani wildlife sanctuary as tiger reserve has been begun since 2008.
- The **National Tiger Conservation Authority (NTCA**) has accorded in principle approval to notify **Ratapani wildlife sanctuary as the tiger reserve in 2011.**
- Kolar River forms the western boundary of the Sanctuary.
- The sanctuary also includes **Bhimbetka, a UNESCO World Heritage Site** known for its ancient rock shelters and paintings.
- **Flora and Fauna:**
- **Fauna:** Chinkara, Sloth Bears, and the Paradise Flycatcher (state bird of Madhya Pradesh).
- **Flora:** Predominantly dry and moist deciduous forests.

Mining Dust-Based Carbon Capture: A Sustainable Innovation

- The first pilot company has pioneered a revolutionary technology that uses mining dust to improve carbon capture and reduce climate change impact, turning an environmental nuisance into an opportunity.

Description

- **Technology Overview:** The company uses a unique method to build a material that will be able to grab CO2 from emissions of industrial facilities and from the air.
- **Mining Dust Characteristics:** Containing a large number of metal oxides, the surface area and reactivity of mining dusts are similarly desirable for carbon capture.
- **Capture Process:** The new mining dust will collect CO2 and, after having formed a stable carbonate precipitate, the dust simply remains solid and can be stored or applied.

Significance

- **Climate Change Mitigation:** New carbon capture technology is vital in reducing global warming.
- **Waste Valorization:** As good as it is, recycling of mining dust has two major advantages economically and environmentally where удалите liabilities are cut while the economy attracts benefits.
- **Circulatory Economy:** Taking care of the loop, the industrial waste or emission.

Pros

- **Efficient Carbon Capture:** The state achieved high capture and rates while experiencing minimal fluctuations.
- **Cost-Effective:** Incorporates mining dust which is easily accessible thus cutting

down many expenses.

- **Scalability:** spanning across all kinds of industries and types of emission sources.
- Job Creation: New opportunities in CUC.

Cons

- **Limited Geographical Applicability:** It can be established that the percentage of manganese extraction depends on mining activities and dust availability.
- **Potential Environmental Impacts:** Accidental burst of dust emission or inadequate containment.
- **Regulatory Frameworks:** Absence of well-defined framework for the carbon capture and utilisation.

Challenges

- **Scalability and Commercialization:** Taking laboratory experiments to industrial applications: A reality.
- **Public Perception:** To cite the problems relating to mining dust use.
- **Integration with Existing Infrastructure:** Compatibility with the existing industrial processes.

Way Forward

- **Research and Development:** Improving accuracy of capture, its stability and scaling capabilities.
- **Partnerships and Collaborations:** Tripartite partnership between industry, government and academia.
- **Policy Support:** Promoting the use of appropriate legal measures and appropriate rewards for carbon capture and utilisation.
- **Public Awareness:** Raising awareness of the drivers and the prospects of the

adsorption of CO2 by mining dust.

Conclusion

- The utilisation of mining dust in carbon capture may be one of the most effective solutions for reducing climatic change and waste valorization.
- To that end, handling problems and increasing the capacity for the services will be more significant for extensive usage.

CBD COP16

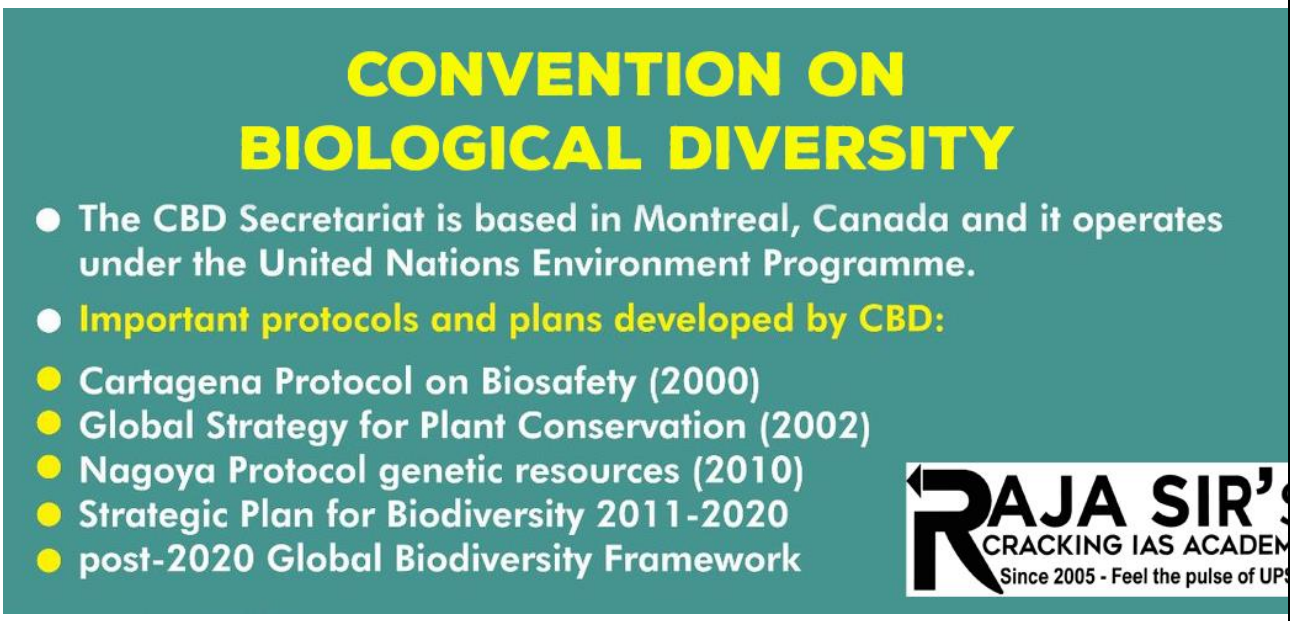
- Representatives from governments around the world have been gathering in Cali, Colombia, for the 16th Conference of the Parties (COP16) to the Convention on Biological Diversity (CBD).
- **COP** stands for "Conference of the Parties," referring to regular meetings of countries that have ratified a specific UN convention.
- In this instance, COP16 marks the sixteenth meeting of the Parties to the CBD, a treaty designed to promote sustainable development through biodiversity conservation.
- The last biodiversity conference, COP15, took place in Montreal in December 2022, where the Kunming-Montreal Global Biodiversity Framework (GBF) was established. This framework outlines:
- **Long-term Goal**: Achieving a world in harmony with nature by 2050.
- **Short-term Targets**: Twenty-three specific goals aimed at halting and reversing biodiversity loss by 2030.

Convention on Biological Diversity (CBD)

- The CBD, launched during the 1992 Earth Summit in Rio de Janeiro, is one of the most widely ratified UN conventions.
- It aims to conserve biological diversity, ensure sustainable use of its components,

and promote fair sharing of genetic resource benefits.

- Parties to the CBD convene every two years to review progress and set new priorities.



KUNO NATIONAL PARK

A female cheetah is pregnant and expected to deliver cubs soon at the Kuno National Park (KNP).

On September 17, 2022, Prime Minister Modi released eight cheetahs — five females and three males – brought from Namibia into enclosures at the KNP as part of the **world's first intercontinental translocation of the big cats.**

- In February 2023, another 12 cheetahs were translocated to the national park in MP from South Africa.

Kuno National Park – Key Facts

- Location: Madhya Pradesh.
- Area: Approximately 748 sq km.

- Established: Initially designated as a Wildlife Sanctuary in 1981, it was upgraded to a National Park in 2018.
- It is **part of the Khathiar-Gir dry deciduous** forests ecoregion.

Biodiversity and Ecosystems

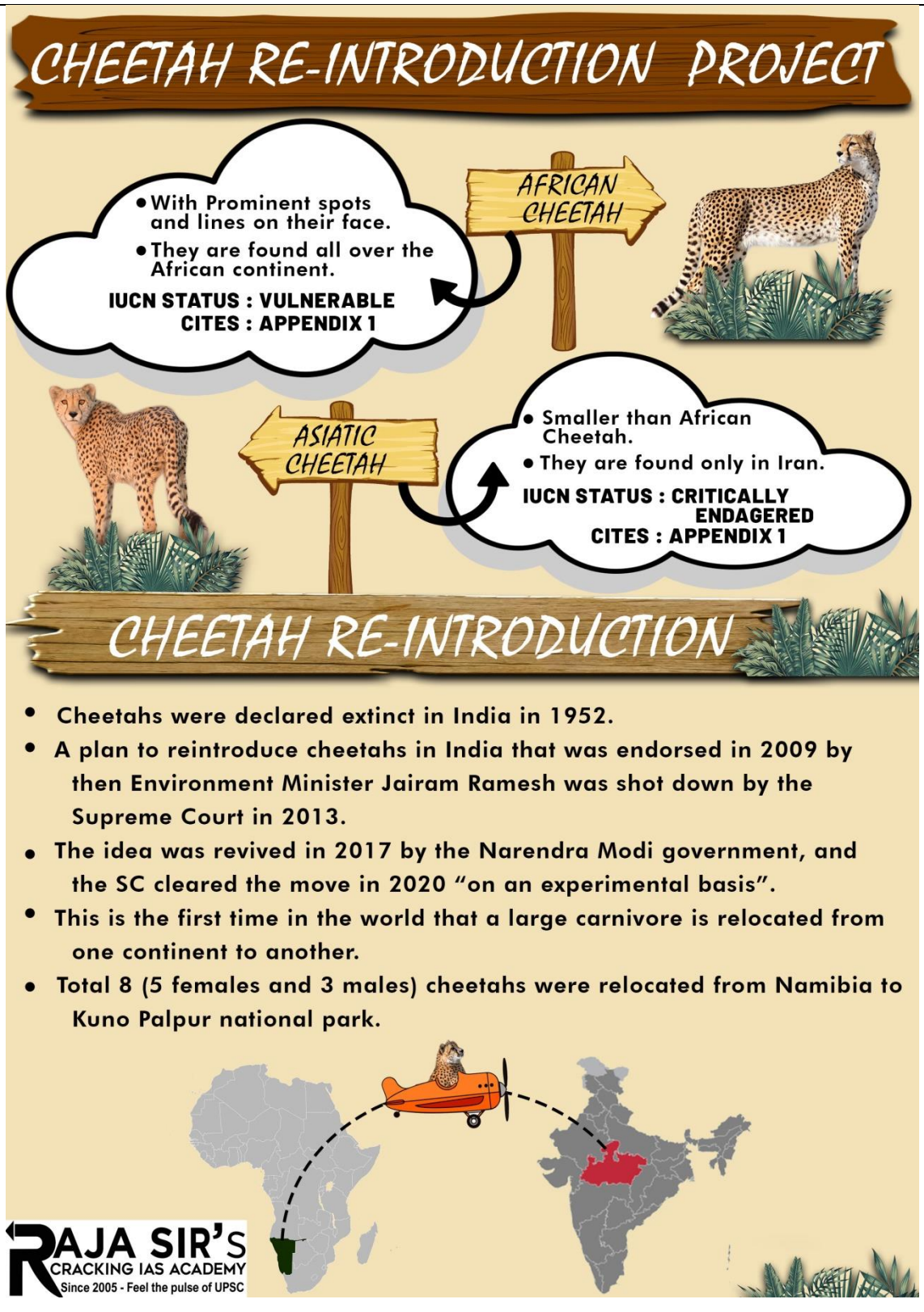
- Flora: Predominantly dry deciduous forest, with significant presence of grasslands and scrub.
- Fauna: Flagship Species: Asiatic Cheetah (reintroduced in 2022 as part of India's Cheetah reintroduction program).
- Other species: Leopards, Indian Wolves, Jackals, Nilgai, Chinkara, Sambar, and various species of birds and reptiles.

Cheetah Reintroduction Project:

- Kuno National Park was chosen for the reintroduction of Cheetahs in India, after being declared extinct in the country in 1952.
- The first batch of African Cheetahs from Namibia was released into the park in 2022 as part of a historic translocation project to restore the species in India.
- The park was originally identified in the 1990s as a potential site for the relocation of Asiatic Lions from Gir National Park (Gujarat), but this plan faced delays.
- However, the focus shifted to cheetah reintroduction due to suitable habitat conditions.

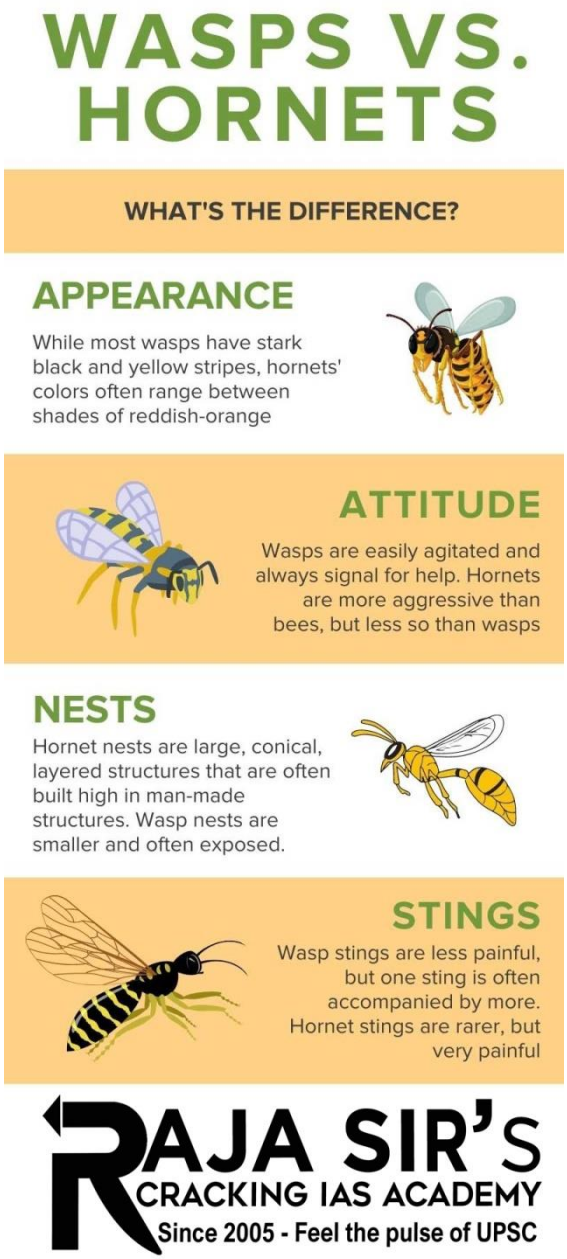
Geographical Features:

- The park is part of the larger Vindhyan hill ranges and lies within the semi-arid region of central India.
- Rivers: The **Kuno River, a tributary of the Chambal River**, flows through the park, providing an important water source for the wildlife.


CHEETAH RE-INTRODUCTION PROJECT
AFRICAN CHEETAH
With Prominent spots and lines on their face.
They are found all over the African continent.
IUCN STATUS : VULNERABLE
CITES : APPENDIX 1
ASIATIC CHEETAH
Smaller than African Cheetah.
They are found only in Iran.
IUCN STATUS : CRITICALLY ENDAGERED
CITES : APPENDIX 1
CHEETAH RE-INTRODUCTION
Cheetahs were declared extinct in India in 1952.
A plan to reintroduce cheetahs in India that was endorsed in 2009 by then Environment Minister Jairam Ramesh was shot down by the Supreme Court in 2013.
The idea was revived in 2017 by the Narendra Modi government, and the SC cleared the move in 2020 "on an experimental basis".
This is the first time in the world that a large carnivore is relocated from one continent to another.
Total 8 (5 females and 3 males) cheetahs were relocated from Namibia to Kuno Palpur national park.
RAJA SIR'S CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC

Hornets Vs Wasps

- A species of hornet can tolerate liquor without any side effects, at levels higher than any known animal.



About	They are a species of **wasps**, which live in large, highly **organized colonies**.They belong to the **insect family Vespidae, which contains all species of hornets as well as wasps like yellow jackets, potter wasps, paper wasps, and pollen wasps.**
Scientific Name	***Vespa orientalis***
Diet	They eat nectar and ripe fruits. **Ripe fruits especially include grapes, which naturally ferment in their body to produce ethanol.**
Distribution	**They are typically found in Asia, Europe, Africa and North America.** **The northern giant hornet, or Asian giant hornet is native to Asia and it is the largest known wasp species in the world.**
Features	**Alcohol toleration** They can tolerate ethanol levels up to 80 per cent higher than any known animal. They show no adverse effects on behaviour or lifespan, even at high ethanol concentrations. **While other animals such as fruit flies and tree shrews cannot tolerate more than 4% ethanol.** High alcohol tolerance provides them a competitive edge in accessing nutrient-rich fermented foods. **Mutualistic Relationship** **Hornets also have a mutualistic relationship with**

	yeast Saccharomyces cerevisiae which aids both species in survival. **Venom** **They release a higher amount of venom per sting than any other stinging insect.**
How do they tolerate high ethanol concentrations?	**Hornets have two to four copies of a specific gene that produces NADP+, which in turn helps break down alcohol.** NADP+ is converted to NADPH in the photosynthesis process, due to which the former is less abundant in plants. **But in Hornets, due to the abundance of NADP+, they can tolerate high ethanol concentrations.**
NADP, NADP+ and NADPH	NADP is a **nicotinamide adenine dinucleotide phosphate molecules coenzyme that transfers electrons in anabolic activities and NADPH is the reduced form of NADP with a hydrogen atom added to it.** While NADP+ is the oxidized form of NADP. NADP+ is converted to NADPH in the photosynthesis process when the energy from the sun extracts electrons from water.

Orchids

- A new species of orchid, called **Crepidium assamicum,** was discovered in Dibru-Saikhowa National Park in Assam.

Crepidium assamicum

About	It is a new **species of orchid discovered in Dibru-Saikhowa National Park in Assam.** Their numbers are approximately 500–600 individuals in the wild.
Scientific Name	Crepidium assamicum
Characteristics	They have a large **flower cover and blooming period from July to August.** Their flowers have minimal or no fragrance.
Habitat	These species **thrive in open grasslands and they do not prefer dense forests.**
Distribution	These orchids are **confined to the open grassland near the riverbank of Dibru-Soikhowa river in Assam.**
Conservation Status	They have been provisionally assessed as Near Threatened per IUCN Red List of endangered species in 2024.

Orchids

- Orchids are **non woody perennial plants of family Orchidaceae.**
- It has over 25,000 species and nearly 1,000 genera.
- They are predominantly found in tropical regions.

  They are categorised into three life types:

  (1) epiphytic,

  (2) terrestrial and

  (3) mycoheterotrophic.

Morphology of Orchids

Flowers:

- **Orchid flowers have unique and differing structural characteristics. These**

are:

- **They have pollinia**, which are masses of pollen that facilitate specific pollination strategies.
- The stamens and pistil are fused to form a column. This distinguishes orchids from other flowering plants.
- **They have a Lip or Labellum, which is** a specialized petal that serves as a landing platform for pollinators.

Seed

- Seeds of Orchid are tiny and lack an endosperm. They depend on **mycorrhizal fungi** for germination and uptake of nutrients.

Habitat

- **Orchids survive in** diverse environments, from sea level to elevations of 4,600 metres.

Geographical Distribution

- They are found in tropical montane forests, temperate zones, and even in arid regions.

Orchids in India:

As per the Botanical Survey of India, Orchids of 1,256 species or taxa are found in India.

Out of total orchids, about 760 species or 60% are epiphytic, 447 are terrestrial and 43 are mycoheterotrophic in India

About 400 species of orchids are endemic to India and about one-third of them are endemic species found in Western Ghats.

The Western Ghats feature a high endemism of orchids, but north-east India has the highest species concentration.

There are 612 orchid species known to exist in Arunachal Pradesh, which is followed by Sikkim (560) and West Bengal.

In terms of orchid species, the Himalayan zone is the most abundant of India''s ten biogeographic zones, followed by the Northeast, the Western Ghats, the Deccan plateau, and the Andaman and Nicobar Islands.

Symbiotic Relationships

- Many orchids in many cases **form mutualistic relationships with fungi, which helps orchids in their nutrient absorption and growth.**

Pollination and Reproductive Strategies

- The flower structures of orchids are adapted to attract particular pollinators, which enhances their reproductive success.
- The complex flowering structure **facilitates the transfer of pollinia to visiting insects to ensure effective cross-pollination.**

Economic Importance

- **Vanilla Production:** The most notable economic product which is derived from orchids is vanilla. It is sourced from ***Vanilla planifolia*** orchids and related species.
- **Traditional Uses:** Traditionally Orchids have various applications in folk medicine, culinary products, and as natural adhesives.



SPECIES IN NEWS : ANGUICULUS DICAPRIOI, TENKANA JAYAMANGALI, NILGIRI TIT

- The Scientists have found a new species of snake in the Western Himalayas, which have been named **Anguiculus dicaprioi** after Hollywood star Leonardo Di Caprio.

Anguiculus dicaprioi

About	**It is a new species of snake discovered in the Eastern Himalayas.** **Anguiculus is the Latin word meaning small snake.** **The term"dicaprioi" is a patronym to honour Leonardo DiCaprio, who has actively worked to create awareness about increased biodiversity loss, and human health issues due to the pollution explosion.**
Family	It is a member of the Colubridae, **which is the largest family of snakes on the planet having 304 genera and 1,938 species in it.** Almost two-thirds of all living snakes in the world comprise Colubridae.
Distribution	They are found in **Chamba, Kullu and Shimla regions of Himachal Pradesh, Nainital district in Uttarakhand and Chitwan National Park in Nepal.**
Features	They have no limbs, external ears and eyelids. They only have one functional lung, and a long, slender body. They *have* a complete and robust skull.
Significance	The eastern part of the Himalayas generally harbours more diversity than the western part.

	However, the **findings suggest that the biota of the Western Himalayas is distinct and they are not merely a subset of the East Himalayan biota.**
Conservation status	Data Deficient

Tenkana jayamangali

About	They are a new species of Ground-dwelling jumping spider.
Morphological Features	Males have a colour pattern which resembles a panda face. **They shave a brownish abdomen.** Females are grey with distinct colour patterns.
Habitat	They prefer the **shaded short grasses with dry leaf litter in closed areas and in open areas, they prefer sunny areas with rocky outcrops.** They mostly prefer marshes, forests, agricultural lands, etc.
Distribution	They are currently endemic to southern India. They are mostly sighted in Karnataka and Tamil Nadu.
Documented Species	Three species in the genus Tenkana have been discovered so far. These are: **Tenkana jayamangali, Tenkana arkavathi, Tenkana manu.**
Ecological Role	They play a role in local ecosystems as a predator

Nilgiri tit

Category	Details
About	This is a rare and endemic butterfly species. It is **recorded for the first time using Eulophia epidendraea as a host near the Kallar horticultural garden.** Eulophia epidendraea is a terrestrial orchid found on rocky slopes in humid areas and they are associated with various grasses.
Scientific Name	***Hypolycaena nilgirica***
Habitat	They live on the **surface of terrestrial orchids and lay eggs on the inflorescence of Eulophia epidendraea.**
Distribution	They are typically found in the western Ghats surrounding Nilgiris and in Sri Lanka. It was first described in 1884 from Coonoor, Nilgiris.
Conservation Status	They are classified under Schedule II of the Wildlife Protection Act.

Spraying DIAMOND DUST To cool Earth

A new study has argued that spraying millions of tonnes of diamond dust in the Earth's upper atmosphere every year could help cool down the Earth and combat global warming.

Aspect	Details

• ***Proposal***	• Injecting five million tons of diamond dust annually into the stratosphere to cool the Earth.
• ***Potential Temperature Reduction***	• 1.6 degrees Celsius
• ***Inspiration***	• Past volcanic eruptions caused global cooling by releasing particles into the atmosphere.
• ***Concept***	• Diamond dust in the • stratosphere would reflect sunlight, reducing heat on Earth.
• ***Geoengineering Context***	• Similar to methods like ocean iron dumping and space mirrors to fight global warming.
• ***Method***	• Solar geoengineering – Stratospheric Aerosol Injection (SAI)
• ***Historical Example***	• 1991 Mount Pinatubo eruption cooled Earth by 0.5 degrees for several years.
• ***Problems with Sulfur Dioxide***	• Leads to sulfuric acid rain, damages ozone layer, disrupts weather and climate patterns.
• ***Diamond Dust Findings***	• Reflects radiation effectively, remains airborne longer,

• ***Cooling Effect***	doesn't produce acid rain. • Injecting 5 million tons of diamond dust annually could reduce global temperature by 1.6°C.
• ***Cost of Diamond Dust***	• $200 trillion by 2100, 2,400 times more expensive than sulfur dioxide.
• ***Alternative Option***	• Sulfur dioxide – cheaper but has harmful environmental impacts.

GIANT SALMON CARP

- The The giant salmon carp, thought to be extinct, has been found in the Mekong River.

The Giant Salmon Carp

About	They are a species of fish commonly called the Mekong Giant Salmon Carp. Fewer than **30 individuals have been recorded since its formal identification in 1991.**
• ***Scientific Name***	***Aaptosyax grypus***
• ***Size***	The predatory fish **can grow up to 4 feet length.** **Generally, they have a weight of 30 kilograms but the freshwater fish exceed 30 kilograms in weight.**

• ***Identification***	It has a conspicuous knob at the tip of its lower jaw, which identifies the fish.
• ***Habitat***	They are generally found in the middle reaches of the Mekong River in Northern Cambodia, Laos and Thailand.
• ***Threats***	Overfishing, habitat degradation, and other threats such as noise from ships and industrialisation in the Mekong River.
• ***Conservation status***	They have been listed as **Critically Endangered** by the IUCN.

Mass Bleaching of Coral Reefs

- According to the **National Oceanic and Atmospheric Administration (NOAA)**, the mass bleaching of coral reefs around the world since 2023 is now the most substantial on record.
- **77% of the sector's coral reef regions** – from the Atlantic to the Pacific to the Indian oceans – have up to now been subjected to bleaching-level warmness strain.
- The NOAA coral reef authority declared the **global bleaching event in 2024**, making it the fourth of its type since 1998.
- Mass bleaching events at the Great Barrier Reef were documented with full-scale surveys in 1998, 2002, 2016, 2017, 2020, 2022 and 2024.
- The preceding report from the 2014 to 2017 mass bleaching affected just under 66% of the world's reef location.
- In coming months and years scientists will conduct underwater tests of dead corals to assist tally up the severity of the damage.

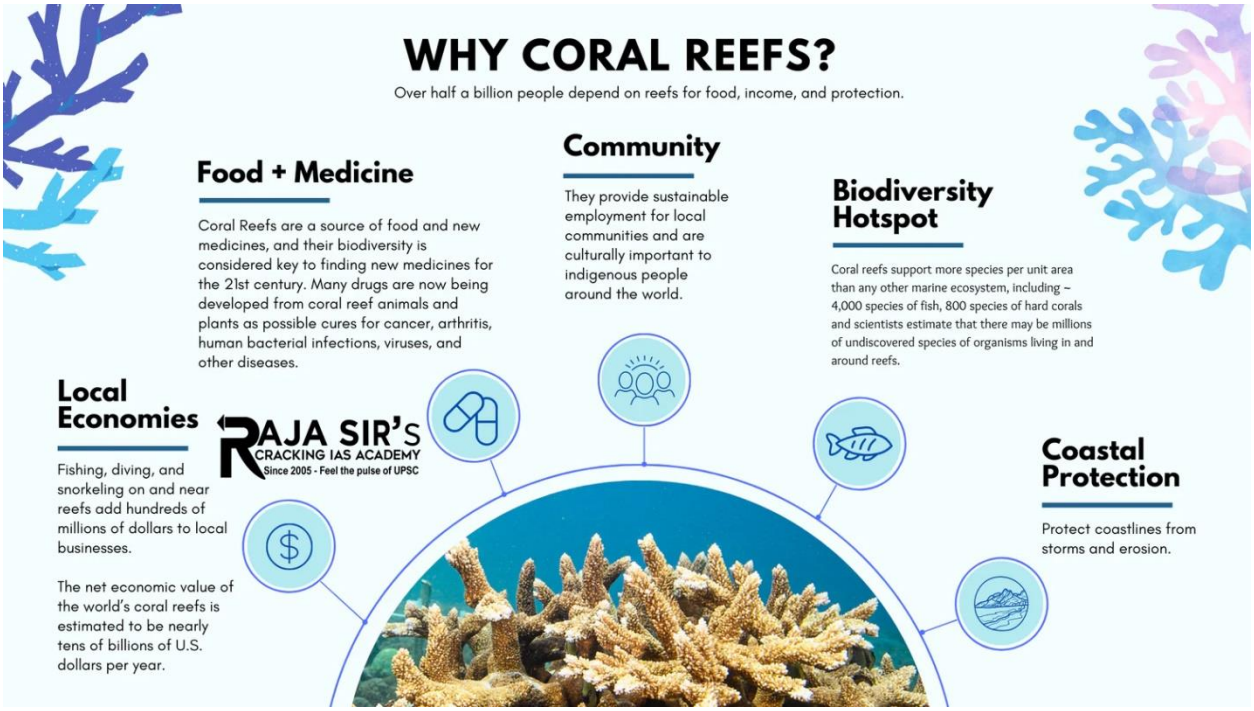
What are Corals?

- Corals are invertebrates that belong to a large group of animals known as Cnidaria.
- Corals are formed by multiple small, soft organisms known as polyps.
- They secrete a rocky chalk-like (calcium carbonate) exoskeleton around themselves for protection.
- Coral reefs are therefore created through thousands and thousands of tiny polyps forming big carbonate systems.
- **Appearance:** Corals range in coloration from crimson to red or even blue, but are most generally shades of brown and green.
- Coral are vibrant and colourful because of microscopic algae known as zooxanthellae.
- There are 3 forms of coral reefs – fringing reefs, barrier reefs and atolls.
- Fringing reefs form along shores, barrier reefs form in open water and atolls are circular reefs which have formed around sunken volcanoes.
- **Significance:** They provide meals, refuge, resting and breeding grounds to 1 / 4 of all marine life, acting as nurseries and refuges to shield important biodiversity.
- They also guide greater than 1 billion humans residing in coastal areas around the sector by supplying food, livelihoods and activity.

Coral Bleaching

- Coral bleaching occurs while corals expel the colourful algae living in their tissues.
- Without those helpful algae, the corals end up light and are liable to hunger and ailment.
- A **bleached coral is not useless**, but ocean temperatures want to cool off for any need of restoration.
- At least 14% of the world's remaining corals have been anticipated to have died in the previous international bleaching events.

- Scientists had formerly projected that coral reefs could become a tipping factor at 1.5 degree Celsius (2.7oF) of global warming, wherein up to 90% of reefs would be lost.



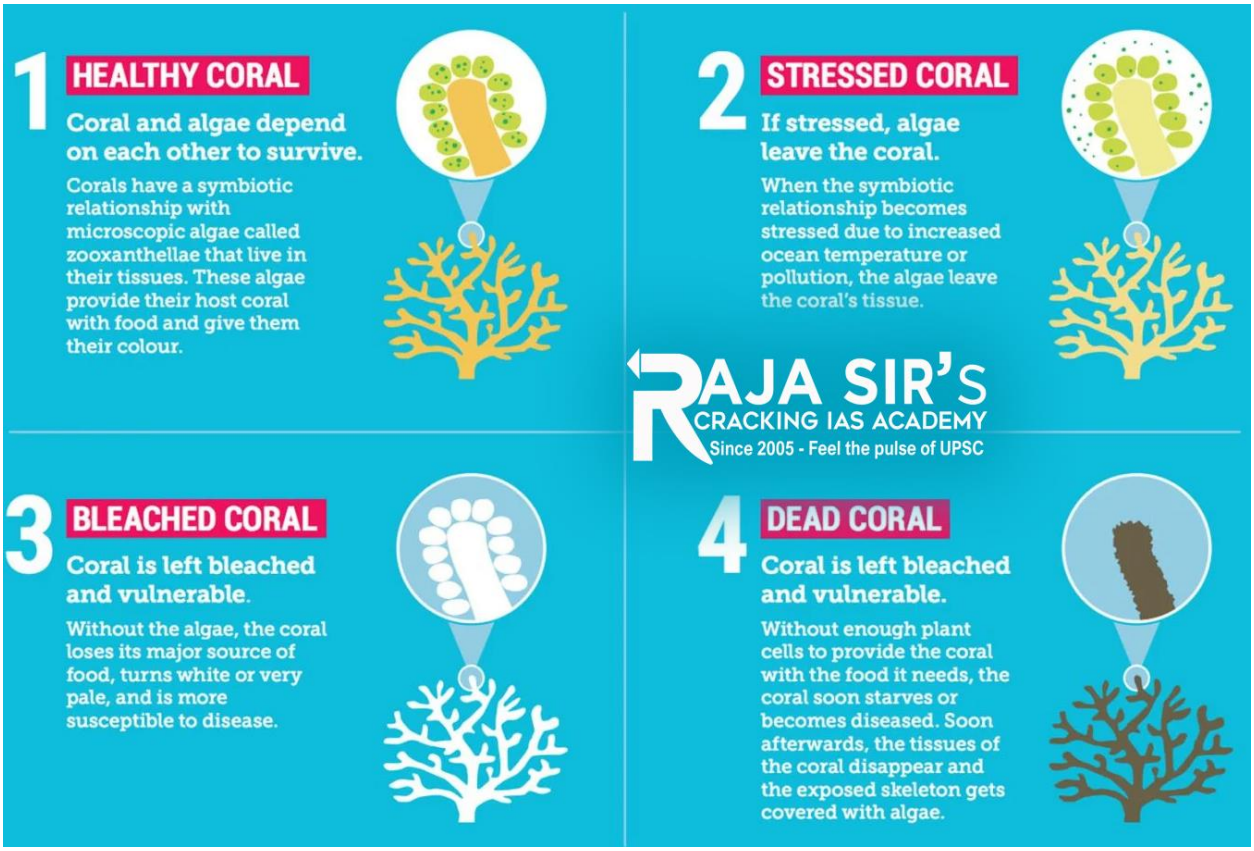
The state-of-the-art report bleaching adds to developing evidence that reefs have already passed a point of no return at just 1.3 C (2.3 F) of warming.

What triggers Coral Bleaching?

- The leading motive of coral bleaching is climate change.
- A warming planet means a warming ocean, and a trade in water temperature—as little as 2 tiers Fahrenheit—can cause coral to power out algae.
- Coral also bleaches for other reasons, like extremely low tides, pollution, or too

much daylight.

- The ongoing bleaching has been made worse by El Nino, a natural climate sample that can temporarily warm a few oceans, which led to May.



Impact of Coral Bleaching

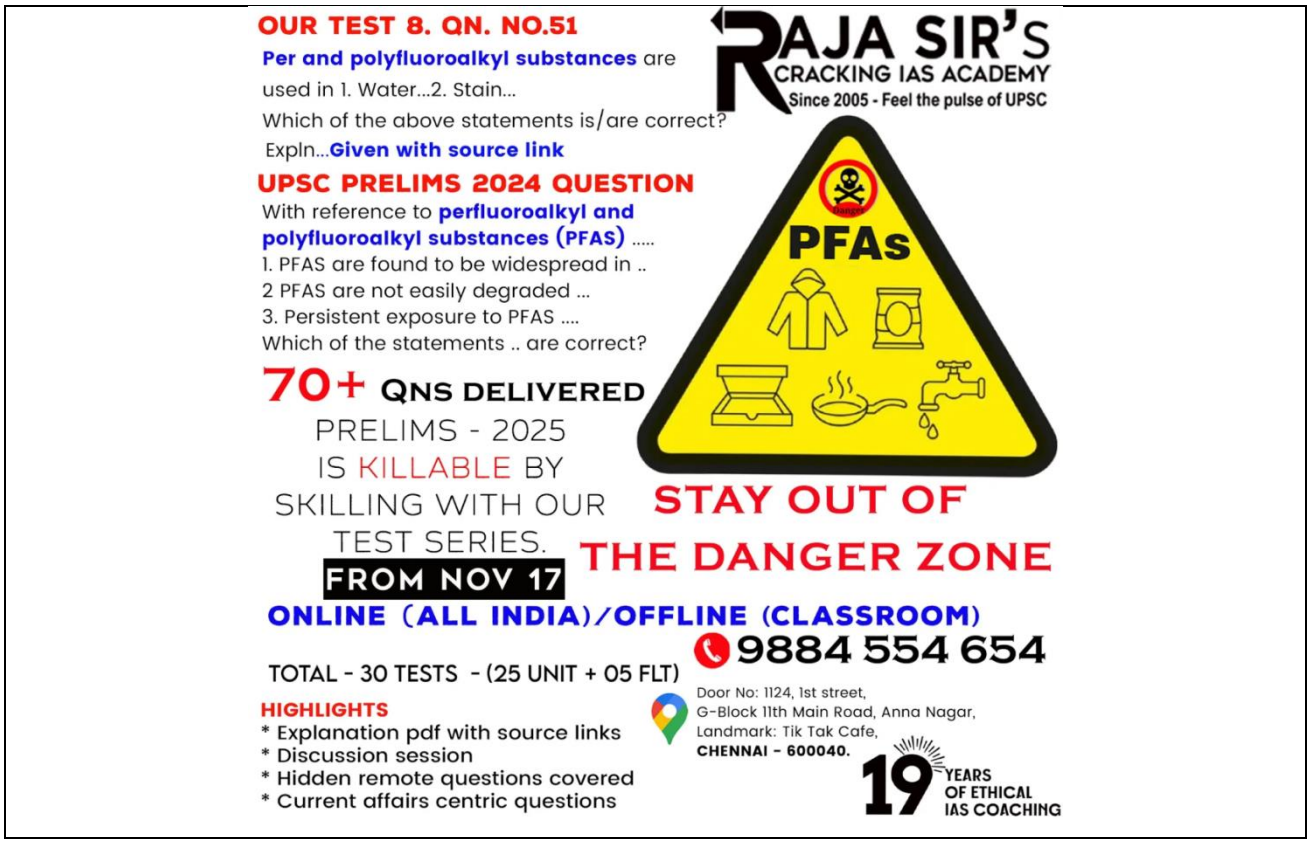
- **Wildlife:** Thousands of marine animals rely on coral reefs for survival.
- Coral reefs offer shelter, spawning grounds, and safety from predators.
- They also guide organisms at the bottom of ocean food chains.
- As reef ecosystems disintegrate, already at-risk species might also face extinction.
- **Humans:** Coral reefs are natural boundaries that take in the force of waves and storm surges, retaining coastal groups safe.
- Every year, reefs offer about $2.7 trillion in goods and services, as per a 2020

estimate via the Global Coral Reef Monitoring Network.

- Bleached coral also compounds the overfishing disaster by doing away with links in the food web and depriving some fish of an area to spawn and expand.
- Reef tourism brings in billions of dollars each year and supports lots of jobs.

Way Ahead

- Strengthening Marine Protected Areas (MPAs).
- Implementing coral healing techniques, including coral gardening and breeding resilient coral species, to enhance healing after bleaching occasions.
- Advocating for global efforts to reduce greenhouse gas emissions to restrict temperature will increase ocean acidification.
- Increasing funding in studies to better apprehend coral resilience, bleaching triggers, and recovery strategies, along with growing advanced tracking technology.


OUR TEST 8. QN. NO.51
Per and polyfluoroalkyl substances are used in 1. Water...2. Stain...
Which of the above statements is/are correct?
Expln...Given with source link
UPSC PRELIMS 2024 QUESTION
With reference to perfluoroalkyl and polyfluoroalkyl substances (PFAS) .....
1. PFAS are found to be widespread in ..
2 PFAS are not easily degraded ...
3. Persistent exposure to PFAS ....
Which of the statements .. are correct?
70+ QNS DELIVERED
PRELIMS - 2025
IS KILLABLE BY
SKILLING WITH OUR
TEST SERIES.
FROM NOV 17
RAJA SIR'S CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC
Danger
PFAs
STAY OUT OF
THE DANGER ZONE
ONLINE (ALL INDIA)/OFFLINE (CLASSROOM)
9884 554 654
TOTAL - 30 TESTS - (25 UNIT + 05 FLT)
HIGHLIGHTS
* Explanation pdf with source links
* Discussion session
* Hidden remote questions covered
* Current affairs centric questions
Door No: 1124, 1st street,
G-Block 11th Main Road, Anna Nagar,
Landmark: Tik Tak Cafe,
CHENNAI - 600040.
19 YEARS OF ETHICAL IAS COACHING

STUBBLE BURNING & RIGHT TO HEALTHY ENVIRONMENT

- The Supreme Court recently observed that stubble burning is not just an issue of breach of law but it also encompasses the violation of fundamental rights under Article 21 of the Constitution.

SC verdict on Stubble Burning:

- The court observed that stubble burning encompasses the violation of the fundamental right to the environment under Article 21 of the Constitution.
- The court referred to **Section 15 of the Environment (Protection) Act, 1986, which provides for penalties of up to five years in prison and fines of ₹1 lakh for causing harm to the environment.**
- The court ruled that there is a lack of a proper system in place to collect these fines and questioned the role of the **Commission for Air Quality Management (CAQM) in this regard.**
- The court observed that there is a **gap between the number of stubble-burning cases reported and the actual penalties imposed for violations.**

Court directives:

- The court directed that the Union government should consider the request of the Punjab government for more funds to fight stubble burning.
- The court also directed the central government and the state governments of **Delhi, Haryana, Uttar Pradesh, and Rajasthan to submit reports on how they are handling pollution issues within 2 weeks.**

Right to the environment in the Indian constitution

- Environment has been defined in **The Environment (Protection) Act, 1986 as The water, air and land and the interrelationship among them and the human beings, other living creatures, plants, microorganisms and property.**
- There are various constitutional and legal frameworks to ensure the right to the

environment.

Constitutional Provisions:

Article 21

- The Supreme Court in the **Maneka Gandhi vs. The Union of India case held that Article 21 guarantees the fundamental right to life.**
- **Article 21 of the Constitution covers the right to live with dignity, the right to survive as a species, the right to livelihood, and the right to a healthy environment.**
- Article 21 of the Indian Constitution also prevents the deprivation of one's life or personal liberty except by following procedures established by law.
- **In Subhash Kumar v. State of Bihar, 1991** the Supreme Court held that Article 21 covered the right to environment and the same verdict was reiterated in Virender Gaur v. State of Haryana case of 1994.

Article 47

- Apart from Article 21, Article 47 of the Constitution of India also outlines the state''s duties to improve public health, nutrition, and the standard of living.

Directive Principle of State Policy

- Article 48-A directs the states to endeavour for the protection and improvement of the environment and to safeguard the forests and wildlife in the country.
- **The National Green Tribunal in Sher Singh vs State of Himachal Pradesh 2014,** held that the State has a constitutional obligation to protect and strive towards the protection of the environment.
- **In M.C. Mehta vs Union of India, 2002**, The Supreme Court established the principle of "absolute liability", which holds corporations in hazardous industries strictly liable for any mishaps in industries.

Fundamental Duties

- **Article 51A(g)** imposes a fundamental duty upon the citizens of India to protect and preserve the environment.
- **Article 51-A (g),** provides that "**It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.**"

Legal Framework:

- Environment (Protection) Act, 1986
- Water (Prevention and Control of Pollution) Act, 1974
- Forest Conservation Act, 1980
- Wildlife Protection Act, 1972
- Air (Prevention and Control of Pollution) Act, 1981
- Biological diversity Act, 2002
- Plastic waste management rules

What is Stubble Burning?

- Stubble burning is the **process of removing paddy residue from fields after the harvest to prepare for the next crop.**
- **Farmers in northwest India burn 23 million tonnes of rice straw annually.**
- **India produces over 500 million tonnes of crop residues and cereals account for 70% of this.**
- As per the Ministry of Agriculture, **80% of 20 million tonnes of stubble generated in Punjab is burnt annually due to cost and time constraints.**
- It is commonly practised in areas which use the combine harvesting machines, which leaves residue behind.
- **Combine Harvesting**

These machines harvest, thresh, and clean grains in one go.

- They don''t cut crops close enough to the ground, due to which the stubble is left behind.

Reason Behind Stubble Burning

- Stubble which has been left behind has no use for farmers and delays the next sowing season. This makes farmers obliged to burn the stubbles.
- **The short time of 20-25 days between rice harvesting and wheat sowing also causes farmers to burn stubble.**
- **Punjab's 2009 Subsoil Act further delays paddy transplantation. The Act is an effort to conserve groundwater resources by mandatorily delaying the transplantation of paddy.**

Risks associated with Stubble Burning

- **Environmental Risks**

Stubble burning reduces soil nutrients such as nitrogen, phosphorus, and potassium and kills beneficial microbes in the soil.

- **Health Risks**

The burning process also releases huge amounts of harmful pollutants **such as CO2, CO, NOx, SOx, CH4, and particulate matter which includes PM2.5 and PM10. These are the major causes of respiratory and cardiovascular diseases.**

Long-term exposure to these pollutants increases cancer risks and mortality.

- Burning is not the only solution but it is the cheapest and fastest method available to farmers.

Way ahead

- **Technological Interventions**

There are machines such as the **Happy Seeder, Zero-till seed drill, Rotavator, and Paddy Straw Chopper** which help to manage residue without burning.

- **The Turbo Happy Seeder for instance cuts stubble and sows wheat simultaneously and covers the seeds with straw as mulch.**

- **Waste Decomposer**

A bio-concoction has been developed by the **National Centre for Organic Farming to compost crop residue in situ. The compost can be used as manure in farms to further enhance productivity.**

- **The Chhattisgarh Model of Gauthan** applies a sustainable approach where crop residue is collected and turned into organic fertiliser. This reduces the stubble burning and also provides rural employment.
- **Other Uses for Stubble**

The stubble can also be used as animal feed, compost, biochar, or converted into biodegradable cutlery.

Stubbles may also be used as a replacement for coal in power plants.

Long-Term Solutions

- **Combine Harvester Redesign**

There is a need to modify the combine harvester design to cut closer to the base. The government can incentivise companies in this process.

- **Agri-Waste Collection Centers**

The government can set up Agri-Waste Collection Centers where farmers can sell stubble for additional income. This incentivises them not to burn it.

Incentives for Industries

- The union and state governments can support industries to convert stubble into valuable products like cattle feed or fuel.

Crop Diversification

There is a need to incentivise the farmers to plant crops like maize, beans, and lentils which can reduce the need for burning as they are harvested by hand and have earlier harvest windows.

- Short-duration paddy varieties including the Pusa Basmati-1509 allow earlier harvest.

Global Ecosystems Atlas was launched at the 16th Conference of Parties (COP16)

- Global Ecosystems Atlas was launched at the ongoing 16th Conference of Parties (COP16) to the United Nations Convention on Biological Diversity (CBD).
- It has been developed by the **Group on Earth Observations (GEO) as the first global tool for ecosystem mapping and monitoring.**
- The atlas targets the major challenges such as biodiversity loss, climate change, and land degradation globally.

Objectives

- Its atlas aims to transform the understanding and protection of vital natural systems in the world.
- It will provide **crucial data on ecosystem health and risks associated with the ecosystem.**
- The atlas aims to enable countries in informed decision-making for sustainable management of ecosystems.

Technology:

- GEA will utilise the **Earth observation, artificial intelligence, and field data to fill data gaps in ecosystem management.**
- The atlas map has been aligned with the **Global Ecosystem Typology for consistency for the International Union for Conservation of Nature.**

IUCN Global Ecosystem Typology

It is a detailed classification framework for Earth's ecosystems which integrates functional and compositional features of the ecosystem to identify key ecosystems for biodiversity conservation and human well-being.

In simple words, it is a **classification framework for Earth"s ecosystems which helps us to identify ecosystems that are important for the conservation of biodiversity, research, and human well-being.**

Hierarchy

- The typology is hierarchical with **six levels in it.**
- It classifies ecosystems based on their functional characteristics and species assemblages.

Upper levels

- It Classifies ecosystems based on their functional characteristics like water regime, climatic regime, and food web structure. **This level includes realms, functional biomes, and ecosystem functional groups.**

Lower levels

- It Classifies ecosystems based on their species assemblages. The lower levels of typology include biogeographic **ecotypes, global ecosystem types, and sub globular local ecosystem types.**

The IUCN Global Ecosystem Typology

- The IUCN Global Ecosystem Typology helps the countries and stakeholders to understand and compare the ecological traits of various ecosystems, which is essential for ecosystem management.

Definitions

Realm:

It is one of **five major components of the biosphere which are terrestrial, freshwater, marine, subterranean, atmospheric and transitional realms (Which is a combination of the other four realms).**

- It is the broadest biogeographic division of the land surface on Earth based on the distribution patterns of terrestrial organisms. It is further subdivided into two parts- bioregions and ecoregions. The major realms around the world are:

Biome: It is a component of a realm. A biome is a community of flora and fauna that have common characteristics in the environment they exist in. **They're distinct geographical regions and have specific climate, vegetation, and animal life.**

Some examples of the biomes on land include **tundra, taiga, temperate deciduous forest, temperate rainforest, temperate grassland, chaparral, desert, savanna, and tropical rainforest.** The freshwater biomes are lakes, rivers, and wetlands, while the marine biomes include coral reefs and the oceans.

Ecosystem Functional Group: They are groups of functionally related ecosystems within a biome sharing common ecological drivers. They are grouped based on the role they play in an ecosystem. Primary producers, herbivores, carnivores, genera, species, domains, etc. are examples of functional groups.

Biogeographic ecotype: A biogeographic ecotype is a group or population of organisms which are adapted to local conditions and which can be found in patches in different regions. **Ecotypes are different from different subspecies, as they can exist in multiple habitats, and they also have no taxonomic rank.**

Global ecosystem types: they are complexes of organisms and their associated physical environment within a large area, which are occupied by an ecosystem functional group.

Subglobal ecosystem types: These are the subunits or nested groups of subunits within a global ecosystem type.

Importance of the Atlas for Stakeholders

- **Governments:**

It is an essential tool for **countries, businesses, communities, and institutions for ecosystem conservation and planning.**

- It supports the monitoring framework under the **Kunming-Montreal Global Biodiversity**
- **Framework.**

It also guides the countries in compliance with the Convention on Biological Diversity(CBD) obligations on ecosystem protection.

- It will help governments to monitor ecosystems, fulfil international commitments, and track biodiversity indicators.
- **Businesses:**

Businesses and corporations can incorporate environmental risks into their business strategies.

- **Local Communities:**

Local communities can also access data for conservation and restoration in their areas.

- **Financial Institutions**:

The atlas helps FIs to make informed investments and align their projects with sustainability goals.

PONG Dam

- The government was planning to give land rights to Pong Dam outsees under the Forest Rights Act, (FRA) 2006.

Details of Pong Dam :

- Pong Dam Lake (also known as **Maharana Pratap Sagar**) is a manmade reservoir formed due to the construction of **Pong Dam on Beas River** in the wetland zone

of **Shivalik hills in Kangra district of Himachal Pradesh.**

- The Pong Dam is the highest earth-fill dam in India and was constructed in **1975**. The catchment of the lake spreads up to 12562 sq. km and the total geographical area of the lake is 207 sq. km mainly up to 1410 ft.

Birds:

- Pong Dam Lake was designated a **Ramsar site in 2002** under the Ramsar criteria 5 and 8. It is home to several species of avifauna, some of which include **Bar-headed Geese**, Red-neck Grebe, northern lapwing, common teal, **spot-billed duck**, Eurasian coot, black stork, egrets, etc.

Beas River:

Location	Himachal Pradesh and Punjab, northwestern India.
Significance	One of the five rivers that give Punjab its name; Eastern limit of Alexander the Great's invasion of India (326 BC)
Source	• Rohtang Pass, western Himalayas, Himachal Pradesh
Course	• Flows south through Kullu Valley • Passes Mandi • Flows west into Kangra Valley • Enters Punjab, flows southwest to join Sutlej
Confluence	• Confluence with the Sutlej River at Harike
Major Tributaries	Bain, Banganga, Luni, Uhal, Banner, Chakki, Gaj, Harla, Mamuni, Parvati,

	Patlikuhlal, Sainj, Suketi, Tirthan
Famous Valleys Formed	• Kullu Valley, Kangra Valley

Asiatic Golden Cat

The Asiatic golden cat **(Catopuma temminckii)**,has been rediscovered in **Assam's Manas National Park**.

- This sighting marks a major conservation milestone, given that the last confirmed sighting occurred in 2007.
- Manas National Park now joins other **Northeast India**n reserves, such as those in Meghalaya and Arunachal Pradesh, in supporting this rare species.
- **Habitat:** Highly adaptable found in forests ranging from **tropical/subtropical evergreen forests, mixed and dry deciduous forests and tropical rainforests** even at an **altitude of 3,738** above sea level.
- **Range Countries: Southern China, Southeast Asia, and Northeast India.**

Species Characteristics:

- The common coat colour is **golden or red-brown**, but it may also be **dark brown or even grey.**
- Its size is medium with relatively long legs.
- **Mainly Nocturnal** but recent data indicates that **it may be diurnal.**
- Males are larger than females.

- **Reproduction** a gestation Period of 75 – 80 days.

Protection Status:

- Wildlife (Protection) Act of 1972: **Scheduled I**
- IUCN: **Near Threatened**
- CITES: **Appendix I**

Centre Issues Guidelines on Seaweed Import

The recent notification by the Indian government concerning the import of live seaweeds marks a significant step towards enhancing the country's coastal economy and promoting sustainable practices in aquaculture. This initiative, outlined in the 'Guidelines for Import of Live Seaweeds into India,' aims to address critical challenges faced by the domestic seaweed industry, particularly in securing high-quality seed stock

Seaweeds

- Seaweeds are a **type of marine algae** found in oceans and seas.
- They vary in color **(green, red, and brown)** and are **rich in nutrients like vitamins, minerals, and bioactive compounds,** making them valuable for multiple industries including food, agriculture, cosmetics, pharmaceuticals, and biofuels.
- Seaweeds grow in **shallow coastal waters,** where they absorb sunlight to photosynthesize.
- India's long coastline supports the cultivation of different types of seaweed as mentioned in the table.

Seaweed	Type	Uses	Cultivation Areas
Kappaphycus alvarezii	Red seaweed	Extracting carrageenan (used in food, cosmetics, pharmaceuticals)	Tamil Nadu, Gujarat
Gracilaria edulis	Red seaweed	Producing agar (used in food products, laboratories)	Tamil Nadu, Maharashtra, Gujarat
Gelidiella	Red	Source of agar (used in food	Southern coastlines,

acerosa	seaweed	processing, pharmaceuticals, biotechnology)	especially Tamil Nadu
Ulva lactuca (Sea Lettuce)	Green seaweed	Food source, animal feed (high protein content)	**West coast,** primarily Gujarat and Maharashtra

Objectives of the Guidelines

- **Addressing Seed Shortages:** The main goal of these guidelines is to enable the introduction of quality germplasm of seaweed species. Today, India's seaweed industry still has challenges because of raw materials, particularly the seed for Kappaphycus, the most widely grown species. This policy seeks to help the government ensure that domestic farmers get access to better seed materials that would increase production yield.
- **Economic Upliftment:** They address the need to strengthen economic prospects where communities live particularly along the coast. As a major economic activity, the creation of seaweed enterprises aims to improve the soci-economic welfare of fisherfolk and other stakeholders. This is in line with other objectives under PMMSY with production aspires of 1.12 million tonnes of seaweed in 2025.

Regulatory Framework

- **Application Process:** Keeping live seaweeds for import is only allowed in India under very specific conditions which will require the importer to make an elaborate application to the Department of Fisheries. The National Committee on Introduction of Exotic Aquatic Species in Indian Waters shall assess this application rigorously. Upon approval an import permit will be issued within four weeks thereby simplifying the process of importing high quality germplasm.
- **Quarantine and Biosecurity Measures:** To prevent the invasion of undesirable

species in the Indian marine environment, the guidelines contain very stringent measures on quarantine and biosecurity. These protocols are especially needed to avoid introducing new pests and diseases that may be fatal to aquatic life in that area. After import control measures, monitoring and risk assessment will also be implemented for the sustenance of the environment while ***pursuing TiO2 industry development***.

Investment in Infrastructure

- The government has also produced significant efforts towards putting in place framework that will support this effort.
- ₹127.7 crore has been proposed to be spent for a Multipurpose Seaweed Park in Tamil Nadu to facilitate research and development of seaweed farming.
- This facility is believed to contribute significantly in the downstream processing industries hence generating more employment in the coastal villages.

Environmental Sustainability

- The guidelines emphasize **environmental sustainability**, ensuring that while economic growth is pursued, ecological balance is maintained.
- The government has articulated its commitment to uphold environmental protection standards throughout this initiative, recognizing that sustainable practices are vital for long-term success in aquaculture. By addressing seed shortages, promoting economic upliftment, and ensuring environmental sustainability through rigorous regulatory frameworks, these guidelines are poised to transform India's coastal economies.
- As the country aims for significant production targets by 2025, this initiative could serve as a model for integrating sustainable practices into economic development strategies across various sectors

Applications of Seaweed

- **Agriculture:** Used as natural fertilisers and soil conditioners.
- **Food Industry:** Serve as food additives and stabilisers (e.g., agar and carrageenan).
- **Cosmetics and Pharmaceuticals**: Source of bioactive compounds with antioxidant, anti-inflammatory, and antibacterial properties.
- **Biofuels:** Emerging renewable energy source due to high biomass productivity.
- By enabling regulated seaweed import, the guidelines open pathways for sustainable economic growth in coastal regions and broader applications of seaweed in various industries.

Digital Sequence Information (DSI)

- U.N. Biodiversity Summit, COP16, is set to take place in Cali, Colombia from October 21 to November 1, 2024.
- Nearly 200 countries are there to discuss strategies to combat the rapid destruction of nature.

Goals at COP16

- **Unified System:** Establish a single, multilateral system to generate revenue for conservation from DSI usage

What is Digital Sequence Information (DSI)?

- DSI refers to the unique genetic codes and sequences found in all living organisms.
- **Importance:** These sequences are crucial for understanding how organisms develop and function.
- DSI is vital for the conservation and sustainable use of genetic resources, particularly in food and agriculture.

Why Genetic Information?

- **Research and Development:** Scientists have been using genetic codes from plants, animals, and microbes to discover new products for pharmaceuticals and cosmetics.
- **Biodiversity Concerns:** Countries rich in biodiversity, like Brazil and India, want to ensure they receive compensation when companies exploit their natural resources.

Importance of Digital Sequence Information to Companies

- **Economic Impact:** Sectors using DSI contribute approximately $1.6 trillion annually, impacting industries like pharmaceuticals and agriculture.
- **Product Development:** DSI is vital for creating new medical treatments, including vaccines, and food products.
- **Role in Research**
    - **Fundamental Tool**: DSI is crucial for environmental and biological research, aiding in the understanding of life's molecular basis and evolution.
    - **Therapeutic Potential**: It helps explore ways to manipulate genes for new therapies, cures for diseases, and alternative energy sources.
    - **Conservation Applications**: DSI assists in taxonomy, risk assessment for threatened species, tracking illegal trade, identifying product origins, and conservation management

Benefits of Digital Sequence Information (DSI)

- **Accelerated Research : DSI provides quick access to genetic information, speeding up research for scientists and institutions globally.**
- **Protecting Endangered Species:** DSI is crucial for studying and conserving biodiversity, especially for species at risk of extinction.
- **Research Opportunities:** The digital nature of DSI facilitates research on plant genetics and the development of new medicines, benefiting industries that

depend on genetic resources.

- **Data Sharing and Collaboration : Publicly accessible DSI databases encourage international collaboration, allowing efficient knowledge sharing and contributing to global research projects.**

Challenges of Digital Sequence Information (DSI)

- Lack of Benefit-Sharing Framework : Developing countries argue that open access to DSI lets developed nations profit from genetic data without giving fair compensation to the original countries or local communities.
- Intellectual Property Issues: DSI can lead to companies or nations patenting products developed from genetic data, raising questions about the rights of source nations and communities.
- Conservation vs. Commercialization: DSI could either help conserve biodiversity or lead to its exploitation, depending on how the information is used and whether benefits are shared fairly.

Current Challenges :

- **Complex Legal Framework:** Laws governing genetic material usage vary widely by country which complicates research and sharing.
- **Limited Financial Benefits:** Developing nations often see little profit from their biodiversity due to these regulations.

Related Initiatives :

Kunming-Montreal Global Biodiversity Framework (GBF)

- The GBF includes DSI in its targets. It aims for a balanced approach to biodiversity conservation and benefit-sharing, emphasizing the need for multilateral cooperation.

Nagoya Protocol

- This protocol, part of the Convention on Biological Diversity, focuses on fair and equitable sharing of benefits from genetic resources, but does not fully address DSI.

Nature Conservation Index

India''s environmental performance has come under scrutiny following the release of the **Nature Conservation Index**, which ranked the country 176 out of 180 countries in terms of natural environment protection. With a score of 45.5 out of 100, this ranking reflects significant challenges in managing biodiversity and conservation efforts.

Key Highlights of the Index

- **Overall Ranking:** India ranked 176th out of 180 countries.
- **Score:** India received a score of 45.5 out of 100.
- **Top Performers:** Luxembourg, Estonia, and Denmark topped the list, while Kiribati was the lowest-ranked.
- **Marine Conservation**: India scored 0 out of 100 in managing marine protected areas and species protection within marine ecosystems.
- **Terrestrial Protection:** India scored 73 out of 100 for terrestrial species protection but faces challenges with illegal wildlife trade, ranking fourth globally in this area.
- **Protected Areas:** While 7.5% of India's terrestrial area is protected, only 0.2% of marine waters are under protection.
- **Regional Comparison:** Other South Asian nations such as Bangladesh, Pakistan, and Myanmar ranked above India, with Bhutan being the highest in the region at a commendable position.

Details of the Index

- The Nature Conservation Index is a new assessment tool that ranks countries

based on their efforts in natural environment protection across four key pillars:

- **Managing Protected Areas:** Evaluating the extent and effectiveness of designated conservation zones.
- **Addressing Threats Against Biodiversity:** Assessing actions taken to mitigate risks posed to various species and ecosystems.
- **Nature and Conservation Governance:** Analyzing policies, regulations, and institutional frameworks supporting conservation efforts.
- **Future Trends in Natural Resource Management:** Looking at the sustainability and long-term strategies for managing natural resources.
- The index uses 25 parameters within these pillars to gauge each country's performance.
- draws upon publicly available data from reputable sources such as the **International Union for Conservation of Nature (IUCN), World Bank, and Yale"s Environmental Performance Index (EPI).**

Mangroves and Cyclones

Cyclone Dana, which made landfall close to Bhitarkanika National Park and Dhamra Port in Odisha ***did not cause significant damage*** as many had feared.

What are mangroves?

- Mangroves are **salt-tolerant trees and shrubs typical of estuarine and intertidal regions**, meaning they grow in areas where freshwater and saltwater meet. Mangroves have aerial, breathing roots and waxy, succulent leaves, and are flowering plants.
- **The Sundarbans (spread across India and Bangladesh)** is the largest contiguous mangrove forest in the world. Mangrove seedlings called **propagules germinate** on the parent tree before falling into the waters and growing into a mangrove tree again.

How Mangroves Reduced Cyclones?

Ecological Stabilisation	• Maintain and build soil. • Act as a reservoir for tertiary waste assimilation • Protect against cyclones. • Promote land accretion and fixation of mud banks. • Dissipate wind, tidal, and wave energy.
Mangroves and Tides	• The dense tangle of roots helps handle daily tidal rise and fall. • Most mangroves are flooded at least twice a day.
Coastal Stabilisation	• Stabilize the coastline. • Reduce erosion from storm surges, currents, waves, and tides.
Water Purification	• Improve water quality by absorbing nutrients from runoff. • Prevent harmful algal blooms offshore. • Support coral reefs and seagrass beds by keeping water clear and healthy.
Storing Blue Carbon	• Mangroves represent less than 2% of marine environments but contribute 10-15% of carbon burial. • Store "blue carbon" in soil after plant matter falls to the seafloor.

Supporting Biodiversity	• Support a diverse array of wildlife, including birds, fish, invertebrates, mammals, and plants.
Government Measures:	
India State of Forest Report (ISFR) 2023	• Mangrove cover in India increased by 17 sq km (0.34%) as compared to the previous assessment.
MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes)	• Government-led initiative under the Ministry of Environment, Forest and Climate Change (MOEF & CC) aimed at increasing mangrove cover along the coastline and saltpan lands, providing financial assistance to local communities.
Sustainable Aquaculture In Mangrove Ecosystem (SAIME)	• Initiative promoting sustainable aquaculture using IMA (Integrated Mangrove Aquaculture) systems to build aquaculture farms that are mangrove-friendly.
Magical Mangroves Campaign	• WWF India's campaign to involve citizens from nine coastal states in mangrove conservation efforts.
National Coastal Mission Programme on 'Conservation and Management of Mangroves and Coral Reefs'	• Annual preparation of a Management Action Plan (MAP) for the conservation and management of mangroves and coral reefs under the

	National Coastal Mission Programme.
Awareness Campaigns	• Conducting public awareness programs to educate people about the importance of mangroves and their role in environmental protection.

NEED FOR FGD REGULATIONS IN INDIAN TPPs

- The recent memorandum from NITI Aayog has ignited a significant debate regarding the necessity of flue gas desulfurization (FGD) systems in India's thermal power plants (TPPs). This discussion is crucial as India grapples with its status as the world's largest emitter of sulfur dioxide (SO_2), primarily from coal combustion in TPP's.

Context of the Debate

- According to the NITI Ayog memorandum supported by the information gathered by the Council of Scientific & Industrial Research-National Environmental Engineering Research Institute (CSIR-NEERI), the need for further ***FGD provision is in doubt.***
- The CSIR-NEERI report found 467 monitoring stations where maximum permitted levels of SO_2 emissions were crossed and out of these, only 13 stations crossed the allowed limits in 2015.

Contrasting Evidence

- Even as CSIR-NEERI has recommended a change of strategy towards regulation of PM, which often violates the legal limit, an analysis made with the help of satellite data by a team from IIT Delhi proposes a phased roll out of FGDs that seem to point to a higher actual emissions of SO_2 than declared by CSIR-NEERI. This difference illustrates a lesson that could be learned from the attempted use of one study in the formation of national policy; more particularly when health

risks are involved.

Key Details

- The study aimed to assess the need for current **flue gas desulfurization (FGD**) regulations in Indian TPPs.
- It concluded that SO_2 levels from 467 **Central Control Room for Air Quality Management stations operated by CPCB and 486 sites managed by TPPs** across India showed only 13 sites exceeded the prescribed **limit of 80 micrograms per cubic metre** and only in the fourth quartile (less than 25 per cent of data).
- IIT Delhi's report, ***Study to Assess the Compliance of Thermal Power Plants in India to New SO_2 Emission Norms (2015) and Lay Out Phased Plan for FGD Implementation***, recommended phased FGD implementation in thermal power plants (TPPs) across India based on SO_2 concentration data from **AURA (OMI) Satellite and MERRA2 reanalysis (2015-2019).**

Should FGD be installed?

- **Installing FGD systems is costly,** at Rs 1-2 crore per megawatts, leading to an added charge of 0.50-0.55 paise per unit, which increases electricity generation costs.
- If **FGD implementation continues**, consumers may face additional costs, while coal power plants and regulators avoid **accountability for market-driven technology prices.**

Where is the SO_2?

- **In 2023, India consumed approximately 1,155.3 million tonnes of coal**, with the coal-based thermal power sector accounting for 826.64 million tonnes. Indian coal has a sulphur content ranging from 0.35 to 0.4 percent, which is relatively low compared to **Chinese or Indonesian coal**.
- However, the **calorific value (CV) of Indian coal is about half that of imported**

coal, leading to double the consumption for each MWe generated. During combustion, the sulphur in coal combines with oxygen, forming SO_2, which is released into the environment unless effective capture mechanisms are in place.

- **The SO_2 emitted from coal combustion in India is transformed into sulphates** in the atmosphere, which contributes to an increase in **particulate matter (PM2.5).**
- **India is the world's largest emitter of sulfur oxides**, emitting nearly two to three times as much as China, which has already implemented abatement measures in its power plants.

Why is it important to control SO_2 emissions?

- **In 2019, India surpassed China to become the largest SO_2** emitter globally, emitting nearly twice the amount of Russia, the second-largest emitter.
- **SO_2, along with PM2.5 and PM10,** poses severe health risks, increasing the likelihood of stroke, heart disease, lung cancer, and premature death.
- Given the harmful effects of SO_2 on human health, controlling its emissions is crucial. **SO_2 also reacts with nitrogen oxides (NOx) to form PM2.5 and PM1,** both of which have serious health implications and contribute to haze. High NOx levels in Indian coal-fired power plants enhance the conversion of SO_2 into fine PM.
- According to the Ministry of Power, in 2024, FGDs were being installed in 537 units across the country's coal-based TPPs.

<u>The current status of FGD installation as per the ministry is as follows:</u>

- FGD installed in 39 units (19,430 MW).
- Contracts awarded or installations underway in 238 units (105,200 MW).
- Units in various stages of tendering process: 139 units (42,847 MW).
- Units in the pre-tendering process: 121 units (36,683 MW).

Flue Gas Desulfurization (FGD)

- It is a process that **uses a sorbent, usually lime or limestone, to react with SO in the flue gas and convert it into harmless products**. The sorbent can be injected as a dry powder, sprayed as a wet slurry or circulated as a seawater solution. **The reaction products can be collected as solid residues, dissolved i water or discharged into the sea**.

Thermal Power Plants in India

Thermal Power Plant	Location	Capacity (MW)
Vindhyachal Thermal Power Station	Madhya Pradesh	4,760 MW
Mundra Thermal Power Station	Gujarat	4,620 MW
Sipat Thermal Power Plant	Chhattisgarh	2,980 MW
Tiroda Thermal Power Station	Maharashtra	3,300 MW
Talcher Super Thermal Power Station	Odisha	3,000 MW
Korba Super Thermal Power Plant	Chhattisgarh	2,600 MW
Rihand Thermal Power Station	Uttar Pradesh	3,000 MW

Sasan Ultra Mega Power Plant	Madhya Pradesh	3,960 MW
Kudgi Super Thermal Power Station	Karnataka	2,400 MW
Ramagundam Super Thermal Power Plant	Telangana	2,600 MW
NTPC Dadri	Uttar Pradesh	2,637 MW
Neyveli Thermal Power Station	Tamil Nadu	1,970 MW
Tuticorin Thermal Power Station	Tamil Nadu	1,050 MW
Kahalgaon Super Thermal Power Station	Bihar	2,340 MW
Farakka Super Thermal Power Plant	West Bengal	2,100 MW
Chandrapur Super Thermal Power Station	Maharashtra	2,920 MW
Dahanu Thermal Power Station	Maharashtra	500 MW
Simhadri Super Thermal Power	Andhra Pradesh	2,000 MW

Station		
Barauni Thermal Power Station	Bihar	720 MW
Udupi Power Plant	Karnataka	1,200 MW
Bhusawal Thermal Power Station	Maharashtra	1,210 MW
Mejia Thermal Power Station	West Bengal	2,340 MW
Raichur Thermal Power Station	Karnataka	1,720 MW
Parli Thermal Power Station	Maharashtra	1,130 MW
Jharsuguda Thermal Power Plant	Odisha	2,400 MW
Anpara Thermal Power Plant	Uttar Pradesh	1,630 MW
Gadarwara Super Thermal Power Plant	Madhya Pradesh	1,600 MW
Kothagudem Thermal Power Station	Telangana	1,720 MW
Mettur Thermal Power Station	Tamil Nadu	840 MW

Panipat Thermal Power Station	Haryana	1,360 MW
Singrauli Super Thermal Power Station	Uttar Pradesh	2,000 MW
Rajpura Thermal Power Plant	Punjab	1,400 MW
Tanda Thermal Power Plant	Uttar Pradesh	440 MW
Durgapur Thermal Power Station	West Bengal	1,000 MW
Bara Thermal Power Plant	Uttar Pradesh	1,980 MW

Similipal Tiger Reserve

- Odisha is set to get its first tiger from Maharashtra under a big cat relocation project intended at improving the **genetic diversity** of the Tigers in the Similipal landscape.
- **First-Ever Tiger Relocation from Maharashtra to Odisha with Radio-Tracking**
- **Source and Destination**: A female tiger from **Tadoba-Andhari Tiger Reserve (TATR)** in Maharashtra is being transported to **Similipal Tiger Reserve (STR)** in Odisha.
- **Significance**: This relocation is the **first such project between Odisha and Maharashtra,** following the suspension of an earlier tiger relocation program between Odisha and Madhya Pradesh in 2019.

- **Radio-Collaring**: The relocated tiger will be equipped with a radio collar to allow continuous tracking and monitoring of its movement within STR

Tadoba-Andhari Tiger Reserve (TATR)

- **Located** in Chandrapur district, Maharashtra.
- Named after the god **"Tadoba" or "Taru,"** worshipped by indigenous tribes in the dense forests of Tadoba and Andhari.
- **"Andhari"** refers to the **Andhari River**, which flows through the forest.
- Linked by corridor connections with Nagzira-Navegaon and Pench Tiger Reserves in Maharashtra.
- **Vegetation type**: Southern Tropical Dry Deciduous forest.
- **Contains two lakes and one waterway**: Tadoba Lake, Kolsa Lake, and the Tadoba River.
- Designated as **Maharashtra's second Tiger Reserve in 1993-94.**

Similipal Tiger Reserve (STR)

- Designated as a Tiger Reserve in 1956; included in Project Tiger in 1973 and declared a Biosphere Reserve in 1994.
- Recognized as part of the UNESCO World Network of Biosphere Reserves since 2009.
- Forms part of the **Similipal-Kuldiha-Hadgarh Elephant Reserve (Mayurbhanj Elephant Reserve),** which encompasses three protected areas: **Similipal Tiger Reserve, Hadagarh Wildlife Sanctuary, and Kuldiha Wildlife Sanctuary.**
- **Location**: Situated in northern Odisha's Mayurbhanj district, at the eastern edge of the Eastern Ghats.
- **Tribes:** Home to th**e Erenga Kharias and Mankirdias tribes**, who engage in traditional agriculture and collect seeds and timber.

- **Unique feature:** The **only place in the world** where **melanistic (black) tigers** are found.

· **Fauna:** Includes leopard, gaur, elephant, langur, barking deer, spotted deer, sloth bear, mongoose, and flying squirrel.

The Great-Eared Nightjar

- In the thick forests of Southeast Asia, the **Great Eared Nightjar reminds people of a dragon from ancient folklore.** They are birds with nocturnal habits and it is named so because its calls which are are often described as jarring.
- It is the *Second heaviest species* in the family Caprimulgidae, after Nacunda Nighthawk.
- **Scientific Name : Lyncornis macrotis Common Name: Great Eared Nightjar**
- **Physical Features :** They are very large nightjars with long barred wings and a barred tail. They have long ear-tufts, with a white throat band**.** However, they lack white patches on the wings or tail
- **Behaviour :** They are nocturnal and active at dusk and night.They are known for their distinctive call which is the sharp "tsiik," pause, which is followed by the two-syllable "ba-haaww"
- **Subspecies :** They exist in ***five subspecies.***
  These are:

1. L. m. cerviniceps: They are found in Bangladesh, NE India, southern China, Indochina and the northern Malay Peninsula.
2. L. m. bourdilloni: They are restricted to South West India
3. L. m. macrotis: They are found in the Philippines, except far west of Visayas, Palawan group and the Sulu Archipelago**.**
4. L. m. jacobsoni: They are found on Simeulue island in Indonesia.

5. L. m. macropterus: Sulawesi, Sangihe and Talaud Islands, Banggai, and Sula Island of Indonesia are the places where they are found

- **Distribution:** They are found in South Asia and Southeast Asia, including the Western Ghats (India) and Sri Lanka. India, Bangladesh, Sri Lanka, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam are the countries where they are found
- **Habitat :**They are found in subtropical or moist lowland tropical forests
- **Conservation status :IUCN: Least Concern**

Asthamudi Lake

- Ashtamudi Lake, a backwater lake in Kerala, was the site of a concerning environmental incident, as hundreds of dead fish were found floating in the water, triggering panic among local residents.
- Although isolated reports of fish deaths had occurred in the area previously, this marks the first instance of such a massive die-off in the lake''s history.

Causes of mass fish mortality:

- Local residents suspect that leachate contamination is to blame for the fish mortality, citing the potential dumping of large volumes of waste into the lake.
- The recent mass die-off of fish in Ashtamudi Lake has been linked to the discharge of toxic substances into the water. These pollutants have significantly reduced the oxygen levels in the lake, leading to the death of a large number of fish downstream.
- The contamination has also resulted in the production of harmful gases and elevated levels of hazardous compounds, including hydrogen sulfide, ammonia, and heavy metals.

Ashtamudi Lake

- Ashtamudi Lake is a prominent backwater lake located in the Kollam district of Kerala, and is one of the most visited in the state.
- The lake's surroundings were pivotal in the **14th century as a major port area**, connecting the ancient city of ***Quilon*** (Kollam) to international trade routes.
- This made Quilon an important trading hub in Kerala during the medieval period. **Ibn Battuta**, the Moroccan traveler and explorer, mentioned Quilon as one of the ***key trading centers***, emphasizing the strategic and economic importance of the city and the lake.
- Ashtamudi Lake is the second largest estuary ecosystem in Kerala, after the Vembanad Lake.
- Its name, derived from the Malayalam word "Ashtamudi", meaning "eight braids", reflects the lake's octopus-shaped topography, with multiple interconnected branches.
- Ashtamudi boasts a unique wetland ecosystem, supporting rich biodiversity, including numerous species of fish and shellfish.
- The lake is part of Kerala's backwaters, renowned for its houseboats and resorts that attract thousands of tourists each year. The Kallada River serves as the primary water source for Ashtamudi Lake, contributing to its brackish water ecosystem.
- Ashtamudi Wetland was designated a **Ramsar site in 2002**, recognising its international importance for wetland conservation and sustainable utilization, particularly for fishing and tourism.
- In 2014, the Clam Governing Council of Ashtamudi became **the first Marine Stewardship Council (MSC) certified fishery in India** for its sustainable clam fishing practices, a significant achievement for responsible resource management.
- Ashtamudi Lake is home to various mangrove species, including two endangered species, **Syzygium travancoricum and Calamus rotang**, highlighting its ecological value in preserving rare and vulnerable flora. These species thrive in

the marshy regions of the lake, contributing to the unique biodiversity of the wetland

WMO Releases GREENHOUSE GAS BULLETIN

The Greenhouse Gas Bulletin reports on greenhouse gas concentrations, **rathethan on emission levels**. The Greenhouse Gas Bulletin complements the UN Environment Programme's Emissions Gap report. Both were published ahead of COP29 in Baku, Azerbaijan.

Key takeaways

- The Greenhouse Gas Bulletin has been published annually since 2004.
- The publication presents the latest analysis of observations from the WMO Global Atmosphere Watch **(GAW) Programme** on concentrations of long-lived greenhouse gases in the atmosphere.
- The Bulletin reports globally averaged surface mole fractions of carbon dioxide (**CO2**), methane **(CH4),** and nitrous oxide (**N2O**). It compares these values to those of the previous year and pre-industrial levels.
- Additionally, it provides insights into changes in radiative forcing — the warming effect on the atmosphere by long-lived greenhouse gases and details the contribution of individual gases to this effect.
- The Greenhouse Gas Bulletin is **released yearly** to inform the United Nations Climate Change negotiations, the annual Conference of the Parties (COP).

Key findings of latest bulletin

- The globally-averaged surface concentration of CO2 reached 420.0 parts per million (ppm), methane 1934 parts per billion and nitrous oxide 336.9 parts per billion (ppb) in 2023. These values are 151%, 265% and 125% of pre-industrial (before 1750) levels.
- In 2023, the increase in CO_2 levels was driven by three main factors: large

amounts of CO_2 released from wildfires, a possible decline in how much CO_2 forests can absorb, and persistently high CO_2 emissions from fossil fuels due to human and industrial activities.

- During ***El Niño years***, greenhouse gas levels tend to rise because drier vegetation and forest fires reduce the efficiency of land carbon sinks.
- Given the extremely long life of CO2 in the atmosphere, the temperature level already observed will persist for several decades even if emissions are rapidly reduced to net zero.
- The last time the Earth experienced a comparable concentration of CO2 was 3-5 million years ago, when the temperature was 2-3°C warmer and sea level was 10-20 meters higher than now.

Hasdeo Arand Forest and Ongoing Protests

The Hasdeo forest in Chhattisgarh, often referred to as the "**lungs of Chhattisgarh**," has recently become a flashpoint for conflict between local villagers, environmental activists, and government authorities. The resumption of tree-felling for coal mining in this ecologically rich region has sparked protests, leading to clashes with police and raising significant concerns about biodiversity, tribal rights, and environmental degradation.

What is the Hasdeo Arand Forest?

- The Hasdeo Arand forest is one of the **largest un-fragmented forest ecosystems** in Central India, spanning approximately 1,879.6 square kilometers across the districts of **Sarguja, Korba, and Surajpur**. It is characterized by its diverse flora and fauna, including:
- **Biodiversity**: The forest is home to numerous species, including nine that are specially protected under the Wildlife Protection Act, 1972, such as elephants, leopards, and sloth bears. It also hosts 640 floral species, 128 medicinal plants,

and various timber-yielding species.

- **Ecological Importance**: The Hasdeo Arand serves as a crucial habitat and migration corridor for wildlife, particularly elephants and tigers.

Significance of Mining in Hasdeo

- The Hasdeo-Arand Coalfield (HAC) is significant for coal mining, with 23 coal blocks identified, covering about 437.72 square kilometers. Notably, several blocks, such as **Parsa and Kente Extension**, have been auctioned to companies, including Adani Enterprises.
- Mining activities are considered essential for meeting energy demands; however, they pose a substantial threat to the forest ecosystem and local communities, whose livelihoods depend on agriculture and forest resources.

Reasons for Opposition to Mining

- **Environmental Concerns**: Villagers argue that mining will devastate their villages, destroy forest cover, and impact their livelihoods, leading to long-term ecological damage.
- **Compensation and Resettlement Issues**: Many locals are dissatisfied with government compensation and resettlement offers, claiming they are being moved to smaller houses and losing their land.
- **Allegations of Improper Procedures**: Activists allege that fake gram sabha resolutions were used to secure environmental clearances for mining projects, undermining local governance and consent.
- **Demand for Protection**: Activists are calling for the cancellation of specific coal blocks and for the protection of the Lemru Reserve Forest, emphasizing the need to respect legislative resolutions aimed at preserving the environment.

STATUS OF THE WORLD''S TREES REPORT

- A new Global Tree Assessment “Status of the World’s Trees Report” has revealed

that over one-third of the tree species in the world are threatened with extinction.

World's Trees Report/The Global Tree Assessment (GTA)

- GTA is a **collaborative global initiative led by Botanic Gardens Conservation International (BGCI) and the International Union for Conservation of Nature(IUCN) Species Survival Commission"s Global Tree Specialist Group.**
- It **evaluates the conservation status of all global tree species** to guide biodiversity conservation efforts across the world.
- GTA is the largest global assessment project and encompasses the conservation status **assessments for nearly 50,000 tree species in the world, which is more than a quarter of all assessments on the updated IUCN Red List.**

Findings from the Global Tree Assessment

Extinction Threat:

- **Nearly 38% or 16,425 trees)of the world"s tree species are now at the risk of extinction.**
- This number of threatened tree species far exceeds the combined count of threatened birds,
- mammals, reptiles, and amphibians across the world.

Islands at Higher Risk:

- Islands have the highest proportion of endangered trees and this is due to rapid urban and agricultural development, invasive species, pests, and diseases.

South America:

- **South America, the region with the richest tree diversity, has 3,356 out of 13,668 tree species facing the threat, which is largely attributed to deforestation for agricultural expansion.**
- Tropical regions such as South America face additional risks from rising sea levels, severe storms, and other climate-related challenges such as sea level rise and ocean acidification, which impact tree survival.

Human Utility of Forests:

- **Over 5,000 tree species of the assessed trees are used for timber, and more than 2,000 of them are essential for food, medicine, and fuel.**
- Trees play a vital role in ecosystems by supporting biodiversity, carbon sequestration, water and nutrient cycles, soil formation, etc., among others. For these reasons, there is a need to conserve trees to utilise their values.

Trees

- Trees are **perennial plants** which have an elongated trunk, branches, and leaves they are often defined as woody plants with secondary growth.

Types of Trees:

1. Trees include a variety of species, including
2. Angiosperms which are hardwoods and
3. Gymnosperms which are softwoods,

- Apart from them there are non-traditional forms like palms, tree ferns, bananas, a bamboo.

Government initiatives to protect forests

- **Indian Forest Policy, 1952** aImed to cover one-third of total land area by forests.
- Forest Conservation Act of 1980 targeted to check deforestation, conserve biodiversity, save wildlife, etc.
- **The forest policy of 1988** made a shift from a commercial focus to the ecological role of the forests and Joint Forest management.
- **National Green Tribunal Act, 2010** is mandated to ensure environmental protection and conservation of forests.
- **Compensatory Afforestation Fund Act, 2016** seeks to provide an institutional mechanism, to ensure utilisation of trees efficiently and transparently.

Measures to taken:

- The policy recommendations by the report include **habitat protection, restoration, ex-situ conservation through seed banks and botanical gardens, and community-driven actions(** Such as **Chipko and Appiko movements)** to conserve the trees globally.
- **Afforestation** to create resources without depleting existing natural forests provides wildlife habitat, recreational areas, and economic benefits. Such initiatives can be promoted by initiatives like **Van Mahotsava, which was launched in 1950.**
- Tree **reforestation** should be **focused on diversification of the species and prioritisation of the threatened trees,** rather than solely focusing on tree planting as a climate solution.
- **Selective Logging removes specific trees based on size and allows for regeneration.** It is a sustainable method that balances forest conservation and resource needs.

GEOGRAPHY

How, why global forecasters got La Nina prediction wrong

The delayed onset of the La Niña and the late retreat of the monsoon have eroded the optimism that Delhi's residents could experience better air this winter compared to previous years.

- A large part of north India will face significant pollution-related challenges in the early winter months, with the possibility of some relief in December and January

depending on how quickly La Niña conditions strengthen.

- La Niña is a climate pattern that describes the cooling of surface ocean waters along the tropical west coast of South America. It is the counterpart to El Niño, which is characterized by unusually warm ocean temperatures in the equatorial region of the Pacific Ocean. Together, La Niña and El Niño are the "cold" and "warm" phases of the El Niño-Southern Oscillation (ENSO) cycle.

Key Characteristics

- Sea Surface Temperatures: La Niña is marked by cooler-than-normal sea surface temperatures in the central and eastern Pacific Ocean Trade Winds: During La Niña, trade winds are stronger than usual, pushing warm water towards Asia and allowing cold water to rise to the surface near the coast of South America.
- Atmospheric Pressure: It is characterized by lower-than-normal air pressure over the western Pacific, which contributes to increased rainfall in that region.
- Causes: La Niña is caused by a build-up of cooler-than-normal waters in the tropical Pacific. Strong eastward-moving trade winds and ocean currents bring this cold water to the surface, a process known as upwelling.

La Niña affects weather patterns worldwide:

- Asia and Australia: Typically experience increased rainfall and cooler temperatures, which can lead to flooding.
- North America: The southern United States tends to be drier and warmer, while the northern United States and Canada can experience colder and wetter conditions.
- South America: Coastal regions near Ecuador and Peru often see cooler sea surface temperatures and reduced rainfall.
- Role of La Niña in shaping air quality in winter (North India particularly Delhi).
- The delayed onset of La Niña is a matter of concern. La Niña brings stronger winds and more dynamic atmospheric circulation, which helps disperse

pollutants in northern India.

La Nina could also bring a longer and more severe winter in North India.

Tsangyang Gyatso Peak

Recently, An Indian mountaineering team **(the National Institute of Mountaineering and Adventure Sports)** successfully climbed a previously **unnamed peak in Arunachal Pradesh.**

More on the news

- The peak, located at **20,942 feet in the Gorichen range,** is in the Tawang-West Kameng region.
- The team named the peak **"Tsangyang Gyatso Peak"** to honor the **6th Dalai Lama, Rigzen Tsangyang Gyatso.**

- **Significance**
  - The naming aims to tribute the **Dalai Lama**'s **legacy and contributions** to the **Monpa community and beyond.**
  - Highlights Arunachal Pradesh as a key destination for **adventure sports**.

Monpa Community

- The Monpa are a prominent ethnic group primarily found in **Arunachal Pradesh, northeastern India.**
- **Principal Monpa festivals :** The Choskar harvest festival, Losar, and Torgya.
- **Religion:** They believe in Gelug sect of Tibetan Buddhism,
- **Lifestyle:** The Monpa traditionally wear attire inspired by the Tibetan chuba.
- **Economy:**
  - **Types of Cultivation:**

- **Shifting Cultivation**: Moving to different plots to grow crops.
- **Permanent Cultivation:** Farming on fixed land.

- **Livestock**: They raise Cattle, yaks, cows, pigs, sheep, and fowl.
- **Cultural Connections:** The Monpa share a close cultural affinity with the Sharchops of Bhutan.
- **Language**
  - The Monpa language belongs to the **Tibeto-Burman language family.**
  - It is notably different from the **Eastern Tibetan dialect** and is written using the **Tibetan script.**

Geological Survey of India conducts Swachhata Hi Seva campaign at Shyok-Nubra valley in Ladakh

- As part of the Government of India's Swachh Bharat Abhiyan initiative, the Geological Survey of India (GSI) conducted a successful Swachhata / cleanliness drive at the Geo-heritage Site "**Land of Cold Desert**, Shyok-Nubra valley" on 01-10-2024.
- The breathtaking Ladakh region is renowned for its remote mountain beauty, rich culture, and stunning geological marvels. The Geoheritage Site "Land of Cold Desert, Shyok-Nubra Valley" of the UT: Ladakh has been recognized by the Geological Survey of India, Ministry of Mines, Government of India, for its exceptional geological significance.
- Such geoheritage sites are treasure troves of geo-relics, phenomena, and geological structures that hold national and international interest.
- Located at the confluence of the Shyok and Nubra rivers near Diskit, the Shyok-Nubra valley boasts unique geological features. The presence of sand dunes, reminiscent of Rajasthan's deserts, attracts tourists who can experience the thrill of **double-hump camel** rides.
- At an altitude of 3048 m above mean sea level, these dunes are the largest in the **Trans-Himalayan region**. These sand dunes hold particular interest for

geologists, indicating climatic variations in this high-altitude terrain.

- Situated along the riverbanks, they offer valuable insights into Quaternary geological studies. The Shyok-Nubra valley also exposes an ophiolite rock bearing suture zone, immensely important for understanding the Himalayan evolution and journey of Indian tectonic plate.

Solar Storm Warning: ISRO On Alert As India Braces for Potential Disruptions

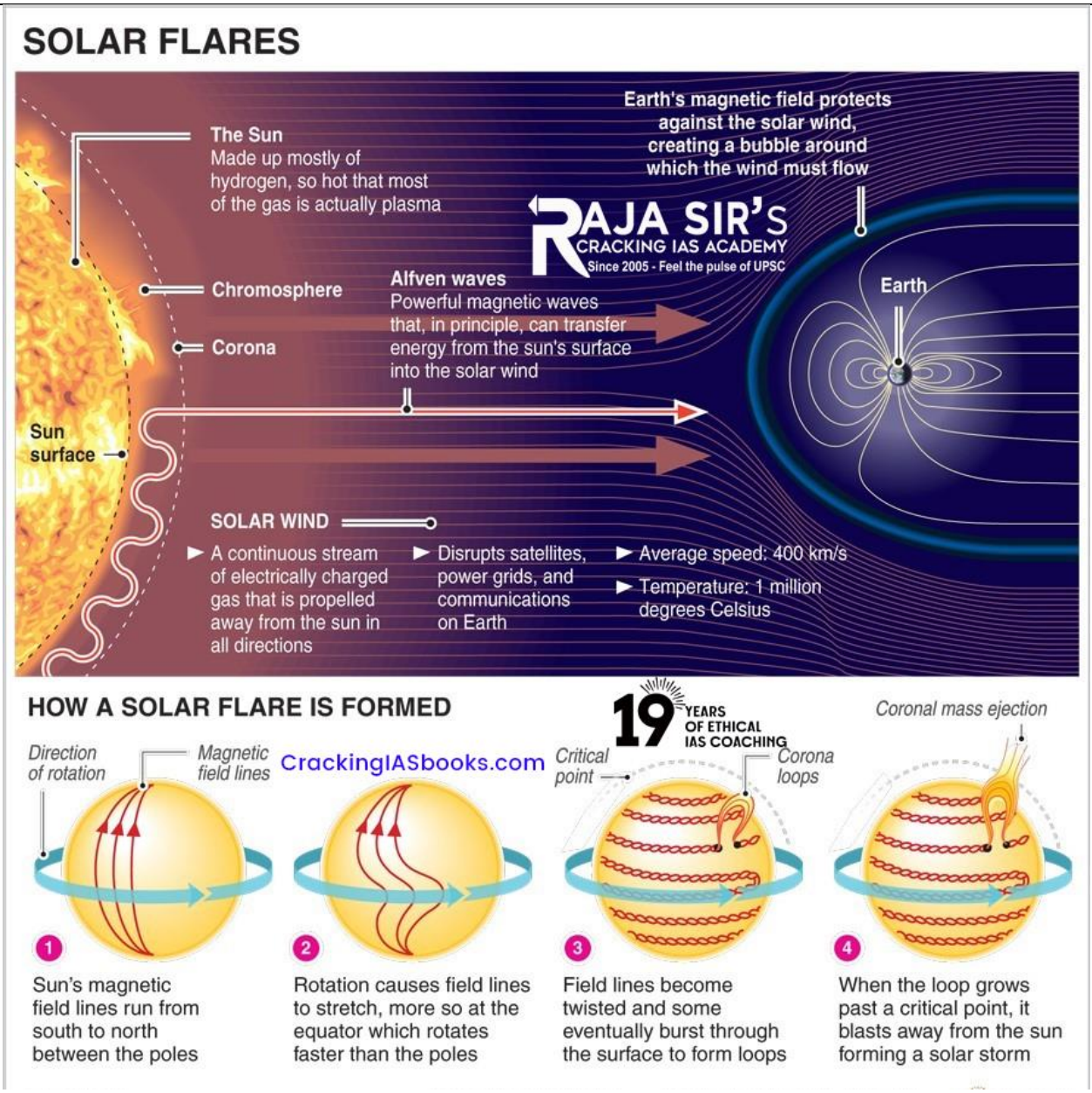
- The Indian Space Research Organisation (ISRO) is taking steps to protect vital infrastructure, with experts stressing the importance of heightened vigilance.
- Solar storms are sudden bursts of particles, energy, and magnetic fields from the Sun that can disrupt Earth''s magnetosphere. These can cause geomagnetic storms, leading to radio blackouts and power outages on Earth.
- A geomagnetic storm is a major disturbance of Earth's magnetosphere that occurs when there is an exchange of energy from the solar wind into the space environment surrounding Earth.
- Solar storms are caused by the release of magnetic energy called solar winds from the sunspots.
- These storms result from variations in the solar wind that cause major changes in the currents, plasmas, and fields in Earth's magnetosphere.
- Solar Storms happen when Sun emits large bursts of energy in the form of solar flares and coronal mass ejections. These phenomena send a stream of electrical charges and magnetic fields toward the Earth at high speed.

Solar Storms are of the following types:

1. **Solar Flares:** A solar flare is a sudden flash of increased brightness on the Sun, usually observed near its surface and in proximity to a sunspot group.
2. **Coronal Mass Ejection:** A coronal mass ejection (CME) is a significant release of

plasma and accompanying magnetic field from the solar corona. They often follow solar flares and are normally present during a solar prominence eruption.

3. **Geomagnetic Storm:** A geomagnetic storm is a temporary disturbance of the Earth's magnetosphere caused by a solar wind shock that interacts with the Earth's magnetic field.
4. **Solar Particle Events:** A solar particle event or solar proton event (SPE), or prompt proton event, occurs when particles (mostly protons) emitted by the Sun become accelerated either close to the Sun during a flare or in interplanetary space by coronal mass ejection shocks.



RAJA SIR'S CRACKING IAS ACADEMY Since 2005 - Feel the pulse of UPSC
19 YEARS OF ETHICAL IAS COACHING

The solar wind conditions that are required for creating geomagnetic storms are:

- Many hours of the high-speed solar wind,
- A southward directed solar wind magnetic field (opposite to the direction of Earth's field) at the dayside of the magnetosphere

These conditions are effective for transferring energy from the solar wind into Earth's

magnetosphere.

The largest storms that result from these conditions are associated with solar coronal mass ejections (CMEs) where a billion tons or so of plasma from the sun, with its embedded magnetic field, arrives at Earth. CMEs typically take several days to arrive on Earth but have been observed, for some of the most intense storms, to arrive in as short as 18 hours.

Sunspots: The dark regions on the Sun are cooler than the surrounding photosph which is also the lowest layer of the solar atmosphere.

Solar wind: The solar wind is created by the outward expansion of plasma (a collection charged particles) from the Sun's corona (outermost atmosphere). This plasma continually heated to the point that the Sun's gravity can't hold it down. It then trav along the Sun's magnetic field lines that extend radially outward.

Magnetosphere: A magnetosphere is a region around a planet dominated by the plane magnetic field. Other planets in our solar system have magnetospheres, but Earth has t strongest one of all the rocky planets: Earth's magnetosphere is a vast, comet-shap bubble, which has played a crucial role in our planet's habitability. It protects the plar from harmful solar and cosmic radiation as well.

Effect of a geomagnetic storm on Earth

- It **results in intense currents** in the magnetosphere, **changes in the radiation belts**, and changes in the ionosphere, including **heating the ionosphere and an upper atmosphere** region called the **thermosphere**.
- These storms can heat the ionosphere, **causing beautiful auroras** on earth.
- Because the ionosphere is heated and distorted during storms, l**ong-range radio communication** that relies on sub-ionospheric reflection **gets affected**.
- **Ionospheric expansion due to these** storms **can increase satellite drag** and make their orbits difficult to control.
- **Satellite electronics can be damaged** through the buildup and discharge of

static-electric charges.

- It can **disrupt global navigation systems**.
- It can **create harmful geomagnetic-induced currents (GICs)in** the **power grid** and pipelines.

Auroras

- An aurora is a colorful light show in the sky caused by the Sun's flares.
- Auroras occur when particles from the Sun interact with gases of the Earth's atmosphere, causing beautiful displays of light in the sky.
- Auroras are often seen in areas near the North Pole and the South Pole. It is called aurora borealis or northern lights on the North Pole and aurora australis or southern lights on the South Pole.
- Auroras are a special treat because of the beautiful light show in the sky.
- When a solar storm comes toward the Earth, some of the energy and small particles can travel down the magnetic field lines at the north and south poles into Earth's atmosphere.
- Any planet in the solar system that has an atmosphere and magnetic field, has auroras. Planets like Jupiter and Saturn have beautiful auroras.

How are geomagnetic storms predicted?

- Solar Storms or geomagnetic storms are predicted by:
    - Solar physicists and other scientists deploy computer models to forecast solar storms and other solar activity.
    - Current models can forecast the arrival timing and pace of a storm. But the structure or orientation of the storm cannot be foreseen.
- The magnetic field orientations can cause a more intense response in the magnetosphere which results in more violent magnetic storms.
- Since the dependence of the world is increasing on satellites for most activities, it is imperative that space weather forecasts are improved and more efficient measures to safeguard satellites are invented.
- Geomagnetic storm set to hit earth after filament eruption from the sun.

India's southwest monsoon has ended on an optimistic note, with 8% more rain, focus shifts to Northeast Monsoon.

- The Northeast Monsoon occurs from October to December, bringing rainfall primarily to the southern part of India.
- It is often referred to as the "post-monsoon season" or "retreating monsoon" in meteorological terms.
- Wind Direction: Characterized by northeast trade winds blowing from the northeastern directions towards the Indian subcontinent.

South West Monsoon	North East Monsoon
These monsoon winds blow northward from the Arabian sea and the Bay of Bengal.	These monsoon winds blow from northeast towards the sea-side.
These monsoon winds blow from the month of June to September.	These winds blow from the month of October to November.
These winds are reason for rainfall throughout the country.	These winds cause rainfall only in Coromandal coast and also in Tamil Nadu when these winds strike the wetlands of the eastern Ghats.
They blow from the high-pressure areas (ocean) to low pressure areas (land)	These winds blow from land to sea as a result of reversal in the direction of wind or start of retreating monsoon season.
These winds blow during the advancing monsoon season.	These winds blow during retreating monsoon season.

Mechanism

- One of the primary causes of the northeast monsoon is the southward movement of Inter Tropical Convergence Zone (ITCZ) — a dynamic region near the Equator where the trade winds of the northern and southern hemispheres come together.
- During the southwest monsoon season, this ITCZ moves northwards over to the

Indian landmass, where it is also referred to as the monsoon trough. But as the temperatures in the northern hemisphere begin to drop around September, the ITCZ starts moving towards the Equator and further into the southern hemisphere.

- This southward movement of the ITCZ, coupled with the heating up of the Indian Ocean, reverses the direction in which the lower-atmosphere moisture-laden winds blow (from southwest to northeast), thereby triggering the NEM.
- As the northeastern winds blow from land to sea, most parts of the country are dry in these months. But a portion of these monsoon winds blows over the Bay of Bengal, picks up moisture, and brings rain-bearing clouds to the southern subdivisions of Tamil Nadu, Kerala and southern parts of Karnataka, Telangana, and Andhra Pradesh.

Geographical Distribution of Rainfall

- The Northeast Monsoon is crucial for the southeastern states of India. Unlike the Southwest Monsoon (which covers most of India), the Northeast Monsoon brings significant rainfall mainly to:
    - Tamil Nadu: About 48%–60% of Tamil Nadu's annual rainfall is received during this season, making it vital for agriculture and water resources.
    - Southern Andhra Pradesh, Karnataka, and Kerala also receive rainfall but in lesser quantities.
    - The Andaman and Nicobar Islands also receive rainfall during this season.

Importance of the Northeast Monsoon

- Agricultural Impact:
    - Tamil Nadu and parts of Andhra Pradesh rely heavily on the Northeast Monsoon for agricultural activities, as the region doesn't receive much rainfall from the Southwest Monsoon.
    - Rice cultivation is a significant beneficiary of the rainfall from this monsoon.

- Water Resources:
    - It is vital for recharging reservoirs and water bodies in the southern states, which face severe water scarcity otherwise.
    - Groundwater recharge during this period is essential for drinking water and irrigation.
- Fisheries:
    - The monsoon is crucial for the fishing communities along the Coromandel Coast, as it influences marine ecosystems and seasonal fishing patterns.

Salt Pan land to be used for Homes

The Maharashtra government has issued a GR (Government Resolution) allocating 255 acres of salt pan land, distributed over three land parcels in Mumbai's eastern suburbs, for the construction of rental houses in the Dharavi Redevelopment Project through a lease agreement

What are salt pans?

- Salt pan lands are ecologically important salt marshlands. They are low-lying areas around the shore that are used for salt cultivation. They act as holding ponds and work as a sponge for the absorption of rain
- They are a coastal area's natural defence against flooding

Concerns:

- Impact assessment study needs to be done before opening up large packs of land for intensive activities like housing.
- The most important demand with respect to the Dharavi project has been for in-situ rehabilitation. Urban planners point out that handing over land parcels in different parts of the city for a developer will lead to formation of ghettos.

What lies ahead?

- The Centre will hand over the land to the State government, which will give permission to DRPPL to go ahead with the construction after their plans are

approved.

For that, the DRPPL will have to seek an approval from the Ministry of Environment, Forest and Climate Change. Environmentalists claim that the entire process from here on can be challenged in the court of law.

2023 driest for global rivers in 33 years, reveals WMO's report

The **year 2023 was the driest for global rivers** in the past 33 years, The State of Global Water Resources report by the World Meteorological Organization (WMO). The report highlighted severe stress on global water supplies.

- In **fact, the past five consecutive years have recorded** widespread below-average river flows and reservoir inflows, reducing the amount of water available for communities, agriculture and ecosystems.

Drier than average river discharge

- **With 2023 being the hottest year on record, increasing** temperatures and widespread dry conditions contributed to prolonged droughts. Compared to the historical period (1991–2020), rivers mostly faced conditions that were drier-than-average to average for river discharge, the report said.
- Similar to 2022 and 2021, more than half of global catchment areas in 2023 showed **deviations from near-average conditions for river discharge**, predominantly lower than average, with fewer basins exhibiting above- or much-above-average conditions
- In an era of growing water demand, the report **showed a rising trend in dry areas** over time, with 2023 being the driest year in the last three decades, followed by 2021 and 2015. Below- and much-below-average conditions affected North America (except Alaska), Central America and South America.
- Meanwhile, in Asia, large river basins such as those of the Ganga and Brahmaputra experienced lower-than-average conditions across almost their entire territories. Discharge conditions **also remained lower than average across the West and Central**

Asia.

- The transition from La Niña (2022-2023) to El Niño (2023) appears to have been a key climatic driver in this record-breaking dry and warm situation, combined with a widespread anomalous warming over the worldwide ocean.

Reservoir inflows and storage

- The report, **now in its third year, indicated that inflow into reservoirs in 2023 generally reflected the overall discharge conditions**, with the global balance being mostly below average or average.
- Specifically, reservoirs in India, especially along the west coast, experienced below- and much-below-average inflows. However, the Ganga river basin in India saw above-average reservoir storage.
- Reservoir storage is influenced not only by climatic conditions and inflows but also by human regulation of the storage. Even when inflows are low, water can be stored, increasing reservoir volumes but decreasing discharge downstream.
- Meanwhile in Australia, the Murray-Darling river also recorded below-average inflows. In North and South America, reduced water availability was evident, with lower-than-usual inflows into reservoirs, particularly in the Mackenzie river in North America, across Mexico and in the Paraná river in southern Brazil and Argentina.

Across the West and Central Asia, inflows into reservoirs remained lower than usual.

Dip in groundwater levels

- In 2023, average groundwater levels were much below average in 19 per cent of monitored wells, below average in 11 per cent, average in 40 per cent, above average in 10 per cent and much above average in 20 per cent.
- A large part of North America, central and northern Chile, western and southern Brazil, southern Europe (Portugal, Spain, most of France), central Europe (Hungary, Austria, Bavaria, northern Poland), as well as western and southern Australia, were

regions where average groundwater levels were below or much below average in a high proportion of wells.

- **Conversely, groundwater levels were above o**r much above average in a high proportion of wells in New England (United States), the Maritime provinces of Canada, along the Atlantic coast of north-eastern Brazil, northern Europe (the British Isles and Scandinavia), Israel, southern Africa, parts of India, the Republic of Korea, eastern Australia and the North Island of New Zealand.
- High precipitation also directly contributes to rising groundwater levels by recharging aquifers and this effect was observed in some parts of India.

Low soil moisture

- The year 2023 ranked just behind 2022 in recent historical records for dry soils. Soil moisture in 2023 was predominantly below or much below average across large areas globally throughout the year.
- For example, almost all of North America, South America, North Africa and West Asia experienced much-below-average soil moisture levels, particularly during June, July and August.
- During the same period (June-August), almost all of Europe, the Russian Federation, Central Asia and China experienced below- to much-below-average soil moisture conditions.
- However, Alaska, north-eastern Canada, India and the north-eastern Russian Federation experienced much-above-average soil moisture conditions.
- Currently, 3.6 billion people face inadequate access to water for at least one month every year and **this number is expected to rise to more than five billion by 2050, according to United Nations Water.**

Delhi Government pushes for cloud seeding ahead of post-Diwali air crisis

Cloud seeding is a method of artificially inducing rain which involves releasing chemicals into the atmosphere to promote condensation of moisture particles, leading to rainfall

How It Works?

- **Seeding Materials:** Common materials include silver iodide, potassium iodide, dry ice, or liquid propane.
- **Delivery Method:** Seeds can be dispersed using aircraft or ground-based sprayers.
- **Condensation Process:** The introduced particles encourage the condensation of smaller water droplets into larger ones until they become heavy enough to fall as rain.

Examples

- **India:** In Solapur, Maharashtra, cloud seeding reportedly increased rainfall by about 18%.
- **UAE**: The technique has been employed to enhance rainfall in arid regions.
- **China**: During the 2008 Beijing Olympics, cloud seeding was used to improve air quality .

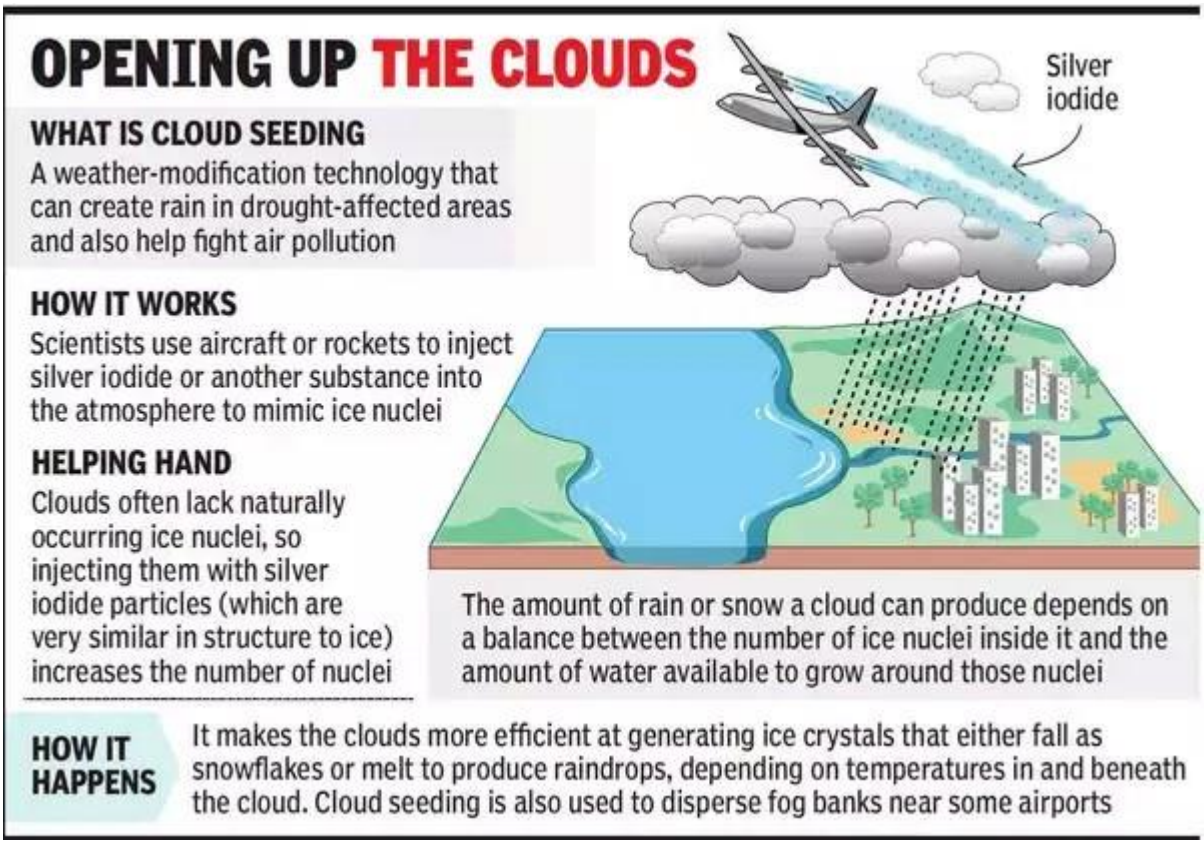
Role of Rainfall in cleaning air

- **Absorption:** As raindrops fall, they absorb pollutants like particulate matter (PM), sulphur oxides (SOx), and nitrogen oxides (NOx).
- **Chemical Reactions:** When raindrops encounter pollutants, they can undergo chemical reactions that transform these harmful substances into less harmful compounds.
- **For example**, sulphur oxides and nitrogen oxides can react with water and other atmospheric components to form sulfuric and nitric acids.
- **Washout:** The raindrops, now laden with pollutants or their transformed products, wash these substances to the ground. This process is known as "washout."
- **Scrubbing:** As raindrops fall through the atmosphere, they can also scrub the air

of pollutants by physically colliding with and removing them. This process is called "scrubbing."

Cloud Seeding

- It is the process of **artificially generating rain** by implanting clouds with particles such as silver iodide crystals.
- Cloud seeding uses planes to spray clouds with chemicals to condense smaller particles into larger rain droplets.



- **Cloud Seeding Methods:**
  - This method involves **introducing ice nuclei, such as silver iodide or dry ice, into cold clouds** that have supercooled liquid water droplets.
  - The ice nuclei can trigger the formation of ice crystals or snowflakes, which

can grow at the expense of the liquid droplets and fall as precipitation.

- Dynamic cloud seeding is a method of inducing rain by **boosting vertical air currents.**
  - The process is considered more complex than static cloud seeding because it depends on a sequence of events working properly.
- This method involves spraying fine particles of hygroscopic materials, such as **salts through flares** or explosives into the base of warm clouds.
- The particles can act as cloud condensation nuclei and increase the number and size of the cloud droplets, which can enhance the reflectivity and stability of the clouds.
- **Static Cloud Seeding:**
- **Dynamic Cloud Seeding:**
- **Hygroscopic Cloud Seeding:**

- **Applications:**
  - Cloud seeding is done to enhance **winter snowfall and increase mountain snowpack**, which can supplement the natural water supply for communities in the surrounding area.
  - Cloud seeding can also be done to prevent hailstorms, dissipate fog, induce rainfall in drought-prone regions, or reduce air pollution.

Cloud seeding, a groundbreaking technique to enhance rainfall, has taken centre stage in a recent study published in the ***journal Bulletin of the American Meteorological Society***, conducted by the **Indian Institute of Tropical Meteorology, Pune.**

- The study unveils the potential of cloud seeding to boost precipitation in water-scarce regions, offering hope for tackling **drought conditions.**
  - **Practical Applications:**
    - Cloud seeding can significantly benefit regions like Solapur which falls on the **leeward side of the Western Ghats** and hence gets low rainfall.
    - Additional water through cloud seeding has the potential to alleviate

water scarcity issues in such areas.

- **Microphysics and Cloud Characteristics:**
  - The two-year study aimed to understand the **microphysics and characteristics of convective clouds** suitable for enhancing rainfall.
    - It provides comprehensive protocols and technical guidance for planning and conducting cloud seeding in India.
- **Cloud Variability:**
  - Not all cumulus clouds respond to cloud seeding; **approximately 20-25% can produce rainfall** if seeding is executed correctly.
  - Cloud microphysics varies widely, leading to varied results with cloud seeding.

Convective Clouds

- **Convective clouds** are clouds that form when **warm, humid air rises** through cooler air in the atmosphere.
  - The warm air is less dense than the surrounding air, so it rises. This process is called **convection.**
  - Convective clouds are also known as **cumuliform clouds.** They look like stacks of cotton balls.
- There are two types of convective clouds: **Cumulus clouds and cumulonimbus clouds.**
  - Cumulus clouds are fluffy, white clouds with a flat base and a rounded top. Cumulus clouds can develop into cumulonimbus clouds, which are associated with thunderstorms.
  - Cirrocumulus Clouds are high-altitude clouds that appear as small, white, and fluffy cloud patches. They often have a wavy or honeycomb-like pattern.

Challenges and Concerns

The effectiveness of cloud seeding can vary depending on several factors, including cloud

type, temperature, humidity, and the choice of seeding agents. It is not a guaranteed solution and is subject to natural meteorological conditions. The technique has faced some controversies and concerns, including questions about its environmental impact and the safety of the chemicals used. Some critics argue that the environmental effects and long-term consequences of cloud seeding are not fully understood.

- **Environmental Impact:** Cloud seeding typically involves the release of substances into the atmosphere, such as silver iodide or potassium iodide. These substances can have environmental impacts, including concerns about potential toxicity and accumulation in ecosystems.
- **Health and Safety:** There are concerns about the health and safety of people exposed to the substances used as seeding agents. While they are typically released at high altitudes, some of these particles may eventually reach the ground.
- **Unintended Consequences:** It can have unintended consequences. Altering weather patterns in one region can affect weather patterns in neighboring areas, potentially causing droughts or excessive rainfall in unintended places.
- **Regulatory Challenges:** Regulations and oversight of cloud seeding activities can be inconsistent, leading to concerns about the accountability and transparency of such programs.
- **Effectiveness:** The effectiveness of the method can vary depending on meteorological conditions and the type of cloud-seeding materials used. It is not always a reliable or predictable method for increasing precipitation.
- **Lack of Scientific Consensus:** While some studies suggest that cloud seeding can be effective in enhancing precipitation, there is not a universal consensus on its efficacy. The scientific community continues to study and debate its effectiveness.
- **Ethical and Legal Issues:** There can be ethical concerns about artificially modifying weather patterns, as it may affect the natural balance of ecosystems and disrupt the environment. Legal issues related to liability and compensation for potential damages can also arise.

- **Cost-Effectiveness:** Such programs can be costly to implement, and their cost-effectiveness is a subject of debate. Weighing the benefits against the expenses is a crucial consideration.
- **Public Concerns:** Public perception of cloud seeding programs can vary. Some may support such efforts to address drought conditions, while others may have concerns about the environmental and health impacts.
- **Transboundary Issues:** Weather systems do not adhere to political borders. Cloud seeding in one region can affect weather patterns in neighboring countries, leading to potential diplomatic and international concerns.
- **Long-Term Impact:** The long-term impact of cloud seeding on ecosystems, including water resources, air quality, and climate, remains a topic of research and concern.

Cloud seeding is a valuable tool for increasing precipitation in regions where water resources are limited, but it is not a standalone solution to address long-term water scarcity. It is typically used in conjunction with other water resource management strategies. Additionally, cloud seeding programs often require careful monitoring and regulation to ensure they are conducted safely and responsibly. In light of these concerns, proponents of cloud seeding argue that it can be a valuable tool in managing water resources, particularly in regions facing water scarcity. Critics, however, emphasize the need for rigorous scientific assessments, responsible regulation, and transparent communication with the public to address these concerns and challenges associated with cloud seeding.

Chaukhamba Peaks of the Garhwal Himalayas

- Towering over the Gangotri Glacier, Chaukhamba stands as a majestic massif in the Gangotri Group of the Garhwal Himalayas.
- Its name, translating to "four legs" in Hindi, aptly reflects its quadripartite peak structure, each summit exceeding 7,000 meters

- It is **located in the northern Indian state of Uttarakhand**, west of the Hindu holy town of Badrinath.
- It has **four summits,** along a northeast-southwest trending ridge, ranging in elevation from 7,138 meters (23,419 ft) to 6,854 m (22,487 ft) with an average elevation 7,014 m; the main summit is at the northeast end.

- Chaukamba I 7,138 m
- Chaukamba II 7,070 m
- Chaukamba III 6,995 m
- Chaukamba IV 6,854 m

- Chaukhamba I is an **ultra-prominent peak,** with a prominence of more than 1,500m. **Mana Pass is the key col for Chaukhamba I.**

Azores Islands

The regional assembly of Portugal's Azores Islands authorized the **creation of the biggest covered marine area** in the North Atlantic to reach international conservation goals.

- It aims to achieve the goals set by the United Nations of protecting 30% of the Earth's land and sea by 2030 under a global pact adopted last year.
- The community ensures the preservation of underwater mountain degrees and susceptible marine ecosystems, consisting of deep-sea corals, hydrothermal vents and marine species.

Azores Islands

- The 9-island archipelago is an autonomous region of 1,500 km (932 miles) west of mainland Portugal lies within the North Atlantic Ocean and domestic to specific marine biodiversity.
- The Azores are divided into 3 extensively separated island organizations: the jap organization, the critical group, and the northwestern institution.

- Their unstable geologic nature is indicated by several earthquakes and volcanic eruptions.

Atmospheric rivers are shifting poleward

- Atmospheric rivers are shifting toward higher latitudes, and that's changing weather patterns around the world.

What are Atmospheric Rivers?

- **Atmospheric rivers**are large, narrow sections of the Earth's atmosphere that carry moisture from the Earth's tropics near the equator to the poles.
- Similar to terrestrial rivers, atmospheric rivers can vary in strength and size. They carry massive amounts of moisture.
- On average, the Earth has four to five active atmospheric rivers at any time.

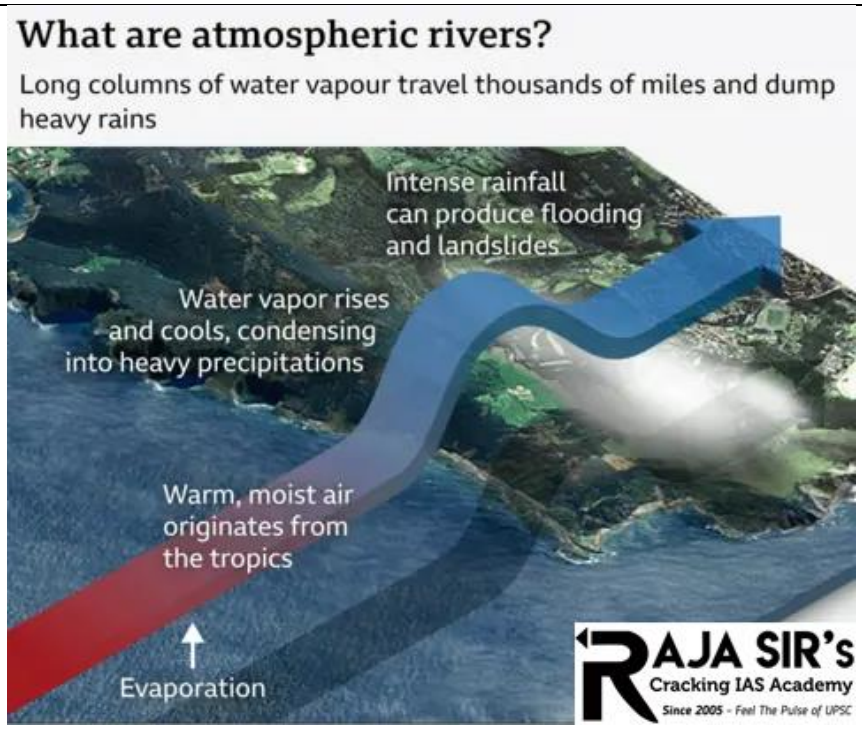
Occurrence: They can occur both in the:

1. **Northern hemisphere** – typically between December and February
2. **Southern hemisphere** – typically between June and August, when extratropical cyclones are prevalent

Each moves the equivalent of the liquid water that flows through the mouth of the Amazon River. When they reach land, atmospheric rivers release this moisture, producing heavy snow and rain.

Role of atmospheric rivers:

- Atmospheric rivers are responsible for 90 percent of the movement of moisture from the tropics toward the poles.
- They are a major factor in the formation of cloudsand therefore have a significant influence on air temperatures, sea ice, and other components of the climate.

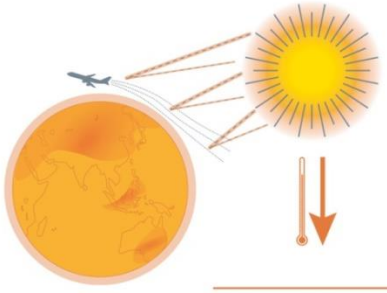


Stratospheric Aerosol Injection (SAI)

It is a **proposed method of solar geoengineering** (or solar radiation modification) to reduce global warming. This would introduce aerosols into the stratosphere to create a cooling effect via global dimming and increased albedo, which occurs naturally from volcanic winter.

- It **appears that stratospheric aerosol injection**, at a moderate intensity, could counter most changes to temperature and precipitation, take effect rapidly, have low direct implementation costs, and be reversible in its direct climatic effects.
- The **Intergovernmental Panel on Climate Change** concludes that it "is the most-researched [solar geoengineering] method that it could limit warming to below 1.5 °C (2.7 °F).

What is **stratospheric aerosol injection** and why do we need to **govern** it?



Climate change is already here.

The world is not reducing and removing emissions fast enough to avoid dangerous global warming.

Scientists are exploring new ideas **to cool the planet.**

One is called Stratospheric Aerosol Injection (SAI).
The idea is to spray particles in the stratosphere, which would reflect sunlight and reduce global temperatures. It could be relatively cheap to deploy, and quick acting.

But it also brings big risks.
And **there are no effective global systems in place to govern it.**

We have no time to waste. The window may be closing to create effective governance that looks at all tools potentially available.

It could have unequal effects.
One place could get more rain, another could get less.





Stopping it suddenly could **cause rapid temperature rise** that would be disruptive to human society and be dangerous for many species.

Depending on the materials it uses, it could damage the ozone layer.
This can cause health and environmental problems.





Countries might disagree on its use, and some might act alone, creating geopolitical and security tensions.

These and other risks must be measured against the growing dangers of a rapidly warming planet.

RAJA SIR'S CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC

How would we decide whether to use SAI, or not?	Who would decide, when, on what, and in which fora?	How would we implement decisions on SAI?

Some people say this conversation **could undermine other action on climate.**
Should we even discuss it?

But research is already happening, the conversation is already being shaped.

We need to learn more and create governance before events overtake us.

- Stratospheric Aerosol Intervention (SAI), also known as Stratospheric Aerosol Injection, is a geoengineering or climate engineering approach that uses tiny reflective particles or aerosols to reflect sunlight into space in order to cool the planet and reverse or stop global warming.
- It aims to mimic the cooling effects of volcanic eruptions by injecting sulfur dioxide (SO2) directly into the stratosphere, where it forms sunlight-reflecting sulfate aerosols.
    - The 1991 eruption of Mount Pinatubo in the Philippines, often cited as the inspiration for this concept, deposited massive amounts of particulate matter and sulfur dioxide (SO2) into the atmosphere.
    - This aerosol layer was reported to have lowered average temperatures around the world by about 0.5 °C (0.9 °F) over the following few years.
- It is believed that as more radiation is scattered in the stratosphere by aerosols, less would be absorbed by the troposphere, the lower level of the atmosphere where weather primarily occurs.
- The production of such an artificial aerosol layer could be accomplished by shooting sulfur particles into the stratosphere with cannons or dispersing them from balloons or other aircraft.

Aerosols

- They are tiny solid or liquid particles suspended in air or a gas.
- Aerosols can be natural, such as fog or gas from volcanic eruptions, or artificial, such as smoke from burning fossil fuels.
- Aerosol particles are either emitted directly into the atmosphere (primary aerosols) or produced in the atmosphere from precursor gases (secondary aerosols).
- Aerosol particles are tiny, but numerous, and often comprise a number of inorganic and organic substances.
- True aerosol particles range in diameter from a few millimicrometres to about 1 micrometre (equal to 10-4 cm).

- Particles with a diameter of less than 0.1 micrometre are sometimes referred to as Aitken nuclei.
- Visible forms of atmospheric aerosol plumes include smoke, smog, haze, and dust.

Stratosphere

- It is the layer of Earth's atmosphere lying between the troposphere and the mesosphere.
- The stratosphere extends from the tropopause at about 10 to 17 km (about 6 to 11 miles) altitude to its upper boundary (the stratopause) at about 50 km (30 miles).
- It's characterized by a highly stable temperature gradient that cools from top to bottom.
- It also contains the ozone layer.
- Commercial jet aircraft fly in the lower stratosphere to avoid turbulence and increased atmospheric drag, which are common in the troposphere below.
- This layer holds 19 percent of the atmosphere''s gases but very little water vapor.

Diamond:

- Diamond is a **solid form of the element carbon** with its atoms arranged in a crystal structure called **diamond cubic.** Diamond as a form of carbon is a **tasteless, odourless, strong, brittle solid, colourless in pure form, a poor conductor of electricity,** and **insoluble** in water.
- Another solid form of **carbon known as graphite** is the chemically stable form of carbon at room temperature and pressure, but diamond is metastable and converts to it at a negligible rate under those conditions.
- Diamond has the **highest hardness and thermal conductivity** of any natural material, properties that are used in major industrial applications such as **cutting and polishing tools.**

Stratosphere:

- **It** is the **second-lowest layer of the atmosphere of Earth**, located above the **troposphere** and below the mesosphere. The stratosphere is composed of stratified

temperature zones, with the warmer layers of air located **higher (closer to outer space)** and the cooler **layers lower (closer to the planetary surface of the Earth).**

Ocean Iron Dumping:

- Ocean iron fertilization is an **example of a geoengineering technique** that involves intentional introduction of **iron-rich deposits into oceans,** and is aimed to enhance biological productivity of organisms in ocean waters in order to **increase carbon dioxide (CO 2)** uptake from the atmosphere.

Space Mirrors:

- Space mirrors are satellites that are designed to **change the amount of solar radiation** that impacts the Earth as a form of climate engineering. **The concept was first theorized in 1923** by physicist **Hermann Oberth** and later developed in the **1980s** by other scientists.
- Space mirrors can be **used to increase or decrease the amount of solar energy** that reaches a specific point of the earth for various purposes. They have been theorized as a method of solar geoengineering by creating a space sunshade to **deflect sunlight and counter global warming.**

Atlantic Meridional Overturning Circulation (AMOC)

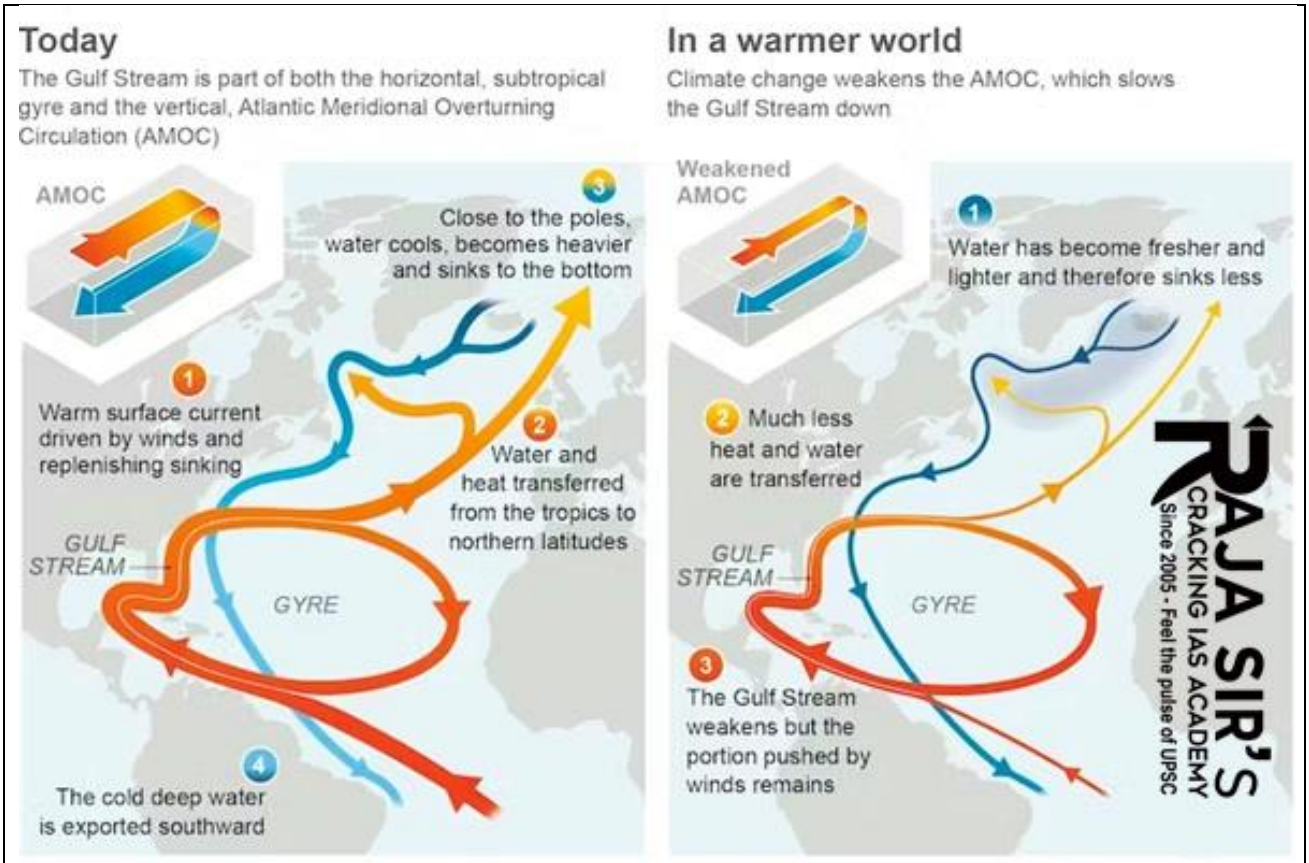
Scientists have issued a stark warning about the capacity disintegration of the Atlantic Meridional Overturning Circulation (**AMOC**). The collapse of the AMOC should have "devastating and irreversible" effects, in particular on Nordic countries (Denmark, Iceland, Norway, Finland, and Sweden). These areas could revel in severe climate modifications, including enormous cooling and southward shift of tropical monsoon systems, disrupting agriculture and ecosystems globally.

The **Atlantic Meridional Overturning Circulation (AMOC)** is at risk of imminent collapse, with recent studies indicating that **anthropogenic emissions** could expedite this between **2025 and 2095.**

- AMOC is a large-scale oceanic circulation system that transports **warm surface waters from the tropics** to the northern latitudes and returns cold, deep waters from the **North Atlantic** back towards the equator.
    - It plays a crucial role in redistributing heat globally, influencing regional and global climates, especially moderating temperatures in Europe, North America, and near the Equator.

Mechanism:

- **Warm Water Transport:** AMOC transports warm, salty surface waters from the tropics to the northern regions. These warm waters carry heat energy, contributing to the **warming** of regions like Europe.
- **Cooling and Density Increase**: As the warm surface waters move towards the poles, they gradually cool due to heat loss to the atmosphere. Also, cold, fresh water from the melting ice of the **Arctic** is added to the cooler ocean.
- **Downwelling:** Once cooled, the dense, cold water sinks to deeper layers of the ocean in a process known as downwelling.
    - This downwelling occurs primarily in the **North Atlantic Ocean,** where the dense water mass forms and begins its southward journey.
- **Southward Flow:** The cold, dense water flows southward along the ocean floor, traversing vast distances across the Atlantic basin.
    - This southward flow represents the **deep limb of the AMOC**, where cold, dense water mass redistributes heat and nutrients throughout the ocean.
    - As the water resurfaces, it begins to warm up again, completing the circulation cycle of the AMOC.



Role of Indian Ocean: As the **Indian Ocean warms** faster and faster, it **generates additional precipitation.** This draws more air from other parts of the world to the Indian Ocean, including the Atlantic. With so much precipitation in the Indian Ocean, there will be **less precipitation in the Atlantic Ocean.**

- Less precipitation will **lead to higher salinity in the waters of the tropical portion of the Atlantic —** because there won't be as much rainwater to dilute it.
- This saltier water in the Atlantic, as it comes north via AMOC, will get cold much quicker than usual and sink faster.
- This would act as a jump start for AMOC, intensifying the circulation.

- **Contribution to Global Climate:** This cycle acts like a **heat conveyor belt,** warming the northern latitudes and cooling the southern latitudes, contributing to the overall stability of the Earth''s climate.
- **Threat:** Rising precipitation and accelerated melting of the **Greenland ice sheet** have introduced more cold freshwater into the North Atlantic.
    - This influx has lowered water salinity and density, causing the colder ocean layer to expand while the warmer layer contracts.
    - Consequently, the AMOC is slowing down, posing a risk of collapse.
    - Also, anthropogenic activities, such as **greenhouse gas emissions,** can influence ocean temperatures and circulation patterns, further affecting the AMOC.

Potential Cascading Effects:

- AMOC collapse may **alter precipitation patterns,** potentially destabilizing the **southern Amazon rainforest** and transforming it into a savannah-like ecosystem.
- Increased ocean heat in the southern hemisphere could accelerate the melting of the **West Antarctic ice sheet,** exacerbating sea-level rise.
- Weakening of monsoon circulation in regions like South Asia and Africa could have far-reaching consequences for **agriculture, water resources, and regional climates.**

Cloud Chamber Under Project Mausam

- India is strengthening **research in cloud physics**, which is crucial for weather modification. Under Project Mausam, a cloud chamber is being established at the Indian Institute of Tropical Meteorology (IITM), Pune.

What Is a Cloud Chamber?

- The cloud chamber was **invented by Charles Thomson Rees Wilson** in 1911.

- **Structure:** A cloud chamber resembles a closed cylindrical or tubular drum . Water vapour and aerosols are injected into the chamber.
- **Function:** Under controlled humidity and temperature conditions, clouds can develop inside the chamber.
- **Significance:** The facility will allow scientists to study how seed particles form cloud droplets or ice particles.
- This is vital for understanding cloud formation, precipitation, and weather patterns.

Significance Of Cloud Chamber for India

- **Enhancing Weather Prediction:** The cloud chamber will enhance the study of cloud physics, crucial for better weather prediction models, especially in monsoon-dependent India.
- **Cloud Seeding Research:** The chamber and ongoing studies will help develop cloud seeding techniques, which can potentially address droughts and water shortages by artificially inducing rainfall.
- **Mission Mausam** : It focuses on **studying cloud properties** with an emphasis on the Indian monsoon.
- India is building the cloud chamber with convection properties essential for studying monsoon clouds.
- Mission Mausam is a **₹2,000 crore initiative** by the Union Cabinet to upgrade India's weather forecasting system.

Cloud Seeding

- Cloud seeding is a technique aimed at artificially inducing rainfall by introducing particles such as silver iodide into clouds.
- These particles serve as nuclei around which moisture can condense, ultimately forming rain droplets.



How Does It Work?

- **Seeding Materials:** Common materials include silver iodide, potassium iodide, dry ice, or liquid propane.
- **Delivery Method:** Seeds can be dispersed using aircraft or ground-based sprayers.
- **Condensation Process:** The introduced particles encourage the condensation of smaller water droplets into larger ones until they become heavy enough to fall as rain.

Applications and Examples

- **India**: In Solapur, Maharashtra, cloud seeding reportedly increased rainfall by

about 18%.

- **UAE:** The technique has been employed to enhance rainfall in arid regions.

The Caspian Sea is shrinking – but why?

- The Caspian Sea is the planet's largest inland sea and its largest lake, an enormous body of water roughly the size of Montana.
- The Caspian Sea's water level has dropped two metres since the mid-1990s, particularly affecting the shallower northern basin, which could face near-total drying by the century's end.
- Coastlines have shifted up to 50 kilometres in some areas, affecting human and economic activities, including the oil industry. Among the five Caspian nations, Kazakhstan is so far the most affected.



Caspian Sea

Location	Between Asia and Europe.
Geographical Boundaries	• East of the Caucasus Mountains, west of Central Asia''s steppe.

Bordering Countries	• Russia, Azerbaijan (west), Kazakhstan, Turkmenistan (north and east), Iran (south).
Historical Naming	• Named after the Kaspi, ancient peoples who lived on its western shores.
Formation	• Once part of the ancient Paratethys Sea, landlocked due to tectonic uplift and sea-level fall.
Geological Composition	• Seafloor composed of oceanic basalt.
Salinity	• Varies from fresh in the north to saltier in the south, average salinity about one-third that of oceans.
Rivers Flowing into Sea	• Volga, Ural, Terek (from the north). • **Additional Rivers:** The **Kura River from Azerbaijan,** the **Sefid-Rud River and Gorgan River from Iran, the Atrek River from Turkmenistan,** and the **Ural River** passing through Kazakhstan.
Major Cities	• **Baku (Azerbaijan) largest port** on the Caspian Sea, **Resht and Ramsar** (Iran), **Makhachkala and Astrakhan** (Russian Federation).
Other Important City	• Nowshahr, Iran.
Energy Resources	• Oil and natural gas reserves in offshore fields and onshore along the coast.
Caviar Production	• Source of most of the world's caviar (**Caviar is unfertilized fish eggs**, also known as fish roe. It

is a **salty delicacy, served cold**. True caviar comes from wild sturgeon, which belong to the ***Acipenseridae*** family).



Mekong River

- It is an international river in Southeast Asia.
- It is the **twelfth-longest river in the world and also the third-longest river in Asia with a total length of 2700 km.**

Course of the river

- The river originates at the place **called Sanjianyuang in the Tibetan Plateau of China and it drains into the South China Sea.**
- The river course covers six Asian countries which are **China, Myanmar, Laos, Thailand, Cambodia and Vietnam.**
  The river basin is the **second most biodiverse region in the world, after Amazon River Basin.**
- The river basin biodiversity has about 21,000 plant species,1,200 bird species, numerous mammals, amphibians, reptiles, and fish species.

Major cities on the river banks are

1) Vientiane– It is the capital of Laos
2) Phnom Penh- it is the capital of Cambodia

Importance for India

- The Mekong Ganga Cooperation (MGC) initiative by India and five riverine countries of the Mekong River and also the ASEAN countries of Cambodia, Laos, Myanmar, Thailand, and Vietnam has potential to enhance the trade and connectivity between India and South East Asia.


Yangtze
Lancang
Chengdu
Chongqing
Changsha
CHINA
Guiyang
INDIA
Kunming
Guangzhou
Hong
Nanning
Irrawaddy
Salween
Mandalay
VIETNAM
Hanoi
MYANMAR
(BURMA)
LAOS
Nay Pyi Taw
Chiang Mai
Mekong
Vientiane
Yangon
THAILAND
Chi
Mun
Bangkok
Tonle Sap
Srepok
CAMBODIA
Phnom Penh
Ho Chi Minh City
0 100 200 300 400 km

TN Govt notifies heatwave as state-specific disaster

- The Tamil Nadu government has recently declared heatwaves as a state-specific disaster, signaling the seriousness of the situation.
- This declaration allows for financial relief for those affected, compensation for families of victims, and the implementation of interim measures to manage heat-related crises, funded by the State Disaster Response Fund.

What are heatwaves?

- A heatwave is defined as a prolonged period of abnormally high temperatures occurring during the summer months in India, typically between March and June, and in rare cases extending into July.

IMD criteria for defining heatwaves

- The India Meteorological Department (IMD) has established specific criteria to classify heatwaves based on different parameters, which are summarized as follows:

1) Based on Maximum Temperature:

- Plains: At least 40°C or more.
- Hilly Regions: At least 30°C or more.
- Coastal Areas: At least 37°C or more.

2) Based on Departure from Normal Maximum Temperature:

- When the normal maximum temperature of a station is less than or equal to 40°C:
- Heatwave: Departure from normal is 5°C to 6°C.
- Severe Heatwave: Departure from normal is above 7°C.
- When the normal maximum temperature of a station is more than 40°C:

- Heatwave: Departure from normal is 4°C to 5°C.
- Severe Heatwave: Departure from normal is 6°C or more.

3) Based on Actual Maximum Temperature:

- Heatwave: Actual maximum temperature is above 45°C.
- Severe Heatwave: Actual maximum temperature is above 47°C.

4) Declaration Criteria:

- The above conditions must be met in at least two stations within a meteorological sub-division.
- The conditions must ***persist for at least two consecutive days.***
- The World Meteorological Organisation announced that 2023 was the hottest year recorded, reflecting the increasing frequency of heatwaves attributed to anthropogenic climate change, as detailed in the Intergovernmental Panel on Climate Change''s Sixth Assessment Report.
- India has been experiencing the adverse effects of intense heatwaves, with historical data showing significant mortality linked to heat exposure:
- 1998: Severe heatwave with record temperatures.
- 2003: Estimated over 3,000 deaths in Andhra Pradesh.
- 2010: Approximately 1,300 deaths in Ahmedabad due to heat.
- 2024: A heatwave resulted in temperatures exceeding 50.5°C in Rajasthan, with reported deaths and heat-related illnesses.

What is wet bulb temperature?

- Wet bulb temperature is crucial for understanding heat stress. It represents the lowest temperature a surface can reach through evaporation. Exceeding a wet bulb temperature of 35°C for extended periods can result in hyperthermia, making it vital for understanding the risks in humid climates like India.

SCIENCE AND TECHNOLOGY

BharatGen -World's first Government-funded Multimodal Large Language Model (LLM)

The world's first **Government-funded Multimodal Large Language Model (LLM)** Initiative known as **BharatGen** was recently launched.

BharatGen

Large Language Model (LLM)

- Large Language Model (LLM) is a type of **artificial intelligence model** designed t**understand, generate, and interact with human language.**
- These models are **trained on** vast amounts of **text data.**
- They are capable of performing tasks such as **translation, summarization, question-answering, and text generation.**
- **Examples: GPT (Generative Pre-trained Transformer) , BharatGen**

- **Scope:** BharatGen is an initiative that will create generative **Artificial Intelligence (AI)** systems that can generate **high-quality text** and **multimodal content** in various Indian languages.
- **Initiative by:** Spearheaded by **IIT Bombay** under the **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)** of the Department of Science and Technology **(DST)**
- **Features:** The four key distinguishing features of BharatGen are:
  - The multilingual and multimodal nature of foundation models;
  - **Bhartiya data set** based building, and training;
  - **Open-source platform** and
  - Development of an **ecosystem** of generative AI research in the country.
- **Significance of BharatGen:**
  - **Cultural and Linguistic Preservation**: Supports India's diverse languages

and cultures in AI development.

- **Accessible AI**: Makes AI available to all citizens, promoting social equity.
- **India-Centric Data**: Focuses on India-specific data, ensuring accurate representation and digital sovereignty.
- **Strengthens AI Ecosystem**: Reduces reliance on foreign tech, boosting domestic AI innovation.
- **Open-Source Collaboration**: It will help democratise AI across India
- **Data-Efficient Models**: Creates AI models effective with minimal data, benefiting underserved languages.
- **Long-Term AI Adoption**: Aims for wide AI use across industries by 2026.

National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)

- **About:** The **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)** is a comprehensive Mission aimed at **transforming ideas into market-ready products and fostering advanced technologies**.
  - A Cyber-Physical System (CPS) **integrates physical processes with computational algorithms and networked sensors** to monitor and control these processes in real time.
    - This technology bridges the physical and virtual worlds, facilitating seamless interaction between humans and machines.
- **Implemented by:** The **Department of Science & Technology (DST)**, Government of India is implementing the NM-ICPS
- **Focus Areas:** The mission will focus on four key areas:
  - **Technology Development**
  - **Human Resource Development (HRD) & Skill Development**
  - **Innovation, Entrepreneurship & Start-up Ecosystem Development**

- **International Collaborations**
- **Components:** The Mission aims at establishment of **Technology Innovation Hubs** (TIH), **Application Innovation Hubs** (AIH) and **Technology Translation Research Parks** (TTRP).
- Each hub covers the **entire technology life cycle:** knowledge generation, development, translation, and commercialization.
- The Hubs and TTRPs will operate in a **hub-and-spoke model,** connecting academics, industry, central ministries, and state governments to develop solutions at reputed academic and R&D organisations.

Small nuclear reactors get traction: Private players offer captive sites for power projects

India's plans to get into the manufacturing value chain of Small Modular Reactors (SMR) are yielding some positives with a handful of private players learnt to have shown interest in deploying these at their captive site.

Background: –

- The SMR push comes at a time when the global nuclear power sector is faced with a general decline in output, with its share dropping to the lowest point in nearly four decades due to a combination of factors — national policy pivots, economic viability issues, safety concerns and the rapid growth of renewable energy alternatives.

About Small Modular Reactors (SMR)

- SMRs are small reactors offering 30-300 MWe power output per unit, and are seen as effective in not just producing base load power, but also amongst renewables as a more carbon-neutral source.
- SMRs are conceptualised in such a way that their systems and components are manufactured in a controlled factory environment and then transported straight

to the project site to be installed, which optimises the construction lead time and cuts down the cost of these projects — two concerns with regard to traditional large reactor projects.

- They have potential deployment advantages like reduced size of the Emergency Planning Zone (ring fenced areas around the project site) and passive safety system, rendering them relatively safer than larger reactor-based projects.

Additional Information-

- SMRs are increasingly seen as important for nuclear energy to remain a commercially competitive option in the future.
- India is pushing for a leadership slot in this small reactor space, both as a way of fulfilling its commitment to clean energy transition, and bundling SMRs as a technology-led foreign policy pitch.
- These reactors are important in offering base load power that could give grid operators some degree of operational flexibility. This is seen as significant since SMRs, when pooled together, can produce a meaningfully large amount of electricity and help meet the challenge of inducting more base load power to balance out the vagaries of renewable power output. While thermal generation is seen as important in this regard, nuclear energy offers a more carbon-neutral base load generation option.
- Though India's civil nuclear programme has progressively upscaled its reactor sizes, from the earlier 220MWe reactors to the latest 700MWe PHWRs (pressurised heavy water reactors), the country does have an edge in producing and commercially operating small reactors.
- In the civil nuclear sector, New Delhi is pushing SMRs as a technology of promise that can help in industrial decarbonisation, and is hard selling its ability to take some kind of a leadership role in the dissemination of this technology.

Stem Cells Offer Hope for Type 1 Diabetes

A 25-year-old woman with type 1 diabetes began producing her own insulin within three months of receiving a transplant of reprogrammed stem cells.

Diabetes:

- Diabetes is a chronic disease that occurs when the pancreas can no longer make insulin or the body cannot effectively use the insulin it produces.
- This leads to high blood sugar levels, known as **hyperglycemia**.
- If left untreated, hyperglycemia can cause serious health complications, including **blindness, kidney failure, heart attacks, stroke, and lower limb amputation.**

It can be of two types:

- **Type 1:** An autoimmune disease where the body's immune system attacks and destroys insulin-producing cells in the pancreas.
- **Type 2:** A condition where the body becomes resistant to insulin or doesn't produce enough insulin.

- **In India**, there are estimated **77 million** people above the age of 18 years are suffering from diabetes (type 2)
- Nearly **25 million** are prediabetics (at a higher risk of developing diabetes in near future).
- More than **50% of people are unaware of their diabetic status**.

- A groundbreaking study has revealed the potential of stem cells to **treat type 1 diabetes.**
- This marks the first successful treatment of the disease using **stem cells**.

What are Stem Cells?

- Stem cells are specialised human cells with the remarkable **ability to develop into various cell types, including muscle cells**, brain cells, and insulin-producing cells.
- This **versatility makes them promising candidates for regenerative medicine,** offering hope for treating a wide range of diseases and injuries.

Types of Stem Cells

- **Multipotent:** These stem cells can give rise to multiple cell types within a lineage.
- **Pluripotent:** These stem cells can give rise to all cell types in an adult.
- **Totipotent:** These stem cells can give rise to all embryonic and adult lineages.

Sources of Stem Cells

- **Embryonic Stem Cells (ESCs):** Derived from early-stage embryos, ESCs have the potential to become any cell type in the body.
- **Adult Stem Cells:** Found in specific tissues and organs, adult stem cells play a role in tissue maintenance and repair.
- **Induced Pluripotent Stem Cells (iPSCs):** Adult cells that have been reprogrammed to behave like embryonic stem cells. iPSCs can be generated from a patient's own cells, reducing the risk of rejection.

Applications of Stem Cell Therapy

- **Regenerative Medicine:** Repairing or replacing damaged tissues and organs, such as heart muscle, cartilage, or nerve cells.
- **Treatment of Chronic Diseases:** Exploring potential treatments for conditions like diabetes, Parkinson's disease, Alzheimer's disease, and spinal cord injuries.
- **Immune Disorders:** Modifying or enhancing the immune system to fight cancer or autoimmune diseases.
- **Orthopaedics:** Treating orthopaedic injuries and conditions like osteoarthritis.
- **Cosmetic Procedures:** For procedures like facial rejuvenation.

While this study represents a significant milestone, more research is needed to fully understand the long-term effects of stem cell therapy **for type 1 diabetes.** However, the potential benefits of this approach are immense, offering hope for a future where diabetes is no longer a **life-altering condition.**

New artificial synaptic chip mimicking biological synapses to transform

information technology

- Scientists have created an artificial synaptic device that emulates the behaviour of biological synapses to transform information technology through more efficient computing models.
- They have used two-dimensional electron gas in oxide heterostructures for integrating architecture inspired by the biological brain, also called neuromorphic architecture and logic operations on a single chip.
- Modern computers inherently segregate memory and computation into independent physical units based on 'von Neumann computing'-- a system which is like a set of instructions that tells the computer how to handle information and perform tasks.
- This requires separate units for reading and executing complex operations, and then returning the results to memory, which slows computing. This can create a "bottleneck,". Especially if the computer needs to handle a lot of instructions and data at the same time, it can get slowed down because everything has to travel along the same path.
- On the other hand, a human brain is a sophisticated, dynamic, reconfigurable system with direct memory access, with neurons conducting the computational operations. Neuromorphic electronics, inspired by the intricate workings of the biological brain, offer the potential to transform information technology through more efficient computing models.
- Scientists at the Institute of Nano Science and Technology (INST), Mohali (Punjab), an autonomous institution of the Department of Science and Technology (DST), Government of India used a new approach that follows the working principal of human brains to overcome the challenges of **'von Neumann computing'**.
- They utilized the ***two-dimensional electron gas (2DEG)*** within the EuO-KTaO3 (KTO) oxide heterostructure to develop a chip which exhibited neuromorphic properties as well as showed a large change in resistivity known as resistive

switching behaviour.

- Current is generated at EuO-KTaO3 interface due to shining of light and this persists even after the light is turned off (demonstrating high persistent photoconductivity) resulting in optoelectronic properties necessary for replicating cognitive functions such as sensory perception, learning, and memory.
- The developed chip not only mimics the short- and long-term plasticity observed in biological synapses but also performs logic gate operations, significantly enhancing its versatility and potential for integration in advanced neuromorphic systems.
- Supported by the DST's Nanomission, and CSIRin the form of a sophisticated, custom-made instrument called a combinatorial pulsed laser deposition setup, Prof. Suvankar Chakraverty Professor at INST, Mohali (Punjab), haveproduced 2DEG at the interface composed of chemicals EuO and KTaO3acting as artificial synaptic device showing neuromorphic properties.The researchwas published in the journal 'Applied Physics Letter'.
- Neuromorphic design in oxide interfaces can facilitate more energy-efficient and quicker information processing, enhanced AI capabilities, and improved device miniaturisation. These systems may learn and change with time, resulting in more personalized and responsive technology. Furthermore, their resilience and fault tolerance make them perfect for important applications that will ultimately improve everyday life, including healthcare, education, and environmental sustainability.

Novel polymer nanocomposite creates base for road safety sensor for accident prone turnings

- Researchers from Centre for Nano and Soft matter Sciences (CeNS), Bengluru have developed a **polymer nanocomposite** for pressure sensing and energy harvesting applications and used it to invent a prototype of a road safety sensor.
- The prototype may be implanted in the movable ramp and secured to the road

just 100 meters before acute and fatal turning points.

- Thus, any vehicle approaching from the opposite side will see the signal on a screen and be alerted.
- This prototype works on the principle of piezoelectric effect so it can generate energy that can be stored and used further to power electronic gadgets as well.
- The novel polymer nanocomposite, from which the prototype has been crafted, has been made of transition metal dichalcogenide.
- The scientists, Shri Ankur Verma, Dr. Arjun Hari Madhu, Dr. Subash Cherumannil Karumuthil synthesized **vanadium disulfide (VS2)** with a very high surface charge which has the capacity of improving the **piezoelectric** characteristics of polymers.
- Polymer nanocomposite films were prepared by integrating these nanoparticles at various concentrations into a well-known piezoelectric polymer, **poly (vinylidene difluoride) (PVDF).**
- Further they investigated how the surface charge of nanoparticles will affect the piezoelectric properties of polymer nanocomposite. In addition, a laboratory-scale demonstration of a road safety sensor and smart door was established, with the prototype as a pressure sensor.
- This study is part of an ongoing project "Materials for self powered energy generating and pressure sensing devices" funded by Department of Science and Technology under INSPIRE –faculty fellowship programme.

SPRP for dengue and other Aedes-borne arboviruses

Global Strategic Preparedness, Readiness and Response Plan (SPRP)

- The SPRP aims to reduce the impact of dengue and other Aedes-borne diseases like Zika and chikungunya.
- It promotes a coordinated global response to these health threats.
- **Key Objectives**
    - Decrease disease burden, suffering, and deaths from Aedes-borne

arboviruses.
    - Foster collaboration across various sectors to improve disease management.
- The SPRP aligns with the Global Vector Control Response 2017–2030 and the Global Arbovirus Initiative launched in 2022.
- **Implementation Timeline**
    - The plan will be implemented over one year, concluding in September 2025.
    - It requires funding of US$ 55 million to support health preparedness efforts.

Five Key Components of SPRP

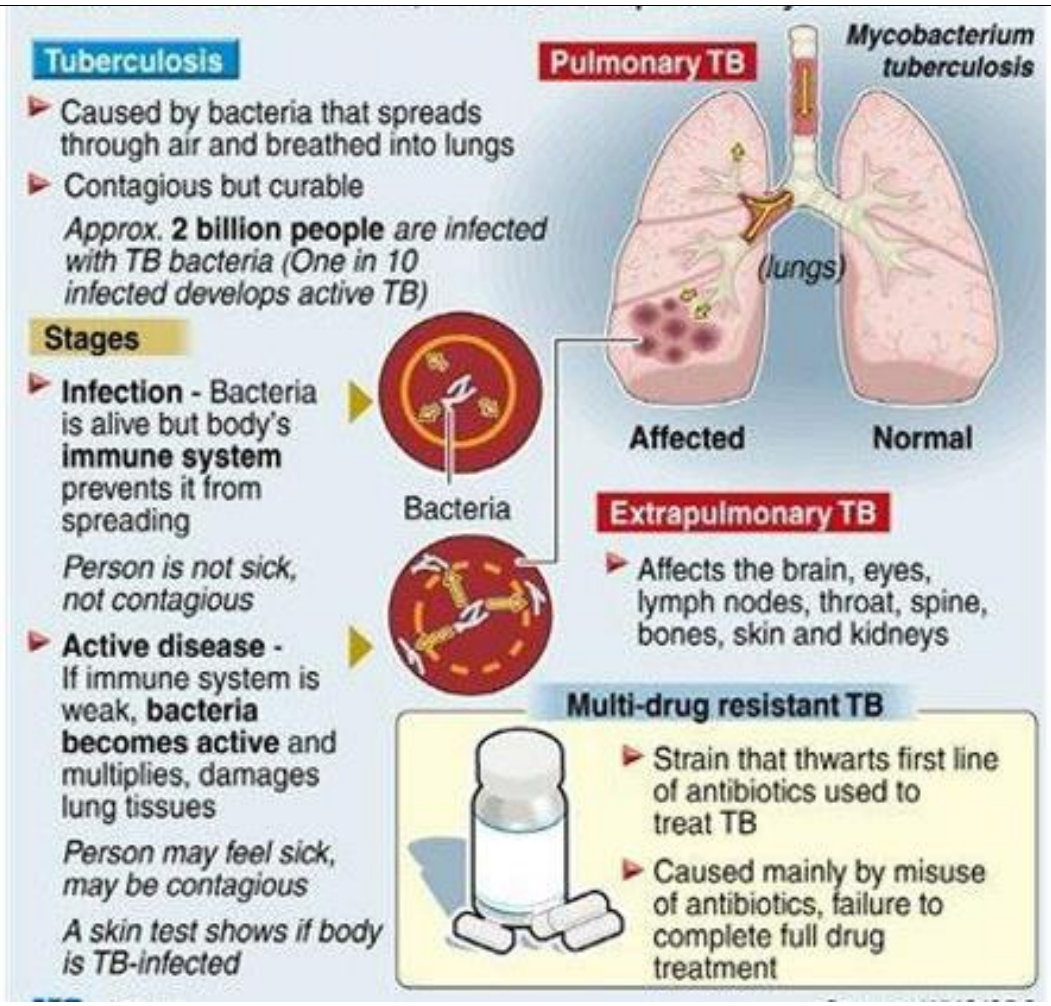
1. **Emergency Coordination:** Establish leadership and coordination for outbreak responses.
2. **Collaborative Surveillance:** Strengthen tools for early detection and control of outbreaks.
3. **Community Protection:** Engage local communities in prevention and response efforts.
4. **Safe and Scalable Care:** Provide effective clinical management and ensure healthcare access.
5. **Access to Countermeasures:** Support research for improved treatments and effective vaccines.

Union Health Minister Unveils Key Initiatives to boost Nutrition Support for TB Patients and their Families

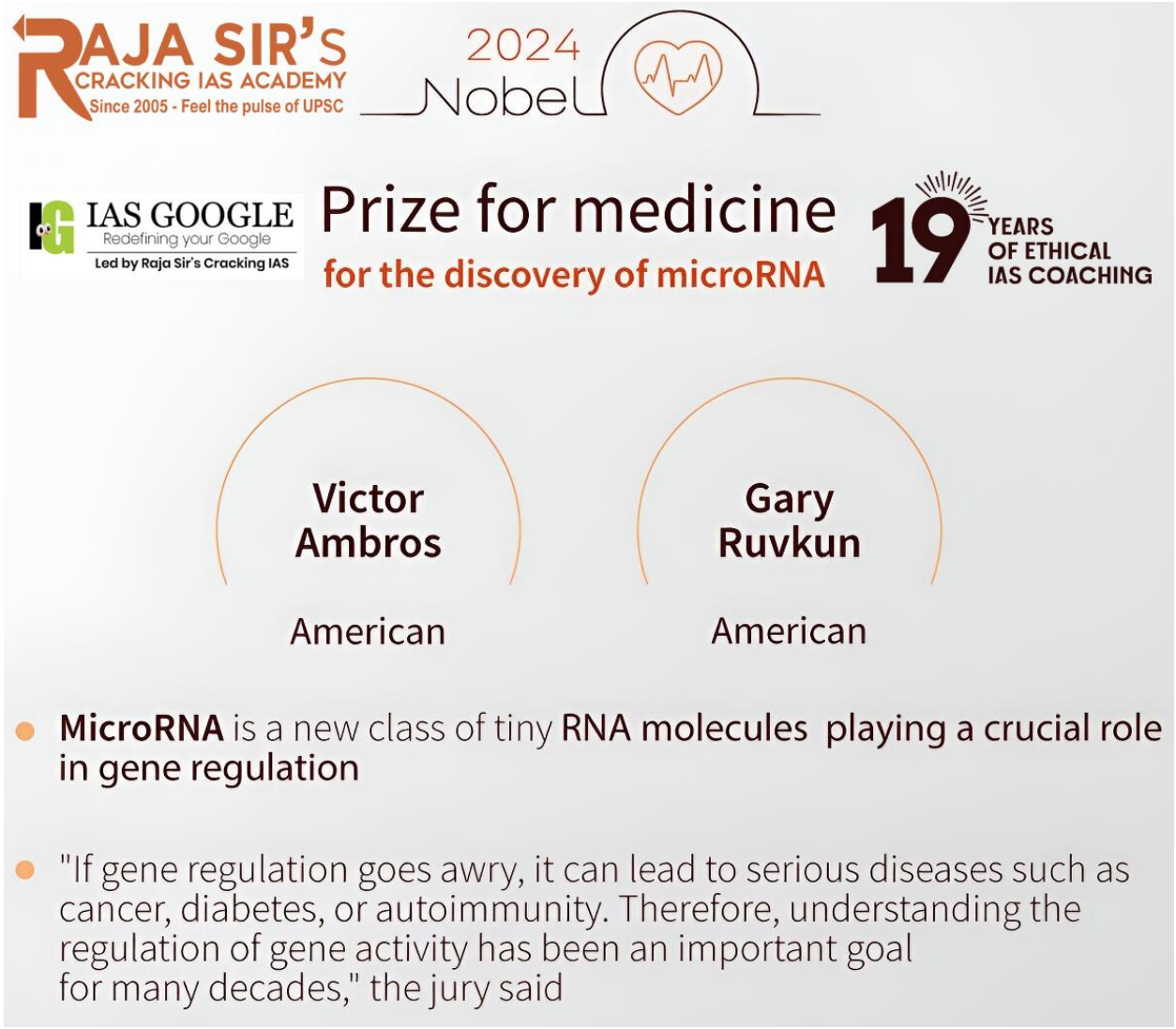
- India has the **world's highest tuberculosis (TB)** burden, with an estimated 26 lakh people contracting the disease and approximately 4 lakh people dying from the disease every year.
- TB usually affects the most economically productive age group of society

resulting in a significant loss of working days and pushing TB patients further into the vortex of poverty.

- The Ministry of Health and Family Welfare (MoHFW) is implementing an ambitious National Strategic Plan with the goal to **achieve SDG End TB targets by 2025**. The challenge of tuberculosis requires a multi-sectoral response to address the social determinants like nutritional support, living and working conditions, and an increase in access to diagnostic and treatment services.
- Underscoring India's resolute commitment to end TB, Nutrition support under **Ni-Kshay Poshan Yojana (NPY)** has been increased from existing Rs. 500 per month/patient to Rs. 1,000/month/patient for entire duration of the treatment.
- The government has also decided to introduce energy dense nutrition supplementation for all patients with BMI<18.5 and to permit expansion of scope & coverage of Ni-Kshay Mitra initiative under **Pradhan Mantri TB Mukt Bharat Abhiyaan (PMTBMBA)** to the family members (household contacts) of TB patients.
- All TB patients will now receive a nutritional support of ₹ 3,000 to ₹ 6,000 under Ni-Kshay Poshan Yojana (NPY).
- While enhancement of NPY support will benefit all 25 lakh TB patients in a year, introduction of Energy Dense Nutritional Supplementation **(EDNS)** would cover approximately 12 lakh underweight patients (BMI less than 18.5 kg/m^2 at the time of diagnosis).
- EDNS would be provided to all eligible patients for the first two months of their treatment. "This move will cost the Government of India approximately an additional ₹1,040 crores to be shared between the center and states on 60:40 basis.
- In addition to TB patients, *Ni-kshay Mitras* will adopt the household contacts of TB patients for distribution of food baskets with a view to improve the immunity of the family members of TB patients. This would lead to a significant reduction in out-of-pocket expenses (OOPE) incurred by TB patients and their families.


Tuberculosis
Caused by bacteria that spreads through air and breathed into lungs
Contagious but curable
Approx. 2 billion people are infected with TB bacteria (One in 10 infected develops active TB)
Stages
Infection - Bacteria is alive but body's immune system prevents it from spreading
Person is not sick, not contagious
Active disease - If immune system is weak, bacteria becomes active and multiplies, damages lung tissues
Person may feel sick, may be contagious
A skin test shows if body is TB-infected
Bacteria
Pulmonary TB
Mycobacterium tuberculosis
(lungs)
Affected
Normal
Extrapulmonary TB
Affects the brain, eyes, lymph nodes, throat, spine, bones, skin and kidneys
Multi-drug resistant TB
Strain that thwarts first line of antibiotics used to treat TB
Caused mainly by misuse of antibiotics, failure to complete full drug treatment

The discovery of microRNA wins the 2024 physiology Nobel Prize:



MicroRNA plays a key role in gene regulation. **MicroRNAs, or miRNAs**, are small, non-coding molecules of RNA. They are typically around **19-24 nucleotides** long and play an important role in determining how much **messenger RNA (mRNA),** which carries genetic information, eventually gets translated into protein.

- The body makes proteins in a complex process with two broad steps.
- In the transcription step, a cell copies a DNA sequence into messenger RNA (mRNA)

in the nucleus. The mRNA moves from the nucleus, through the cell fluid, and attaches itself to the ribosome.

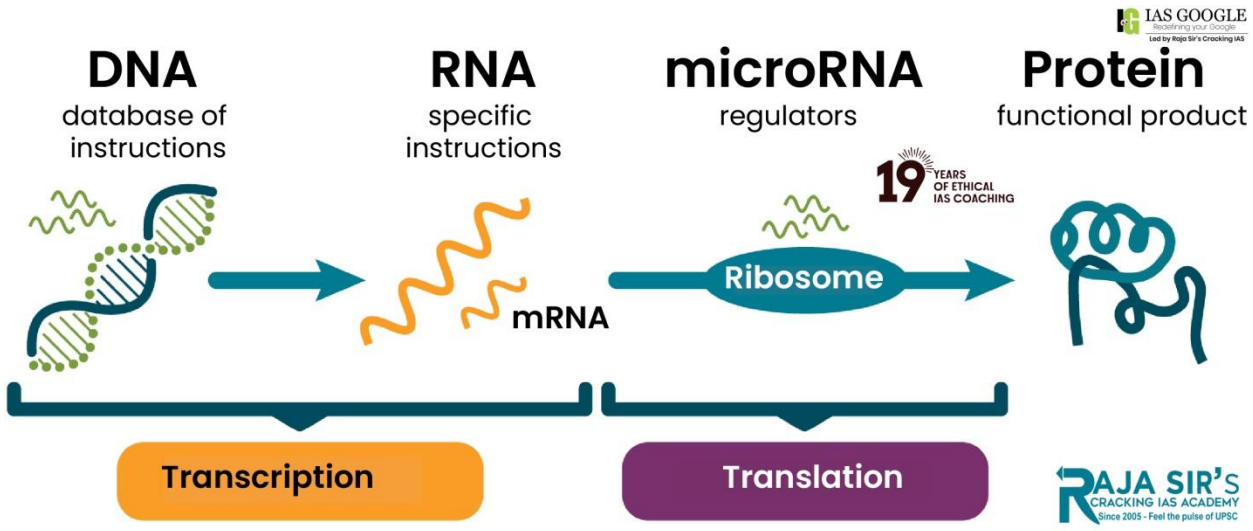
- In the translation step, another type of RNA called transfer RNA (tRNA) brings specific amino acids to the ribosome, where they are linked together in the order specified by the mRNA to make the protein.
- Micro RNA, or miRNA, regulates the production of proteins by bonding with and subsequently silencing the mRNA at an appropriate juncture. The process is called post-transcriptional gene regulation.

Nobel-winning research details:

- Ambros and Ruvkun studied a roundworm, Caenorhabditis elegans which, despite its small size, had specialised cell types such as nerve and muscle cells.
- Ambros and Ruvkun studied two mutant strains, **lin-4 and lin-14**, both of which exhibited abnormalities – their genetic programming that controls development was not functioning as expected. Ambros' previous research proved that lin-4 suppressed the activity of lin-14, but could not tell how it did so.
- The biologists individually researched how lin-4 affected the activity of lin-14. Ambros analysed the lin-4 mutant and cloned the gene and found out that it produced an unusually short RNA molecule that lacked a code for protein production. The findings suggested that this small RNA molecule could be responsible for inhibiting lin-14.
- Around the same time, Ruvkun investigated the regulation of the lin-14 gene in his lab and found that lin-4 did not block the production of lin-14 mRNA. Since the late 1960s, gene regulation was understood as a process that determined which mRNAs are produced, and hence, how genetic information flows. Ruvkun found that the regulation of **lin-14 mRNA** occurred later in the gene expression process by inhibiting protein production.
- Ruvkon's experiment also revealed an important segment in the lin-14 mRNA that was essential for its inhibition by lin-4. The short lin-4 sequence that Ambros

discovered in his research matched complementary sequences in the critical segment of the lin-14 mRNA, which means that they can pair together like keys fit into locks.

- The two biologists conducted further experiments and found that lin-4 microRNA, the "unusually short" RNA molecule, attaches to lin-14's mRNA and blocks the production of lin-14 protein. This is how microRNA was discovered.
- The results were not enthusiastically accepted by scientists as the behaviour was thought to be specific to C. elegans, and therefore irrelevant to complex animals. However, in 2000, Ruvkun's research group published discovery of another microRNA, encoded by the **let-7 gene**. The let-7 gene is present throughout the animal kingdom.



What is microRNA?

- Every cell in the human body contains the same raw genetic information, locked in our DNA. But bone cells, nerve cells, skin cells, white blood cells, heart cells and many more each use that genetic code in different highly specialised ways. The work by the US pair helps explain how that happens.
- This year's Nobel Prize focuses on the discovery of a vital regulatory mechanism

used in cells to control gene activity. Genetic information flows from DNA to messenger RNA (mRNA), via a process called transcription, and then on to the cellular machinery for protein production.

Applications

- A single micro-RNA can regulate the expression of many genes, and alternatively a single gene can also be controlled by multiple micro-RNAs. This leads to fine tuning of different types of cells despite similar genetic information.
- Abnormal regulation by microRNA can contribute to cancer, and mutations in genes coding for microRNAs have been found in humans, causing conditions such as congenital hearing loss, eye and skeletal disorders.



Nobel season is here: Things to know about the prizes

Who created the Nobel prizes?

The prizes in medicine, physics, chemistry, literature and peace were established by the will of **Alfred Nobel.**

Each prize is worth 10 million kronor (nearly $900,000).

It is handed out with a diploma and gold medal.





The economics award wasn't created by Nobel, but by Sweden's central bank in 1968.

Who was Alfred Nobel?

He was a wealthy Swedish industrialist and inventor of dynamite.



He died in 1896.

First awards were handed out in 1901, 5 years after his death.

Who can nominate a candidate?

Thousands of people around the world are eligible to submit nominations for the Nobel Prizes.

They include university professors, lawmakers, previous Nobel laureates & committee members themselves.

The judges try hard to avoid dropping hints about the winners before the announcements, but sometimes word gets out.



Although the nominations are kept secret for 50 years, those who submit them sometimes announce their suggestions publicly, particularly for the Nobel Peace Prize.



What about the Norwegian connection?

The Nobel Peace Prize is presented in Norway while the other awards are handed out in Sweden.

That's how Alfred Nobel wanted it. His exact reasons are unclear.

What does it take to win a Nobel?

Patience, for one. Scientists often have to wait decades to have their work recognised by the Nobel judges.

The peace prize committee is the only one that regularly rewards achievements made in the previous year.

According to Nobel's wishes, that prize should go to "the person who shall have done the most or the best work for fraternity between nations".



Unified Genomic Chip for cattle

Prime Minister has introduced a **Unified Genomic Chip for cattle**, along with indigenous technology for **sex-sorted semen production.**

Unified Genomic Chip For Cattle

- It is a technology designed to revolutionise the livestock breeding industry.
- It's a microchip that **analyses the genetic makeup of animals**, providing valuable insights into their traits, health, and potential offspring.
- **Developed by:** Department of Animal Husbandry and Dairying (DAHD) under Ministry of Animal Husbandry, Dairying and Fisheries.

IndiGau Chip

- Recognized as **India's first Cattle Genomic Chip**, focused on **conserving pure** varieties of indigenous cattle breeds.
- **Global Significance:** It is the largest cattle genomic chip in the world.
- **Developed by:** National Institute of Animal Biotechnology (NIAB), Hyderabad in 2021.
- **Goal:** To preserve our indigenous breeds with superior characteristics.

Two Versions: The chip comes in two versions

1. Gau Chip: Designed for Cattle
2. Mahish Chip: Designed for Buffalo

- Purpose: Assists farmers in early identification of young, high-quality bulls, enabling informed decisions regarding animal selection.
- Benefit: Enhances the quality and efficiency of cattle in the dairy sector.

Sex Sorted Technology

- Sex sorting technology for cattle is a method used to **separate sperm cells based on their sex chromosomes**, allowing farmers to choose the sex of their offspring.

- **Indigenous Technology:** Recently launched for the production of sex-sorted semen.
- **Purpose:** Increases the availability of sex-sorted semen for farmers, enabling the production of predominantly female calves.
- **Technology Use:** IVF Technology (Test Tube Baby) is also utilised to expedite the production of desired cattle breeds.
- **DAHD Aim:** To produce 1 million doses of sexed semen annually for the Artificial Insemination (AI) program.

Significance:

- Lowers the cost from **Rs 1,000 (for imported technology) to Rs 200 per** dose .
- Facilitates quicker production of high-grade female cattle with a 90% success rate.

When combined with the Unified Genomic Chip, the sex-sorted semen technology helps reduce the number of non-productive animals, making dairy farming more economically sustainable

MACE, Asia's Largest and World's Highest Imaging Cherenkov Observatory, at Hanle, Ladakh

MACE project plays a significant role not only in advancing scientific research but also in supporting the socio-economic development of Ladakh.

- **Major Atmospheric Cherenkov Experiment (MACE) Observatory** MACE is the largest imaging Cherenkov telescope in Asia. Located at an altitude of ~4,300 m, it is also the highest of its kind in the world. The telescope is indigenously built by BARC with support from ECIL and other Indian industry partners. The inaugural of MACE Observatory was a part of the Platinum Jubilee year

celebrations of the DAE.

It Is A Big Deal

- Major Atmospheric Cherenkov Experiment (MACE) is the highest of its kind in the world
- Asia's largest imaging Cherenkov telescope, located at an altitude of almost 4,300 metres, was inaugurated on Wednesday at Ladakh's Hanle.
- The Major Atmospheric Cherenkov Experiment (MACE) observatory, the highest of its kind of telescope in the world, has been indigenously built by the Mumbai-based Bhabha Atomic Research Centre (BARC) with support from the Electronics Corporation of India Ltd (ECIL) and other Indian industry partners.
- The MACE observatory is touted to place India at the forefront of cosmic ray research globally by allowing scientists to study high-energy gamma rays. This will pave the way for deeper understanding of the universe's most energetic events, such as supernovae, black holes, and gamma-ray bursts.
- Even before its formal inauguration, the telescope produced high-quality work detecting gamma ray flares as far away as 200 million light years away.

MACE observatory

- MACE is 21 metres in diameter, 175 tonnes heavy, has reflector area of 356 sqm and 1,424 diamond-turned metallic mirror facets, 712 actuators, 1,088 photo-multiplier tubes, and 68 camera modules.
- It is a lightweight construction and features high strength and temperature endurance. Reflector surface measuring over 350 square metres (sqm) comprises highly reflective diamond-turned custom-built metallic mirror facets that are required to be aligned with an accuracy of 2 mm over parabolic surface. The camera at the focal point contains a number of photomultiplier tubes mounted with specialised assembly to enhance light collection efficiency.
- Ultrafast backend electronics with nanosecond digitization electronics is optimised for low-power and -temperature operations. Extreme weather

conditions restrict transport to six-eight months a year and affect the availability of trained personnel on site.

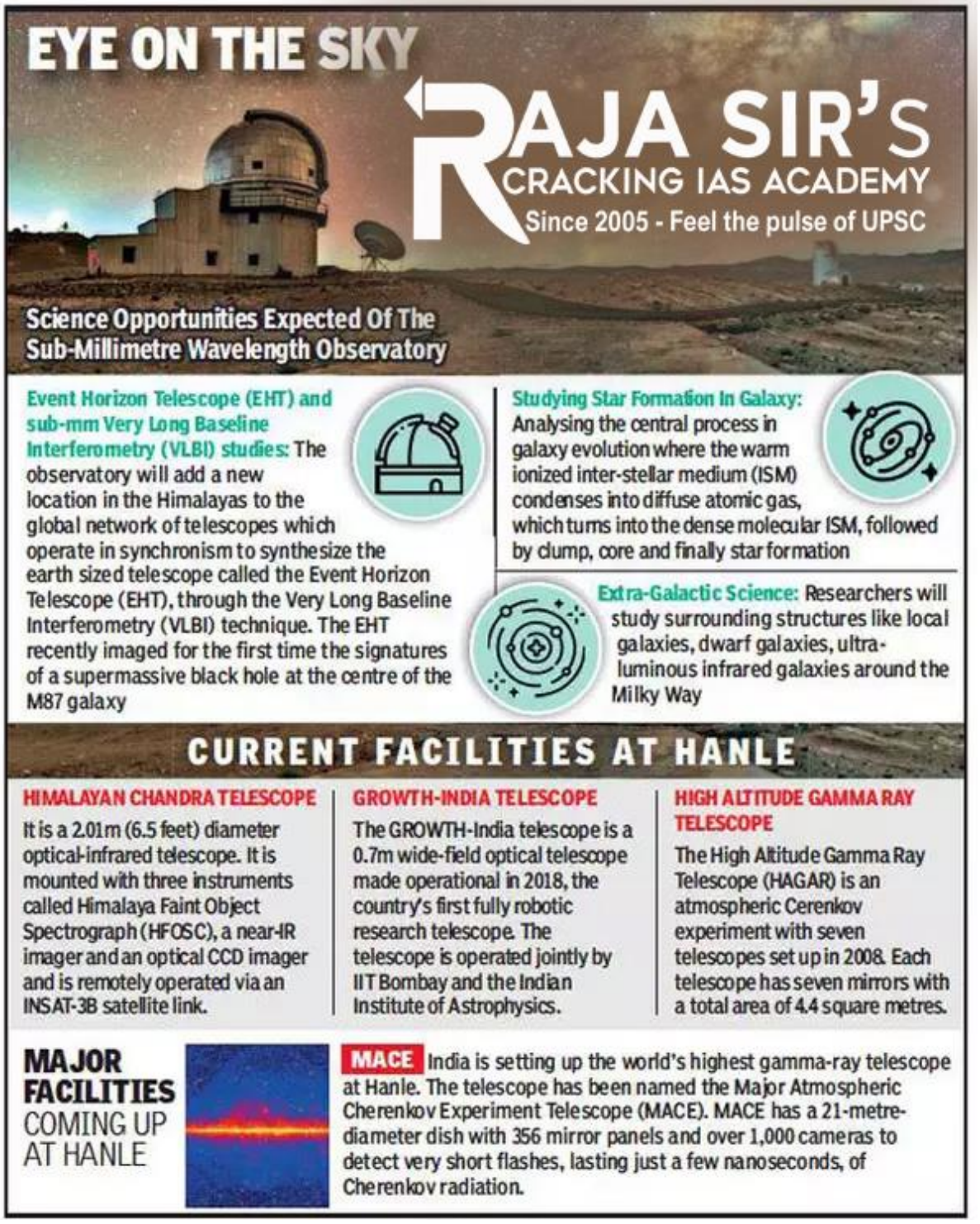
- The MACE Telescope consists of a large-area tessellated light collector of 356 m^2, made up of 356 mirror panels. A high-resolution imaging camera weighing about 1200 kg, for detection and characterization of the atmospheric Cherenkov events, forms the focal plane instrumentation of the telescope. The elevation over azimuth mounted telescope basket structure has two axes movement capability of ± 270° in azimuth and -26° to +165° in elevation for pointing towards any source in the sky and tracking it. The telescope, which weighs about 180 tons, is supported on six wheels which move on a 27-metre-diameter track.
- The telescope has an integrated imaging camera, which contains 1088 photo multiplier-based pixels and all the signal processing and data acquisition electronics. The camera communicates the acquired data to the computer system in the control room over optical fiber.

How will the telescope work?

- **Gamma rays do not reach the Earth's surface** as they are stopped by the atmosphere. However, interaction with the atmosphere creates high-energy particles that travel faster than the speed of flight and emit Cherenkov radiation which is akin to a sonic boom. The mirrors and cameras capture these flashes and trace them back to its cosmic source.

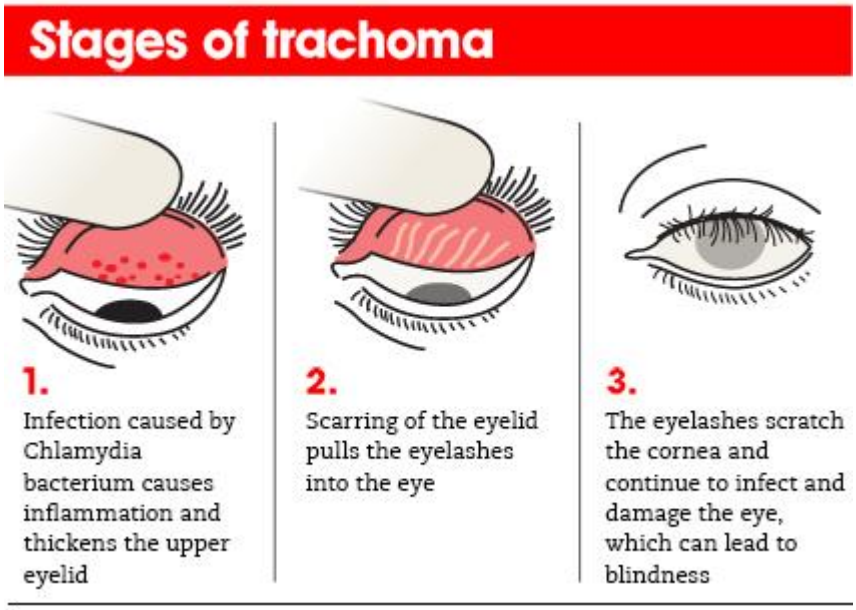
Why Hanle?

- The site has been carefully chosen for its unique scientific advantages as Hanle offers extremely low light pollution required for gamma ray observations. The longitudinal advantage of its location enables MACE to observe sources invisible to other parts of the world.
- "Hanle is like heaven for gamma ray astronomers with its dark skies, low humidity and almost no air pollution.


EYE ON THE SKY
RAJA SIR'S CRACKING IAS ACADEMY
Since 2005 - Feel the pulse of UPSC
Science Opportunities Expected Of The Sub-Millimetre Wavelength Observatory
Event Horizon Telescope (EHT) and sub-mm Very Long Baseline Interferometry (VLBI) studies: The observatory will add a new location in the Himalayas to the global network of telescopes which operate in synchronism to synthesize the earth sized telescope called the Event Horizon Telescope (EHT), through the Very Long Baseline Interferometry (VLBI) technique. The EHT recently imaged for the first time the signatures of a supermassive black hole at the centre of the M87 galaxy
Studying Star Formation In Galaxy: Analysing the central process in galaxy evolution where the warm ionized inter-stellar medium (ISM) condenses into diffuse atomic gas, which turns into the dense molecular ISM, followed by clump, core and finally star formation
Extra-Galactic Science: Researchers will study surrounding structures like local galaxies, dwarf galaxies, ultra-luminous infrared galaxies around the Milky Way
CURRENT FACILITIES AT HANLE
HIMALAYAN CHANDRA TELESCOPE
It is a 2.01m (6.5 feet) diameter optical-infrared telescope. It is mounted with three instruments called Himalaya Faint Object Spectrograph (HFOSC), a near-IR imager and an optical CCD imager and is remotely operated via an INSAT-3B satellite link.
GROWTH-INDIA TELESCOPE
The GROWTH-India telescope is a 0.7m wide-field optical telescope made operational in 2018, the country's first fully robotic research telescope. The telescope is operated jointly by IIT Bombay and the Indian Institute of Astrophysics.
HIGH ALTITUDE GAMMA RAY TELESCOPE
The High Altitude Gamma Ray Telescope (HAGAR) is an atmospheric Cerenkov experiment with seven telescopes set up in 2008. Each telescope has seven mirrors with a total area of 4.4 square metres.
MAJOR FACILITIES COMING UP AT HANLE
MACE India is setting up the world's highest gamma-ray telescope at Hanle. The telescope has been named the Major Atmospheric Cherenkov Experiment Telescope (MACE). MACE has a 21-metre-diameter dish with 356 mirror panels and over 1,000 cameras to detect very short flashes, lasting just a few nanoseconds, of Cherenkov radiation.

WHO declares that India has eliminated Trachoma as a public health problem in 2024

India becomes the third country in the South-East Asia Region to achieve this milestone



- **Trachoma** is a bacterial infection that affects the eyes. It is caused by the *bacterium Chlamydia Trachomatis.* Trachoma is **contagious,** spreading through contact with the eyes, eyelids, nose or throat secretions of infected people, if left untreated it causes irreversible blindness.
- WHO has termed Trachoma as a neglected tropical disease. WHO estimates suggest that 150 million people worldwide are affected by Trachoma and 6 million of them are blind or at risk of visually disabling complications. Trachoma is found in underprivileged communities living in poor environmental conditions.
- Trachoma was amongst the leading cause of blindness in the country during 1950-60. The Government of India launched the National Trachoma Control Program in 1963 and later on Trachoma control efforts were integrated into India's National Program for Control of Blindness (NPCB).
- In 1971, blindness due to Trachoma was 5% and today, owing to the various

interventions under the **National Programme for Control of Blindness & Visual Impairment (NPCBVI)**, it has come down to less than 1%.

- WHO SAFE strategy was implemented throughout the country wherein SAFE stands for adoption of surgery, antibiotics, facial hygiene, environmental cleanliness etc. As a result, in 2017, India was declared free from infective Trachoma.
- The National Trachomatous Trichiasis (TT only) Survey was also carried out in 200 endemic districts of the country under NPCBVI from 2021-24, which was a mandate set by WHO in order to declare that India has eliminated Trachoma as a public health problem.

High Court Allocates ₹974 Crore for Rare Diseases, Forms National Committee.

The Delhi High Court directed the Union Government to establish the National Fund for Rare Diseases (NFRD).

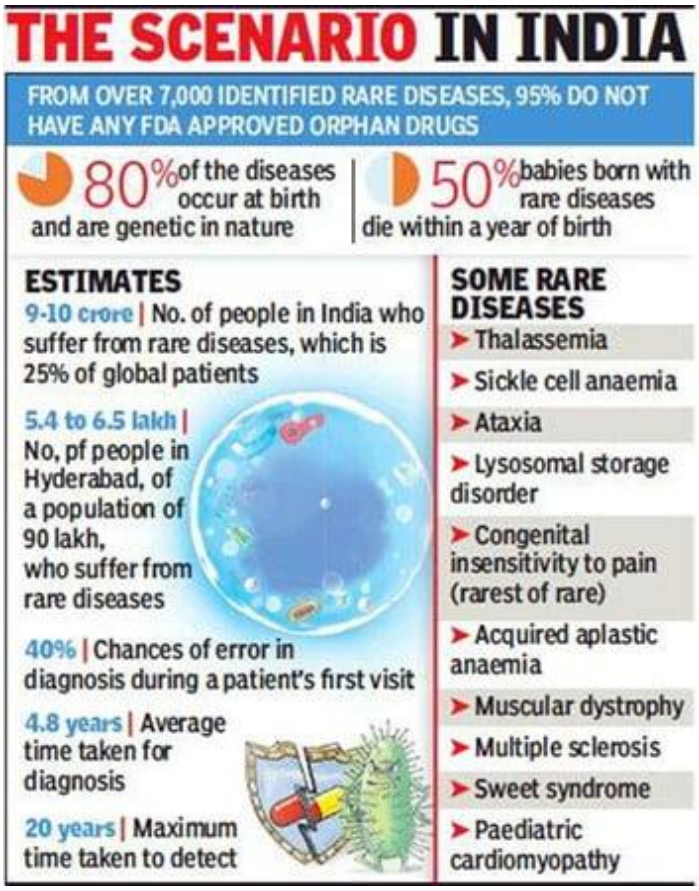
- The Court also directed to allocate a sum of Rs 974 crore to the NFRD for the financial years 2024-25, and 2025-26.
- The Court's decision was influenced by the previous underutilization of funds.
- Only ₹119.35 crore of the ₹402.67 crore allocated for treating Rare Disease was spent between 2017 to 2022.
- The High court also directed for the establishment of the **National Rare Disease Cases Committee.**

Rare Diseases

- Rare diseases are conditions with a low prevalence, affecting a small population.
- **According to WHO**, a disease is considered rare if it affects **1 or fewer in 1,000 people.**
- They include genetic diseases, rare cancers, tropical diseases, and degenerative

disorders.

- **Global Scenario:** Over 7,000 rare diseases exist, but **only 5%** are treatable.
- **India's Rare Disease Burden:** India accounts for a significant portion of the global rare disease cases, with estimates suggesting that between 80 to 100 million people are affected.
- **About 75%** of those are children, and many of these diseases are life-threatening, contributing to high child mortality rates.



Challenges Posed by Rare Diseases

- **Limited Access to Care**: Lack of specialist availability hinder access, resulting in care disparities.
- **Diagnostic Delays:** Many rare diseases are poorly understood, leading to long diagnostic odysseys, misdiagnoses, and prolonged suffering.

- **Treatment Issues:** Limited research yields few approved treatments; healthcare professionals may lack experience or knowledge in managing these diseases.
- **Financial Burden:** High costs of treatment and care can lead to financial hardship for families and strain national healthcare systems.
- **Psychosocial Impact:** Patients and families face stress, anxiety, and social isolation, significantly affecting mental health.
- **Education and Awareness:** Lack of public understanding leads to misconceptions and stigma; increased awareness is essential for support and early diagnosis.
- **Research and Innovation:** Small patient populations and limited funding hinder research; collaboration among stakeholders is crucial for advancing therapies and outcomes.

National Policy for Rare Diseases (NPRD), 2021

- **Aim**: To reduce the prevalence and incidence of rare diseases in India.
- It categorises rare diseases into three groups based on treatment needs:
- **Group 1:** Disorders that can be treated with a one-time curative treatment.
- **Group 2:** Diseases requiring long-term or lifelong treatment but with lower treatment costs.
- **Group 3:** Diseases that have a definitive treatment, but patient selection is difficult, and costs are high.
- **Centres of Excellence (CoEs):** These are identified health facilities dedicated to diagnosing, preventing, and treating rare diseases. Eight such centres have been designated.

Financial Support:

- Up to ₹5 crore is provided to upgrade diagnostic facilities at CoEs.
- Patients suffering from rare diseases can receive up to ₹50 lakh for treatment at CoEs, separate from the Rashtriya Arogya Nidhi (RAN) scheme, which offers a

maximum of ₹20 lakh.

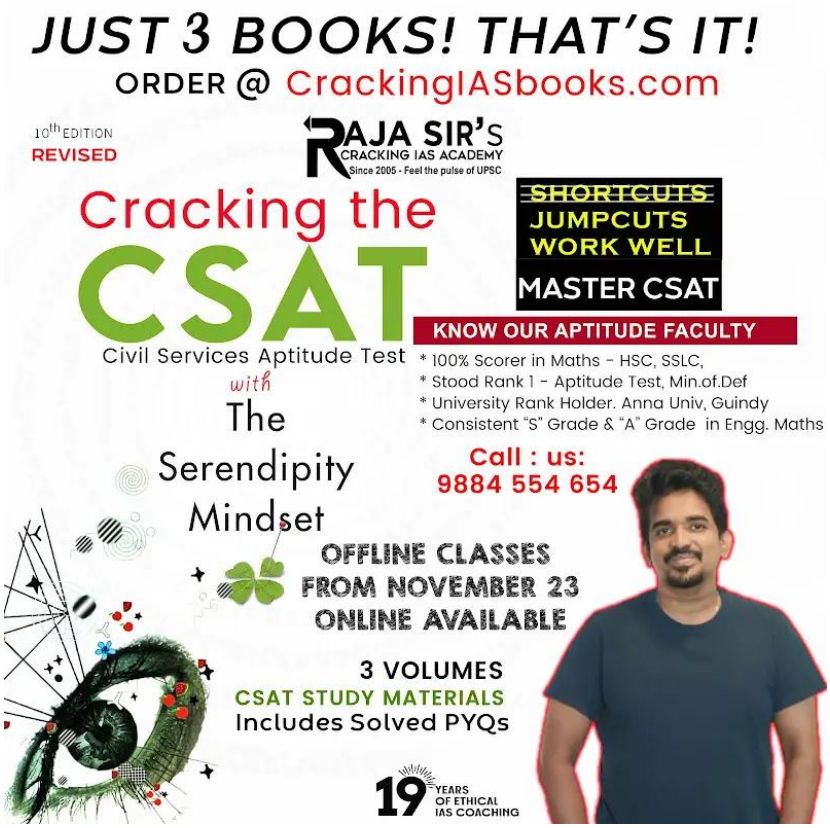
- **National Registry:** A hospital-based national registry is being developed to collect data and support research into rare diseases

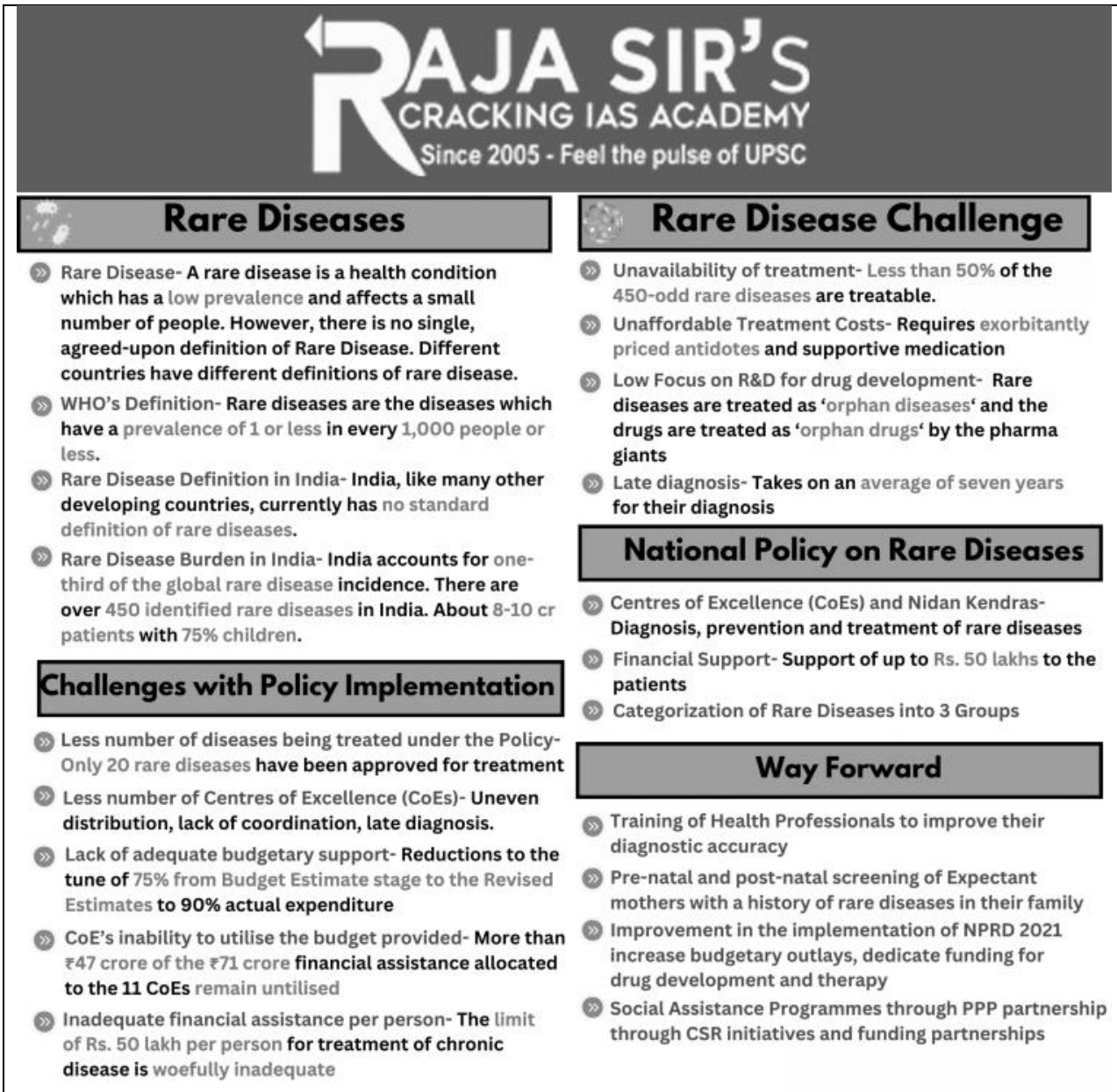
National Rare Disease Cases Committee

- It is a **five-member panel** to implement the rare diseases policy.
- **Members:** Experts from relevant fields, including medical professionals, policymakers, and representatives from healthcare institutions.

This committee is responsible for:

- Assessing individual cases to determine treatment needs.
- Implementing policy provisions through guidelines and strategies.
- Facilitating coordination among medical experts, policymakers, and healthcare institutions to address the challenges related to rare diseases.
- Monthly meeting, faster approval, and better Utilisation of Fund.



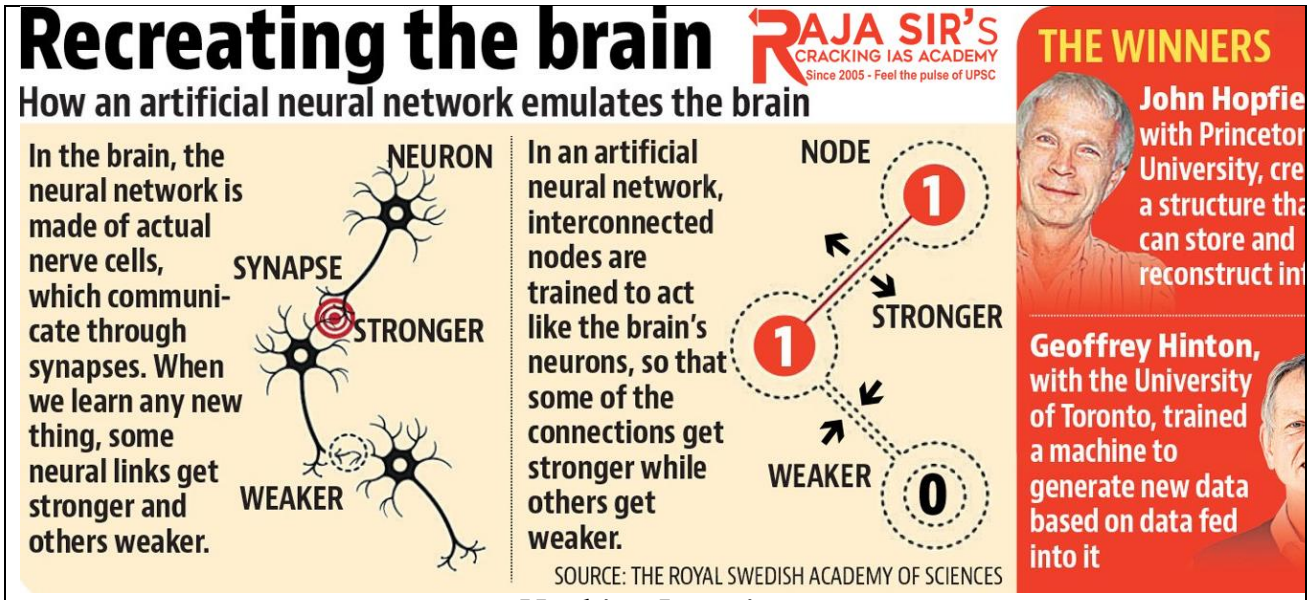


Physics Nobel awarded to neural network pioneers who laid foundations for AI

U.S. scientist John Hopfield and **British-Canadian Geoffrey Hinton** won the 2024 **Nobel Prize in Physics** for discoveries and inventions that **laid the foundation for**

machine learning.

- **John Hopfield and Geoffrey Hinton Work**
- **Work: Developing computer algorithms** that **mimic the functioning of the human brain** in performing common tasks.
- **Hopfield's revolutionary work in the 1980s:** Built an **artificial neural network (ANN)** resembling the **network of nerve cells in the human brain**, that allowed **computer systems to 'remember' and 'learn**'
    - **Hopfield's network**: Processed information using the entire network structure, and not its individual constituents.
    - **Traditional computing**: Information is **stored or processed in the smallest bits**.
    - **Hinton** took forward the **work of Hopfield and developed artificial networks** that could perform **much more complex tasks**.
    - **Hopfield networks** could recognise **simple patterns of shape or sound**
    - **Hinton's advanced models** could **understand voices and pictures**.
    - Neural networks could be **strengthened**, and thei**r accuracy at pattern recognition enhanced** through **repeated inputs of data,** called **training**.
    - Hinton developed a method called **backpropagation** that enabled the artificial neural networks to learn from previous mistakes and improve itself



Machine Learning

Subset of artificial intelligence (AI), it focuses on the **development of algorithms** that **enable computers** to l**earn from and make decisions based on data**, without being explicitly programmed for specific tasks.

Essence of machine learning is r**ecognizing patterns within data** and **making predictions or decisions based on those patterns.**

How it works?

- ML systems learn by **processing data and optimising internal variables**, or model parameters, to reflect the data.
- The learning algorithm then **updates the parameter values** as it learns, allowing the model to **make predictions and decisions** based on the data.

Examples of machine learning

1. **Spam filtering:** Uses patterns in data to identify spam emails
2. **Natural language processing:** Enables computers to understand, interpret, and generate human language.
3. **Neural networks:** Inspired by the human brain's neural connections, these

models are used in machine learning.

4. **Overfitting and Underfitting**: Overfitting occurs when a model performs **well on training data but poorly on new data.** Underfitting happens when a model is **too simplistic**, failing to capture underlying patterns.

Helicase-assisted continuous editing

- A **fundamental challenge of genomics is to chart** the impact of the three billion bases in the human genome on protein function and gene regulation. Thus, a critical goal is to develop strategies for mutagenizing genomic sequences systematically and at high throughput.
- In particular, **targeted mutagenesis of single genomic loci could emulate** the natural evolution process to reveal sequence-structure relationships, gain- and loss-of-function phenotypes, and cooperative mutations.
- However, no method exists that can perform continuous mutagenesis at targeted regions in the endogenous genomes of mammalian cells
- **Platform called helicase-assisted continuous editing (HACE),** which combines long-range editing of entire loci with the sequence programmability inherent to CRISPR gene editing tools.
- **HACE uses CRISPR-Cas9** to direct the loading of a helicase-deaminase fusion for targeted hypermutation of the downstream genomic sequence. HACE achieved locus-specific deamination across >1000 nucleotides with mutations continuously accumulating over time.
- **HACE can be multiplexed to target multiple** genomic regions with a minimal number of guide RNAs.
- **HACE can be applied in coding and noncoding genomic** contexts to functionally dissect endogenous mutations conferring drug resistance, changes in enzymatic activity, and altered cis-regulatory element function.
- **HACE makes possible the continuous, long-range**, programmable diversification of endogenous mammalian genomes. We envision that HACE will

substantially expand the functional genomics toolbox and enable the building of systematic sequence-function maps of both coding and noncoding genomes.

- Furthermore, **HACE can be developed into a directed evolution system** in the endogenous genome, enabling the selection of sequences for desired functions in mammalian biology.

Union Cabinet has extended the universal supply of fortified rice in all central government schemes.

The Union Cabinet has extended the universal supply of fortified rice in all central government schemes under the National Food Security Act, 2021 until December 2028.

Rice Fortification Initiative to Combat Anaemia with 100% Central Funding

- Rice fortification initiative would continue as a central sector initiative with 100% funding
- The initiative aims **to address anaemia and micronutrient deficiencies** in the population.

Food Fortification?

- Food fortification **involves deliberately increasing the content of essential micronutrients in food to improve its nutritional quality** and provide public health benefits with minimal health risks.
- The Food Safety and Standards Authority of India (FSSAI) defines this process and oversees its implementation
- In October 2016, **FSSAI operationalised the Food Safety and Standards (Fortification of Foods) Regulations, 2016** for fortifying staples namely wheat flour and rice (with Iron, Vitamin B12 and Folic Acid), milk and edible oil (with Vitamins A and D) and double fortified salt (with Iodine and Iron) to reduce the high burden of micronutrient malnutrition in India.
- The '+F' logo has been notified to identify fortified foods.

- At present, all the major oil producers in the country are voluntarily fortifying at least one brand in their product portfolios.

Fortification of Rice

- Rice is fortified using various technologies such as **coating, dusting, and extrusion.**
- The extrusion process produces fortified rice kernels (FRKs) by mixing dry rice flour with a premix of micronutrients, which is then processed through an extruder to create kernels resembling regular rice.
- Fortified rice is blended with regular rice, ensuring 10 grams of FRK is combined with 1 kilogram of regular rice.

Fortified rice is enriched with essential micronutrients, including:

- **Iron:** 28 mg – 42.5 mg
- **Folic Acid:** 75 – 125 micrograms
- **Vitamin B-12:** 0.75 – 1.25 micrograms
- Additional nutrients may include zinc, vitamin A, and various B vitamins.

Progress of the Fortification Initiative

- The rice fortification initiative was announced in **2015,** with a goal for implementation across various central government schemes by 2024.
- The initiative has been rolled out in **three phases:**
- **Phase 1:** Covered programs like Integrated Child Development Services and PM POSHAN by March 2022.
- **Phase 2:** Extended to Public Distribution System (PDS) in 112 Aspirational Districts and 291 high stunting burden districts by March 2023.
- **Phase 3:** Aims for full coverage across remaining districts by March 2024.
- **Annual cost:** Approximately Rs 2,700 crore, accounting for less than 2% of India's total food subsidy bill.

- **Distribution so far:** By March 2024, about 406 lakh metric tonnes of fortified rice are expected to be distributed through the PDS.
- **Facility for Fortification:** The Centre has invested Rs 11,000 crore to develop the

fortified rice supply chain in India, with 925 manufacturers producing fortified rice.

What is the difference between fortification and biofortification?

- **Biofortification** is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology. **Biofortification differs from conventional fortification**. Biofortification aims to increase nutrient levels in crops during plant growth rather than through manual means during processing of the crops.

Benefits of Fortified Rice

- Fortified rice retains the same cooking and eating properties as regular rice, making it easy to integrate into daily diets.
- It is packaged in jute bags labelled with the **logo ('+F')** and the statement "Fortified with Iron, Folic Acid, and Vitamin B12".

The Nobel Prize in Chemistry 2024

- The Nobel Prize in Chemistry 2024 is **about proteins, life's ingenious chemical tools**. David Baker has succeeded with the almost impossible feat of building entirely new kinds of proteins.
- Demis Hassabis and John Jumper have **developed an AI model to solve a 50-year-old problem: predicting proteins' complex structures**. These discoveries hold enormous potential
- The chemistry prize concerns two areas in the field of protein research: design and structure.

What are proteins and what do they do?

- Proteins are large, complex molecules that play many critical roles in the body.
- They do most of the work in cells and are required for the structure, function, and regulation of the body's tissues and organs.
- Proteins are made up of hundreds or thousands of smaller units called amino acids, which are attached to one another in long chains.
- There are 20 different types of amino acids that can be combined to make a protein.
- The sequence of amino acids determines each protein's **unique 3-dimensional structure** and its specific function.
- Amino acids are coded by combinations of **three DNA building blocks (nucleotides),** determined by the sequence of genes.

Why are proteins important?

- **All life requires proteins** and all proteins are made of amino acids. While there are many types of amino acids in nature, only 20 of them in different combinations make up all the proteins in the human body and in most life-forms.
- Amino acids are found in tissues — like muscles, skin, and hair — that provide structural support; they're catalysts in biochemical reactions; move molecules like oxygen across membranes; control muscle contraction that lets us move and have our hearts beat; and help cells communicate with each other to perform tasks.

What is the protein-folding problem?

- A protein has many identities and one of them depends on the arrangement of its amino acids in the three dimensions of space — in other words, its 3D structure. And scientists have spent decades trying to understand how proteins attain these structures.
- In 1962, John Kendrew and Max Perutz won the Nobel for elucidating the first 3D

models of haemoglobin and myoglobin, both proteins, using X-ray crystallography. (This method reveals a crystal's structure based on how its constituent atoms scatter X-rays. For this the proteins need to be purified and crystallised first).

- A year earlier, Christian Anfinsen had found that a protein's 3D structure is governed by the sequence of amino acids in the protein, and won the 1972 chemistry Nobel.
- **Notable breakthrough arrived in 1969** when scientists found that a protein doesn't try to bend into different shapes before settling into its final one. Instead it somehow knows the shape it needs to have and rapidly folds itself to acquire it. The mysterious nature of **this 'knowledge' of the protein is called the protein-folding problem.**
- By the late 2010s, scientists had worked out the structures of around 1.7 lakh proteins — a large number yet still small compared to the roughly 200 million proteins in nature. This situation changed drastically around 2018.



What is AlphaFold?

- Hassabis co-founded DeepMind in 2010 and which Google acquired. Here, Hassabis and his colleagues unveiled AlphaFold in 2018. AlphaFold is a deep-learning model able **to predict the structures of almost all proteins after training on the set of known structures**.
- DeepMind launched its successor AlphaFold 2 in 2020, when it was able to predict the structure of proteins with an accuracy comparable to that of X-ray crystallography.
- Jumper led the work on AlphaFold 3. This model is able to predict the structures of various proteins as well as how two proteins and/or a protein and another molecule might interact.
- Given enough computing power, these machine-learning models are capable of deducing the 3D shapes of most proteins in a matter of hours. However, these machines have not been able to say why a protein prefers a particular structure.

What is protein design?

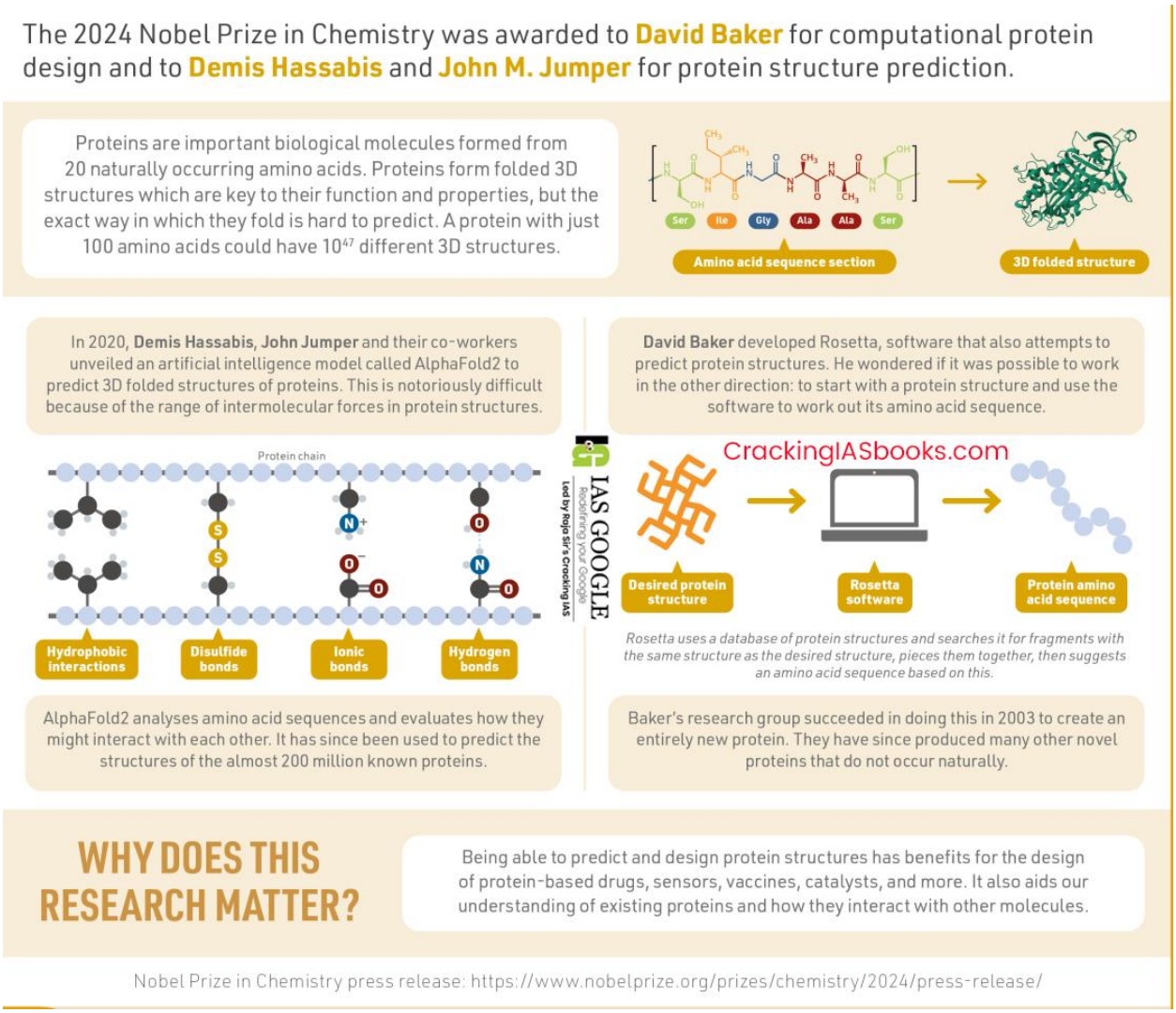
- Baker, who received the other half of chemistry Nobel**, developed tools that scientists use to design new proteins with specific shapes and functions**. His first notable work was in 2003, when he led a team to create a novel protein and determined its structure using a bespoke computer program they had developed in 1999 called 'Rosetta'.
- **The ability to design proteins has far-reaching implications**. For example, in 2022, Baker's team developed an antiviral nasal spray to treat COVID-19. At its heart were proteins the team designed using computational methods in the laboratory to stick to vulnerable sites on the viral surface and target the spike protein.

Other 2024 Awards

- **Physiology or Medicine award:** Victor Ambros and Gary Ruvkun for their work

on the **discovery of microRNA**

- **Physics Prize:** John Hopfield and Geoffrey Hinton for their contributions to **machine learning.**
- The official award ceremony is scheduled for December 10, 2024.



New cancer therapy target could help patients overcome resistant to current treatments.

- Scientists have identified a promising new target for cancer treatment by

activating a **DNA repair enzyme called TDP1**, suggesting a combination therapy which could be a potential precision medicine especially for those resistant to current cancer remedies.

- Existing anticancer drugs like Camptothecin, Topotecan, and Irinotecan target an enzyme crucial for **DNA replication and transcription called Topoisomerase** 1 (Top1). Cancer cells often develop resistance to such single-agent treatments and hence require alternate therapy methods.
- In order to explore such alternative routes to treatment, scientists of Department of Science and Technology (DST) probed how cancer cells repair DNA during cell division and respond to chemotherapy that targets the **enzyme Top1, often leading to drug resistance.**
- The research highlights two key proteins --**Cyclin-dependent kinase 1 (CDK1)** and Tyrosyl-DNA phosphodiesterase 1 (TDP1).
- The study suggests that using CDK1 inhibitors—such as *avotaciclib, alvocidib, roniciclib, riviciclib, and dinaciclib*—alongside Top1 inhibitors could enhance cancer cell killing. This combination disrupts DNA repair mechanisms and halts the cell cycle, making it more difficult for cancer cells to survive.
- "Cancer cells often develop resistance to single-agent treatments. By using both CDK1 and Top1 inhibitors, it can more effectively target and eliminate cancer cells.
- By identifying CDK1 as a key regulator and TDP1 as a repair enzyme, this research highlights both as potential targets for developing cancer therapies that inhibit DNA repair in cancer cells
- This breakthrough points to a promising avenue for precision medicine in treating cancers, especially those resistant to current therapies.

India meets WHO international standards for vaccine regulations

- The Central Drugs Standard Control Organisation (CDSCO), along with the National Regulatory Authority of India (NRA) and affiliated institutions, has been

found to **meet the World Health Organization (WHO) published indicators** for a functional vaccine regulatory system.

- India's vaccine regulatory system was benchmarked in the year 2017 against Global benchmarking tool version V which is now revised to GBT VI with raised bars and stringency in benchmarking criteria.
- **Safety, efficacy, and quality** are three basic parameters of assessment of vaccines. WHO has established global standards and benchmarks for assurance of vaccine quality through the development of tools and guidelines, benchmarking of the NRA and prequalification programme of vaccines.
- The **WHO NRA re-benchmarking** was aimed to assess and document the status of the India regulatory system in the area of vaccine regulation, re-benchmark the status of the India vaccine regulatory system against the WHO NRA Global Benchmarking Tool **(GBT)** and measuring the maturity of the system.
- **India has been declared 'functional' against all the core regulatory** functions of the WHO Global Benchmarking Tool Version VI.
- India's vaccine regulatory system was benchmarked in the year 2017 against Global benchmarking tool (GBT) version V which is now **revised to GBT VI with raised bars and stringency in benchmarking criteria.**
- **India, as a large vaccine producing country**, is currently supplying several vaccines to the **UN agencies (UNICEF, WHO and PAHO)".** "National Regulatory Authority of India meets the standards of the WHO NRA indicators (WHO Global benchmarking Tool) on functional regulatory system for vaccineS.
- **India is a major vaccine producer that has 36 major** vaccine manufacturing facilities. These vaccines are used for the national and international market (150 countries), which makes India a major vaccine supplier across the globe.
- The **WHO Prequalification Programme (PQP)** is aimed at facilitating access to vaccines that meet unified standards of quality, safety and efficacy as well as programme needs. It is also prerequisite for manufacturers to supply to countries through United Nations procuring agencies. A functional NRA is a criterion for

WHO prequalification of vaccines..

Crucial role of Biobank regulations in advancing Precision medicine in India

- **Genomics has become pivotal in revolutionising the diagnosis** and treatment of various conditions, including cancers, chronic illnesses and diseases affecting the immune, cardiovascular and liver systems.
- Other emerging technologies, such as **gene-editing and mRNA therapeutics,** also contribute to precision medicine.
- **Examples:**
    - Using gene therapy, researchers were able to restore vision in people who had lost it due to a genetic mutation.
    - Researchers in the U.K. reversed an individual's diabetes by transplanting reengineered stem cells.
    - COVID-19 pandemic: Researchers were able to use the mRNA platform to develop new vaccines in record time, winning the technology a Nobel Prize in 2023.
- **Organ-on-chips is a promising precision Medical-Solutions.**
    - **These small microfluidic devices containing human cells** can replicate the microenvironment of a tumor or an organ in a laboratory setting.
    - Researchers can now test drugs in settings more similar to the drugs' eventual user.

Advancements in precision medicine in India:

- The Indian precision medicine market is estimated to be growing **at a CAGR of 16% and will be worth more than $5 billion by 2030.**
- It contributes **36% of the national bioeconomy.**
- The **New 'BioE3' ((Biotechnology for Economy, Environment and Employment)** policy also includes the development of precision therapeutics.

- ***The policy aims to harness the power of biotechnology*** *and develop new manufacturing methods that* ***replicate or mimic processes found in natural biological systems.***
- *The BioE3 policy emphasizes* ***innovation in research and development (R&D) and entrepreneurship, establishing Biomanufacturing, Bio-AI hubs and bio-foundries*** *to expand India"s skilled biotechnology workforce.*
- ***This aligns with "Lifestyle for Environment" programs,*** *and targets the development of* ***regenerative bioeconomy models.***
- In 2023, the Central Drugs Standard Control Organization approved **NexCAR19, India's domestically developed CAR-T cell therapy.**
- The *Siemens Healthineers, in collaboration with the Indian Institute of Science, Bengaluru*, launched new **AI-driven facilities** for precision medicine.

The role of Biobanks in advancing Precision medicine:

- **A biobank is a repository of biological samples, such as blood, DNA, cells, tissues, and/or organs, alongside their genetic data.**
- These samples are collected from **consenting individuals** and intended for use in research.
- For precision medicine to succeed, **biobanks must be extensive and diverse**, ensuring that their research **benefits a wide range of individuals** rather than just a limited population segment.
- Recently, health researchers **created the largest biobank of sarcoma patient-derived organoids.** This biobank is used to understand sarcoma and identify potential therapies using high-throughput drug screening.
- ***Organoids are miniaturized, synthetic versions of organs that can replicate tumors.***
- **The growth of Biobanks in India:**
    - There are **19 registered biobanks in India,** hosting many biological specimens, including cancer cell lines and tissues.

- In 2024, the **'Genome India'** program finished sequencing 10,000 genomes from 99 ethnic groups to identify treatments for **rare genetic diseases.**
- The pan-India **'Phenome India'** project has collected 10,000 samples to create better prediction models for **cardio-metabolic diseases.**
- **The Paediatric Rare Genetic Disorders (PRaGeD)** mission could help identify new genes or variants to develop targeted **therapies for genetic diseases that affect children.**

Despite potential, ***stringent regulations around biobanks*** *in India pose a* ***significant challenge*** *to fully harnessing the benefits of precision medicine.*

Challenges in regulating Biobanks in India:

1. Global standards vs. India''s regulatory gaps:

- The U.K., the U.S., Japan, China, and many European countries have laws or comprehensive regulations addressing several biobanking issues, including informed consent, withdrawal rights, privacy, and data protection.
- **India's regulation of biobanks is inconsistent, with gaps** that could undermine public trust and limit the potential of precision medicine.
- There is a lack **of regulations to protect the rights of individuals.**

2. Inadequacies in ethical guidelines and data practices:

- The Indian Council for Medical Research's guidelines for biomedical and health research involving human participants, as well as the Department of Biotechnology's (DBT) practices for data storage and analysis, **have many gaps.**
- **Example:** Participants are expected to consent to providing samples **without knowing how their data will be used and for how long they will be stored.**
- Genetic information **can reveal insights about an individual and their family,** potentially leading to discrimination.

3. Lack of Central regulation and penalties:

- Without a single authority to regulate biobanks and **no penalty for misconduct,**

there is a considerable risk of inconsistencies arising from sample mishandling and ethical violations like data sharing for non-consenting purposes.

4. **Risks of unregulated access to biological samples:**
   - Many pharmaceutical companies, including those abroad, **will have access to samples from India, as** many research projects often require researchers and pharmaceutical companies to collaborate with biobanks during drug discovery and development.
5. **Impact of regulatory gaps on Data ownership and profits**:
   - Indians could be deprived of the ownership of biological samples, the data and **the profits from the resulting research findings.**

Seizing the opportunity for leadership in Biobanking:

1. **Enhancing public trust through strong protections:**
   - Vital data, privacy protections and regulatory oversight **by an expert committee will encourage more people** to share samples and participate without worry.
   - It will also allow research to happen on the right foundations.
2. **India"s pharmaceutical diplomacy and global aspirations:**
   - India is a part of international groups like the Quad and BRICS, **with pharmaceuticals as a critical component of its soft diplomatic initiatives.**
   - It is a major supplier of generic drugs and a hub of vaccine manufacturing, and it plans to expand its leadership to include next-generation therapeutics.
   - For this, India will have to **align its biobanking laws with global standards,** which will encourage public participation and trust.

Fostering greater public confidence in biobanking practices will encourage participation in precision medicine research, which in turn will enhance healthcare outcomes for India's population and solidify its role in the global biopharmaceutical landscape.

Wayanad's new X-band radar

How do radars work?

- Radar is short for **'radio detection and ranging'.** The device uses **radio waves** to determine the **distance, velocity, and physical characteristics of objects** around the device. A **transmitter** emits a signal aimed at an object whose characteristics are to be ascertained (in meteorology, this could be a cloud). A **part of the emitted signal is echoed** by the object back to the device, where a **receiver** tracks and analyses it.
- One of the important kinds of radars is **Weather radar** or a **Doppler radar.**
    - The **Doppler effect** is the change in frequency of sound waves as their source moves towards and away from a listener.
    - In meteorology, **Doppler radars can reveal** how fast a cloud is moving and in which direction based on how the cloud's relative motion changes the frequency of the radiation striking it.
    - Modern Doppler radars can **monitor weather conditions** and anticipate new wind patterns, the formation of storms, etc.

What is an X-band radar?

- Doppler radar relies on **Rayleigh scattering**, when the scatterer is much smaller than the wavelength of the radiation. A radar trying to 'see' smaller particles like rain droplets or fog will **need to use radiation of lower wavelengths**, like in the **X-band**.
- An **X-band radar** is radar that **emits radiation** in the X-band of the electromagnetic spectrum: **8-12 GHz**, corresponding to **wavelengths of around 2-4 cm** (this is in the microwave part of the spectrum.)
    - Due to operating at a **smaller wavelength**, X-band radars are more sensitive and can **detect smaller particles** compared to other radar bands. The smaller wavelengths allow the radar to **produce images of higher resolution**.

- However, the greater the frequency of any radiation, the faster it will be attenuated. So, X-band radars have a **relatively shorter range.**
- X-band radars are typically used for **studies about cloud development** and **light precipitation** due to their abilities to **detect tiny water particles and snow.**

Significance: In Wayanad, the new radar is expected to be **able to monitor the movements of particles,** such as soil, to inform landslide warnings. The device will also **perform high temporal sampling**, i.e., rapidly sample its environs, allowing it to spot particle movements happening in shorter spans of time.

S-band radars vs. X-band radars:

There are two types of radars that are frequently used: S-band and X-band.

1. S-band radar:

- **Operating frequency:** 2-4 GHz.
- **Speciality:** Long-range detection.
- **Benefits**: Capable of operating accurately even in severe weather conditions (heavy precipitation and cloud cover), making it useful for civilian and military aircraft navigation.
- **Applications**:
  - Used for **maritime surveillance as it provides long-range coverage**. **E.g.,** Used by naval warships for precise tracking of threats, both aerial and surface, at greater distances.
  - Used in weather forecasting due to their ability to operate in adverse weather.

2. X-band Radar:

- **Operating frequency:** 8-12 GHz.
- **Speciality**:

- **Higher-resolution short-range imaging** for target identification.
- **Detection of smaller objects** because X-band radars (operating on smaller wavelengths) have high sensitivity.

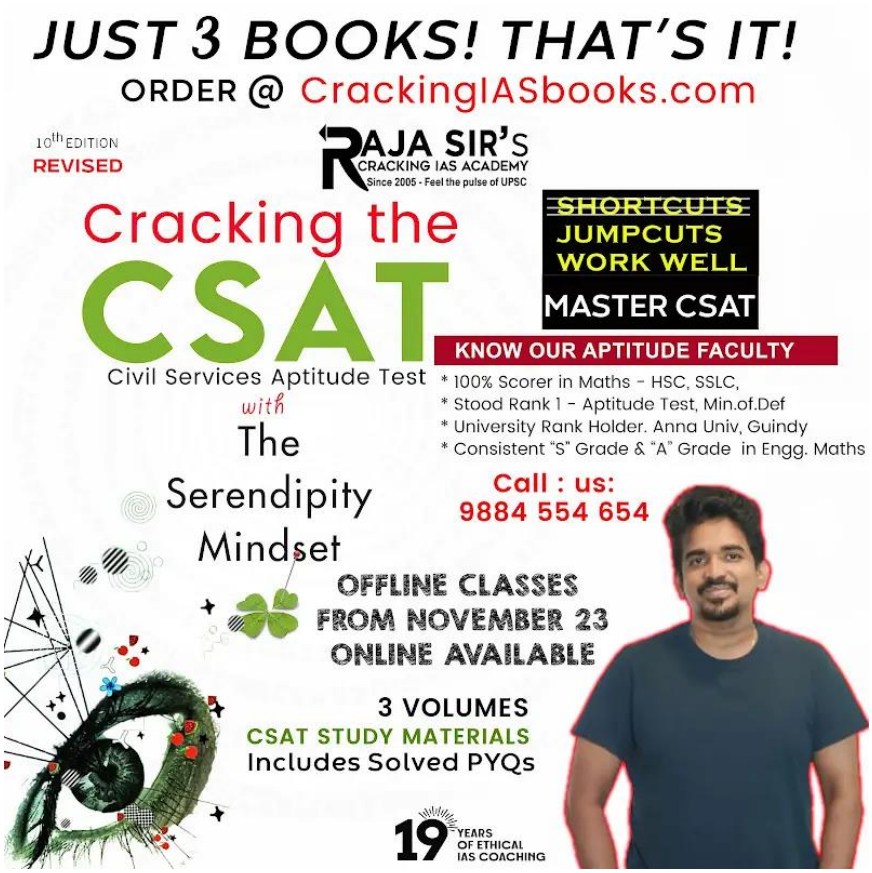
- **Benefits:** They have compact size and thus can be installed on mobile platforms.
- **Limitations:**
  - **More susceptible to be impacted by weather conditions** due to their smaller wavelengths. (atmospheric conditions like rain can reduce their range)
  - Have relatively **shorter range** than S-radars.
- **Applications**:
  - **Used in short-range weather forecasting** and for **monitoring localised weather phenomenon**, like, heavy rainfall, thunderstorms, weather patterns, cyclones etc.
  - X-band technology is also used for civil, military, and government settings for tasks such as:
    - Weather Monitoring (localised weather phenomenon)
    - Air Traffic Control (high resolution imaging helps in the identification/distinguishing and tracking of aircrafts)
    - Maritime Vessel Traffic Control
    - Vehicle Speed Detection for Law Enforcement
    - Missile guidance systems (can track small, fast-moving targets with precision).

How many radars does India have?

- The India Meteorological Department (IMD) started using radar for weather applications in the early 1950s. The **first indigenously designed and manufactured X-band storm detection radar was installed in 1970** in New Delhi. In 1996, IMD replaced 10 outdated X-band radars with digital X-band radars. In its X-band radar network, India has both wind-finding and storm-

detecting radars, and some with dual capabilities.

- The country also uses **S-band radars** (2-4 GHz) for long-range detection. The first S-band cyclone detection radar was installed in Visakhapatnam in 1970 and the first locally made variant was commissioned in Mumbai in 1980.
- In September 2024, the Ministry of Earth Sciences said India is set to have **56 additional Doppler radars** in a few years. On September 11, the Union Cabinet cleared the **₹2,000-crore 'Mission Mausam'** to upgrade meteorological infrastructure in the country. This includes installing up to 60 meteorological radars until 2026 under the Mission's first phase.
- The government has started the process to procure and install 10 **X-band Doppler radars** to improve weather forecasting in the northeast States and in Himachal Pradesh's Lahaul and Spiti district.



India Commits to Safe and Trusted AI with New EoI initiative

- The **IndiaAI Mission** has selected **eight Responsible AI Projects** against the Expression of Interest (EoI) floated under the **Safe and Trusted AI Pillar** of the IndiaAI Mission. Recognizing the need for adequate guardrails to advance the responsible development, deployment, and adoption of AI, the selected Responsible AI projects include the development of indigenous tools and frameworks, and establishing guidelines for ethical, transparent, and trustworthy AI technologies.

Promoting responsible AI through 8 strategic projects

- As AI continues to permeate various sectors of society, India is committed to invest in agile mechanisms for developing indigenous governance tools, frameworks, and guidelines that are based on Indian datasets and reflect its unique challenges, opportunities, and datasets. To support this vision, IndiaAI has issued an Expression of Interest (EoI) to promote responsible AI projects across a range of critical themes. These include **Machine Unlearning**, **Synthetic Data Generation, AI Bias Mitigation, Ethical AI Frameworks, Privacy-Enhancing Tools, Explainable AI, AI Governance Testing, and Algorithm Auditing Tools.**
- **The details of the Selected Projects are given below**:-

Name of the Theme	Name of the Selected Project	Title of the Project
Machine Unlearning	Indian Institute of Technology, Jodhpur	Machine Unlearning in Generative Foundation Models
Synthetic Data	Indian Institute of	Design and Development

Generation	Technology, Roorkee	of Method for Generating Synthetic Data for Mitigating Bias in Datasets; and Framework for Mitigating Bias in Machine Learning Pipeline for Responsible AI
AI Bias Mitigation Strategy	National Institute of Technology Raipur	Development of Responsible Artificial Intelligence for Bias Mitigation in Health Care Systems
Explainable AI Framework	Defence Institute of Advanced Technology (DIAT), Pune in partnership with Mindgraph Technology Pvt. Ltd.	Enabling Explainable and Privacy Preserving AI for Security
Privacy Enhancing Strategy	Indian Institute of Technology, Delhi in partnership with Indian Institute of Technology, Dharwad, Indraprastha Institute of Information Technology, Delhi and	Robust Privacy-Preserving Machine Learning Models

	Telecommunication Engineering Center (TEC)	
AI Ethical Certification Framework	Indraprastha Institute of Information Technology, Delhi in partnership with Telecommunication Engineering Center (TEC)	Nishpaksh: Tools for assessing fairness of AI model
AI Algorithm Auditing Tool	Civic Data Labs	ParakhAI - An open-source framework and toolkit for Participatory Algorithmic Auditing
AI Governance Testing Framework	Amrita Vishwa Vidyapeetham in partnership with Telecommunication Engineering Center (TEC)	Track-LLM, Transparency, Risk Assessment, Context & Knowledge for Large Language Models

- **<u>Advancing India"s leadership in AI through the IndiaAI Mission</u>**

This initiative aligns with the Government of India's vision of leveraging **AI for inclusive growth. IndiaAI, an IBD (Independent Business Division)** under the **Digital India Corporation (DIC) of the Ministry of Electronics and IT (MeitY),** is the implementation agency of the **IndiaAI Mission**, which aims to

democratize AI''s benefits across all strata of society, bolster India's global leadership in AI, foster technological self-reliance, and ensure ethical and responsible use of AI.

New Photocatalyst can Efficiently Degrade Broad-Spectrum Antibiotics

- Antibiotic contamination has **several adverse effects, including antibiotic resistance, ecological impact, human health concerns**, etc. Hence, there is a need to find ways to mitigate this environmental issue.
- A team of scientists from Institute of Advanced Study in Science and Technology (IASST), Guwahati, have synthesized **copper zinc tin sulfide Cu2ZnSnS4 (CZTS) nanoparticles (NPs)** and copper zinc tin sulfide -tungsten disulfide CZTS-WS2 composite. The team led utilised hydrothermal reaction of zinc chloride, copper chloride, tin chloride and tungsten disulfide forming a composite that is efficient photocatalyst in degrading sulfamethoxazole, an antibiotic.
- **Broad-spectrum antibiotics** like sulfamethoxazole (SMX) have long been used to treat human illnesses like urinary and respiratory tract infections. However, more **than 54 % of SMX was released into the environment along** with the faeces and urine of the patients.
- "CZTS and its nanocomposites are a multifunctional **quaternary semiconductor** nanomaterial made up of earth-abundant, inexpensive, and non-toxic components possessing remarkable photostability making it extremely valuable in light-harvesting and photocatalyst applications,"
- **CZTS-WS2 composite** exhibits good photocatalytic activity for the breakdown of sulfamethoxazole.
- The developed catalyst could be recovered and used repeatedly without losing its effectiveness, which is very important from an economic point of view.

Prime Minister Early Career Research Grant (PMECRG)

- The newly operationalised **Anusandhan National Research Foundation (ANRF)** recently announced the launch of **first two of its initiatives**— the Prime Minister Early Career Research Grant (PMECRG) and the Mission for Advancement in High-Impact Areas -Electric Vehicle (MAHA- EV) Mission.

Prime Minister Early Career Research Grant (PMECRG)

- **Objective**: To support **early career researchers** in contributing to India's scientific excellence and innovation.

Key Focus:

- **Encourages young researchers** to engage in innovative, high-quality research.
- E**xpands knowledge boundaries** and drives technological progress.
- Aligns with **ANRF's goal** of fostering a vibrant, research-driven ecosystem.
- **Impact**: Aims to position India as a **global leader in Science and Technology (S&T)**, nurturing early researchers to contribute to groundbreaking discoveries.

Significance of the Initiatives

- **PMECRG**: Boosts innovation by empowering early-career researchers, driving India's research potential and technological advancements.

Mission for Advancement in High-Impact Areas – Electric Vehicle (MAHA-EV)

- **Objective**: To develop a robust research and development ecosystem for **Electric Vehicles (EV)** in India, promoting **domestic innovation** and reducing import dependency.

Key Focus Areas:

  - **Tropical EV Batteries and Battery Cells**.
  - **Power Electronics, Machines, and Drives (PEMD)**.

- **Electric Vehicle Charging Infrastructure**.

Mission Goals:

- Supports **Atmanirbhar Bharat** by fostering self-reliance in EV components.
- Encourages collaboration across institutions to tackle critical scientific challenges.
- Aims to establish India as a **global hub for EV component development**.

Jiangmen Underground Neutrino Observatory (JUNO)

- **Location**: Built 700 meters underground in China's Guangdong province.
- **Purpose**: Designed to detect neutrinos emitted by nearby **nuclear power plants**, the sun, and Earth's mantle.
- **Detector**: Features a **600 metric ton spherical detector** with thousands of light-detecting tubes.
- **Timeline**: Expected to start operations in **late 2025**.
- **Collaboration**: Scientists from France, Germany, Italy, Russia, and the U.S. are involved.
- **Global impact**: Aims to surpass similar projects in the U.S. and Europe in neutrino research.

Neutrinos:

- **Fundamental particle**: Neutrinos are **elementary particles** produced in high-energy processes like nuclear reactions in stars.
- **Hard to detect:** Neutrinos rarely interact with matter due to their lack of electrical charge.
- **Origins:** Produced by stars, supernovae, and on Earth in nuclear reactors and accelerators.
- **Key in physics:** Studying neutrinos helps understand processes in the sun, the

universe's formation, and Earth's interior.

- **Future applications:** Could revolutionize astronomy and medical imaging; potential for **long-distance communication** via neutrinos.



Indian Neutrino Observatory (INO):

- **Proposal:** Conceived in 2005 to study neutrinos using a detector under Tamil Nadu's Bodi West Hills.
- **Budget:** Initially funded at **Rs 1,500 crore** by the Indian government.
- **Approval:** Received environment ministry clearance in 2018.
- **Challenges:** Faces opposition due to environmental concerns, including its location in a **tiger corridor** and potential impact on local ecology.
- **Status:** Construction is stalled due to opposition from **environmentalists** and local government, with no significant progress to date.

IndiaAI Mission

- **Origin:** Launched during the Global Partnership on Artificial Intelligence (GPAI) Summit in 2023, New Delhi, by the Prime Minister of India.
- **Background:** Announced to drive AI innovation and build a comprehensive AI ecosystem in line with the visions of "Making AI in India" and "Making AI Work for India."
- **Aim:** To create an advanced AI infrastructure supporting various sectors, boost AI innovation, enhance data quality, and promote ethical AI practices across the country.
- **Nodal ministry:** Ministry of Electronics and Information Technology (MeitY)
- **Implementing agency:** IndiaAI Independent Business Division (IBD) under the Digital India Corporation (DIC)

Key Components:

- **IndiaAI Compute Capacity:** Develop AI compute infrastructure with 10,000+ GPUs via public-private partnerships.
- **IndiaAI Innovation Centre:** Create Large Multimodal Models (LMMs) and sector-specific foundational AI models.
- **IndiaAI Datasets Platform:** Unified platform providing access to high-

quality non-personal datasets for AI research and startups.

- **IndiaAI Application Development Initiative:** Promote AI applications addressing key challenges in sectors like healthcare, agriculture, and governance.
- **IndiaAI FutureSkills:** Expand AI education through new programs at various academic levels and set up Data & AI Labs in smaller cities.
- **IndiaAI Startup Financing:** Easier access to funding for AI startups, with Rs 2,000 crore allocated.
- **Safe & Trusted AI:** Ensure responsible AI practices with indigenous tools and frameworks.

Artificial Stone

Artificial stone, also known as **engineered stone or quartz**, is widely used in kitchens due to its aesthetic appeal and durability. However, it poses significant health risks to workers involved in its cutting and polishing.

- Made from crushed rocks bound with resins.
- Contains over 90% silica, compared to 3% in marble and 30% in granite.

- **Advantages:**
  - **Aesthetic appeal:** Smooth, polished look.
  - **Durability:** More resistant to damage than natural stone.
  - **Ease of handling:** Lacks natural imperfections found in natural stone.
- **Health Risks:**
  - Generates fine silica dust when cut or polished.
  - High risk of silicosis, a progressive lung disease caused by silica inhalation.
  - Workers face increased risks due to dry cutting without dust suppression measures like water.

Thorax Study Findings:

- Documented eight cases of workers, average age 34, with severe lung disease.
- Conditions include lung transplants, autoimmune diseases, and lung infections.

- **Preventive Measures:**
  - Use of water to suppress dust during cutting.
  - Adoption of nasal filters and other technologies to minimize silica exposure.
  - Advocating for stricter safety measures to protect workers.

Haemodialysis (HD) Machines

Nations Involved

- **Lebanon**: Recipient of 33 tonnes of Indian medical aid to improve healthcare services.
- **Papua New Guinea**: Recipient of HD machines and portable RO units, fulfilling India's healthcare commitments under the **Forum for India-Pacific Islands Cooperation (FIPIC)**.

Haemodialysis (HD) Machines:

- **Function**: HD machines filter blood to remove wastes, excess fluids, and toxins for patients with kidney failure.
- **Components**:
  - Uses a **dialyzer**, also known as an artificial kidney.
  - Blood flows through hair-thin hollow fibers inside a **clear plastic cylinder**.
  - **Dialysate fluid** cleans the blood by surrounding the fibers.
  - Wastes diffuse through pores and are flushed away.
- **Outcome**: With each pass through the dialyzer, the blood is gradually cleaned, supporting patients with severe kidney dysfunction.

'Smart' insulin prevents diabetic highs — and deadly lows

Scientists have designed a new form of insulin that can automatically switch itself on and off depending on glucose levels in the blood. In animals, **this 'smart' insulin 1** reduced high blood-sugar concentrations effectively while preventing levels from dropping too low.

Smart Insulin (NNC2215)

- Smart insulin is a drug designed to circulate in the body and turn on when it's needed and off when it's not.
- NNC2215 is a smart insulin that consists of two key components:
- A **ring-shaped structure** and a **glucoside molecule** (similar in shape to glucose).

How NNC2215 Works?

- When blood sugar levels are low, the **glucoside binds to the ring**, keeping the insulin inactive to prevent further lowering of blood sugar.
- As blood glucose levels rise, **glucose replaces the glucoside,** causing the insulin to change its shape and become active, helping to lower blood sugar to safer levels.

Diabetes

- Diabetes is a non-communicable disease (NCD) that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces.
    - Insulin is the hormone responsible for regulating blood sugar (glucose).

Types of Diabetes

- **Type 1 Diabetes:** The immune system destroys insulin-producing beta cells in the pancreas and the body produces very little or no insulin.

  - Commonly diagnosed in children and young people, hence called Juvenile Diabetes.
- **Type 2 Diabetes:** Results from the body's ineffective use of insulin it produces.
  - It is often associated with lifestyle factors and is more common in adults.
- **Gestational Diabetes:** Occurs in women during pregnancy when the body becomes less sensitive to insulin.
  - Typically temporary but can increase the risk of developing type 2 diabetes later.



Unique Drug Delivery Method to Improve Treatment of Brain Tuberculosis

- In an exciting new development, researchers have created a unique way to deliver Tuberculosis (TB) medicines directly to the brain **bypassing the challenging blood-brain barrier (BBB)** that limits the effectiveness of many brain TB medicines. This innovative drug delivery method can effectively treat brain TB, a life-threatening condition with high mortality rate.
- Tuberculosis (TB) that affects the brain, called Central Nervous System Tuberculosis **(CNS-TB), is one of the most dangerous forms of TB**, often leading to severe complications or death. One of the biggest challenges in treating CNS-TB is that the drugs used to treat TB struggle to reach the brain because of a protective barrier known as the blood-brain barrier (BBB). This barrier prevents many medicines from entering the brain, limiting their effectiveness.
- Traditional treatments involve high doses of oral anti-TB drugs, but these often fail to achieve effective concentrations in the cerebrospinal fluid due to the **blood-brain barrier (BBB)**. This limitation underscored the need for more effective delivery methods that can target the brain directly.
- Scientists at Institute of Nano Science and Technology (INST), Mohali, used tiny particles made of a natural material called chitosan, to deliver TB medicines directly to the brain through the nose, bypassing the BBB.
- The scientists team developed **chitosan nano-aggregates**, tiny clusters of nanoparticles made from chitosan, a biocompatible and biodegradable material. These tiny particles, known as nanoparticles, were then made into slightly larger clusters called nano-aggregates, designed for easy nasal delivery. **They can hold TB drugs like isoniazid (INH) and rifampicin (RIF).**
- The drug delivery technology used was **nose-to-brain (N2B) drug delivery**, which utilizes the olfactory and trigeminal nerve pathways in the nasal cavity to bypass the BBB. By delivering the drug through the nasal route, the nano-aggregates can transport the drugs directly into the brain, significantly improving drug bioavailability at the infection site.

- Besides, **chitosan is known for its mucoadhesive properties**, and sticks to the nasal mucosa, which helps the nano-aggregates stay in place and prolongs the time they can release the drug, enhancing its therapeutic effectiveness.
- The spray-drying process used to form the nano-aggregates also ensures that they are stable, easy to administer intranasally, and can be efficiently absorbed into the brain tissues. This approach enables a much more targeted treatment of ***CNS-TB***
- This study is the first to show that delivering TB drugs through the nose using these advanced particles **can effectively treat brain TB**. The new treatment not only makes sure the medicine reaches the brain but also helps reduce the inflammation caused by the infection.
- It could be applied to treat other brain infections, neurodegenerative diseases (like Alzheimer's and Parkinson's), brain tumours, and epilepsy by enabling efficient drug delivery to the brain.

World Iodine Deficiency Day

- **World Iodine Deficiency Day**, also known as **Global Iodine Deficiency Disorders Prevention Day**, is observed annually on **21st October.** The day aims to raise awareness about the essential role of iodine in maintaining good health and to emphasize the consequences of iodine deficiency
- Iodine is an essential component of the thyroid hormones**, thyroxine (T4) and triiodothyronine (T3),** which regulate metabolism and are crucial for **fetal and infant development.** Found in foods and iodized salt, iodine exists in several forms, **including sodium and potassium salts, inorganic iodine (I2), iodate, and iodide**. Iodide, the most common form, is quickly absorbed in the stomach and used by the thyroid for hormone production. Most excess iodide is excreted through urine
- Iodine deficiency has multiple adverse effects on growth and development and is the most common cause of **preventable intellectual disability** in the world.

Iodine deficiency disorders result from **inadequate thyroid hormone production secondary to insufficient iodine**. During pregnancy and early infancy, iodine deficiency can cause **irreversible effects.**

- If a person's iodine intake falls below approximately 10–20 mcg/day, **hypothyroidism** occurs, a condition that is frequently accompanied by goitre.
- Goitre is usually the earliest clinical sign of iodine deficiency.
- In **pregnant women**, iodine deficiency of this magnitude can cause major **Neuro developmental deficits** and growth retardation in the fetus as well as miscarriage and stillbirth.
- Chronic, severe iodine deficiency in utero causes **cretinism**, a conditions characterized by intellectual disability, deaf mutism, motor spasticity,stunted growth, delayed sexual maturation, and other physical and neurological abnormalities.
- In infants and children, less severe iodine deficiency can also cause neurodevelopmental deficits such as somewhat lower than average intelligence as measured by IQ.
- Mild to moderate maternal iodine deficiency has also been associated with an increased risk of attention deficit hyperactivity disorder in children.
- In adults, mild to moderate iodine deficiency can cause goiter as well as impaired mental function and work productivity secondary to hypothyroidism.
- Chronic iodine deficiency may be associated with an increased risk of the follicular form of thyroid cancer.

National Efforts to Eradicate Iodine Deficiency

- Recognizing the serious health implications of iodine deficiency, the Government of India initiated national efforts to combat the problem through the **National Goitre Control Programme (NGCP)** in 1962. This program marked a significant step toward addressing iodine deficiency, which was linked to conditions such as mental and physical retardation, cretinism, and stillbirths.

- In 1992, the program was broadened and renamed the **National Iodine Deficiency Disorders Control Programme (NIDDCP)** to cover a wider range of iodine deficiency disorders (IDD) and ensure its implementation across all States and Union Territories.

Primary goals of NIDDCP include:

- Reducing the prevalence of IDD to below **5% nationwide**.
- Achieving **100% consumption of adequately iodized salt (with 15 ppm of iodine)** at the household level.
- To accomplish these goals, the programme focuses on several

Key objectives:

- **Conducting surveys** to assess the magnitude of IDD in different districts.
- **Replacing common salt with iodized salt** in affected regions.
- Conducting resurveys every **five years** to measure the impact of iodized salt on IDD.
- **Monitoring iodized salt quality and urinary iodine excretion** through laboratory testing.
- **Promoting health education and public awareness** about iodine's role in preventing IDD.
- A major policy decision was made in **1984** to iodize all edible salt in India, which became a phased initiative starting in **1986**. By **1992**, the country aimed to fully transition to iodized salt. Today, India produces **65 lakh metric tonnes** of iodized salt annually, which is sufficient to meet the needs of its population. This ongoing national effort underscores the government's commitment to eradicating iodine deficiency and improving public health.

Achievements of the National Iodine Deficiency Disorders Control Programme (NIDDCP)

- The implementation of the National Iodine Deficiency Disorders Control

Programme (NIDDCP) has led to significant achievements in the reduction of iodine deficiency disorders (IDD) across India:

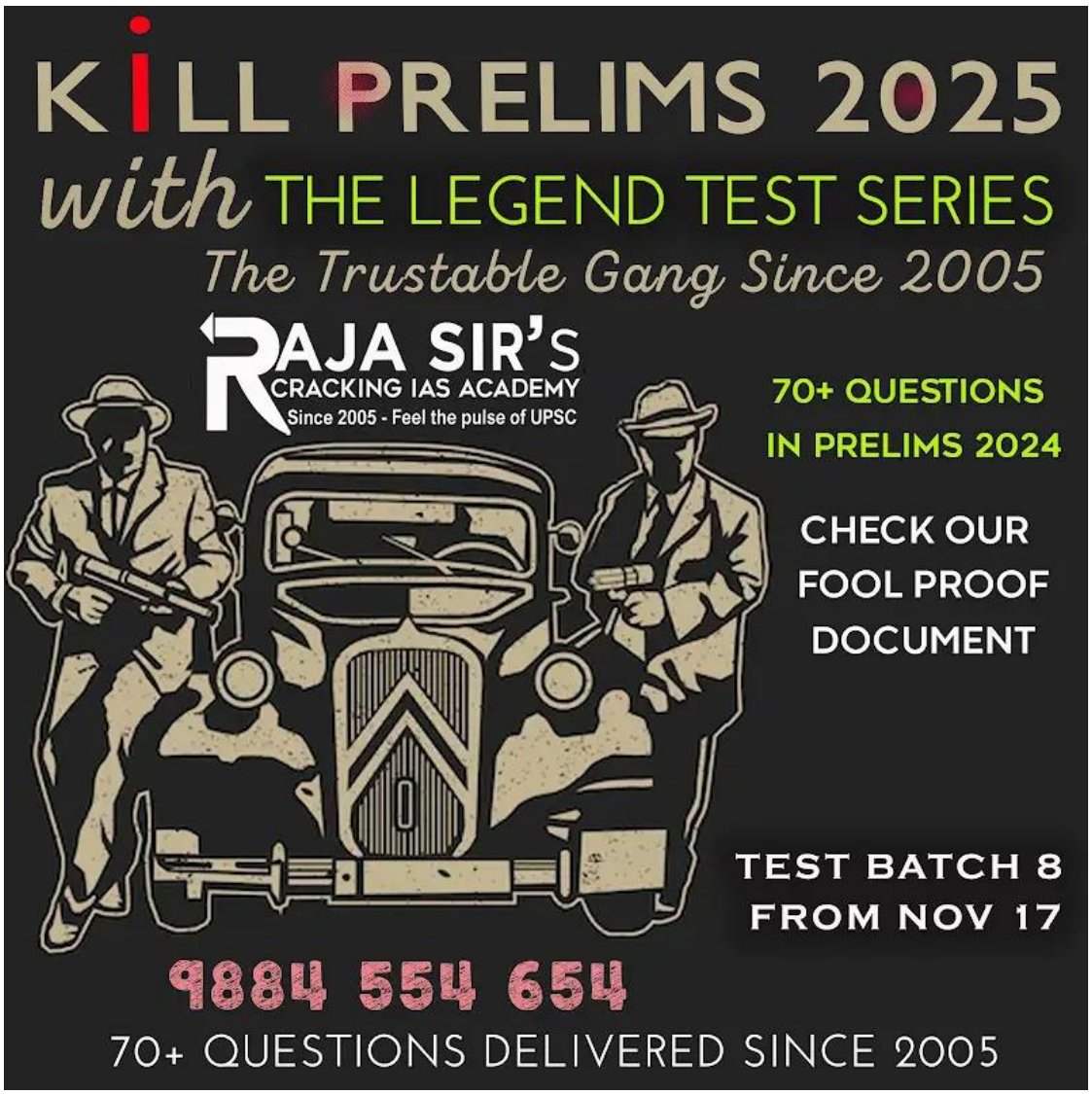
- **Reduction in Total Goiter Rate (TGR):** The programme has substantially reduced the Total Goiter Rate, a key indicator of iodine deficiency, across the country.
- **Increased Iodized Salt Production & Consumption:** The production of iodized salt has **reached 65 lakh metric tonnes (MT)** annually, which is sufficient to meet the dietary needs of the Indian population.
- **Regulatory Measures:** Under Regulation **2.3.12 of the Food Safety and Standards (Prohibition and Restriction on Sales) Regulation, 2011**, the sale of common salt for direct human consumption is prohibited unless the salt is iodized, ensuring nationwide use of iodized salt.
- **Establishment of Monitoring Laboratories:** A **National Reference Laboratory for monitoring** iodine deficiency disorders has been established at the National Centre for Disease Control (NCDC), Delhi, along with four regional laboratories at NIN, Hyderabad, AIIH&PH, Kolkata, AIIMS, and NCDC, Delhi. These laboratories conduct training, monitoring, and quality control of salt and urine testing for iodine levels.
- **State-Level Implementation:** 35 States/UTs have set up IDD Control Cells within their respective State Health Directorates, and an equal number have established State IDD Monitoring Laboratories to ensure effective implementation of the programme.
- **Information, Education, and Communication (IEC) Activities:** Extensive IEC campaigns have been carried out to raise public awareness about the importance of regularly consuming iodized salt to prevent IDD.

Global efforts to combat iodine deficiency

- Global efforts to combat iodine deficiency have been significant, with initiatives like **Iodine Deficiency Day** focusing on raising awareness about the critical role

iodine plays in thyroid function, growth, and development. Globally, an estimated 1.88 billion people are at risk of inadequate iodine intake, impacting nearly 30% of school-aged children. The World Health Organization (WHO) and UNICEF have championed universal salt iodization since 1993, resulting in over 120 countries adopting iodization programs.

- These concerted efforts have led to a significant reduction in iodine deficiency disorders across India, contributing to the improvement of public health.



Candy leaf has Potential beyond its Natural Sweetening properties

- ***Candy Leaf*** (Stevia rebaudiana (Bertoni) Bertoni) a plant recognized for its natural non-caloric sweetening characteristics, also has **therapeutic properties for diseases** like endocrine, metabolic, immune, and cardiovascular diseases, because of its effect on cellular signalling systems.
- Assam exports Stevia worldwide. The North Eastern Council (Government of India) also highlighted stevia cultivation''s potential to help the northeast Indian economy due to high demand and use.
- At the Institute of Advanced Study in Science and Technology (IASST) in Guwahati, pioneering research on Stevia''s medicinal properties, effects on cellular signalling mechanisms to prove the Assam''s Stevia''s therapeutic qualities.
- Their multimodal strategy integrated network pharmacology with *in vitro* and *in vivo* techniques, showing that the plant used phosphorylation **of Protein Kinase C (PKC)** to inhibit a crucial cellular signalling route.
- PKC is connected to inflammatory, autoimmune, endocrine, and cardiovascular illnesses. Stevia suppresses PKC phosphorylation, which alters downstream pathways that cause inflammation, a significant cause of endocrine metabolic and cardiovascular issues.
- Stevia has potential medical benefits for immunological endocrine and cardiovascular problems . It could have therapeutic effect on diabetes, type 1, type 2, autoimmune diabetes, pre-diabetes, chronic inflammation related auto immune disease - rheumatoid arthritis; chronic kidney diseases and cardiovascular diseases like hypertension; vasculopathy .

Nonylphenol Ethoxylates (NPEs) and Nonylphenol (NP)

Chemical Characteristics:

- **NPEs and NP** are **surfactants** contributing to environmental pollution, including

frothing in rivers like the Yamuna, indicating high pollutant levels.

- These chemicals are **recognized as endocrine disruptors**, toxic to aquatic life, and harmful to human health, particularly impacting reproductive and developmental systems.

Regulatory Status:

- Many countries have banned the use of NPEs in detergents.
- India lacks specific regulations for NPEs, though NP was banned in the cosmetics sector in 2009.
- **Industrial Usage:** NP and NPEs are widely used in industries such as textiles, leather, detergents, cleaning products, paper, food packaging, cosmetics, construction, automotive, agrochemicals, paints, and metalworking fluids.

Health and Ecological Concerns:

- **Aquatic Life Toxicity:** NP is toxic to fish, plants, and invertebrates, causing poisoning, reduced survival, impaired growth, and reproductive failure.
- **Human Health Risks:** NP mimics estrogen, leading to hormonal imbalances, reproductive disorders, and increased cancer risks.
- **Environmental Persistence**: NP is resistant to degradation, remaining in ecosystems for long periods and potentially entering the human food chain.

Recommendations for Safer Alternatives:

- The transition to safer, cost-effective, and viable alternatives to NP and NPEs is recommended, but progress in India has been slow.

CAENORHABDITIS ELEGANS

- During his Nobel prize speech, Gary Ruvkun highlighted the significance of the nematode ***Caenorhabditis elegans*** in his scientific discovery.

Caenorhabditis elegans

About	They are living transparent nematodes of size approx. 1 mm in

	length.
Biological Characteristics	They are Unsegmented pseudocoelomates. **Pseudocoelomates have a fluid-filled body cavity which separates the gut from the body wall but it is not lined by mesoderm.** They lack respiratory or circulatory systems.
Habitat	They normally live in soil.
Reproduction	They are primarily hermaphroditic. As **Hermaphroditic animals, they have both male and female reproductive organs.** However, some males have specialised mating tails.
Connectome	It was the first organism to complete its connectome in 2019. Connectome is the **comprehensive map of the brain"s neural connectivity to better understand the structural and functional relationship of the brain.**
Significance for Research	**Simple and Manageable** C. elegans has only 959 cells and serves as a manageable model organism. Tracking developmental stages is also easy due to its transparency and short lifecycle. **Genomic Significance** C. elegans was the first genome-sequenced animal in 1998. **Much research on the species and availability of genome sequences gives it an advantage over other model organisms like flies and mice.** **Reproductive Efficiency**

The worm has the ability to self-fertilise.

Its low maintenance requirements.

This makes it an ideal subject for research as it is both cost-effective and easy to handle.

Nematodes

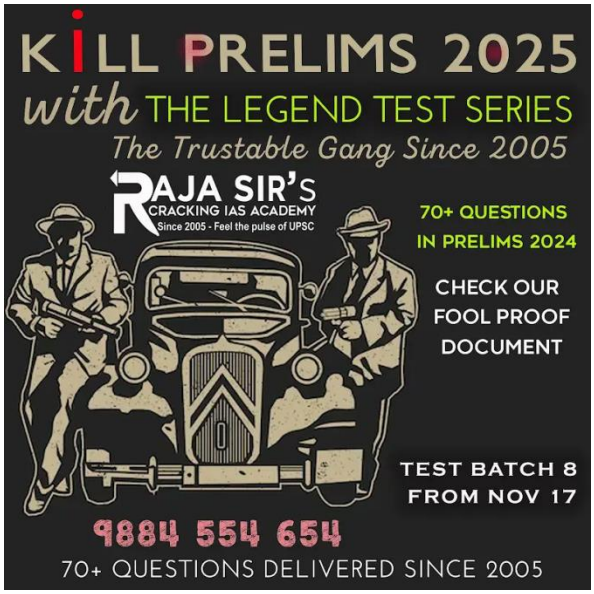
- The nematodes are **roundworms or eelworms of the phylum Nematoda.**
- They inhabit a broad range of environments.
- Most **species are free-living and feed on microorganisms but many species are also parasitic.**
- The parasitic worms called helminths cause soil-transmitted helminthiases.

Characteristics

- Their body is bilaterally symmetrical and the head is radially symmetrical.
- The mouth has three or six lips with a series of teeth on their inner edges.
- An adhesive gland called the caudal gland is often found at the tip of the tail.

Examples:

- Roundworms, hookworms, and heartworms belong to the phylum Nematoda



IndiaAI at MeitY & Meta collaborates to advance Open Source AI

- **IndiaAI** and **Meta** have announced the establishment of the **Center for Generative AI, *Srijan* (सृजन)** at **IIT Jodhpur**, along with the launch of the "**YuvAi Initiative for Skilling and Capacity Building**" in collaboration with the **All India Council for Technical Education (AICTE)**, for the advancement of open source artificial intelligence (AI) in India.
- The partnership will enable development of indigenous AI applications, advance skill development in AI, boost research capabilities with the aim of contributing to India's AI mission of ensuring tech sovereignty and the vision of building AI solutions that are tailor made for India

Center for Generative AI, Srijan (सृजन) at IIT Jodhpur

- As part of this collaboration, Meta will support the establishment of the Center for Generative AI, Srijan, (सृजन) ("GenAI CoE") at IIT Jodhpur. This GenAI CoE aims to **advance research** and **development in AI** while fostering the growth of **responsible** and **ethical** AI technologies in India. It will support and enhance open science innovation across the AI technology landscape.
- Through **education, capacity building,** and **policy advisory**, the center will be empowering the next generation of researchers, students, and practitioners with the knowledge and tools necessary for the responsible development and deployment of GenAI technologies.

Empowering India's AI Future

- Highlighting the power of collaborative innovation, **Ministry of Electronics and Information Technology (MeitY)**, emphasized the significance of the partnership between IndiaAI, IIT Jodhpur, AICTE and Meta. These initiatives are pivotal in creating a robust ecosystem for groundbreaking research, skill development, and open-source innovation, advancing AI technology while

ensuring its responsible and ethical deployment. The initiative will support India''s ambitious goal of becoming a $5 trillion economy by equipping the nation''s youth to lead in the global AI arena, securing India''s position as a leader in technological advancement and economic growth

Collaboration to drive AI Innovation and Skill Development

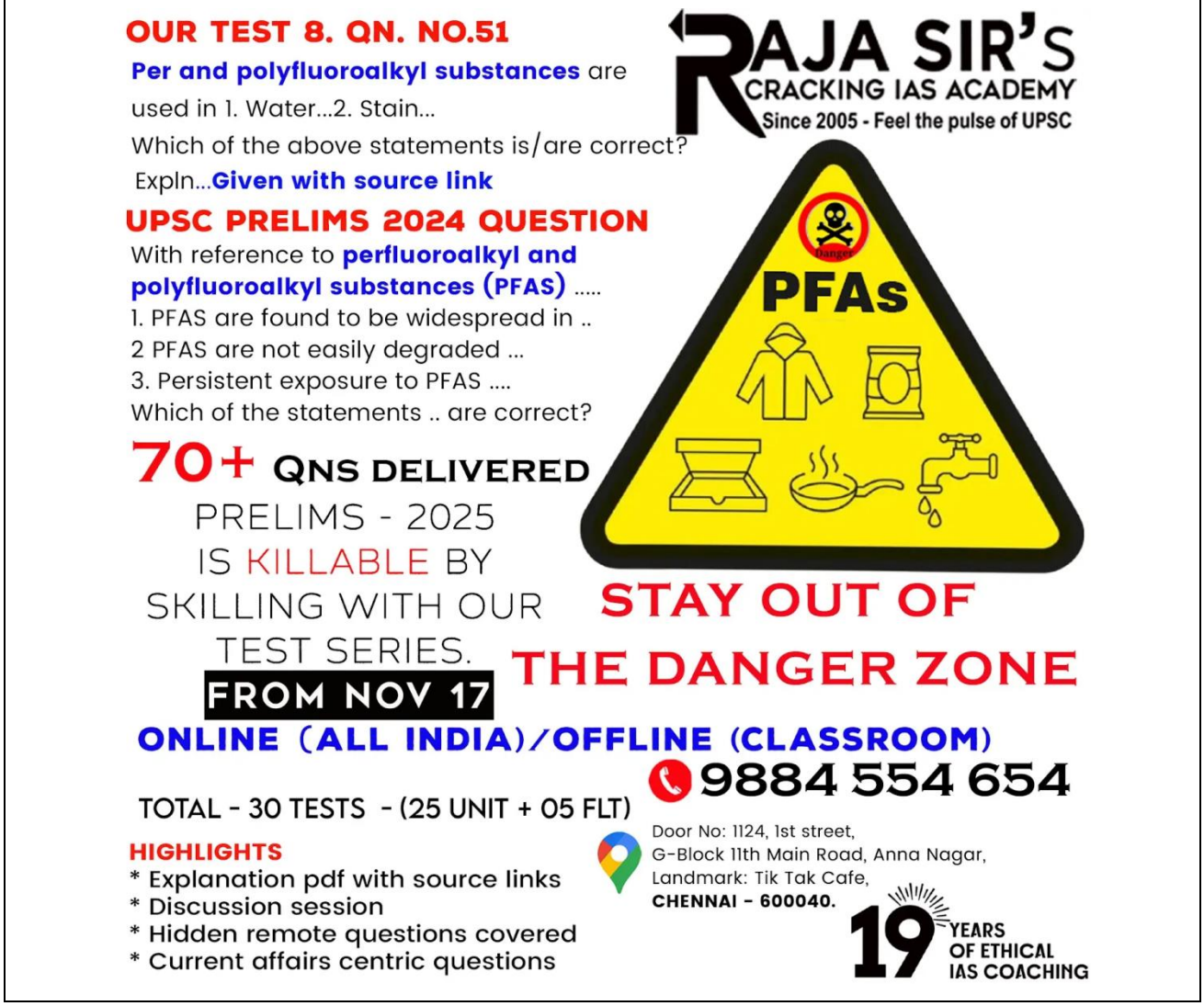
- "The Indian government is supporting the vision of AI innovation, skilling, and technological advancement to drive inclusive growth under the IndiaAI initiative. Our collaboration with industry leaders like Meta is vital to realizing this vision."..
- By emphasizing the importance of open-source AI, IndiaAI ,Meta is committed to nurturing an ecosystem where indigenous solutions can flourish.
- These initiatives will empower the next generation of innovators and equip them with the tools to address pressing real-world challenges, ultimately propelling India to be at the forefront of global AI advancements."

Bridging AI talent gap through "AI for Skilling and Capacity Building" initiative

- Meta, in collaboration with MeitY and the All India Council for Technical Education (AICTE), also launched the "**YuvAi initiative for Skilling and Capacity Buildin**g" . This program aims to bridge the AI talent gap in the country by **empowering 100,000 students** and **young developers aged 18-30** to leverage open-source large language models (LLMs) to address real-world challenges.
- It aims to build capacity in generative AI skills, utilizing open-source LLMs while fostering AI innovation across key sectors. Over the next three years, the initiative will train **one lakh youth, developers, and entrepreneurs**, contributing significantly to India's AI ecosystem across critical sectors such as healthcare, education, agriculture, smart cities, and financial inclusion.
- This will include the establishment of a **Gen AI Resource Hub** with courses, case

studies, and open datasets; an **LLM for Young Developers Course** designed by Meta; and **Master Training Activation Workshops** to introduce participants to foundational AI concepts. The program also features **Unleash LLM Hackathons**, where students will submit AI solutions to address real-world problems, with top ideas receiving mentoring, seed grants, and market support.

- Additionally, the **AI Innovation Accelerator** will identify and support 10 student-led startups experimenting with open-source AI models, offering incubation and visibility.



Novel molecules Developed to Treat Alzheimer''s Disease

- Scientists have designed and synthesized novel molecules through a blend of synthetic, computational, and *in-vitro* studies for treating Alzheimer''s Disease (AD). These ***non-toxic molecules could be effective*** in the treatment of the disease.
- Neurons are specialized cells in the brain that form the nervous system. The nervous system communicates between the brain and the rest of the body. Alzheimer''s disease (AD) disrupts this communication, causing limitations in learning and memory and changes in adaptive behaviour. AD occurs due to an imbalance in certain hormones.
- AD is the most common form of dementia and constitutes around 75% of all dementia cases. Of the about 55 million people worldwide with dementia, 60% to 70% are estimated to have AD. The disease most commonly affects people over the age of 65. The causes mainly include a combination of age-related brain changes and genetic, environmental, and lifestyle factors. The treatment may be able to slow dementia and improve quality of life, but these conditions are progressive, and symptoms of the disease worsen over time.
- To date, treatment options available to cure AD are limited to one ***N*-methyl-*D*-aspartate receptor antagonist (Memantine)** and three anti-cholinesterase drugs (***Donepezil, Rivastigmine, Galantamine***). However, approved anti-cholinesterase drugs suffer from limitations of short-term benefits and serious side effects that restrict their clinical applications.
- Recently, scientists from Agharkar Research Institute, Pune, an autonomous institute of Department of Science and Technology, have developed a rapid one-pot, three-component reaction with high synthetic yields to generate novel molecules. Developed molecules were found to be non-toxic and effective against cholinesterase enzymes.
- Finally, molecules identified through a blend of synthetic, computational, and *in-vitro* studies have proved to be good dual cholinesterase inhibitors. Utilized

multipronged approaches with modern scientific validation offer the potential for holistic health and wellness of society.

- Together, these molecules could be exploited to develop dual anti-cholinesterase drugs to treat AD in combination with other drugs.

What is pink cocaine?

Pink cocaine is a ***bright-colored drug*** that is gaining popularity in the recent times.

- The drug, also known as "**tusi,**" is a combination of ketamine, often combined with MDMA, methamphetamine, cocaine, and opioids
- Tusi is a recreational drug.It is typically found as a pink-coloured powder.They are also known as tusi, tusibi, tuci, or tucibi
- **Origin** :It originated in Latin America in 2018 and gained popularity in the region.This is now used in other areas as a recreational substance
- **Composition:** Pink cocaine contains a mix of substances, which includes ketamine, methamphetamine, MDMA, opioids, synthetic drugs, benzodiazepines, hallucinogens, caffeine, or bath salts. However, no standardised proportions exist for the drugs mixed in tusi. This makes each batch highly unpredictable
- **Risks :** It is highly risky due to the unpredictable mix.It can potentially contain harmful additives such as fentanyl, which is poisonous in some cases
- Effects: Its effects vary widely, depending on the drug combination, alcohol involvement, dose, and individual response. It can lead to extreme side effects such as hallucinations and can impact breathing, heart attacks, high blood pressure, etc.

Study finds long-term dynamics of transplanted stem cells

A recent study has provided crucial insights into the **behavior of transplanted hematopoietic stem cells** over extended periods. This research focuses on some of the longest-living survivors of **hematopoietic stem cell transplants (HSCT),** which are life-

saving procedures primarily used for patients with blood cancers.

Key Findings

Mutation Rates: The study found that the rate of mutations and clonal expansion remained low and consistent, with mutation rates averaging 2% per year in donors and 2.6% in recipients. This suggests minimal widespread clonal expansion of stem cells even decades after transplantation.

Clonal Hematopoiesis (CH): All donors exhibited some degree of clonal hematopoiesis variants, present even in early blood samples. However, the overall mutation rates did not indicate significant adverse effects on the transplanted cells.

Hematopoietic Stem Cell Transplants: These procedures are critical for treating various blood cancers and involve replacing a patient''s damaged or dysfunctional blood-forming cells with healthy stem cells from a donor.

What is HSCT?

Hematopoietic stem cell transplantation (HSCT) is a critical medical procedure used to **restore blood cell production** in patients with damaged or defective bone marrow or immune systems. This technique has seen significant growth over the past 50 years, becoming a standard treatment for various malignant and nonmalignant diseases.

Types of HSCT

1. **Autologous Transplant:** Cells are sourced from the patient's own body. It is commonly used for conditions such as multiple myeloma and non-Hodgkin lymphoma.
2. **Allogeneic Transplant:** Cells are sourced from a donor.
3. **Syngeneic Transplant:** Stem cells are obtained from an identical twin.
4. **Cell Sources:** The primary sources of stem cells for HSCT include:
5. **Bone Marrow:** Traditionally the most common source.

6. **Peripheral Blood:** Stem cells are collected from circulating blood after stimulation.
7. **Umbilical Cord Blood**: Collected at birth; has unique advantages, particularly in matching.
8. **Fetal Liver:** Rarely used due to ethical and practical concerns.

· Each source has its advantages and disadvantages, impacting the clinical applications and outcomes of the transplant.

Tuberculosis replaces COVID-19 as top infectious disease killer

- The World Health Organisation (WHO) published the **Global Tuberculosis Report 2024.**
- (NHM) The World Health Organisation (WHO) published the Global Tuberculosis Report 2024.
- It revealed that approximately 8.2 million people were newly diagnosed with TB in 2023 — the highest number recorded since WHO began global TB monitoring in 1995.
- This represents a notable increase from 7.5 million reported in 2022, placing TB again as the leading infectious disease killer in 2023, surpassing COVID-19.

Key points of the report:

- The report highlights mixed progress in the global fight against TB, with persistent challenges such as significant underfunding.
- While the number of TB-related deaths decreased from 1.32 million in 2022 to 1.25 million in 2023, the total number of people falling ill with TB rose slightly to an estimated 10.8 million in 2023.
- With the disease disproportionately affecting people in 30 high-burden countries, India (26 per cent), Indonesia (10 per cent), China (6.8 per cent), the Philippines (6.8 per cent) and Pakistan (6.3 per cent) together accounted for 56 per cent of the global TB burden.
- About 55 per cent of people who developed TB were men, 33 per cent were women and 12 per cent were children and young adolescents.

- In 2023, the gap between the estimated number of new TB cases and those reported narrowed to about 2.7 million, down from COVID-19 pandemic levels of around 4 million in 2020 and 2021. This follows substantial national and global efforts to recover from COVID-related disruptions to TB services.
- The coverage of TB preventive treatment has been sustained for people living with HIV and continues to improve for household contacts of people diagnosed with TB.
- However, multidrug-resistant TB remains a public health crisis. Treatment success rates for multidrug-resistant or rifampicin-resistant TB (MDR/RR-TB) have now reached 68 per cent. But, of the 400,000 people estimated to have developed **MDR/RR-TB, o**nly 44 per cent were diagnosed and treated in 2023.
- • Global funding for TB prevention and care decreased further in 2023 and remains far below target. Low and middle-income countries, which bear 98 per cent of the TB burden, faced significant funding shortages. Only $5.7 billion of the $22 billion annual funding target was available in 2023, equivalent to only 26 per cent of the global target.
- The United States government remains the largest bilateral donor for TB.
- A significant number of new TB cases are driven by five major risk factors: undernutrition, HIV infection, alcohol use disorders, smoking (especially among men), and diabetes.
- Tackling these issues, along with critical determinants like poverty and GDP per capita, requires coordinated multisectoral action.
- Global milestones and targets for reducing the TB disease burden are off-track, and considerable progress is needed to reach other targets set for 2027 ahead of the second UN High-Level Meeting.

Tuberculosis

- **Tuberculosis is caused by bacteria (Mycobacterium tuberculosis)** that most often affect the lungs. It can spread when people who are sick with TB expel bacteria into the air – for example, by coughing.

- Every year, 10 million people fall ill with TB. Despite being a preventable and curable disease, 1.5 million people die from TB each year.
- TB is the leading cause of death of people with HIV and also a major contributor to antimicrobial resistance.
- Most people who develop the disease are adults.
- TB is preventable and curable. About 85 per cent of people who develop TB disease can be successfully treated with a 4/6-month drug regimen. Treatment has the added benefit of curtailing onward transmission of infection.
- Economic and financial barriers can affect access to health care for TB diagnosis and completion of TB treatment; about half of TB patients and their households face catastrophic total costs due to TB disease.
- Progress towards universal health coverage (UHC), better levels of social protection and multisectoral action on broader TB determinants are all essential to reduce the burden of TB disease.

Indian govt's initiatives to combat TB

- The government implements the National TB Elimination Programme (NTEP) under the aegis of the National Health Mission (NHM).
- The **National Strategic Plan for TB Elimination (2017-25)** was approved on May 8, 2017 and is being implemented in the entire country. It is a multi-pronged approach that **aims to detect all TB patients** with an emphasis on reaching TB patients seeking care from private providers and undiagnosed TB in high-risk populations.
- The National Tuberculosis Elimination Programme (NTEP), previously known as Revised National Tuberculosis Control Programme (**RNTCP**), aims to strategically reduce TB burden in India by 2025, five years ahead of the Sustainable Development Goals.
- In September 2022, President Droupadi Murmu launched Pradhan Mantri TB Mukt Bharat Abhiyan, to provide additional nutritional support to those on TB

treatment, through contributions from community and organisations.

- Pradhan Mantri TB Mukt Bharat Abhiyan (**PMTBMBA**) was launched on September 9, 2022 for community support to TB patients with the objective to provide people with TB with additional nutritional, diagnostic and vocational support. Under the scheme, more than one lakh Ni-kshay Mitras (donors) are supporting over 11 lakh TB patients all over the country presently.
- In March 2023, Prime Minister Narendra Modi launched various initiatives, including the **TB-Mukt Panchayat initiative** to leverage the support of over 2.5 lakh Gram Panchayats to raise awareness about TB.

Valeriana

A significant Maya city named Valeriana has been uncovered in the dense jungles of Campeche, Mexico, using LiDAR technology.

LiDAR (Light Detection and Ranging) technology is a cutting-edge remote sensing method that uses laser light to create high-resolution 3D models of objects and environments.

By **emitting pulses of laser light** and measuring the time-of-flight and wavelength of the returned reflections, LiDAR sensors can accurately capture detailed spatial information, including distance, shape, and texture.

This technology has numerous applications across various industries, such as:

1. Autonomous vehicles: navigation, obstacle detection, and mapping
2. Surveying and mapping: terrain modeling, land management, and urban planning
3. Architecture and construction: building information modeling, structural analysis
4. Environmental monitoring: forest canopy analysis, crop monitoring, flood mapping
5. Archaeology: site mapping, artifact detection

SOCIETY

Sarco Suicide Pod

The death of a 64-year-old American woman in Switzerland has brought the Sarco pod, a controversial suicide device, under legal scrutiny.

More On News

- The woman, who reportedly suffered from an autoimmune condition, used the Sarco pod to end her life, prompting Swiss authorities to arrest at least four individuals involved.

What Are Euthanasia and Assisted Dying?

- Euthanasia and assisted dying both involve a person intentionally choosing to end their life, but they differ in how this is accomplished.
- **Euthanasia:** It requires the involvement of a physician, who administers a lethal drug to the patient or removes the life supporting devices depending on the **type of euthanasia.**
    - **Voluntary Euthanasia**: When a patient consents to end their life, often due to terminal illness or pain.
    - **Involuntary Euthanasia**: The patient is euthanized without their consent, despite being capable of providing it, which is illegal in most places.
    - **Non-Voluntary Euthanasia**: Performed when the patient cannot consent, like in cases of coma, with decisions made by others.
    - **Active Euthanasia**: Involves directly causing death, such as administering a lethal injection.
    - **Passive Euthanasia**: Withholding life-sustaining treatments, allowing the patient to die naturally
- **Assisted Dying:** It involves the person administering the **lethal substance themselves,** with medical professionals only providing the drug.
    - In this case, the patient actively participates in the process, and there is

no requirement for the individual to be terminally ill.

What Is the Sarco Pod?

- The Sarco pod, short for sarcophagus,which is a **term used for stone coffins historically** used for Royal burials.
- Sarco Pod was designed by **Dr. Philip Nitschke,** founder of the pro-euthanasia group **Exit International**, in collaboration with Dutch engineer Alex Bannink.
- The pod, first introduced in 2019, is a portable, **3D-printed, airtight capsule** that enables a person to end their life.

Working:

- It **works by releasing nitrogen gas,** rapidly lowering oxygen levels inside the capsule.
- Once the process is initiated, **the user loses consciousness within a minute**, and death follows shortly thereafter.
- To use the Sarco, **an individual must pass an online mental fitness test**, after which they are granted access to the device via a 24-hour access code.
- The pod is intended to allow individuals **to choose the location of their death,** emphasising autonomy in the dying process.

Swiss Laws on Assisted Dying and Euthanasia

- Switzerland has strict laws on euthanasia, **banning active euthanasia** while **permitting assisted dying and assisted suicide**.
  - It requires the person ending their life does so without external assistance and those assisting them have no self-serving motives.
- These laws have made Switzerland a destination for **"death tourism,"** where individuals travel to the country to legally end their lives.

How does Sacro Pod Violate the law?

- **Loophole in Swiss Law**: Some argue that the Sarco pod **exploits gaps in Swiss assisted suicide laws**, though it may not fully comply with national regulations.
- **Swiss Legal Expert's View**: Daniel Hürlimann stated that the **Sarco pod did not violate laws** related to medical devices, nitrogen use, or product safety.
- **Government's Dispute**: Swiss authorities claim the pod breaches product safety and chemical laws, challenging its compliance with regulations.
- **Key Legal Issue**: Whether Sarco constitutes **"external assistance"** in assisted suicide remains unclear under Swiss law.
- **Ethical Debate**: The Sarco pod raises questions about the balance between technological assistance and personal autonomy in assisted dying.
- **Ongoing Investigation**: The Sarco pod is central to the ongoing debate on the future of assisted suicide and euthanasia in Switzerland.

Euthanasia in India

- **Legalisation of Passive Euthanasia (2018)**: The Supreme Court legalised passive euthanasia, allowing individuals to make a **'living will'** and refuse life support under certain conditions.
    - The judgement came in **Aruna Shanbaug v. Union of India,2011 case.**
- **Right to Dignity Under Article 21**:
  The Court ruled that dignity in the dying process is a part of the right to life, protected under Article 21, which safeguards life and personal liberty. Depriving someone of dignity at the end of life undermines meaningful existence.
- **Active Euthanasia is a Crime**:
  In India, active euthanasia remains illegal and is considered a criminal act.

SARTHIE 1.0

The **SARTHIE 1.0** initiative was recently launched by the **Department of Social Justice and Empowerment (DoSJE)** in collaboration with the **National Legal Services Authority (NALSA)** to empower vulnerable communities in India.

Key aspects of SARTHIE 1.0:

- **Awareness Generation:** Under this partnership, **State Legal Services Authorities (SLSAs)** and **District Legal Services Authorities (DLSAs)**, will organise awareness camps across the country through the para-legal volunteers and panel lawyers.
- **Focus Acts:** The Awareness camps will focus on ensuring awareness of the **five important Acts** being implemented by the Department:
    - Protection of Civil Rights Act, 1955
    - Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities) Act, 1989
    - The Maintenance and Welfare of Parents and Senior Citizens Act, 2007
    - The Transgender Persons (Protection of Rights) Act, 2019
    - Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013
- **Legal Support:** Offering **legal assistance** to ensure effective implementation of social welfare programs.
- **Target Groups:** Empowering **Scheduled Castes (SCs), Other Backward Classes (OBCs), senior citizens, transgender persons, victims of substance abuse, beggars, and denotified and nomadic tribes.**
- **Aligns with UN 2030 Agenda:** The SARTHIE 1.0 initiative also **aligns with the United Nations 2030 Agenda for Sustainable Development**, particularly the goals focused on eradicating poverty, reducing inequality, and promoting social protection policies that ensure greater equality for all.

Celebrating 10 Years of Swachh Bharat Mission

Swachh Bharat Diwas 2024

October 2, 2024, marks the completion of 10 years since the launch of one of the most significant mass movements for cleanliness—the Swachh Bharat Mission coinciding

with the 155th Gandhi Jayanti.

Campaign Overview

- On August 15, 2014, Prime Minister Shri Narendra Modi delivered a powerful message from the ramparts of the Red Fort, calling for cleanliness to become a national priority and urging citizens to join in this mission. This led to the launch of the Swachh Bharat Mission on 2nd October 2014, which embraced a 'whole-of-government' approach to make sanitation the responsibility of all. The nation united to create the world's largest movement for cleanliness
- Swachhata Hi Seva (SHS) is a pivotal campaign under the Swachh Bharat Mission (SBM), officially launched by Prime Minister Narendra Modi in 2017. This campaign is a significant annual event aimed at mobilizing the citizens of India towards enhanced cleanliness and sanitation.
- The Swachhata Hi Seva campaign 2024, observed from 17 September to 1 October, is themed ***"Swabhav Swachhata, Sanskaar Swachhata,"*** culminating in the celebration of Swachh Bharat Diwas on 2 October. The campaign emphasizes three core objectives: transforming neglected areas with health and hygiene risks, encouraging active public participation in cleanliness activities, and improving the welfare of sanitation workers. The campaign aims to foster a cleaner, healthier India for all through these initiatives.

Pillars of SHS 2024

- **Cleanliness Target Units (CTUs):** A Cleanliness Target Unit (CTU) refers to severely neglected, high-risk areas like garbage points or dumpsites that pose significant environmental and health risks, often overlooked during routine cleanliness drives in various regions. The campaign aims to transform these target units in a time-bound manner, contributing to the broader goal of

achieving overall cleanliness.

- **Safai Mitra Suraksha Shivirs:** Single-window health and welfare camps for Safai Mitras for preventive health care treatment and linkages with various welfare schemes of Central and State Government
- **Swachhata Mein Jan Bhaagidari:** Widespread engagement with citizens, communities, and organisations to raise awareness and trigger involvement through various activities.

GI Tag for Bodo Products from Assam

The Geographical Indications Registry in Chennai granted GI tags to eight Bodo products.

Eight Bodo Products

Rice Beer Varieties:

o **Bodo Jou Gwran:**	Contains the highest alcohol content (16.11%) among rice beers. Made by the Bodo community.
Maibra Jou Bidwi:	Also called "**Maibra Jwu Bidwi"** or "Maibra Zwu Bidwi,".
Bodo Jou Gishi:	Another traditional rice-based alcoholic beverage. Believed to have originated fro**m Lord Shiva and considered medicinal.**

Traditional Food Items:

The Association of Traditional Food Products successfully applied for four GI tags:

Bodo Napham:	A fermented fish dish prepared anaerobically in a sealed container for 2-3 months. Fermentation is a preferred preservation method due to high rainfall and limited fish availability.
Bodo Ondla:	A curry made from rice powder, flavoured with garlic, ginger, salt, and alkali.
Bodo Gwkha:	Also called "Gwka Gwkhi," prepared during the Bwisagu festival.
Bodo Narzi:	A semi-fermented dish made from jute leaves, which are rich in Omega 3, vitamins, calcium, and magnesium.

Traditional Clothing:

Bodo Aronai

A small traditional cloth (1.5-2.5 meters long, 0.5 meter wide), received a GI tag after an application by the **Association of Traditional Bodo Weavers.**

Bodo traditions are reflected in dance, music, festivals, and clothing, with designs inspired by nature, including trees, flowers, mountains, and birds.

What is a GI Tag?

A Geographical Indication (GI tag) is a label for products that come from a specific place and have special qualities linked to that region.

Other GI Tags in Assam

- Assam (Orthodox) Logo
- Muga Silk of Assam (Logo)

- Joha Rice
- Boka Chaul
- Muga Silk
- Assam Karbi Anglong Ginger
- Tezpur Litchi
- Kaji Nemu
- Chokuwa Rice
- Gamosa

Type of Protection: It acts as a legal right to protect the product's quality and reputation based on its origin.

Legal Framework

- **International Recognition:** GI tags are accepted under global agreements like the Paris Convention and TRIPS Agreement.

Types of Products

- **Wide Range:** GI tags apply to various products like food items, agricultural products, wines, handicrafts, and more.
- **Specific Qualities:** The product must have unique qualities or characteristics tied to its region.

Benefits of a GI Tag

- **Prevents Misuse:** It stops others from using the label for products that don't meet the set standards.
- **Exclusive Use:** Only authorised producers can use the GI tag for their products.
- **Protection from Copying:** Protects against imitation or fake versions of the product.
- **Legal Action:** Producers can take legal steps against anyone violating their GI rights.

Bodo Community

- **Origin:** The Boro (or Bodo) is an ethnolinguistic group from Assam, India.
- **Geographical Spread:** They live mainly in the Bodoland Territorial Region of Assam but are also present in other districts of Assam and Meghalaya.
- **Recognition and Language**
- **Scheduled Tribe Status:** Listed as "Boro" and "Borokachari" in The Constitution (Scheduled Tribes) Order, 1950.
- **Boro Language:** A Boro-Garo language of the Tibeto-Burman family, recognized as one of India's 22 Scheduled languages.
- **Bilingualism:** Most Boros speak Assamese as a second language.
- **Historical Background**
- **Prehistoric Settlers:** The Boro and other Bodo-Kachari groups migrated over 3,000 years ago.
- **Occupation:** Primarily settled farmers with traditional irrigation systems called "dong."
- **Special Status**
- **Plains Tribe:** Recognized under the Sixth Schedule of the Indian Constitution.
- **Autonomous Region:** They have special powers in the Bodoland Territorial Region.

A tribe out of time: how Chenchus have been caught between ancestral past and uncertain future in Andhra Pradesh

The Chenchus of Penukumadugu, traditionally hunter-gatherers, who lived in the dense Nallamala forests of Andhra Pradesh face dwindling employment opportunities under MGNREGA.

Chenchus Tribe

- The Chenchus are a **small, migratory tribal community.**
- Predominantly found in Andhra Pradesh and Odisha,
- These are among the 12 Particularly Vulnerable Tribal Groups (PVTGs) in Andhra Pradesh.

Lifestyle and Occupation

- The Chenchus traditionally depend on hunting and gathering for sustenance rather than agriculture.
- They are known for their skills in bamboo cutting and honey collection..
- They mainly cultivate tobacco, maize, and millet but rely heavily on natural resources for their diet.
- Many Chenchus have moved towards agricultural and forest work due to the influence of non-tribal communities

Demographics and Language

- The Chenchus numbered approximately 59,000 at the beginning of the 21st century.
- They predominantly speak Telugu, a **Dravidian language,** and have distinct dialects such as Chenchucoolam and Chenswar.
- Their physical characteristics include being shorter in stature, with a flat nose and wavy black hair.

Social Structure and Family

- Chenchu families are typically small.
- Men and women enjoy equal status.
- They practice exogamous marriages, allowing individuals to choose their partners freely.

India ranks 105 in Global Hunger Index 2024

- The Global Hunger Index (GHI) has ranked India 105th out of 127 countries.
- India is among 36 countries that fall within the "serious" category, alongside Pakistan and Afghanistan. Other South Asian neighbours such as Bangladesh, Nepal and Sri Lanka show better GHI scores and are listed under the "moderate" category.
- • Belarus has the lowest hunger level in the world, followed by Bosnia & Herzegovina, Chile and China.

What is Global Hunger Index?

- The Global Hunger Index (GHI) is a tool designed to comprehensively measure and track hunger at global, regional, and national levels, reflecting multiple dimensions of hunger over time.
- It is a peer-reviewed annual report, **jointly published by Concern Worldwide and Welthungerhilfe.**
- The GHI is intended to raise awareness and understanding of the struggle against hunger, provide a way to compare levels of hunger between countries and regions, and call attention to those areas of the world where hunger levels are highest and where the need for additional efforts to eliminate hunger is greatest.

How are the scores calculated?

- Each country's GHI score is calculated based on a formula that combines four indicators that together capture the multidimensional nature of hunger:
  i) Undernourishment: The share of the population with insufficient caloric intake.
  ii) Child Stunting: The share of children under age five who have low height for their age, reflecting chronic undernutrition.
  iii) Child Wasting: The share of children under age five who have low weight for their height, reflecting acute undernutrition.
  iv) Child Mortality: The share of children who die before their fifth birthday,

partly reflecting the fatal mix of inadequate nutrition and unhealthy environments.

GHI scores are calculated using a three-step process:

- **Step 1:** Values are determined for the four component indicators for each country, drawing on the latest published data available from internationally recognised sources.
- **Step 2:** Each of the four component indicators is given a standardised score based on thresholds set slightly above the highest country-level values observed worldwide for that indicator since 1988.
- **Step 3:** The standardised scores are aggregated to calculate the GHI score for each country. Undernourishment and child mortality each contribute one-third of the GHI score, while child stunting and child wasting each contribute one-sixth of the score.
- This calculation results in GHI scores on a 100-point scale, where 0 is the best score (no hunger) and ***100 is the worst.***
- In practice, neither of these extremes is reached. A value of 100 would signify that a country's undernourishment, child wasting, child stunting, and child mortality levels each exactly meets the thresholds set slightly above the highest levels observed worldwide in recent decades.
- A **value of 0 would mean that a country had no undernourished people** in the population, no children younger than five who were wasted or stunted, and no children who died before their fifth birthday.

Other key points of the Index:

- The 2024 Global Hunger Index (GHI) score for the world is 18.3, considered moderate, down only slightly from the 2016 score of 18.8. This global score obscures wide variations in hunger by region.
- The situation is most severe in South of the Sahara and South Asia, where

hunger remains serious. South of the Sahara's high GHI score is driven by the highest undernourishment and child mortality rates of any region by far.

- In South Asia, serious hunger reflects rising undernourishment and persistently high child undernutrition, driven by poor diet quality, economic challenges, and the increasing impact of natural disasters.
- **The goal of Zero Hunger by 2030** now appears unreachable, and if progress remains at the pace observed since the 2016 global GHI score, the world will not reach even low hunger until 2160 — more than 130 years from now.
- Hunger is considered alarming in six countries: Burundi, Chad, Madagascar, Somalia, South Sudan, and Yemen. In another 36 countries, hunger is designated as serious.

Some important definitions

What is hunger?

- The problem of hunger is complex, and different terms are used to describe its various forms.
- Hunger is usually understood to refer to the distress associated with a lack of sufficient calories. The Food and Agriculture Organisation of the United Nations (FAO) defines food deprivation, or undernourishment, as the consumption of too few calories to provide the minimum amount of dietary energy that each individual requires to live a healthy and productive life, given that person's sex, age, stature, and physical activity level.

What is undernutrition?

- Undernutrition goes beyond calories and signifies deficiencies in any or all of the following: energy, protein, and/ or essential vitamins and minerals.
- Undernutrition is the result of inadequate intake of food in terms of either quantity or quality, poor utilisation of nutrients due to infections or other illnesses, or a combination of these factors.

- These, in turn, are caused by a range of factors, including household food insecurity; inadequate maternal health or childcare practices; or inadequate access to health services, safe water, and sanitation.

What is malnutrition?

- Malnutrition refers more broadly to both undernutrition (problems caused by deficiencies) and overnutrition (problems caused by unbalanced diets, such as consuming too many calories in relation to requirements with or without low intake of micronutrient-rich foods).

Launch of Tribal Welfare Projects Under DAJGUA, EMRS and PM-JANMAN

Recently, the Prime Minister inaugurated and laid the foundation stone for projects worth over Rs 80,000 crore in Jharkhand, including the launch of Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DAJGUA).

- He also inaugurated 40 Eklavya Model Residential Schools (EMRS) and laid the foundation stone for 25 more, along with several projects under the Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN).

Dharti Aaba Janjatiya Gram Utkarsh Abhiyan

- Originally named the PM Janjatiya Unnat Gram Abhiyan (PM-JUGA), is an umbrella scheme to implement existing schemes across 63,000 Scheduled Tribe-majority villages.
    - Dharti Aaba refers to Birsa Munda, a 19th-century tribal leader and anti-colonial icon from Jharkhand.
- The initiative aims to address critical gaps in social infrastructure, health, education, and livelihood through 25 interventions implemented by various 17 Ministries and Departments of the Government of India.

Eklavya Model Residential Schools (EMRS)

- EMRS is a scheme for making model residential schools for Scheduled Tribes (STs) across India. It started in the year 1997-98. Its nodal ministry is the

Ministry of Tribal Affairs.

- These schools are being developed to provide quality education to tribal students, focusing on academic as well as overall development.
- The EMR Schools generally follow the CBSE curriculum.

- The scheme aims to build schools similar to Jawahar Navodaya Vidyalayas and Kendriya Vidyalayas, with a focus on state-of-the-art facilities for preserving local art and culture, as well as providing training in sports and skill development.

Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN)

- PM-JANMAN was launched on 15th November 2023, on Janjatiya Gaurav Diwas, to improve the socio-economic welfare of PVTGs.
- It is implemented by the Ministry of Tribal Affairs, in collaboration with the State governments and the PVTGs communities.
  - It encompasses various sectors, including safe housing under the PM-Awas Scheme, access to clean drinking water, improved healthcare, education, nutrition, road and telecommunications connectivity, as well as opportunities for sustainable livelihoods.
- The plan also includes the establishment of Van Dhan Vikas Kendras for trading in forest produce, off-grid solar power systems for 1 lakh households, and solar street lights.
- The scheme is expected to enhance the quality of life and well-being of the PVTGs, by addressing their multiple and intersecting forms of discrimination and exclusion, and by recognizing and valuing their unique and valuable contribution to national and global development.

Equitable Agrifood Systems for Food Access

- Food access is a **fundamental aspect of equitable agrifood systems**, crucial for addressing food inequality and ensuring that everyone has access to nutritious food.

Major Categories of Food Security

- Proper nutrition should be considered as important to people's health and welfare as political stability. However, current statistics indicate that, the world over, 733 million people are affected by hunger as supported by the Food and Agriculture Organization (FAO). People with access to proper diet also have compact and contented societies hence nutrition is imperative for society.

Historical Context

- Indeed India's Green Revolution was crucial in increasing the food stocks. But now there is emphasis on nutrition which is essential in the growth of these children and the nation's productivity.
- The Indian agriculture and food industry has undergone revolutionary changes such as the White Revolution in Dairy and the Blue Revolution in fisheries producing sufficient food which is safe and diverse.

Addressing Inequalities

- Thus, countering food inequality requires the launch of an empowering process for the disadvantaged. This can be done through adherence to, and promotion of, the right to food and nutrition security.
- Due to higher poverty rates in the rural area, tackling poverty in these areas continues to be an issue; hence, Credit/ subsidies, machinery technology, and efficient irrigation systems are required for providing better production.

Sustainable Practices

- Climate change is dangerous to agriculture because it causes unpredictable weather conditions. Applying better ways of farming including water management and rehabilitation of soils would assist the farming communities develop some buffer. The agreements between Rome based agencies and the Government of India are centered on the natural resource management, Markets and modern Agriculture.

Access to Food Right Beyond Agricultures

- Specifically, the Right to Food transcends the sphere of agriculture; it affects all residents irrespective of the household's occupation. The provision of healthy foods that are safe, affordable and available requires protection on principles of human rights regardless of occupation or geographical location. Just as important is to feed a growing number of people living in cities and not directly connected with farming.

Urban Food Security

- There is increased and conscious demand for food security for the non-horticultural population under a robust food retail system. Food inequality is still existing in urban areas hence the need to create good policies that will enhance issuance of social safety nets and also policies that encourage market regulation for basic foods.
- The analysis of the Public Distribution System **(PDS) in India** shows that great progress was achieved in addressing the food access issue related to various segments of the population.

Collective Responsibility

- The theme of World Food Day 2024 indicates that it is about ensuring that everyone gets access to healthy and safe foods; it is more than production Issue: It is about creating stronger and a more secure and sustainable agrifood systems for all people. **This partnership with EXIM, which stands for FAO, IFAD, WFP and the Government of India** underlines our common mission to tackle world hunger.

Conclusion

- In furthering the agenda, there is a need to uplift both agricultural and non-agricultural households and to enhance livelihoods with a bid to address food disparities. Leaving no one behind, it is crucial for creating a new form of a

healthy, prosperous society where the society will find its place to improve the whole life and future. It will be important for several stakeholders to cooperate in achieving these goals.

Global Hunger Index (GHI), 2024

India's Status in GHI 2024 (Crisp Points):

- **Rank:** India ranks 105th out of 127 countries with a score of 27.3.
- **Child wasting:** India has the highest global rate of child wasting at 18.7%.
- **Stunting:** 35.5% of children under five are stunted.
- **Undernourishment:** 13.7% of India's population is undernourished.
- **Child mortality:** 2.9% of children die before their fifth birthday.
- **Comparison:** India lags behind South Asian neighbors like Bangladesh, Nepal, and Sri Lanka, which fall into the moderate hunger category.

Methodology used:

- **Indicators:** GHI uses four indicators – undernourishment, child stunting, child wasting, and child mortality.
- **Data sources:** Data is sourced from UNICEF, WHO, World Bank, and FAO, ensuring comparability across countries.
- **Child wasting:** The GHI uses survey estimates vetted for inclusion in the Joint Malnutrition Estimates and WHO Global Database.

Limitations of the report:

- **Data discrepancies:** The Ministry of Women and Child Development raised concerns about GHI not using data from the Poshan Tracker, which shows lower child wasting rates (7.2% vs. GHI's 18.7%).
- **Survey-based estimates:** Reliance on survey data might not fully reflect real-time data from government tracking systems.
- **National representation:** The GHI's methodology may not capture regional variations and improvements in India's nutrition programs.

Way Ahead:

- **Improved data collection:** India should integrate real-time data from systems like Poshan Tracker to improve hunger and nutrition estimates.
- **Focus on maternal health:** Address the intergenerational transfer of undernutrition by improving maternal health and nutrition.
- **Agricultural investments:** Increase focus on sustainable agriculture and nutritious crop production like millets to improve dietary diversity.
- **Social safety nets:** Strengthen access to Public Distribution Systems (PDS) and Integrated Child Development Services (ICDS) for better coverage of vulnerable populations.

India's performance in the Global Hunger Index highlights serious challenges, especially in child malnutrition. By improving data transparency, maternal health, and investing in sustainable food systems, India can enhance its hunger and nutrition outcomes, aligning better with global targets like **Zero Hunger by 2030.**

'E-Cube Hindi Language Lab'

- **Objective:** Provides an interactive language learning environment for English, now extended to Hindi.
- **Developer:** Created by KITE (Kerala Infrastructure and Technology for Education).
- **Audience:** Targets students in schools, primarily using school laptops.
- **Interactive Features:**
    - Includes game-based activities for practicing listening, speaking, reading, writing, and discourse creation.
    - Students can record their voices and save activities in audio/video formats.
    - Supports animated conversations to help students speak confidently in real-life situations.
- **Monitoring:**

- Teachers and head teachers have separate logins to track student progress.
- Provides feedback mechanisms for teachers to review and guide students.

- **FOSS-based:** Entirely developed using Free and Open-Source Software.

'Karmayogi Saptah'

- **Launch Date:** 19th October 2024 by Prime Minister Modi.
- **Objective:** Promote individual and organizational capacity-building for civil servants through competency-linked learning.
- **National Learning Week (NLW):**
  - Largest learning event for civil servants.
  - Aims to create a "One Government" message, aligning civil servants with national goals.
  - Focuses on lifelong learning and continuous development.
- **Learning Targets:**
  - Each Karmayogi is expected to achieve at least 4 hours of competency-linked learning during the week.
  - Learning methods include role-based modules on iGOT, webinars, public lectures, and policy masterclasses by eminent speakers.
- **Workshops & Seminars:**
  - Ministries and departments will organize seminars and workshops to enhance domain-specific competencies.
  - Emphasis on improving citizen-centric service delivery through knowledge sharing and skill development.

Compassion case

R Prakash, a police head constable in Tiruppur city, was on patrol under the **Dedicated Beat System** when he encountered a disabled woman named G Amutha, living under a Neem tree with only an umbrella for shelter. Moved by her plight, Prakash took it upon

himself to build her a small shelter using his own funds. Amutha, despite her physical challenges, earns a meager income by turning knitwear waste into yarn. Prakash's actions not only exemplify compassion but also the dedication of public servants who go beyond their duty to improve the lives of the needy.

Empathy and Public Service: This anecdote can be used to highlight how compassion and empathy are key traits in effective public service.

1. **Social Responsibility:** Can be linked to essays on **social justice** and **responsibility of public officials** in uplifting marginalized individuals.
2. **Example of Citizen-Police Relations:** Demonstrates the **role of police in society** as not only protectors but also enablers of welfare.

Usage in Ethics Case Study:

1. **Demonstrating Ethical Leadership**: The anecdote can be used to show how individuals in positions of responsibility can take initiative to act beyond their defined roles for the public good.
2. **Compassionate Public Service:** This example can be cited to emphasize the importance of empathy, integrity, and **duty towards vulnerable sections**.

Global Multidimensional Poverty Index 2024

- MPI is published annually by the **UN Development Programme (UNDP)** and the Oxford Poverty and Human Development Initiative.
- The index makes use of 10 **indicators across these 3 dimensions.**
- If **a family is disadvantaged in one-third or more of those indicators**, it's considered multi dimensionally terrible.

Key Findings

- Across 112 nations and 6.3 billion people, 1.1 billion people **(18.3 percent) live in acute multidimensional poverty.**
- **Poor people stay in rural areas:** 962 million (83.7 percent) live in rural regions.

- Around 70.7 percent of all poor people stay in rural areas of Sub- Saharan Africa (463 million) and South Asia (350 million).
- The five countries with the largest quantity of people residing in poverty are India (234 million), Pakistan (93 million), Ethiopia (86 million), Nigeria (74 million) and the Democratic Republic of the Congo (66 million).
  - Together, those five nations account for nearly half (48.1 percent) of the 1.1 billion poor people.
- Approximately 584 million people below 18 are living in extreme poverty, making up 27.9% of all children globally, as compared to 13.5% of adults.

- **Poverty in conflicted areas:** The report cited that 2023 witnessed more conflicts than at any time since World War II inflicting displacement of over 117 million people.
  - Nearly 40% of the 1.1 billion people stay in poverty, about 455 million, are situated in countries experiencing conflict.

Reasons for India's poor performance

- **Regional Disparities:** Rural poverty rates stay high due to insufficient infrastructure, bad carrier shipping, and restricted financial opportunities outside agriculture.
- **Poor nutrition:** India struggles with severe malnutrition, particularly amongst children.
- **Quality of education:** The quality of education in many government-run colleges is terrible, leading to insufficient studying consequences.
- **Water and sanitation:** Poor access to secure consuming water and insufficient sanitation, specifically in rural regions, maintains to push many households into multidimensional poverty.
- **Economic setbacks:** The COVID-19 pandemic critically disrupted India's economy, leading to job losses, decreased earning, and expanded vulnerabilities for millions of households.

Government Steps for Poverty relief

- **National Food Security Act (NFSA), 2013:** It offers prison entitlement to 67% of the population (75% in rural areas and 50% in city regions) to receive notably backed foodgrains.
- **Pradhan Mantri Ujjwala Yojana (PMUY) (2016):** This initiative was introduced to offer LPG (liquefied petroleum gasoline) connections to women belonging to Below Poverty Line (BPL) households.
- **Ayushman Bharat scheme:** It gives medical health insurance policies of as much as ₹5 lakh per family per year to protect beneficiaries from the financial burden of high priced scientific treatments, thereby stopping them from falling deeper into poverty because of healthcare costs.
- **National Nutrition Mission (POSHAN Abhiyaan):** Launched in 2018, the project targets to lessen malnutrition through specializing in stunting, undernutrition, and anemia, particularly amongst children, adolescent girls, pregnant women, and lactating mothers.
- **Right to Education Act (RTE):** The RTE Act, enacted in 2009, affords free and compulsory education for children between 6 and 14 years.
- **Swachh Bharat Mission:** The task ambitions to achieve universal sanitation insurance with the aid of building bathrooms and promoting cleanliness.

Way Ahead

- India has made **substantial strides in poverty reduction** through various initiatives however there's room for in addition development.
- Promoting sustainable livelihoods, enhancing the nature of service transport, and leveraging digital solutions for higher implementation will make sure that multidimensional poverty maintains to say.

UDAN Scheme

- The Indian government plans to extend the **'UDAN' (Ude Desh ka Aam Nagrik)**

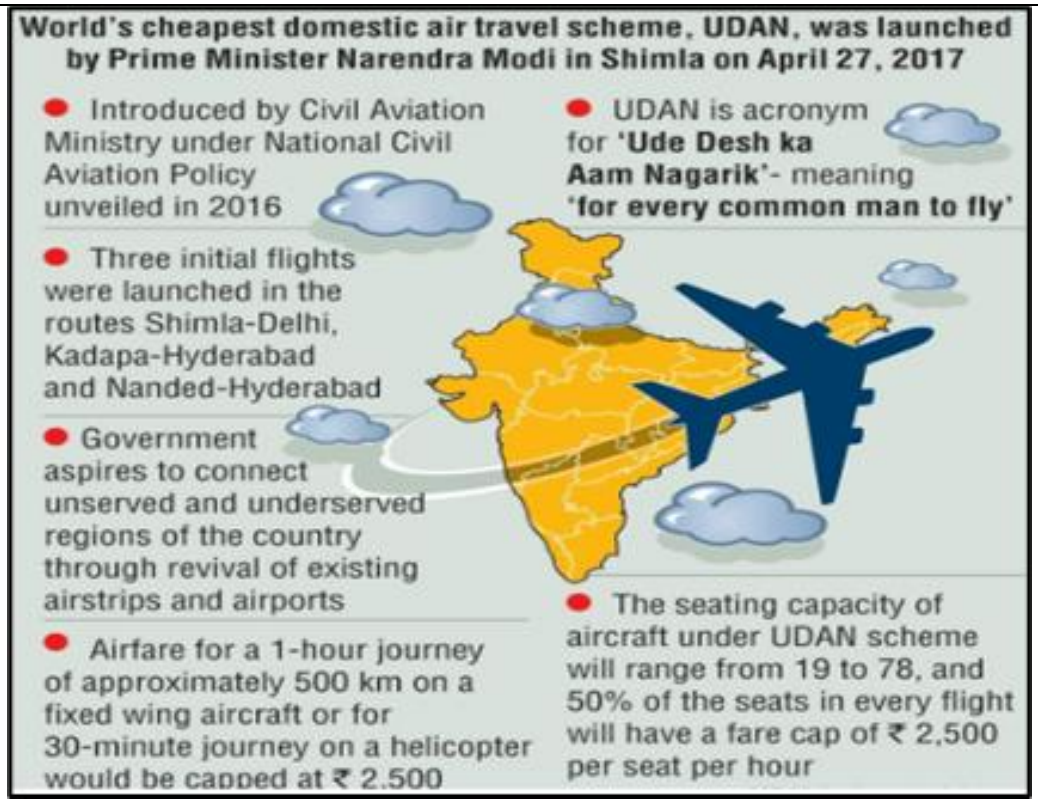
regional air connectivity scheme for 10 more years.

Features of UDAN Scheme

- **Launched in:** 2016
- The **Regional Connectivity Scheme (RCS)-UDAN (Ude Desh Ka Aam Naagrik)**is a regional connectivity scheme.
- It is a vital component of India''s **National Civil Aviation Policy (NCAP) 2016**, launched by the **Ministry of Civil Aviation (MoCA)** in 2016, with a 10-year vision.
- The **Centre's UDAN (Ude Desh ka Aam Nagrik) scheme** aimed at enhancing regional air connectivity and making flying more affordable was introduced in 2016 for 10 years.
- The UDAN scheme aims to establish air connectivity in underserved regional areas.
- The Scheme offers financial incentives to selected airlines, comprising concessions from central and state governments and airport operators.
- The government, under the scheme, provides financial assistance to selected airline operators through **Viability Gap Funding (VGF).**
- Notably, the scheme was initially launched for the period of 10 years, and now the government intends to extend this for 10 more years.

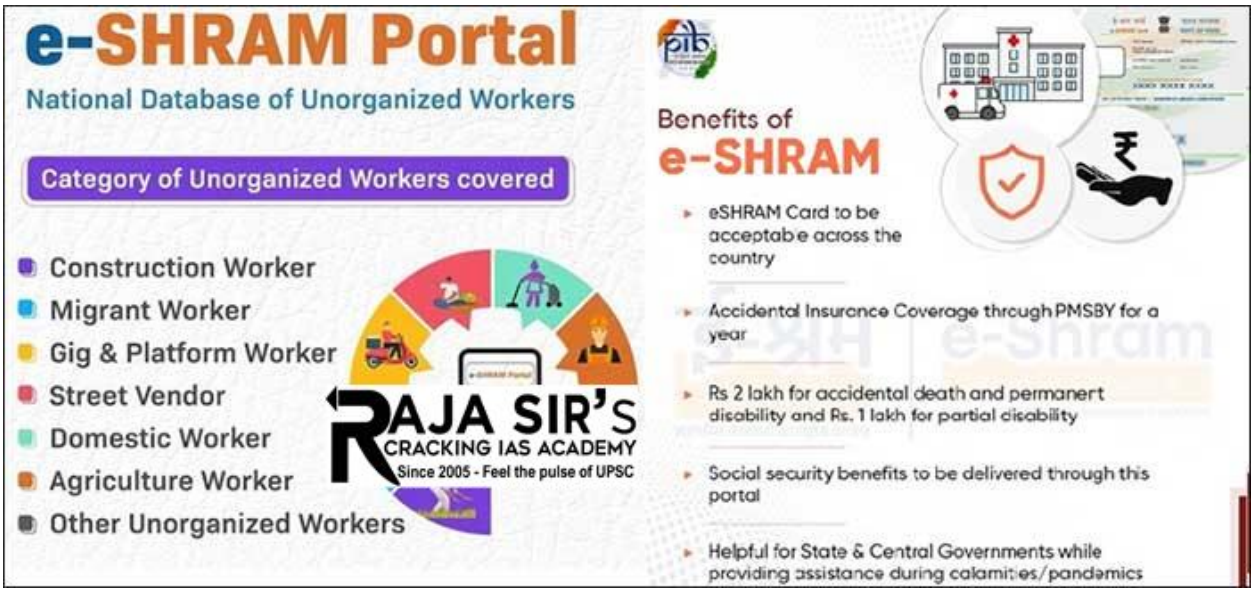
Implementing Agency: Airport Authority of India (AAI)

- **Progress so far:**
- Under UDAN, 601 routes and 86 airports have been made operational, serving over 14.4 million passengers thus far.
- Notably, the first flight under 'UDAN' scheme was inaugurated by Prime Minister Narendra Modi on April 27, 2017. This was from Shimla to Delhi.
- The scheme aims to provide opportunities to small regional airlines to scale up their businesses.



eShram Portal

- Ministry of Labour & Employment launched the "eShram – One Stop Solution
- **Aim:** For registration and creation of a comprehensive National Database of **Unorganized Workers.**
- The term unorganised worker has been defined under the Code on Social Security, 2020, means a home-based worker, self-employed worker or a wage worker in the unorganised sector.
- It also includes a worker in the organised sector **who is not covered by the Industrial Disputes Act,1947** or Chapters III to VII of the Code i.e.Employees Provident Fund, Employees' State Insurance Corporation, Gratuity, Maternity Benefit, Employee's Compensation.



- **Facilitates**: eShram has been integrated with the National Career Service (NCS) Portal where an unorganised worker can register on NCS using his/ her 12 digit Universal Account Number (UAN) and search for **suitable job opportunities.**

eShram Portal Key Benefits

- Help unorganised workers become aware of the schemes designed for them.
- Help to facilitate in identification and implementation of the Social Security & Welfare Schemes for the unorganised worker
- Integration of schemes: Platform currently integrates key welfare schemes like One Nation One Ration Card, Mahatma Gandhi National Rural Employment Guarantee Act, National Social Assistance Programme, National Career Service, and Pradhan Mantri Shram Yogi Maandhan.

PM Young Achievers' Scholarship Award Scheme for Vibrant India (PM YASASVI)

- The Ministry of Social Justice and Empowerment has implemented the PM Young

Achievers Scholarship Award Scheme for Vibrant India (PM-YASASVI).

- **Purpose**: Supports quality education for students from **Other Backward Classes (OBC), Economically Backward Classes (EBC), and Denotified Tribes (DNT)** communities by easing financial burdens.
- **Launch**: Initiated in **2021-22**, by merging the **Dr. Ambedkar Post-Matric and Pre/Post-Matric Scholarship schemes.**

Scholarship Details:

- **Pre-Matric Scholarship**: For Classes 9-10 students in government schools.
- **Post-Matric Scholarship**: For students in higher education (post-Class 10).
- **Eligibility**: Family income below Rs. 2.5 lakh for Pre-Matric Scholarships.
- **Implementing Agency:** Department of Social Justice and Empowerment, Ministry of Social Justice and Empowerment.
- The scheme's focus on supporting students at both school and college levels helps to nurture talent from an early age and carry it through to higher education, laying a strong foundation for personal and professional growth.
- Moreover, by integrating earlier scholarship initiatives into a single, streamlined program, PM YASASVI enhances the impact of these efforts, contributing to the creation of a more inclusive and equitable education system.
- PM-YASASVI is ensuring that no student is left behind in the pursuit of academic and social progress. This scheme is playing a crucial role in the welfare and upliftment of marginalized communities, enabling them to contribute meaningfully to the vision of **Viksit Bharat @ 2047**.

Pradhan Mantri Vanbandhu Kalyan Yojana

- The **Pradhan Mantri Vanbandhu Kalyan Yojana (PMVKY)** is a landmark initiative that was launched on **October 28, 2014**. This ambitious scheme has been conceived as a comprehensive strategy to address the unique challenges faced by tribal communities in India, which constitute about **8.9%** of the

country''s population.

- With over **700 scheduled tribes** spread across diverse regions—from the Himalayas to the Andaman and Nicobar Islands—India''s tribal populations often remain marginalized in terms of socio-economic development.
- The **Pradhan Mantri Vanbandhu Kalyan Yojana (PMVKY)** aims to empower tribal communities in India, recognizing their historical neglect. The initiative not only provides financial assistance but also establishes a framework for sustainable development ,improve the socio – economic conditions of Tribal populations but also emphasizes the preservation of their cultural heritage and identity .

Six Key Steps Under PMVKY

The PMVKY encompasses six steps aimed at different facets of tribal welfare.

These include:

1.Pradhan Mantri Adi Adarsh Gram Yojana

- The **Pradhan Mantri Adi Adarsh Gram Yojana (PMAAGY)** revamps the existing Special Central Assistance to Tribal Sub-Plan, which focuses on integrated village development in **36,428 villages** with significant tribal populations. This initiative targets critical sectors such as road and telecom connectivity, education, health services, and sanitation, all of which aim to raise the living standards of tribal communities.
- Under the scheme, these villages have been specifically identified to address challenges in road connectivity, mobile and internet access, schools, Anganwadi centres, health sub-centres, drinking water facilities, drainage, and solid waste management. Each village will receive **₹20.38 lakh**, with a total expenditure of **₹7,276 crore** planned by **2025-26**. As of July 2024, schemes for approximately **16,000 villages** have been approved, and **₹2,283 crore** has already been released for implementation.

2.Development of Particularly Vulnerable Tribal Groups (PVTGs)

- The PVTG development scheme is designed to ensure the socio-economic upliftment of the most marginalized tribal communities (PVTG families) while preserving their cultural heritage. The initiative provides financial support to state governments for tailored developmental activities in housing, health, and education sectors.
- The Pradhan Mantri PVTG Development Mission has been launched to enhance further living conditions and provide PVTG families with access to basic facilities.
- In the 2023-24, the government launched Pradhan Mantri PVTGs Development Mission to improve their socio-economic conditions, allocating Rs. 15,000 crore over three years for essential amenities like secure housing, clean drinking water, sanitation, education, health, nutrition, and enhanced connectivity. An initial comprehensive IEC campaign is underway in 100 districts, targeting around 500 blocks and 15,000 PVTGs habitations to raise awareness about their entitlements. The initiative will ensure that every unreached PVTGs household benefits from various government schemes, utilizing local centers like Haat Bazar, CSCs, and Gram Panchayats to facilitate access and services at their doorstep.

3.Support to Tribal Research Institutes (TRI)

- This component facilitates research and documentation efforts related to tribal communities. Financial assistance is allocated to state governments and UTs based on their proposals to strengthen the knowledge base concerning tribal cultures and challenges.

4.Pre-Matric Scholarships

- These centrally sponsored schemes aim to support tribal students in their educational pursuits. The **Pre-Matric Scholarship** caters to students in grades IX and X, the scholarship is available for students with a parental income of up to ₹2.50 lakhs, ensuring that financial constraints do not hinder educational

advancement.

- For most states, the Government of India contributes 75%, while the state government provides 25%. In the case of North Eastern and hilly states, the Government of India's contribution increases to 90%, with the state contributing only 10%. For Union Territories (UTs) like Andaman & Nicobar, which do not have a Legislative Assembly or their own grants, the Government of India provides 100% of the funding.

5.Post-Matric Scholarships

- The Post-Matric Scholarship follows similar terms and conditions as the Pre-Matric scheme but caters to Scheduled Tribe students studying beyond class 10. This scholarship aims to further support their educational journey by alleviating financial burdens and encouraging continued academic advancement.

6.Administrative Assistance for Project Management Units

- The PMVKY also allocates funds to establish project management units within state governments, ensuring that schemes related to the welfare of Scheduled Tribes are effectively monitored and implemented.

Other Steps by Government of India for Tribal Welfare:

Pradhan Mantri Janjatiya Vikas Mission (PMJVM):

- Approved for implementation from 2021-22 to 2025-26, the PMJVM has been restructured **by merging and extending two existing schemes**: the "Mechanism for Marketing of Minor Forest Produce through Minimum Support Price" and the "Institutional Support for Development and Marketing of Tribal Products."
- The Pradhan Mantri Janjatiya Vikas Mission (PMJVM) is designed to enhance tribal entrepreneurship and create livelihood opportunities by promoting the efficient and equitable use of natural resources, including agricultural products, Non-Timber Forest Products (NTFPs), and non-farm enterprises.

- The Tribal Cooperative Marketing Development Federation of India (**TRIFED**) serves as the central implementing agency for this initiative
- The mission supports the theme of "Vocal for Local by Tribal," aiming to empower tribal communities through local resource utilization.
- Under the PMJVM, the Ministry provides financial assistance for the procurement of Minor Forest Produces (MFPs) at Minimum Support Price (MSP), the development of infrastructure for MFP and non-MFP value chains, and value addition training programs through Van Dhan Vikas Kendras

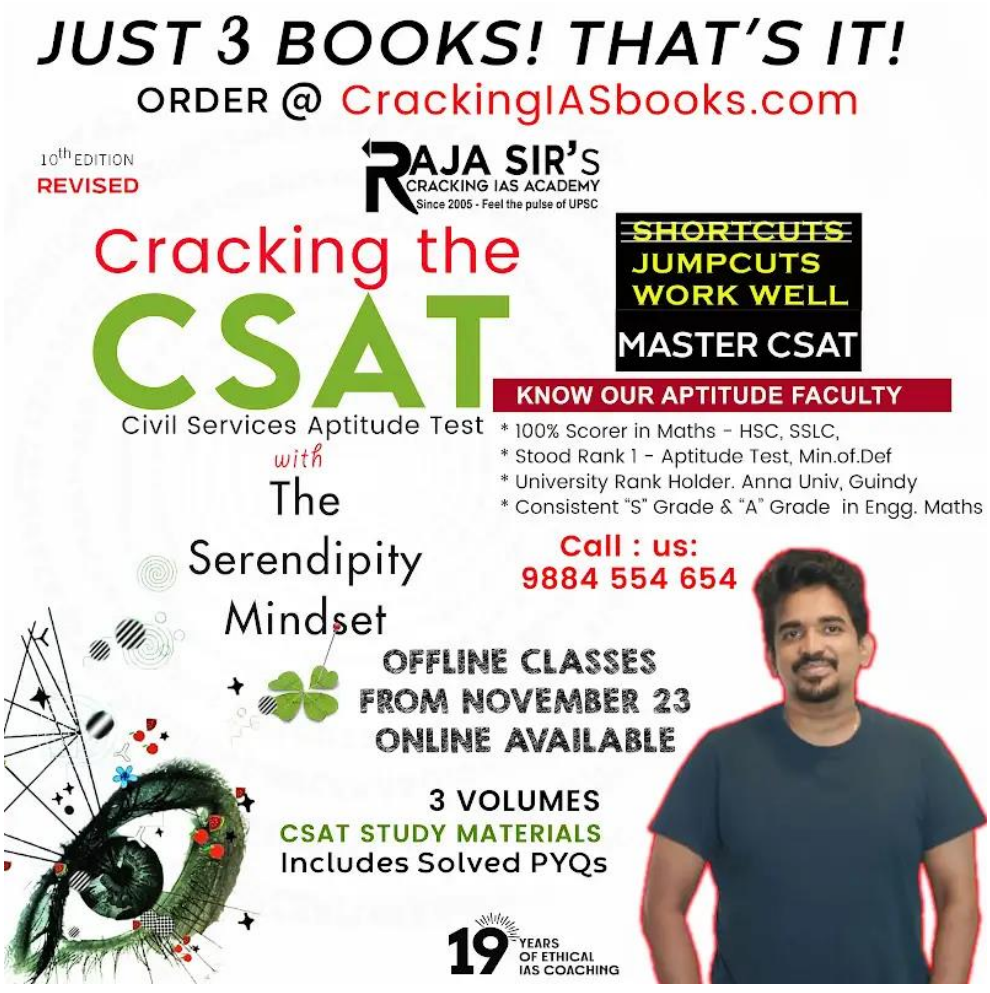
Development Action Plan for Scheduled Tribes (DAPST)

- The **Development Action Plan for Scheduled Tribes (DAPST)** serves as a dedicated funding source for tribal development. This multi-faceted strategy encompasses support for critical areas such as education, health, sanitation, water supply, and livelihood opportunities
- In addition to the **Ministry of Tribal Affairs (MoTA)**, **41 ministries and departments** contribute a percentage of their total scheme budgets each year towards tribal development initiatives under the DAPST.

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)

- **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana**: Launched in 2018 as the **world's largest publicly funded health assurance scheme,** it initially targeted vulnerable populations covering 55 crore individuals from 12.34 crore families.
- The scheme is being implemented in 33 states and Union territories currently except for Delhi, Odisha, and West Bengal.
- The scheme, thus far, has facilitated 7.37 crore hospital admissions and benefited recipients by more than ₹1 lakh crore.
- **Continuous Expansion**: In January 2022, the beneficiary base was increased to 12 crore families due to population growth

- **Recently, the Union Cabinet has decided to extend Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)** coverage to **all senior citizens aged 70 and above, regardless of income.**
- **Implications:** This initiative reflects a shift toward universal health coverage for India's elderly, aiming to address healthcare needs as the population ages.
- By prioritising senior citizens, the government is addressing a **demographic often vulnerable to high medical costs** and **limited insurance access,** with the hope of promoting affordable, quality healthcare for all.



PARAKH RASHTRIYA SARVEKSHAN

- The **National Achievement Survey (NAS)** to assess students' learning progress will be held under a new name – PARAKH Rashtriya Sarvekshan 2024
- The assessment is conducted by the National Council of Educational Research and Training (NCERT) and the Central Board of Secondary Education (CBSE) to evaluate school students'' learning achievements across India.
- The survey will involve assessing a sample of students from government, government aided and private schools through multiple choice questions (MCQ) across various subjects.
- The assessment has been conducted every three years since 2001. The 2021 survey assessed students in classes 3, 5, 8 and 10. The 2021 survey involved 34,01,158 students across 1.18 lakh schools in 720 districts.
- The 2021 survey was performed during the COVID-19 pandemic, indicating a decline in achievement levels from 2017. For example, In Class 3, all states and UTs had an overall score lower than the national average reported in 2017. In Class 5, only Punjab and Rajasthan achieved overall marks higher than the 2017 national average.

Key Objectives of the PARAKH Rashtriya Sarvekshan 2024

- Assessing students from class 3, 6, and 9 to evaluate their understanding in language, mathematics, science, and social science.
- Providing *report cards at national, state and district levels* to help stakeholders to understand educational outcomes.
- Aligning with the National Education Policy (NEP) 2020 to define educational strategy, ensuring that the survey reflects the new educational structure.
- Performance Assessment, Review and Analysis of Knowledge for Holistic Development (PARAKH) was set up in 2023 as the National Assessment Centre, to organize the achievement surveys in schools across India.

ART AND CULTURE

Status of Classical Language

- The Union Cabinet, under the leadership of Prime Minister Narendra Modi, has approved to confer the status of Classical Language to Marathi, Pali, Prakrit, Assamese and Bengali languages.
- Classical languages are regarded as the custodians of India's ancient and profound cultural legacy, preserving the rich history, literature, and traditions of their respective communities.
- By conferring this status, the government seeks to honor and protect the linguistic milestones of Bharat's diverse cultural landscape, ensuring that future generations can access and appreciate the deep historical roots of these languages.
- This move not only reinforces the importance of linguistic diversity but also acknowledges the vital role these languages play in shaping the nation's cultural identity.

Why is a language declared as Classical?

- The designation of a language as *classical* is intended to recognize its historical significance and its role as a guardian of Bharat's rich cultural and intellectual heritage.
- These languages have been essential in preserving and transmitting India's ancient knowledge systems, philosophies, and values across generations for thousands of years.
- By recognizing these languages as classical, the government acknowledges their deep-rooted antiquity, vast literary traditions, and their invaluable contribution to the cultural fabric of the nation. This recognition highlights the significant

cultural and linguistic contributions these languages have made to India's heritage

What are the criteria for declaring a language as classical?

In 2004, the Government of India, for the first time, created a new category of languages known as *Classical Languages*. It set the following as criteria for the status of Classical Language:

- High antiquity of its early texts/ recorded history over a thousand years.
- A body of ancient literature/ texts, which is considered a valuable heritage by generation of speakers.
- The literary tradition must be original and not borrowed from another speech community.

This criterion was revised in 2005 and 2024 based on the recommendations of Linguistic Experts Committees (LEC) under Sahitya Akademi to examine the proposed languages for the status of Classical Language.

The criteria were revised in November 2005 as follows, and Sanskrit was declared a Classical Language:

High antiquity of its early texts/recorded history over a period of 1500-2000 years.

- A body of ancient literature/texts, which is considered a valuable heritage by generations of speakers.
- The literary tradition must be original and not borrowed from another speech community.
- The classical language and literature being distinct from modern, there may also be a discontinuity between the classical language and its later forms or its offshoots.

The criteria were revised in 2024 as follows:

- High antiquity of its early texts/recorded history over a period of 1500- 2000 years.
- A body of ancient literature/texts, which is considered a heritage by generations of speakers.
- Knowledge texts, especially prose texts in addition to poetry, epigraphical and inscriptional evidence.
- The Classical Languages and literature could be distinct from its current form or could be discontinuous with later forms of its offshoots.

The 2024 Linguistic Expert Committee also recommended the following languages to be fulfilling revised criteria to be considered as a Classical Language: Marathi, Pali, Prakrit, Assamese, Bengali.

How many languages have been declared classical so far?

Six Indian languages namely Sanskrit, Tamil, Telugu, Kannada, Malayalam and Odia were earlier accorded the status of Classical Language. The Union Cabinet chaired by the Prime Minister Narendra Modi has approved to confer the status of Classical Language to Marathi, Pali, Prakrit, Assamese and Bengali languages on October 03, 2024, thus bringing the total number of classical languages to 11.

Language	Date of Recognition	Notification by	Source/Notification Date
Tamil	October 12, 2004	Ministry of Home Affairs	October 12, 2004
Sanskrit	November 25, 2005	Ministry of Home Affairs	November 25, 2005
Telugu	October 31, 2008	Ministry of Culture	October 31, 2008

Kannada	October 31, 2008	Ministry of Culture	October 31, 2008
Malayalam	August 8, 2013	Ministry of Culture	August 8, 2013
Odia	March 1, 2014	Ministry of Culture	March 1, 2014

The Ministry of Home Affairs initially granted the status to Tamil and Sanskrit, and the Ministry of Culture took over the responsibility for further implementations and future recognitions. The Ministry of Culture established the Linguistic Experts Committee (LEC) on November 1, 2004, to assess future proposals for the recognition of classical languages.

What is the impact of a language being declared classical?

- The inclusion of languages as Classical Languages will create significant employment opportunities, especially in the academic and research sectors. Additionally, the preservation, documentation, and digitization of ancient texts in these languages will generate jobs in areas such as archiving, translation, publishing, and digital media.
- Recognizing the languages as classical encourage scholarly research, preservation, and the revitalization of ancient texts and knowledge systems, which are essential to India's intellectual and cultural identity. Furthermore, it instills a sense of pride and ownership among the speakers of these languages, promoting national integration and aligning with the broader vision of a self-reliant and culturally rooted India.
- In conclusion, the Union Cabinet's decision to confer Classical Language status to Marathi, Pali, Prakrit, Assamese, and Bengali reflects a deep recognition of the invaluable role these languages have played in shaping India's cultural and intellectual heritage.
- This step not only acknowledges their historical and literary significance

but also underscores the government's commitment to preserving and promoting India's linguistic diversity.

- The initiative is expected to foster academic and research opportunities, enhance global collaborations, and contribute to the nation's cultural and economic growth.
- By safeguarding these languages for future generations, the government is reinforcing a broader vision of cultural self-reliance and national integration, in line with the objectives of Atmanirbhar Bharat and a culturally rooted India.

Banjara Virasat Museum

PM inaugurated the Banjara Virasat Museum in **Poharadevi at Washim, Maharashtra.**

- The Prime Minister also paid floral tribute to the memorials of Banjara leaders **Sant Sevalal Maharaj and Sant Ramrao Maharaj.**
- He also played the Nangara, a key musical instrument of the Banjara culture.

Historical Significance

- **Resistance Against British Rule:** The Banjara community played a significant role in resisting British attempts to seize their lands and force them into labour.
- **Legal Challenges:** Despite their resistance, the Banjara community faced legal challenges, being listed under the Criminal Tribes Act in 1871 They were eventually denotified in the 1950s.
- But were later listed under the **Habitual Offenders Act in 1952**

The Banjara Community

- The Banjara community, often referred to as **Gypsies,** has a rich and vibrant history rooted in nomadic traditions.

- Derived from the words **"Vanaj" (to trade)** and **"Jara" (to travel)**, their nomadic lifestyle played a crucial role in connecting villages and providing essential supply.
- **Geographical Spread:** The Banjara community has deep roots in Rajasthan and is now spread across various states, known by different names such as **Lambada or Lambadi in Andhra Pradesh, Lambani in Karnataka, Gwar or Gwaraiya in Rajasthan,** and more.
- **Language:** Their unique language, **"Gorboli" or "Gor mati Boli,"** falls under the **Indo-Aryan language category**.

Nangara

- The nangara is a unique and essential musical instrument closely associated with the Banjara community
- Material: Nangaras can be made from various materials, including wood, metal, or even goat or buffalo skin.
- Cultural Significance: It is often played during celebrations, rituals, and social gatherings of the Banjara Community.
- Accompaniment: The nangara is often used to accompany singing, dancing, and storytelling.
- Symbol of Identity: The nangara serves as a symbol of Banjara identity and heritage. It is a reminder of their nomadic lifestyle and rich cultural traditions .

Sant Sevalal Maharaj

- **Birth and Origin:** Born on February 15, 1739, in **Surgondankoppa, Karnataka,** Sant Sevalal Maharaj was a prominent figure in the Banjara community.
- **Social Reformer and Spiritual Teacher:** He is revered as a social reformer and spiritual teacher who played a crucial role in uplifting the Banjara community.
- **Widespread Influence:** With a following of around 10-12 crore Banjara people across India, his teachings and influence extended far and wide.
- **Serving Nomadic Tribes:** Sant Sevalal Maharaj travelled extensively with his

Ladeniya Troup to serve forest dwellers and nomadic tribes.

- **Ayurveda and Naturopathy Expertise:** His knowledge of Ayurveda and Naturopathy helped dispel myths and superstitions, leading to reforms in tribal lifestyles.
- **Impact on Banjara Community:** The Banjara community, settled across various states with different names, abandoned their nomadic lifestyle and established permanent settlements called Tandas, influenced by Sant Sevalal Maharaj's teaching

Doddalathur Megalithic Burial Site

A team of history and archaeology scholars from the University of Mysore have embarked on an excavation of megalithic burial sites in Chamarajanagar district**,** Karnataka.

Doddalathur Megalithic Burial Site

- **Location:** The megalithic site is **located in a small valley** formed by the **Male Mahadeshwara Hill ranges.**
- It dates back to the Megalithic-Iron Age (1200 BCE to 300 CE).
- The site features burials marked by large stone boulders in circular arrangements.
- **Discovery:** In 1961 by C Krishnamurti of the **Archaeological Survey of India (ASI)**.

Current Excavation

- **Objective:**
  - To explore megalithic-iron age culture in southern Karnataka.
  - To gather scientific dating and cultural insights from the site.
- The department previously excavated the nearby **habitation-cum-megalithic burial site** of Budipadaga, 20 km from Doddalathur, in 2021 and 2022.

Aspect	Paleolithic	Mesolithic	Neolithic
Period	2.5 million years ago to 10,000 BCE	10,000 BCE to 8,000 BCE	8,000 BCE to 3,000 BCE
Habitat	Caves, temporary shelters, open plains	Semi-permanent camps near water sources	Permanent settlements, farming villages
Key Findings	Stone tools (e.g., hand axes), cave art, early fire usage	Microliths (small stone tools), bone tools, art (petroglyphs)	Agricultural tools, pottery, domesticated plants and animals
Lifestyle	Hunter-gatherers, nomadic lifestyle	Transition to more sedentary life, seasonal migration	Farming, animal husbandry, social stratification, trade

Megaliths

- A **megalith is a large stone** that has been **used to construct a prehistoric structure** or monument, either alone or together with other stones.
- They were **constructed either as burial sites or commemorative (non-sepulchral) memorials**.
- The megalithic monuments of peninsular India, believed to have been erected in the **Iron Age (1500 BC – 200 AD).**
- **Origin:** As megalithic societies were **preliterate, the racial or ethnic origins** of the megalithic people are thus difficult to pin down.
- **Geographical Coverage:** Though megalithic sites are found all across India, they are **concentrated mostly in peninsular India.**

Types of Megaliths

- **Underground Components:**
  - **Pit Burials:** Unlined pits where one or more bodies are buried.

- **Cist Burials:** Stone-lined rectangular graves often used for burials.
- **Urn Burials:** Terracotta urns used to hold the mortal rem
- **Sarcophagus Burials:** Terracotta receptacles, often with lids, sometimes shaped like animals.

- **Surface Components:**
  - **Menhirs:** Large, unshaped stones or minimally altered boulders, used as markers or memorials.
  - **Boulder Circles:** Circular arrangements of rocks or boulders, marking burial sites.
  - **Cairns:** Mounds of earth, often covering burials or other structures.
  - **Dolmenoid Cists:** Partially underground stone structures with a capstone.
  - **Dolmens**: Freestanding stone structures with a large capstone placed on upright stones.

These elements form an important part of ancient burial practices and memorial structures found in various archaeological sites worldwide.
Some of the significant Megalithic Burial sites are mentioned in the following table.

State	Burial Sites	Features/Components Found
Jharkhand	Seraikela	Megalithic burials, large stone structures, urn burials, associated with **iron age tools and artifacts.**
Uttarakhand	Deodhoora (Almora district)	**Early human habitation**, rock shelters, and megalithic burial remains.
Uttar Pradesh	Koldihwa (Belan Valley), Banda, Mirzapur, Prayagraj, Varanasi	Chalcolithic materials, evidence of early agricultural practices, copper tools, and pottery.
Kerala	Thrissur, Kunnattur	Megalithic burial sites with **Topikal,**

		urn burials, stone circles, dolmens, and pottery artefacts.
Kashmir	Waztal, Burzahom, Brah	Burzahom**: Pit dwellings,** Neolithic to Megalithic transition, animal bones, tools, and ceramics.
Karnataka	Maski, Hallur, Chandravalli, Hire Benakal, Coorg, Heggadehalli, Brahmagiri	**Megalithic dolmens**, cist burials, iron tools, pottery, skeletal remains, evidence of early agriculture.
Andhra Pradesh	Nagarjunakonda	**Buddhist relics**, stupa remains, Megalithic burials, urn burials, stone tools, and pottery.
Maharashtra	Junapani, Khapa, Mahurjhari, Naikund (near Nagpur), Pune	Megalithic burials, stone circles, urn burials, **copper and iron tools,** skeletal remains, pottery, and beads.
Tamil Nadu	Adichanallur, Sanur, Kodumanal, Perumbair	Urn burials, iron implements, pottery, skeletal remains, and **evidence of trade** with ancient civilizations.

Cabinet approves development of National Maritime Heritage Complex

The Union Cabinet has approved a proposal for the development of the National Maritime Heritage Complex **(NMHC**) at Lothal, Gujarat.

This initiative, led by the Ministry of Ports, Shipping & Waterways, aims to celebrate and showcase India's extensive maritime heritage.

Development of NMHC

- To showcase India's rich and diverse maritime heritage, the Ministry of Ports, Shipping and Waterways (MoPSW) has envisioned the development of NHMC at Lothal near Ahmedabad.
- The **NMHC is envisioned to be one of the largest maritime** complexes in the world.
- NMHC will not only curate and present diverse & rich artifacts from ancient to modern times from across India but also inspire the public and make them aware of and learn about our glorious maritime heritage.
- With its multifaceted phases of development, the NMHC promises to be a world-class facility that not only showcases ancient artifacts and the legacy of maritime trade but also serves as a hub for education and tourism.
- The development of NMHC will boost growth and immensely help the local communities, tourists and visitors, researchers and scholars, government bodies, educational institutions, cultural organisations, environment and conservation groups, and businesses.
- The foundation stone of the project was laid by Prime Minister Narendra Modi in March 2019.
- The Ministry of Ports, Shipping and Waterways has appointed Indian Ports Association as the nodal agency, while Indian Port Rail Corporation Ltd (**IPRCL) as executing agency of the project.**
- The master plan of NMHC has been prepared by renowned architecture firm Architect Hafeez Contractor and the construction **of Phase 1A has been entrusted to Tata Projects** Ltd.
- NMHC is planned to be developed in various phases, wherein Phase 1A will have an NMHC museum with six galleries, which also include an Indian Navy & Coast Guard gallery envisaged to be one of the largest in the country.
- **Phase 2 will have coastal states'** pavilions, hospitality zone, recreation of real-time

Lothal City, Maritime Institute and hostel and four theme-based parks.

• Around 22,000 jobs are expected to be created in the development of the NMHC project, with 15,000 direct employment and 7,000 indirect employment.

Historical significance of Lothal

- **Lothal, a name that combines the Gujarati words "**Loth" and "thal," meaning "the mound of the dead," is rich in historical importance. This ancient city, dating back to 2400 BCE, grew into a bustling trading port within the Indus Valley Civilisation.
- The archaeological excavations, carried out by the Archaeological Survey of India (ASI) from February 13, 1955, to May 19, 1960, aimed to uncover the remnants of this once-bustling metropolis.
- Archaeologists believe **Lothal was strategically placed along a major river system** that formed part of the old trade route linking Sindh to Saurashtra in Gujarat. The excavations at this site have unearthed an impressive array of artifacts, making it one of the richest archaeological finds in modern India.
- As a key player in the Indus Valley Civilisation**, Lothal showcased features that highlighted its role as a maritime hub**. Among the most significant discoveries is the world's oldest known artificial dock, connected to an ancient course of the Sabarmati River.

• The site also revealed an acropolis, a lower town, a bead factory, warehouses, and a well-designed drainage system, all of which underscore **Lothal's status as a vital trading city**.

Important Sites of IVC

- **Harappa in present Pakistan:** Granaries with big platforms, Stone symbol of lingam and yoni, Mother goddess figure, Wheat and barley in wooden mortar, Dice, Copper scale and Mirror.
- **Dholavira in Gujarat:** Giant water reservoir, Unique water harnessing system,

Stadium, Dams and embankments, Inscription comprising 10 large sized signs like an advertisement board.

- **Ropar in Punjab**: Dog buried with human oval pit burials
- **Mohenjo–daro in present Pakistan:** Bronze dancing girl, the sculpture of a bearded priest, the great bath, the great granary.
- **Balathal and Kalibangan in Rajasthan:** Bangle factory, toy carts, bones of camel, decorated bricks, citadel and lower town.
- **Banawali in Haryana:** Toy plough, barley grains, oval-shaped settlement, the only city with radial streets.

Abhidhamma Divas and recognition of Pali as classical language

- The International Abhidhamma Divas celebration organized by the Government of India and International Buddhist Confederation witnessed the participation of academicians and monks from 14 countries and a significant number of young experts on Buddha Dhamma from various Universities across India.
- Abhidhamma Divas commemorates the descent of Lord Buddha from the celestial realm after teaching Abhidhamma.
- The recent recognition of **Pali as a classical language** enhances the significance of this year's Abhidhamma Divas celebrations as Lord Buddha's teachings on Abhidhamma are originally available in Pali language.
- Pali language which was spoken by Lord Buddha is no longer in common usage. Underlining that language is not just a medium of communicating but the soul of culture and tradition
- Listing down the development projects of the places related to Lord Buddha in India and Nepal as a Buddha circuit, India International Centre for Buddhist Culture and Heritage was being built in Lumbini, Dr. Baba Saheb Ambedkar Chair for Buddhist Studies in the Buddhist University in Lumbini was established along with ongoing development projects in many places like Bodh Gaya, Shravasti, Kapilvastu, Sanchi, Satna and Rewa.

Copper plates from Vijayanagara Kingdom

Copper plate inscriptions from the **16th Century CE,** bearing the **Vijayanagara Kingdom's seal**, were recently discovered at the **Sri Singeeswarar temple** in **Mappedu village**, Tiruvallur district.

Details of the Inscription

- **Era**: The inscriptions date back to the **16th Century CE**, specifically to the year **1513** during the reign of **Krishnadevaraya** of the Vijayanagara Empire.
- **Script and Language**: The inscriptions are written in **Sanskrit** using the **Nandinagari** script.
- Nandinagar is a **Brahmic script** derived from the **Nāgarī script** that was used between the **11th and 19th centuries AD**
- **For producing manuscripts** and **inscriptions** in **Sanskrit** in **south Maharashtra, Karnataka and Andhra Pradesh.**
- **Village Donation**: The inscription records the donation of the village **Vasalabattaka**, renamed **Krishnarayapura**, by King Krishnadevaraya.
- **Beneficiaries**: The village was gifted to several **Brahmins**.
- **Boundaries**: It details the boundaries of the donated village, which was under the control of the **Raja of Chandragiri** (modern-day Tirupati district, Andhra Pradesh).

Sri Singeeswarar temple at Mappedu

- **Deity:** Singeeswarar Temple is dedicated to **Lord Shiva.**
- **Construction:** The temple was built in 976 A.D. by **Aditya Karikalan Chola II**, the elder brother of Rajaraja Chola.

Krishnadevaraya

- **Reign:** Krishnadevaraya belonged to the **Tuluva Dynasty** and ruled the

Vijayanagara Empire from 1509-1529 AD.

- **Contributions:** He is credited with constructing **fine temples** and **adding gopurams** (gateway towers) to several significant South Indian temples.
- He founded **Nagalapuram**, near Vijayanagar, in honour of his mother.
- He **composed** a Telugu **work on statecraft** known as **Amuktamalyada.**

Vijayanagara Empire

- **Foundation:** The Vijayanagara Empire was founded in **1336 AD** by **Harihara** and **Bukka** of the **Sangama Dynasty.**
- **Capital: Hampi.**
- It was declared a **UNESCO World Heritage Site** in **1986.**
- **Geographical Extent:** The empire stretched from the **river Krishna in the north** to the **extreme south of the Indian peninsula.**
- **Dynasties of Vijayanagara:** The Vijayanagara Empire was ruled by four major dynasties: **Sangama Dynasty, Saluva Dynasty, Tuluva Dynasty and Aravidu Dynasty**

Visa-Free Kartarpur Corridor

- In a rare move of cooperation, India and Pakistan have agreed to extend the **visa-free Kartarpur Corridor** for another five years.

Details about Gurdwara Darbar Sahib Kartarpur

- Gurdwara Darbar Sahib Kartarpur, often called just Kartarpur Sahib, is one of the holiest shrines for Sikhs.
- That is because Sikh Guru, Guru Nanak Dev (the founder of Sikhism) preached there during the last eighteen years of his life.
- In Kartarpur Sahib, Guru Nanak passed away in 1539.
- After **Partition of India in 1947**, Kartarpur Sahib fell on the Pakistan side of the International Border. It is located in Shakargarh Tehsil, Narowal District, in

Pakistan"s Punjab Province.

- With India being the home for more than 95 per cent of all Sikhs globally, pilgrims from all over India always demanded access to go to Kartarpur Sahib.
- The Kartarpur Corridor was opened in 2019.
- The Corridor facilitates Indian Sikhs" access to the **Gurdwara Darbar Sahib** in Pakistan.
- The corridor allows pilgrims to make the journey without a visa, crossing from India to Pakistan in a symbolic act of religious freedom and cooperation.

Fact Box: Guru Nanak (1469–1539 CE)

- **Guru Nanak** was born in a village called Talwandi ((modern times Nankana Sahib in Pakistan).
- He was the **founder of Sikhism** and the **first of the ten Sikh Gurus.**
- When he was 30 years old, Guru Nanak disappeared for three days during a river bath and many people thought that he had drowned.
- Upon returning, Guru Nanak declared that "There is no Hindu, there is no Muslim" and that humankind should be unified, not divided, by religious labels.
- This, in fact, marked the beginning of his life as a spiritual leader, solemnly affirming the unity of God and, equally so, the brotherhood of man.
- **Large-scale travels (Udasis):** He traveled across India, Sri Lanka, Tibet, Afghanistan, and the Arabian Peninsula.
- He wrote many hymns, which **Guru Arjan Dev** compiled in the **Adi Granth.**
- **Ten Sikh Gurus:** Guru Nanak, Guru Angad, Guru Amar, Guru Ram Das, Guru Arjan, Guru Hargobind, Guru Har Rai, Guru Har Krishan, Guru Teg Bahadur, and Guru Gobind Singh.
- Sikh scripture, called the **Guru Granth Sahib**, is referred to as the **Final Guru**.

The concept of Sikhism includes:

- Universal acceptance of all humanity
- Belief in one God
- The name of God is Truth, "Sat Nam"
- Equality of all persons irrespective of their caste, colour, gender, nationality and religion
- Equality of the sexes is emphasised.

NATIONAL ONE HEALTH MISSION (NOHM)

- The UN General Assembly recognised anti-microbial resistance (AMR) as an urgent "global health threat and developmental challenge". This has brought the attention back on National One Health Mission.
- Antimicrobial is an all-encompassing term that includes antibiotics, antivirals, antifungals and antiparasitics administered to humans, animals and plants. They have been misused and overused not just to treat diseases but also as "growth promoters" in industrial-scale food production. In 2000, the WHO recommended rapidly phasing out antibiotic growth promoters from the agriculture and animal sectors.

Concept of One Health:

- One Health is a collaborative, multi-sectoral, and transdisciplinary approach that recognizes the interconnectedness of the health of humans, animals, and the environment.
- It aims to prevent and control zoonotic diseases (diseases transmitted between animals and humans) and other public health threats by working at the intersection of these three domains.

National One Health Mission

- The National One Health Mission is a comprehensive initiative in India aimed at integrating human, animal, and environmental health sectors to address health challenges holistically.

Vision and Goals

- Vision: To build an integrated disease control and pandemic preparedness system by bringing together human, animal, and environmental sectors for better health outcomes, improved productivity, and conservation of biodiversity.
- Goals: The mission aims to enhance pandemic preparedness, integrated disease control, and early warning systems for both endemic and emerging epidemic threats.

Key pillars of the NOHM are:

- Technology enabled integrated surveillance across sectors.
- National network of Biosafety Level 3 (BSL-3) laboratories (for testing high-risk or unknown pathogens).
- Collaborative and integrated R&D for medical countermeasures including vaccines, diagnostics, and therapeutics for human-animal-wildlife-livestock health.
- Data integration across sectors.
- Training and capacity building in all spheres related to One Health.

Governance Structure

- Executive Committee: Chaired by the Hon'ble Minister of Health and Family Welfare, with the Principal Scientific Adviser as the vice-chair.
- Scientific Steering Committee: Chaired by the Principal Scientific Adviser, providing overall scientific direction and oversight.

Raigad Fort

- The fort of Raigad is **part of the 12 forts nominated for UNESCO World Heritage** under the title "Maratha Military Landscapes of India".
- Among the 12 nominated forts, Raigad is the classic example of Maratha architecture and best representation of the capital fort on a hill.
- India has officially **nominated the Maratha military landscape for the inclusion in the UNESCO World Heritage Sites List for the year 2024-25.**
- These forts were developed between the 17th and 19th century.
- These forts were strategically built in diverse geographical regions including Sahyadri mountain ranges, Konkan Coast, Deccan Plateau and Eastern Ghats.

List of Nominated Forts

1. Salher
2. Shivneri
3. Lohagad
4. Khanderi
5. Raigad
6. Rajgad
7. Pratapgad
8. Suvarnadurg
9. Panhala
10. Vijaydurg
11. Sindhudurg
12. Gingee (in Tamil Nadu)

DURGRAJ RAIGAD

- Towering above the valleys of Maharashtra, Raigad Fort carries the echoes of Chhatrapati Shivaji Maharaj's reign. Once the capital of his flourishing Maratha

Empire, this hilltop stronghold carries with it the stories of bravery, innovation, and heroism.

- Each stone of Raigad echoes the remarkable courage and visionary tactics of Shivaji Maharaj, whose leadership transformed this fort into a symbol of strength. Today, it continues to inspire, reminding generations of the extraordinary deeds that shaped the history of an empire.
- Raigad, surrounded by valleys **shaped by the Kal and Gandhari rivers,** stands as an isolated massif without connections to neighbouring hills. Its impregnable nature, attributed to physiographic features like steep cliffs and 1500-foot escarpments, is underscored by innovative military defence tactics.
- Grant Duff, a British historian of the Maratha period has drawn parallels between **Raigad and the Rock of Gibraltar**. He has gone to the extent of labelling Raigad as the Gibraltar of the east.
- In 1653 CE, Raigad (then known as Rairi) was captured by the Maratha forces from the Mores''. In order to make the fort worthy of being a capital, Shivaji Maharaj assigned the work of reconstruction of the fort **to Hiroji Indulkar.**
- Subsquently, on 6th June, 1674 CE a grand coronation ceremony of Shivaji Maharaj was held on Raigad post, during which he attained the title of "Chhatrapati". The fort served as the second capital of Chhatrapati Shivaji Maharaj and played an important role in the administration and expansion of the Maratha Kingdom
- Raigad Fort is remarkable for magnificently designed gates, fortification walls and imposing monuments. It is quite unfortunate that except Shivaji Maharaj''s Samadhi, Naqqar Khana, Sirkai Devi Temple, Jagadishwar Temple – a shrine dedicated to Lord Siva - most of the structures located within the fort, including the Hall of Public Audience (Rajsadar), Royal Complex, Queens'' palace (Ranivasa), Bazarpeth, Manore (pleasure pavilions), Wadeshwar Temple, Khublada Burj, Massid Morcha, Nanne Darwaza are in a ***bad state of preservation.***

UNESCO World Heritage Site

- World Heritage sites are **the areas with legal protection by an International Convention** administered under UNESCO for their cultural, historical, or scientific significance
- As per the '**Convention concerning the Protection of the World Cultural and Natural Heritage' of 1972,** UNESCO aims to encourage the identification, protection and prevention of cultural and natural sites around the world. **India ratified the Convention in 1977**
- A World Heritage Site can be either cultural or natural areas/objects included in the UNESCO's World Heritage List for having "outstanding universal value."

How sites are included in the list?

Step 1: A country needs to list its significant cultural and natural sites into a document known as a tentative list.

Step 2: The sites selected from the tentative list move into the nomination file, which is then evaluated by the International Council on Monuments and Sites and the World Conservation Union. A site that was not first included in the tentative list cannot be nominated.

Step 3: The two bodies then make their recommendations to the World Heritage Committee, which consists of diplomatic representatives from 21 countries. The committee meets each year to decide whether a nominated site can be included in the World Heritage Site list, the committee makes the final decision.

Currently, **India has 43 World Heritage sites**, including 35 cultural sites, 7 natural site and one mixed site.

A site **can lose its status when the World Heritage Committee found** that it is not properly maintained or protected. It is first placed in the list of World Heritage in Danger

as the committee attempts to find a remedy involving the local authorities. If any remedies fail, the status is removed

Discovery of Two New Cities in Uzbekistan on the Silk Route

- Archaeologists have discovered the remains of **two medieval cities**, Tugunbulak and Tashbulak, in the mountains of eastern Uzbekistan on the Silk Route.
- Traditionally, the Silk Route was related to plains and river valleys, believed to be the most reachable paths for trade.
- However, these new towns in extended parts of Uzbekistan endorse that buyers also traversed more mountainous areas.
- Discovery of Two New Cities in Uzbekistan at the Silk Route

What is the Silk Route?

- The Silk Route, additionally known as the Silk Road, changed into an ancient network of trade routes that connected the East (especially China) to the West (Europe and the Mediterranean).
- Spanning over 6,000 kilometers, the course facilitated the trade of goods, specifically silk, together with spices, precious metals, ceramics, and different treasured items.
- It played a crucial function in the cultural, monetary, and political exchange among civilizations over centuries.

Sohrai Painting

- The Prime Minister of India presented gifts to the leaders of Russia, Iran, and Uzbekistan during the 2024 BRICS summit in Kazan, Russia.
- **Sohrai Painting:**is an indigenous art of wall painting technique, mainly **practiced in the Hazaribagh district, Jharkhand.**
- It is related to the Sohrai festival, which is celebrated after Diwali.

- The root of this art form goes to the Paleolithic period (7000 and 400 BC).
- The art form derived its name from the Mundari verb "**Soroi**", which means "to whip with a stick".
- It is a **matriarchal form of art; which is passed from mother to daughter.**
- The main theme includes; animals, birds, and nature, which highlights the indigenous tribal communities'' relation with wildlife.

Painting Process

- The process starts with the **coating of the wall surface with a mixture of soil and manure, which is followed by a layer of white clay.**
- Natural colors, brushes created from leaves, rice straw, or even fingers are used to draw the pattern.
- The patterns are designed on the partially dry clay using brushes created from leaves, rice straw, sticks, also drawn by fingers.
- In the painting, the **red lines signifies ancestors or fertility, followed by a black line representing Shiva, and finally by white lines representing food.**

Warli Painting

- The Prime Minister of India gifted Warli Painting to the President of Uzbekistan.
- It is an art form from the Warli tribe, mainly **practiced in the North Sahyadri Range of Maharashtra**. Its origin dates back to around the 10th century CE.
- It uses shapes in the painting as a symbolic sign
- **Circles** to represent the sun and moon.
- **Triangles to s**ymbolize mountains and conical trees.
- **Squares to i**ndicate human-made spaces or sacred enclosures.
- **The central element is called "chauk" or "chaukat"** featuring the mother goddess, represents unity and family.
- It depicts scenes of hunting, farming, and festivals. **Tarpa Dance around a tarpa player, symbolizing the cycle of life.**

Materials Used

- Painted on the walls of clay huts made from branches, earth, and red brick, creating a natural ochre background.
- **White pigment made from rice flour mixed with water and gum.**
- A bamboo stick, chewed at one end, used as a paintbrush.
- Since the 1970s, artists like Jivya Soma Mashe and Balu Mashe popularized Warli painting on paper and canvas.

Konark wheel replicas installed at Rashtrapati Bhavan

- Four sandstone replicas of the Konark wheel have been installed at the Rashtrapati Bhavan Cultural Centre and the Amrit Udyan.
- Installation of the Konark wheel replicas aims to showcase and promote the country's rich heritage to visitors.
- This initiative is part of several steps being taken to introduce traditional cultural and historical elements in the Rashtrapati Bhavan.

Key facts about Konark Sun Temple:

- The Konark Sun Temple, a UNESCO World Heritage Site, is the culmination of Odisha temple architecture. It stands as a magnificent testament to Kalinga architecture, blending artistic brilliance with a divine narrative.
- Built by King Narasimhadeva in the 13th century, the entire temple was designed in the shape of a colossal chariot with seven horses and 12 pairs of wheels, carrying the Sun god across the heavens.
- On the north and south sides are 24 carved wheels, each about 10 feet in diameter, as well as symbolic motifs referring to the cycle of the seasons and the months.
- Its scale, refinement and conception represent the strength and stability of the Ganga Empire as well as the value systems of the historic milieu.

- Its aesthetic and visually overwhelming sculptural narratives are today an invaluable window into the religious, political, social and secular life of the people of that period.
- **Konark is also known as Konaditya**. The name Konark is derived from the words "kona" meaning corner and "arka" meaning the Sun. Konark is also known as **Arkakshetra**.
- The temple was used as a navigational point by European sailors. They referred to it as the 'Black Pagoda' due to its dark colour.

FACTS FOR PRELIMS

Bhagat Singh's Birth Anniversary

September 28 marks the **birth anniversary of Bhagat Singh.**

Birth and Early Life

- **Born:** September 28, 1907, in Banga, Punjab (now in Pakistan).
- **Family Background:** Came from a Sikh family actively involved in the freedom struggle;
    - His father, Kishan Singh, and uncle, Ajit Singh, were notable freedom fighters.
- **Jallianwala Bagh Massacre:** Witnessed the massacre at age 12, which fueled his vow to free India from British rule.
- **Education and Revolutionary Organisations:**
    - **Education:** Bhagat Singh joined the National College, Lahore, founded by Lala Lajpat Rai, where he was exposed to revolutionary ideas and focused on the Swadeshi Movement.
    - **Hindustan Republican Association:** Joined in 1924, which later became the **Hindustan Socialist Republican Association (HSRA)** in 1928.
        - This association was founded in **1928**

        - **Founders:** Chandra Shekhar Azad, Sukhdev Thapar, Sachindra Nath Sanyal
    - **Naujawan Bharat Sabha:** Founded **in 1926 by bhagat Singh** to mobilise youth for the freedom struggle**.**
    - **Worker and peasant party:** In 1926, Bhagar singh connected with Sohan Singh Josh, with the help of whom, he established **worker and peasant party.**
        - **This party launched a monthly magazine named " Kirti" in Punjab which focused on workers and peasant's issues.**
- **Martyrs' Day(Execution Date): T**he date of his execution, March 23, is observed as **Martyrs' Day** to honour him and his fellow revolutionaries, Sukhdev and Rajguru.

Major Actions

- **Assassination of J.P. Saunders:** Involved in the **1928 assassination** of police officer J.P. Saunders as revenge for **Lala Lajpat Rai's deat**h due to police brutality.
- **Central Legislative Assembly Bombing:** Threw a bomb in the **assembly on April 18, 1929**, with B.K. Dutt to protest against oppressive British laws.

Arrest and Execution

- **Arrested:** Captured in 1929 for the bomb incident and charged with murder in the Lahore Conspiracy Case.
    - He was first arrested on charges of **association with the Kakori Case**
        - Kakori case was an armed robbery which took place in Uttar Pradesh.
        - Its main aim was to get funds from the British administration for the Hindustan Republican Association (HRA) through force.
- **Execution:** Convicted and executed on March 23, 1931, along with fellow

revolutionaries Sukhdev and Rajguru.

- **H**e is affectionately called S**hahid-e-Azam,** meaning the greatest martyr.

Literary Contributions

- **Why I Am an Atheist:** An Autobiographical Discourse
- **The Jail Notebook** and Other Writings.

Ideologies

- **Beliefs:** Advocated for Marxist and socialist ideologies, focusing on rationalism, equality, and justice.
- **Critique of Religion:** Viewed organised religion as a form of mental and physical slavery.

Prime Minister Shri Narendra Modi pays tributes to freedom fighter Shyamji Krishna Varma on his birth anniversary.

- The Prime Minister Shri Narendra Modi remembered freedom fighter Shyamji Krishna Varma on his 95th birth anniversary today.
- Shyamji Krishna Varma, a Gujarat-born freedom fighter played pivotal role in India's struggle for Independence. Besides being a noted scholar in Sanskrit and other Indian languages, he founded the India House in London, which served as a leading centre of Indian nationalism outside India.
- Shyamji Krishna Varma passed away in 1930. Modi highlighted Shyamji Krishna Varma's unwavering spirit and dedication to the nation, emphasising that his legacy will continue to inspire generations. He said that Shyamji Krishna Varma's revolutionary actions infused remarkable strength into the resolve for the country's independence.
- In 1905 he founded the India House and **The Indian Sociologist**, which rapidly developed as an organised meeting point for radical nationalists among Indian

students in Britain at the time and one of the most prominent centres for revolutionary Indian nationalism outside India.

- Krishna Varma moved to Paris in 1907, avoiding prosecution. The monthly Indian Sociologist became an outlet for nationalist ideas and through the Indian Home Rule Society, he criticised the British rule in India.
- Varma, who became the **first President of Bombay Arya Samaj,** was an admirer of Dayanand Saraswati, and he inspired Veer Savarkar who was a member of **India House in London**. Verma also served as the **Divan** of a number of states in India.

Periyar Memorial in Kerala's Alappuzha

- The Tamil Nadu government is set to build a memorial for social reformer **Periyar E.V. Ramasamy in Arookutty, Kerala**, where he was imprisoned during the Vaikom Satyagraha.
- The memorial will honour Periyar's contribution to the social reform movement that fought against the rigid caste system

Vaikom Protest

- **Non-Violent Protest in Vaikom**: Vaikom, a temple town located in the princely state of Travancore, witnessed the commencement of a non-violent protest on March 30, 1924.
- This marked the inception of the temple entry movements, which would later resonate across the nation.
- **Emphasis on Social Reforms:** The satyagraha placed emphasis on social reform amidst the rising nationalist movement, introducing Gandhian protest methods to Travancore

Legacy of Vaikom Satyagraha

- **Endurance Amid Adversity**: The Vaikom satyagraha stood as a remarkable

movement, enduring for more than 600 days despite hostile social pressures, police interventions, and the devastating flood of 1924.

- **Unity Across Caste boundaries:** It also witnessed unprecedented unity across caste boundaries, a pivotal factor in its sustained mobilisation.
- **Reason for Success:** The Temple Entry Proclamation along with the demonstration of Gandhian methods of civil disobedience as effective tools of protest, was the great success of the Vaikom satyagraha.
- Thus, despite its shortcomings, the Vaikom satyagraha brought **untouchability, unapproachability, and unseeability** to the forefront of political issues in India.

Periyar EV Ramasamy

- He was an **Indian social activist** and politician who started the Self-Respect Movement and Dravidar Kazhagam (DK).
- The title **"Periyar,"** means **"Respected Elder".**
- Since 2021, the Indian state of Tamil Nadu has celebrated his birth anniversary as **'Social Justice Day'.**
- **Political Beginnings**: Periyar began his political career as a Congress worker in Erode in 1919.
- **Vaikom Satyagraha (1924)**: He actively participated in the Vaikom Satyagraha with his wife and was arrested twice, earning him the title **"Vaikom Veerar" (Hero of Vaikom).**
- **Resignation from Congress:** He resigned from the Congress in 1925 when he felt that the party was only serving the interests of Brahmins.
- **Association with Justice Party:** He associated himself with the Justice Party and the Self Respect Movement, which opposed the dominance of Brahmins in social life, especially the bureaucracy.

Social and Political Reforms

- **Redefined Tamil Identity:** He redefined Tamil identity as egalitarian and

untainted by the caste system, contrasting it with the Indian identity promoted by the Congress.

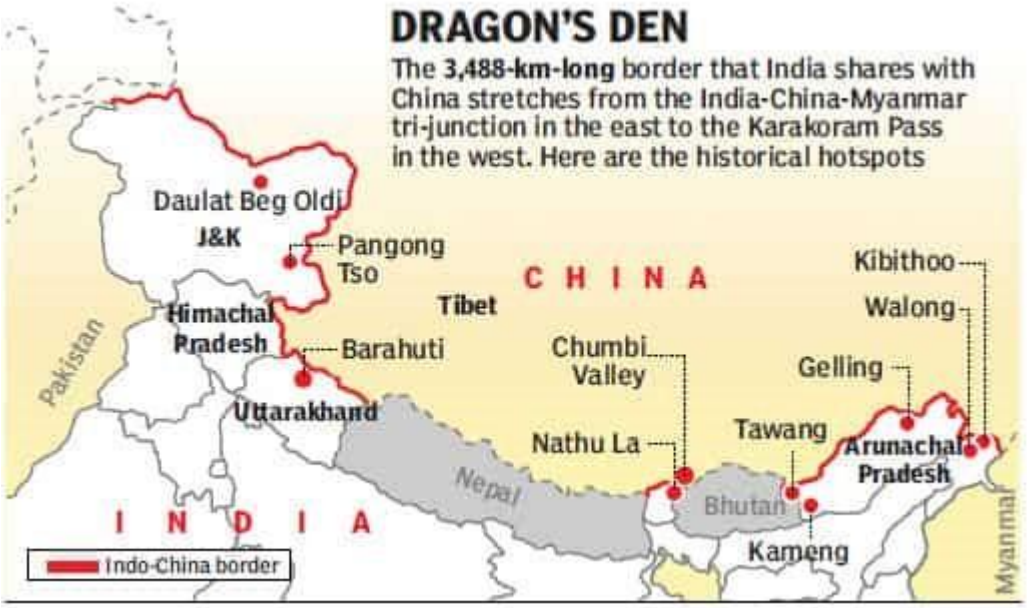
- He argued that caste was introduced to the Tamil region by Aryan Brahmins from Northern India.
- He is known as the **'Father of the Dravidian movement'**
- **Self Respect Movement:** The Self-Respect Movement was a significant social reform movement that originated in Tamil Nadu, South India, in 1925.
- The movement aimed to promote social equality and eradicate the caste system, which was deeply entrenched in Indian society.
- **Opposition to Hindi Imposition (1930s):** Periyar opposed the imposition of Hindi by the Congress Ministry, paralleling it with the Aryanisation process and viewing it as an attack on Tamil identity and self-respect.
- Under his leadership, the Dravidian Movement evolved into a struggle against caste and an assertion of Tamil national identity
- **Dravidar Kazhagam:** In 1939, Ramasamy became the head of the Justice Party, and in 1944, he changed its name to Dravidar Kazhagam, advocating for an independent Dravida Nadu for Tamil, Malayalam, Telugu, and Kannada speakers.
- He based his idea of Dravida national identity on the Dravidian linguistic family.
- The party later split with one group led by C. N. Annadurai formed the Dravida Munnetra Kazhagam (DMK) in 1949.
- **Promotion of Rationalism:** Periyar advocated for rational decision-making in life. He championed women's independence, arguing they should not be confined to childbearing but should have equal employment opportunities.
- **Challenge to Caste System:** Periyar urged people to drop caste suffixes from their names and avoid mentioning caste. He also introduced inter-dining practices with food prepared by Dalits at public conferences in the 1930s.

Battle of Walong

- **Location:** Walong, Arunachal Pradesh, near the **McMahon Line**, was a key

battleground in the 1962 Sino-Indian War.

- **Indian Forces:** The 11th Infantry Brigade, comprising the **4th Sikh, 6th Kumaon, and 3rd Battalion of 3 Gorkha Rifles,** defended Walong with about 800 men.
- **Chinese Offensive:** On October 21, 1962, over 4,000 Chinese troops attacked. Despite limited resources, Indian forces resisted for **27 days**.
- **Tactics:** Indian troops used the terrain to set up ambushes and defensive positions, slowing the Chinese advance.
- **Outcome:** Indian forces withdrew on November 16, 1962, after inflicting heavy casualties and delaying the Chinese significantly.
- **Significance:** The Indian defense forced China to divert additional troops from Tawang, demonstrating India's bravery and resilience in its only counterattack of the war.



Musaned Platform

- **Purpose:** Musaned is a digital platform created by Saudi Arabia to ensure wage protection and improve working conditions for foreign domestic workers.

- **Coverage:** It benefits workers from 10 African countries (e.g., Sudan, Ethiopia, Kenya) and 9 Asian countries (e.g., India, Bangladesh, Pakistan).

Features:

  - Enables workers to **check employment contracts**.
  - Tracks **financial transactions** between employers and workers.
  - Can be linked to **contract insurance** and **health benefits**.
- **Objective:** To safeguard workers' rights, minimize **illegal immigration**, and meet **Vision 2030** goals of providing a stable working environment.
- **Human rights:** The platform promotes **human rights** by ensuring employers fulfill their obligations.

India pledges $250 million for traditional medicine centre; part of $300 million contribution to WHO for 2025-2028

India's contribution will also be used for a new regional office for WHO, digital health and thematic funding.

- India is the sixth largest global contributor to WHO, which faces a global funding gap of $7.1 billion.
- South-East Asia Region countries, partners pledge $345+ million at WHO investment round

World Health Organisation (WHO):

- **Specialised agency of the United Nations, r**esponsible for **International public health**
- **Founded in**: 1948
- **Headquartered:** Geneva, Switzerland
- **Membership**: 194 member states.
- **World Health Assembly (WHA): Highest decision-making body of WHO**
  - Comprises **representatives from all member States.**
  - **WHA Appoints: Director-general every five years** and **votes on matters**

of policy and **finance** of WHO, including the proposed budget.

- **Secretariat**: Responsible for carrying out the policies and programs approved by the WHA.
- **Regional Offices**: Six regional offices
    - Africa, the Americas, Southeast Asia, Europe, **Eastern Mediterranean**, and **Western Pacific**.
- **Funding mechanism**: Two Main Sources:
    - **Assessed contributions**: Dues **countries pay** in order to **be a member of the Organization**.
    - **Voluntary contributions**: From **Member States** (in addition to their assessed contribution) or from **other partners like United Nations organisations, intergovernmental organisations, philanthropic foundations, the private sector** etc.