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IAS BABA

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Baba's Monthly
CURRENT AFFAIRS MAGAZINE

Contents

PRELIMS

POLITY & GOVERNANCE

ASSAM ACCORD

Context:

- The Supreme Court has asked the Centre if a new order allowing persecuted minorities entry to India violates the Assam Accord's 1971 deadline.

About Assam Accord:

- **Signatories:** The Assam Accord was signed on 15th August, 1985, amongst the Union of India, the Govt. of Assam, the All Assam Students' Union (AASU), and the All Assam Gana Sangram Parishad.
- **Objective:** The aim of the accord was to detect and deport all immigrants in the state who had come to the territory post-24 March 1971.
- **Achievement:** The signing of the Accord brought an end to the 6-year-long agitation, the Assam Movement (1979-1985), which was aimed at dispelling foreigners from the state of Assam.
- **Cut-off date:** It determined 1st January 1966 as the cut-off date for the purpose of detection and deletion of foreigners. It allowed for citizenship for all persons coming to Assam from "Specified Territory" before the cut-off date.
- **Application of Foreigners Act, 1946:** It further specifies that all persons who came to Assam prior to 1st January 1966 (inclusive) and up to 24th March 1971 (midnight) shall be detected in accordance with the provisions of the Foreigners Act, 1946, and the Foreigners (Tribunals) Order, 1939.

- **Deletion of names from electoral rolls:** The names of foreigners so detected will be deleted from the Electoral Rolls in force. Such persons will be required to register themselves before the Registration Officers of the respective districts in accordance with the provisions of the Registration of Foreigners Act, 1939, and the Registration of Foreigners Rules, 1939.
- **Provision regarding voting rights:** The Assam Accord does not call for their deportation, but they were to get voting rights only after expiry of 10 years from the date of their detection or declaration as foreigner. Foreigners who came to Assam on or after 25th March 1971 shall continue to be detected and expelled in accordance with law.
- **Clause 6:** It promises to provide constitutional, legislative, and administrative safeguards to protect, preserve, and promote the cultural, social, and linguistic identity, and heritage of the Assamese people.
- **Significance:** These safeguards aim to address concerns regarding the state's demographic and cultural integrity amidst the influx of migrants.

ESSENTIAL SERVICES MAINTENANCE ACT (ESMA)

Context:

- Recently, government doctors in Haryana extended their strike indefinitely despite the state invoking ESMA to ban such protests for six months.

About Essential Services Maintenance Act (ESMA):

- **Enactment:** It is an act of the Indian Parliament enacted in 1968 to assure the supply of certain services that, if impeded, would harm people's daily lives.
- **Objective:** It is enforced to prohibit striking employees from refusing to work in certain essential services. Employees cannot cite bandhs or a curfew as an excuse not to report to work.
- **Constitutional Basis:** ESMA is a law made by the Parliament under List No. 33 of the Concurrent List in the Seventh Schedule of the Constitution. This allows both the central government and state governments to enact their own versions of the Act.

- **Implementation:** The Act's execution largely depends on the discretion of the government (central or state). Before enforcing ESMA, the government must alert the employees through media or newspaper notifications.
- **Duration:** An order under ESMA is typically in force for six months, but the government can extend it, if necessary, in the public interest.
- **Customised ESMA of each state:** Each state has its own ESMA, with provisions that differ slightly from the federal statute. As a result, if the nature of the strike disturbs only one or more states, the states can initiate it. The Act also allows states to choose the essential services on which to enforce ESMA.
- **Central government imposing ESMA:** In a nationwide interruption, particularly involving railways, the central government may activate the ESMA.
- **Applicability:** The government can declare a range of services as "essential" such as:
  - Transportation (railways, airways, public road transport)
  - Public health (hospitals, sanitation, water supply)
  - Energy (electricity generation and distribution, petroleum, coal)
  - Communication (postal, telegraph, telephone services)
  - Defence-related establishments and production
  - Banking services
- **Penal actions that can be taken to impose it:**
  - Persons who commence the strike as well as those who instigate it are liable to disciplinary action, which may include dismissal.
  - As the strike becomes illegal after ESMA is invoked, legal action can also be taken against these employees.
  - Any police officer is empowered to arrest the striking person without a warrant.
  - Persons participating in or instigating the strike are punishable with imprisonment, which may extend to one year, or with fine, or with both.

COMPETITION COMMISSION OF INDIA (CCI)

Context:

- Recently, CCI took cognizance of information filed against IndiGo in the context of the recent flight disruptions witnessed in the aviation sector, across various routes.

About Competition Commission of India (CCI):

- **Nature:** The Competition Commission of India (CCI), constituted under the Competition Act, 2002 serves as India's principal competition regulator.

- **Establishment:** It was officially formed on October 14, 2003, and it is operational since May 2009.
- **Nodal ministry:** It functions as a statutory body under the Ministry of Corporate Affairs.
- **Headquarters:** Its headquarters is located in New Delhi.
- **Objective:** The Competition Commission of India (CCI) was established in response to the economic liberalization of 1991, with a mandate to enforce competition laws, foster a competitive market, and prevent anti-competitive practices.
- **Significance:** Replacing the outdated MRTP Act of 1969, the CCI aligns India's competition laws with global standards, following recommendations from the Raghavan Committee.

- **Major focus area:** It works for preventing anti-competitive agreements, curbing abuse of dominance, promoting healthy competition, safeguarding consumer interests, and ensuring freedom of trade.
- **Composition:** It comprises a Chairperson and six members appointed by the Central Government, ensuring diverse expertise essential for regulating market competition.
- **Term:** All members are appointed by the Central Government for a five-year term.
- **Eligibility:** Members must have at least 15 years of professional experience in areas like law, economics, or international trade.
- **Recent Amendments:** The Competition (Amendment) Act, 2023 introduced critical changes to address modern digital markets:
    - Deal Value Threshold: Mandatory CCI approval for mergers with a transaction value exceeding ₹2,000 crore, specifically targeting "killer acquisitions" in tech.
    - Global Turnover Penalties: Penalties for anti-competitive behavior can now be based on a company's global turnover from all products/services, rather than just relevant domestic turnover.
    - Settlement & Commitment: Allows companies under investigation to offer "settlements" or "commitments" to resolve cases faster without prolonged litigation.
    - Leniency Plus: Encourages companies already disclosing one cartel to reveal another in exchange for additional penalty reductions.

INDIAN PHARMACOPOEIA COMMISSION (IPC)

Context :

- Recently, Union Minister of Health and Family Welfare reviewed the progress of Indian Pharmacopoeia Commission (IPC), underscoring its vital role in pharmacovigilance.

About Indian Pharmacopoeia Commission (IPC):

- **Nodal ministry:** It is an autonomous Institution of the Ministry of Health and Family Welfare, Govt. of India.
- **Objective:** It is created to set standards of drugs in the country. Its basic function is to regularly update the standards of drugs commonly required for treatment of diseases prevailing in this region.

- **Organizational Structure:** The Secretary of the Ministry of Health and Family Welfare is the chairperson of IPC. It has a three-tier structure comprising a General Body, a Governing Body, and a Scientific Body.
- **Pharmacovigilance:** IPC acts as the National Coordination Centre (NCC) for the Pharmacovigilance Programme of India (PvPI), monitoring adverse drug reactions (ADRs).
- **Materiovigilance:** It operates the Materiovigilance Programme of India (MvPI) to track safety issues related to medical devices.

- **Reference Substances:** It provides certified reference substances used as analytical standards for drug testing.
- **Major focus areas:**
  - It promotes rational use of generic medicines by publishing National Formulary of India.
  - It prescribes standards for identity, purity and strength of drugs essentially required from the health care perspective of human beings and animals.
  - It also provides IP Reference Substances (IPRS) which act as a fingerprint for identification of an article under test and its purity as prescribed in IP.
- **Official Publications:**
  - Indian Pharmacopoeia (IP): The official book of standards for drugs in India, having legal status under the Second Schedule of the Drugs and Cosmetics Act, 1940.
  - National Formulary of India (NFI): A guide to promote the rational and safe use of medicines

QUALITY COUNCIL OF INDIA (QCI)

Context:

- Recently, Quality Council of India (QCI) announced a set of next-generation quality reforms on the eve of Sushasan Divas 2025.

About Quality Council of India (QCI):

- **Nature:** It is a non-profit autonomous organisation registered under Societies Registration Act XXI of 1860.
- **Establishment:** It was set up in 1997 jointly by the Government of India and the Indian Industry, represented by the three premier industry associations, i.e., Associated Chambers of Commerce and Industry of India (ASSOCHAM), Confederation of Indian Industry (CII) and Federation of Indian Chambers of Commerce and Industry (FICCI).
- **Nodal ministry:** It is under the administrative control of the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry.
- **Objective:** It has been established to create a mechanism for independent third-party assessment of products, services, and processes.

QCI
Quality Council of India

- **Significance:** It works as the national accreditation body. It also plays a pivotal role at the national level in propagating, adoption, and adherence to quality standards in all important spheres of activities.

- **Composition:** The council comprises 38 members, with equal representation from the government, industries, and other stakeholders.
- **Accreditation services:** It also promotes the adoption of quality standards relating to Quality Management Systems, Food Safety Management Systems, and Product Certification and Inspection Bodies through the accreditation services provided by the National Accreditation Board for Certification Bodies (NABCB).
- **Boards under QCI:**
    - National Accreditation Board for Testing & Calibration Laboratories (NABL)
    - National Accreditation Board for Hospitals & Healthcare Providers (NABH)
    - National Accreditation Board for Education & Training (NABET)
    - National Accreditation Board for Certification Bodies (NABCB)
    - National Board for Quality Promotion (NBQP).

COMMISSION FOR AIR QUALITY MANAGEMENT (CAQM)

Context:

- Recently, CAQM outlined a detailed strategy to curb air pollution in Delhi, projecting an increase in the number of clear "blue-sky" days over the next three to four years.

About Commission for Air Quality Management (CAQM):

- **Nature:** The CAQM is a statutory body established under the Commission for Air Quality Management in National Capital Region (NCR) and Adjoining Areas, Act 2021.
- **Objective:** It aims for betterment in terms of coordination, research, identification, and resolution of problems surrounding the air quality index and for matters connected therewith or incidental thereto.
- **Replacement:** It replaced the Environment Pollution (Prevention and Control) Authority (EPCA), which was a non-statutory body created by the Supreme Court.
- **Focus on Delhi-NCR:** It undertakes action for the prevention and control of Air pollution in Delhi-NCR and coordinate its actions on monitoring of air quality with the government of Delhi and the adjoining states, which includes Punjab, Haryana, Rajasthan, and Uttar Pradesh.

- **Binding orders:** All the directions and orders by the Commission are of binding nature, and any person, officer, or authority shall be bound to comply with the same.
- **Accountability:** The commission is directly accountable to the parliament.
- **Major powers:**
    - Restricting activities influencing air quality.
    - Investigating and conducting research related to environmental pollution impacting air quality, preparing codes and guidelines to prevent and control air pollution,
    - Issuing directions on matters including inspections, or regulations, which will be binding on the concerned person or authority.
- **Composition:** It will be chaired by a government official of the rank of Secretary or Chief Secretary. It will also have five ex officio members who are either Chief Secretaries or Secretaries in charge of the department dealing with environment protection in the States of Delhi, Punjab, Haryana, Rajasthan, and Uttar Pradesh.

NATIONAL CENTRE FOR POLAR AND OCEAN RESEARCH (NCPOR)

Context:

- NCPOR has become the anchor of India's polar and oceanic exploration, said Hon'ble Governor of Goa, while speaking at the Antarctica Day celebrations at Goa.

About National Centre for Polar and Ocean Research (NCPOR):

- **Nature:** It is India's premier R&D institute for polar and ocean sciences, spearheading the Indian Antarctic, Arctic, and Southern Ocean research programs.
- **Establishment:** It was founded on 25 May 1998 as the National Centre for Antarctic and Ocean Research (NCAOR), and it was renamed NCPOR later.
- **Nodal Ministry:** It works under the Ministry of Earth Sciences, Government of India
- **Headquarters:** Its headquarters is located in Vasco da Gama, Goa.
- **Composition:** The governing Body comprises of 13 members and the Chairman (ex-officio) of governing body is Secretary, Ministry of Earth Sciences.
- **Mandate:** It facilitates scientific research activities in Antarctica, Arctic and in Indian Ocean sector of Southern Ocean. It also helps in management of Indian Antarctic Research Bases "Maitri" and "Bharati", and Indian Arctic base "Himadri".
- **Associated with strategic projects:** It also works on strategically vital projects like Mapping of Exclusive Economic Zone (EEZ), Continental shelf surveys, and the Deep Ocean Mission.
- **Data Management and global collaboration:** It conducts climate modelling, and is setting up the first Polar and Ocean Museum. It also participates in international polar science networks, Arctic policy dialogues, and climate monitoring programs.

National Centre for Polar and Ocean Research

INDIAN STATISTICAL INSTITUTE

Context:

- Academics protest against Bill to revamp Indian Statistical Institute, which is considered the gold standard of statistical research in India.

About Indian Statistical Institute:

- **Establishment:** The Indian Statistical Institute (ISI) was founded by Professor P.C. Mahalanobis in Kolkata on 17th December, 1931.
- **Objective:** It aims to advance statistical research, provide academic training, support national planning through data-driven approaches, and apply statistical science across sectors such as agriculture, economics, demography, and public policy.
- **Nodal ministry:** It comes under the Ministry of Statistics and Programme Implementation (MoSPI).
- **Headquarters:** Its headquarters is located in Kolkata, with centres in Delhi, Bengaluru, Chennai, and Tezpur.
- **Regulated by Act of Parliament:** The ISI Act 1959 primarily applies to the ISI, its governing body, employees, and students. The ISA Act 1959 declared the ISI an institution of national importance.

- **Significance:** The Act aimed to recognize the ISI's contributions to national development and provide it with the necessary autonomy and support to carry out its functions effectively.
- **Governing body:** It is governed by a 33-member Council which has elected members, government representatives, UGC nominee, and senior academic leaders. The Director appointed by the Council and ISI has substantial autonomy in academics, appointments, and administration.
- **Journal:** It publishes the renowned journal Sankhyā and offers degree programs in statistics and related sciences.
- **Key highlights of Indian Statistical Institute Bill, 2025:**
    - It replaces the 1959 Act and transforms ISI from a registered society into a statutory body, similar to IITs/IIMs.
    - The President of India becomes the Visitor and the Board of Governance (BoG) will be chaired by a Visitor-nominated chairperson based on Centre's recommendation.
    - It proposes a New Academic Council Structure, which will be led by the Director, comprising division and centre heads. Further, the council will act as an advisory body making academic recommendations to the BoG.
    - The search-cum-selection committee will be constituted by the Union government and it will undertake the task of appointing the Director.

INTERNATIONAL RELATIONS

OPERATION SAGAR BANDHU

Context:

- Prime Minister Narendra Modi held conversation with Sri Lankan President and assured India's continued support under Operation Sagar Bandhu.

About Operation Sagar Bandhu:

- **Nature:** It is India's rapid Humanitarian Assistance and Disaster Relief (HADR) mission launched to support Sri Lanka during the devastating floods triggered by Cyclone Ditwah.
- **Coordination:** It is coordinated by the Ministry of External Affairs, Indian Navy, and Indian Air Force.
- **Objective:** It aims to provide immediate relief and essential supplies to Sri Lanka, ensuring rapid support under India's Neighbourhood First and Vision MAHASAGAR maritime cooperation frameworks.

- **Key features:**
  - It included immediate deployment of INS Vikrant, INS Udaigiri, and IAF C-130J aircraft with relief cargo.
  - The supplies included tents, tarpaulins, blankets, hygiene kits, ready-to-eat meals, etc.
  - It ensured sea–air integrated relief for fast delivery across affected regions.

About Cyclone Ditwah:

- **Nature:** It is a tropical cyclone that brought heavy rains to Sri Lanka and Southern India.
- **Nomenclature:** "Ditwah" is a name given by Yemen, as per the WMO-ESCAP (World Meteorological Organization & UN Economic and Social Commission for Asia-Pacific) cyclone naming list.
- **Significance of name:** The name refers to Detwah Lagoon, an ecologically significant coastal waterbody located in the Socotra Archipelago.
- **Assigning of names to cyclones:** Names of tropical cyclones are assigned sequentially from a pre-approved list contributed by 13 member countries, which includes Bangladesh, India, Iran, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, and Yemen.

BIOLOGICAL WEAPONS CONVENTION (BWC)

Context:

- At the conference on 50 years of Biological Weapons Convention (BWC), Mr. Jaishankar said that Global South should be at centre of preparations to deal with bioweapons.

About Biological Weapons Convention (BWC):

- **Nomenclature:** It is formally known as "The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction".

- **Origin:** It was negotiated in Geneva, Switzerland within the Eighteen Nation Committee on Disarmament (ENDC) and Conference of the Committee on Disarmament (CCD) from 1969 until 1971. It was opened for signature in 1972 and entered into force in 1975.
- **Objective:** It aims to effectively prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons. It supplements the 1925 Geneva Protocol, which had prohibited only the use of biological weapons.

- **Membership:** It has almost universal membership with 188 States Parties (India signed and ratified in 1974) and 4 Signatory States (Egypt, Haiti, Somalia, Syrian Arab Republic).
- **Uniqueness:** It is the first multilateral disarmament treaty which bans an entire category of weapons of mass destruction (WMD).
- **Meeting:** States Parties meet approximately every 5 years to review its operation. States Parties to BWC have strived to ensure that Convention remains relevant and effective, despite the changes in science and technology, politics and security since it entered into force.
- **Measures taken by India to implement Biological Weapons Convention (BWC):**
    - Manufacture, Use, Import, Export and Storage of Hazardous Micro organisms, Genetically/Engineered Organisms or Cells Rules, 1989: It protects the environment, nature and health, in connection with the application of gene technology and micro-organisms.
    - Weapons of Mass Destruction and their Delivery Systems (Prohibition of Unlawful Activities) Act, 2005: It Prohibits unlawful activities (such as manufacturing, transport, or transfer) related to weapons of mass destruction, and their means of delivery.
    - Special Chemicals, Organisms, Materials, Equipment and Technologies (SCOMET): SCOMET list is India's National Export Control List of dual use items, munitions and nuclear related items, including software and technology.

ORGANIZATION FOR SECURITY AND CO-OPERATION IN EUROPE (OSCE)

Context :

- Ukraine wants "real peace, not appeasement" with Russia, its foreign minister recently at the Organization for Security and Cooperation in Europe.

About Organization for Security and Co-operation in Europe (OSCE):

- **Nature:** It is a dynamic organization that is dedicated to promoting peace, stability, and security throughout Europe and Central Asia.
- **Objective:** It works for stability, peace and democracy through political dialogue about shared values and through practical work that makes a lasting difference.
- **Origin:** Its origin dates back to the early 1970s, to the Helsinki Final Act (1975) and the creation of the Conference on Security and Co-operation in Europe (CSCE), which during the Cold War served as an important multilateral forum for dialogue and negotiations between East and West.

- **Renaming:** In 1994, the CSCE was renamed the Organization for Security and Cooperation in Europe (OSCE) to reflect these changes more accurately.
- **Headquarters:** Its headquarters is located in Vienna.
- **Uniqueness:** It is the world's largest regional security organization.
- **Member Countries:** It consists of 57 participating States in North America, Europe and Asia. (India is not a member country).
- **Governance:** There are four decision-making bodies with delineated, distinct mandates namely;
  - Summits: It is the highest decision-making body of the OSCE
  - Ministerial Councils: The OSCE's central decision-making and governing body
  - Permanent Council: It is responsible for the day-to-day business of the Organization
  - Forum for Security Co-operation: It deals with the politico-military dimension of security
- **Leadership:** The OSCE's leadership includes the Chairperson-in-Office, the Secretary General, and the heads of its institutions and field operations.

UNITED NATIONS ENVIRONMENT ASSEMBLY (UNEA)

Context:

- Union Minister Kirti Vardhan Singh departed for Nairobi to represent India at United Nations Environment Assembly (UNEA) session.

About United Nations Environment Assembly (UNEA):

- **Nature:** It is the world's highest-level decision-making body on the environment.
- **Establishment:** UNEA was established in 2012, as an outcome of the UN Conference on Sustainable Development (Rio+20), held in Brazil.
- **Headquarters:** Its headquarters is located at the United Nations Environment Programme (UNEP) headquarters in Nairobi, Kenya.
- **Objective:** It sets the global environmental agenda, provides overarching policy guidance, and defines policy responses to address emerging environmental challenges.
- **Membership:** It has the universal membership of all 193 UN Member States and the full involvement of major groups and stakeholders.
- **Organisational Structure:** It consists of a President and 8 Vice Presidents (forming the UNEA Bureau).
- **Leadership:** The Assembly is headed by a President and a Bureau, who are environment ministers from different countries serving two-year terms.
- **Policy review:** It undertakes policy review, dialogue and the exchange of experiences, sets the strategic guidance on the future direction of the UN Environment Programme (UNEP).
- **Seventh UNEA session (2025) Theme:** Its theme is "Advancing sustainable solutions for a resilient planet."

UNITED NATIONS HUMAN RIGHTS COUNCIL (UNHRC)

Context:

- India's election to the UNHRC reflects the global confidence in democratic institutions, a senior official at the Prime Minister's Office (PMO) said recently.

About United Nations Human Rights Council (UNHRC):

- **Nature:** The Human Rights Council is an inter-governmental body within the United Nations system responsible for strengthening the promotion and protection of human rights around the world.
- **Formation:** The Council was created by the United Nations General Assembly (UNGA) in 2006. It replaced the former United Nations Commission on Human Rights.
- **Headquarters:** Its headquarters is located in Geneva, Switzerland.
- **Significance:** The UNGA takes into account the candidate States' contribution to the promotion and protection of human rights, as well as their voluntary pledges and commitments in this regard.

- **Election:** It is made up of 47 United Nations Member States which are elected by the UN General Assembly (UNGA) through secret ballot.
- **Term:** Members of the Council serve for a period of three years and are not eligible for immediate re-election after serving 2 consecutive terms.
- **Equitable distribution of seats:** The Council's Membership is based on equitable geographical distribution. Seats are distributed as follows:
    - African States: 13 seats
    - Asia-Pacific States: 13 seats
    - Latin American and Caribbean States: 8 seats
    - Western European and other States: 7 seats
    - Eastern European States: 6 seats
- **Working mechanism:**
    - Universal Periodic Review: UPR serves to assess the human rights situations in all United Nations Member States.
    - Advisory Committee: It serves as the Council's "think tank" providing it with expertise and advice on thematic human rights issues.
    - Complaint Procedure: It allows individuals and organizations to bring human rights violations to the attention of the Council.
    - UN Special Procedures: These are made up of special rapporteurs, special representatives, independent experts and working groups that monitor, examine, advise and publicly report on thematic issues or human rights situations in specific countries.

INTERNATIONAL MARITIME ORGANIZATION (IMO)

Context :

- India has been re-elected to the Council of the International Maritime Organization (IMO) in Category B, which includes 10 countries.

About International Maritime Organization (IMO):

- **Nature:** IMO is the global standard-setting authority for the safety, security, and environmental performance of international shipping.
- **Objective:** Its main role is to create a regulatory framework for the shipping industry that is fair and effective, universally adopted, and universally implemented.
- **Headquarters:** Its headquarters is located in London.
- **Membership:** It has 176 Member States and three Associate Members. Once a member state adopts a regulation, it becomes part of that country's domestic law.

- **Funding mechanism:** Funding is sourced through mandatory contributions by member states and also from voluntary donations and commercial revenue.
- **Association with UN:** It is the United Nations' specialised agency responsible for the safety and security of shipping and the prevention of marine pollution by ships.
- **Lacks enforceability of laws:** The IMO formulates regulations on shipping safety, maritime security, and environmental protection but does not enforce them.
- **Promotes SDG 14:** It contributes directly to UN Sustainable Development Goal (SDG) 14, which focuses on the conservation and sustainable use of oceans and marine resources.
- **Deals with legal issues:** The organisation also deals with legal matters such as liability, compensation, and facilitation of maritime traffic.
- **Organisational Structure:** The Assembly is the supreme governing body, comprising all member states. It meets every two years to approve the work programme, budget, and elect members to the Council. The Council acts as the Executive Organ, overseeing IMO's work in between Assembly sessions.
- **Major Committees:** The IMO has five major committees, which are responsible for policy development and regulation formulation, including the Marine Environment Protection Committee (MEPC).

PAX SILICA INITIATIVE

Context :

- The Congress party recently targeted Prime Minister over India's exclusion from the United States-led strategic initiative, Pax Silica.

About Pax Silica Initiative:

- **Nature:** It is a U.S.-led strategic initiative to build a secure, prosperous, and innovation-driven silicon supply chain—from critical minerals and energy inputs to advanced manufacturing, semiconductors, artificial intelligence (AI) infrastructure, and logistics.
- **Nomenclature:** The term 'Pax Silica' comes from the Latin term 'pax' which means peace, stability, and long-term prosperity. Silica refers to the compound that is refined into silicon, one of the chemical elements foundational to the computer chips that enable AI.

- **Objective:** It aims to reduce coercive dependencies, protect the materials and capabilities foundational to AI, and ensure aligned nations can develop and deploy transformative technologies at scale.
- **Countries that are part of Pax Silica:** These include USA, Japan, South Korea, Singapore, Netherlands, United Kingdom, Israel, United Arab Emirates and Australia.
- **India's position:** India is not a member of the Pax Silica Initiative, despite being a member of the Minerals Security Partnership (MSP) and the Quad.

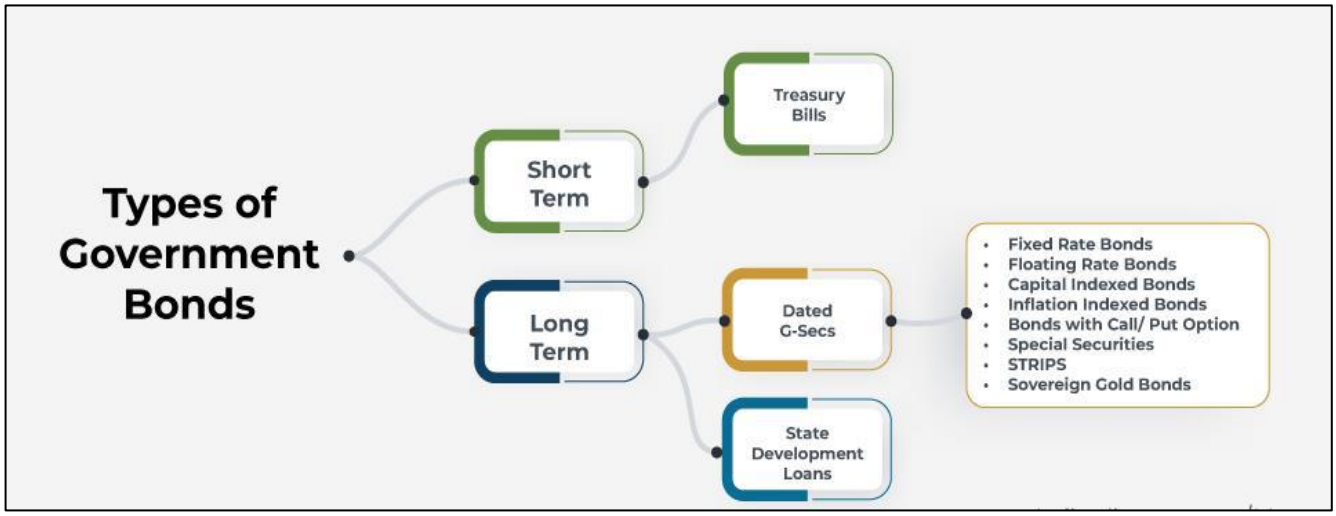
- **Reasons for India's Exclusion:**
  - Capability Gaps: Nascent semiconductor manufacturing ecosystem and limited high-end silicon processing capacity compared to founding members like the Netherlands (ASML) or South Korea (Samsung).
  - Diplomatic Friction: Ongoing negotiations over a bilateral trade agreement and potential trade tensions with the US administration.
- **Major focus areas:**
  - Pursue projects to jointly address AI supply chain opportunities and vulnerabilities in priority critical minerals, semiconductor design, fabrication, and packaging, logistics and transportation, compute, and energy grids and power generation.
  - Pursue new joint ventures and strategic co-investment opportunities.
  - Protect sensitive technologies and critical infrastructure from undue access or control by countries of concern.
  - Build trusted technology ecosystems, including ICT systems, fibre-optic cables, data centres, foundational models and applications.

ECONOMY

GOVERNMENT SECURITIES (G-SECS)

Context:

- In view of the evolving liquidity conditions, RBI announced to conduct Open Market Operation (OMO) purchases of government securities of ₹1,00,000 crore.



About Government Securities:

- **Nature:** A G-Sec is a tradable instrument issued by the Central Government or the State Governments.
- **Objective:** A G-Sec is a type of debt instrument issued by the government to borrow money from the public to finance its Fiscal Deficit.
- **Time-period:** Such securities are short-term (usually called treasury bills, with original maturities of less than one year- presently issued in three tenors, namely, 91-day, 182 days and 364 days) or long-term (usually called Government bonds or dated securities with original maturity of one year or more).
- **Issuing authority:** In India, the Central Government issues both, treasury bills and bonds or dated securities while the State Governments issue only bonds or dated securities, which are called the State Development Loans (SDLs).
- **Significance:** G-Secs carry practically no risk of default and, hence, are called risk-free gilt-edged instruments.
- **Types of G-Secs:**
    - Treasury Bills (T-bills): Treasury bills are zero coupon securities and pay no interest. Instead, they are issued at a discount and redeemed at the face value at maturity.
    - Cash Management Bills (CMBs): In 2010, the Government of India, in consultation with RBI introduced a new short-term instrument, known as CMBs, to meet the temporary mismatches in the cash flow of the Government of India.
    - Dated G-Secs: Dated G-Secs are securities that carry a fixed or floating coupon rate (interest rate) which is paid on the face value, on a half-yearly basis. Generally, the tenor of dated securities ranges from 5 years to 40 years.

  - State Development Loans (SDLs): State Governments also raise loans from the market which are called SDLs. SDLs are dated securities issued through normal auctions similar to the auctions conducted for dated securities issued by the Central Government.
- **Issue Mechanism:** The RBI conducts Open Market Operations (OMOs) for sale or purchase of G-secs to adjust money supply conditions. It sells g-secs to remove liquidity from the market and buys back g-secs to infuse liquidity into the market.
- **Frequency:** These operations are often conducted on a day-to-day basis in a manner that balances inflation while helping banks continue to lend.
- **No direct involvement with public:** RBI carries out the OMO through commercial banks and does not directly deal with the public.

REGIONAL RURAL BANKS (RRBS)

Context :

- Recently, the Finance Ministry unveiled a new logo for Regional Rural Banks (RRBs) to signify a single and unified brand identity.

About Regional Rural Banks (RRBs):

- **Establishment:** RRBs were established under the Regional Rural Banks Act, 1976, on the recommendation of the Narasimham Committee on Rural Credit (1975).
- **Objective:** Their mission is to fulfil the credit needs of the relatively unserved sections in rural areas: small and marginal farmers, agricultural labourers, and socio-economically weaker sections.
- **Collaboration:** They are formed in collaboration by the Central Government, State Governments, and Sponsoring Commercial Banks to give loans to rural areas.
- **Regulation:** Regional Rural Banks are regulated by the RBI and supervised by the National Bank for Agriculture and Rural Development (NABARD).
- **First RRB:** Rathama Grameen Bank was the first RRB bank and was established on 2nd October 1975.
- **Configuration:** RRBs were configured as hybrid micro-banking institutions, combining the local orientation and small-scale lending culture of the cooperatives with the business culture of commercial banks.

- **PSL target:** The RBI has set a Priority Sector Lending (PSL) target of 75% of total outstanding advances for RRBs as against 40% for Scheduled Commercial Banks.
- **Ownership:** Sponsored by the Commercial Banks, the equity of RRBs is held by the central government, concerned state government, and the sponsor bank in the proportion of 50:15:35.
- **Area of operation:** The area of operation of RRBs is limited to the area as notified by the Government of India, covering one or more districts in the State.
- **Sources of Funds:** It comprises owned funds, deposits, borrowings from NABARD, sponsor banks and other sources, including SIDBI and the National Housing Bank.
- **Management:** The Board of Directors manages these banks, overall affairs, which consists of one Chairman, three Directors as nominated by the Central Government, a maximum of two Directors as nominated by the concerned State Government, and a maximum of three Directors as nominated by the sponsor bank.

- **Network size:** At present, 28 RRBs operate across the country with a vast network of over 22 thousand branches in more than 700 districts.

RAPID FINANCING INSTRUMENT (RFI)

Context:

- Recently, IMF approved funding of USD 206 million under its Rapid Financing Instrument to help Sri Lanka address urgent needs arising from the Cyclone Ditwah.

About Rapid Financing Instrument (RFI):

- Nature: It is an IMF emergency lending facility that provides quick, low-access financial assistance to member countries facing urgent balance-of-payments needs, especially during crises such as natural disasters, external shocks, or domestic instability.
- **Organisation:** It is given by International Monetary Fund (IMF).
- **Eligibility:** It is available to all IMF member countries. For low-income countries (LICs), a similar concessional facility called the Rapid Credit Facility (RCF) is available under the Poverty Reduction and Growth Trust (PRGT).
- **Conditionality:** Support is provided with limited or no ex-post conditionality (policy commitments or reviews after the loan is approved), though prior actions might be required. The borrowing country is still expected to pursue policies to address the underlying BoP problem.
- **Disbursement of funds:** It involves a single, rapid disbursement of funds. Repayment is expected within 3¼ to 5 years, with interest rates similar to the IMF's standard non-concessional facilities.
- **Windows:** The RFI has two main windows: a regular window and a large natural disaster window (for disasters where damage is 20% of GDP or more).
- **Focus areas:**
    - To provide immediate liquidity to countries facing sudden balance-of-payments (BoP) pressures.
    - To prevent severe economic disruption when full-fledged IMF programmes are unnecessary or not feasible.
    - To support macroeconomic stability during short-term crises.

INFRASTRUCTURE INVESTMENT TRUST (INVIT)

Context:

- Recently, NHAI received SEBI's in-principle approval of registration to Raajmarg Infra Investment Trust as an Infrastructure Investment Trust (InvIT).

About Infrastructure Investment Trust (InvIT):

- **Nature:** It is Collective Investment Scheme similar to a mutual fund, which enables direct investment of money from individual and institutional investors in infrastructure projects
- **Objective:** It aims to provide retail investors with access to investment opportunities in infrastructure projects, which were previously only available to large institutional investors.
- **Regulation:** InvITs are regulated by the SEBI (Infrastructure Investment Trusts) Regulations, 2014.

- **Similar to mutual funds:** InvITs are instruments that work like mutual funds. They are designed to pool small sums of money from a number of investors to invest in assets that give cash flow over a period of time. Part of this cash flow would be distributed as dividends back to investors.
- **Minimum investment:** The minimum investment amount in an InvIT Initial Public Offering (IPO) is Rs 10 lakh, therefore, InvITs are suitable for high net-worth individuals, institutional and non-institutional investors.
- **Tradable on stock exchanges:** InvITs raise capital through IPOs and are then tradable on stock exchanges. Examples of listed InvITs include the IRB InvIT Fund and India Grid Trust.
- **Parties involved:** An InvIT has 4 parties namely; Trustee, Sponsor(s) and Investment Manager and Project Manager.
    - INVITs are created by sponsors, who are typically infrastructure companies or private equity firms.
    - The sponsor sets up the INVITs and transfers ownership of the underlying infrastructure assets to the trust.
    - The trust then issues units to investors, which represent an ownership stake in the trust and thus the underlying assets.
    - While the trustee (certified by Sebi) has the responsibility of inspecting the performance of an InvIT, sponsor(s) are promoters of the company that set up the InvIT.

UNIFIED PAYMENTS INTERFACE (UPI)

Context:

- The IMF report on 'Growing Retail Digital Payments' recognized Unified Payments Interface (UPI) as the world's largest retail fast-payment system by transaction volume.

About Unified Payments Interface (UPI):

- **Development:** UPI is a real-time mobile payment system developed by National Payments Corporation of India (NPCI).
- **Launch:** It was launched in 2016.
- **Uniqueness:** It allows users to link multiple bank accounts into one app for seamless peer-to-peer and merchant transactions.
- **Working:** UPI enables both push (send) and pull (receive) transactions using a Virtual Payment Address (VPA), with two-factor authentication, eliminating the need to enter bank details each time.
- **Technologies Used:** UPI is built on IMPS (Immediate Payment Service) and integrates Aadhaar Enabled Payment System (AePS).

- **Role of IMPS:** IMPS facilitates funds transfer to an account of the beneficiary with a participating bank, based on beneficiary's Mobile Number & Mobile Money Identification Number (MMID) or Account number & Indian Financial System Code.
- **Role of AePS:** The AePS allows basic banking services like cash withdrawal, deposit, balance enquiry, and money transfer (interbank or intrabank) using Aadhaar authentication.
- **BHIM App:** Bharat Interface for Money (BHIM) is a UPI-based payment app developed by NPCI.
- **Use in other countries:** Unified Payment Interface (UPI) is currently accepted in eight countries, viz. Bhutan, Singapore, Qatar, Mauritius, Nepal, UAE, Sri Lanka and France.

- **Role in financial Inclusion:** UPI's zero-cost, real-time transfers have made digital payments accessible for small vendors and first-time users.

INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD)

Context :

- The Government of India recently showcased the country's pioneering achievements in various fields (such as rural development) at the IFAD–India Day event held in Rome.

About International Fund for Agricultural Development (IFAD):

- **Nature:** It is an international financial institution and a specialized agency of the United Nations.
- **Establishment:** It was established as an international financial institution in 1977 through United Nations General Assembly Resolution.
- **Objective:** It is dedicated to eradicating poverty and hunger in rural areas of developing countries. It also seeks to empower rural people to increase their food security, improve the nutrition of their families.
- **Association with UN:** It is a member of the United Nations Development Group (UNDP).
- **Membership:** Currently, IFAD has 180 Member States, including India. (India is a founding member of IFAD).

- **Governance:** Its Governing Council is the highest decision-making body which meets every three years.
- **Headquarters:** Its headquarters is located in Rome, Italy.
- **Focus on SIDS:** Its projects and programmes are carried out in remote and environmentally fragile locations, including least-developed countries and Small Island developing States (SIDS).
- **Supports pro-poor technologies:** It grants support research, innovation, institutional change, and pro-poor technologies.
- **Grants:** It extends two types of grants, depending on the nature of the innovation and the scope of intervention: global or regional grants and country-specific grants.

DHRUVA SYSTEM

Context :

- The Department of Posts released a draft amendment to the Post Office Act, 2023, aimed at introducing an interoperable, standardised and user-centric DHRUVA system.

About DHRUVA System:

- **Full Form:** DHRUVA stands for Digital Hub for Reference and Unique Virtual Address.
- **Development:** It is developed by the Department of Posts and it sets the foundation for a nationwide Digital Address Digital Public Infrastructure (DPI).
- **Objective:** It envisions a standardized, interoperable, and geocoded digital addressing system that supports secure, consent-based, and seamless sharing of address information.
- **Builds upon DIGIPIN:** It builds upon the earlier launch of the Digital Postal Index Number (DIGIPIN)—the National Addressing Grid introduced by the Department of Posts.

- **Related to AaaS:** At its core is the concept of Address-as-a-Service (AaaS) — the array of services associated with address data management to support secure and efficient interactions between users, government entities, and private sector organizations.

- **Significance:** By recognizing digital addresses as core infrastructure, akin to Aadhaar and Unified Payments Interface (UPI), DHRUVA sets out to streamline everything from e-governance and online commerce to urban planning and emergency services.
- **User-centric design:** The policy also places emphasis on user-centric design, ensuring that citizens have meaningful control over how their address data is used and shared.
- **Control over data:** Citizens will retain full control over their digital address identity, with options to manage access, update details, and share their verified address securely for various use cases.
- **Other features:** It will also feature multilingual support, mobile-first access, and integration with identity systems like Aadhaar, thereby improving usability and accessibility for all demographics.

NATIONAL MISSION ON EDIBLE OILS (NMEO)

Context:

- According to a NITI Aayog report, India ranks first globally in the production of various oilseeds, primarily due to steps taken after National Mission on Edible Oils.

About National Mission on Edible Oils (NMEO):

- **Objective:** It aims to strengthen the country's oilseed ecosystem and achieve Atmanirbharta in edible oil production.
- **Targets of the mission:**
  - It aims to increase the area coverage from 29 million ha (2022-23) to 33 million ha, primary oilseed production from 39 million tonnes (2022-23) to 69.7 million tonnes, and yield from 1,353 kg/ha (2022-23) to 2,112 kg/ha by 2030-31.
  - This mission targets domestic edible oil production at 25.45 million tonnes by 2030-31.
  - The Mission also seeks to expand oilseed cultivation by an additional 40 lakh hectares by targeting rice and potato fallow lands.

- **Two-pronged approach:** It has two-pronged approach which is as follows:
  - National Mission on Edible Oils-Oil Palm
  - National Mission on Edible Oils– Oilseeds

About National Mission on Edible Oils-Oil Palm:

- **Objective:** It aims to expand oil palm cultivation and increasing domestic crude palm oil output.
- **Approval:** It was approved in 2021, as a Centrally Sponsored Scheme, with the aim to enhance the edible oilseeds production and oils availability in the country by area expansion and increasing Crude Palm Oil (CPO) production.

- **Focus:** It focuses on increasing production of seedlings by establishment of seed garden, and nurseries of oil palm in order to assure domestic availability of seedlings as per target fixed under NMEO-OP.
- **Targets:** It targets to bring 6.5 lakh hectares under oil palm cultivation by 2025–26 and increase crude palm oil production to 28 lakh tonnes by 2029–30.
- **Implementation:** The Department of Agriculture & Farmers Welfare (DA&FW) serves as the nodal central authority.

About National Mission on Edible Oils- Oilseeds:

- **Objective:** It aims to improve productivity, seed quality, processing, and market linkages for traditional oilseed crops.
- **Target:** It targets to increase oilseed production from 39 to 69.7 million tonnes by 2030–31 through cluster-based interventions and improved seed systems.
- **Approval:** It was approved in 2024, for a seven-year period, from 2024-25 to 2030-31.
- **Focus:** It focuses on increasing production of key primary oilseed crops such as Rapeseed-Mustard, Groundnut, Soybean, Sunflower, Sesamum, Safflower, Niger, Linseed and Castor. It also focuses on increasing collection and extraction efficiency from secondary sources like coconut, rice bran as well as Tree-Borne Oilseeds (TBOs).
- **Implementation:** It will be implemented in all States/UTs with the funding pattern of 60:40 in case of general States, Delhi & Puducherry and 90:10 in case of North-Eastern States and hill States, and 100% funding for UTs and Central Agencies.

GEOGRAPHY

MAJULI ISLAND

Context :

- In an effort to revive the nearly defunct Royal Bird Sanctuary at Majuli island, the Charaichung Festival has been organised in the island district for the second time.

About Majuli Island:

- **Location:** It is the world's largest river island located in Assam.
- **Formation:** The island is formed by the Brahmaputra River in the south and the Kherkutia Xuti, a branch of the Brahmaputra, joined by the Subansiri River in the north.
- **Landscape:** The island's landscape is characterised by lush greenery, water bodies, and paddy fields.
- **Uniqueness:** It became India's first river island district in 2016.
- **Livelihood:** Rice cultivation is the primary livelihood for the residents of Majuli, with several unique varieties of rice, such as Komal Saul and Bao Dhan, grown in the region.

- **Tribes:** Most of the islanders belong to three tribes- Mishing, Deori, and Sonowal Kachari, with the non-tribal Assamese comprising the rest.
- **Historical significance:** It is often called the soul of Assam. It has been recognized as the cultural capital of Assam since the 16th century.
- **Associated with neo-Vaishnavite culture:** The island has been the hub of Assamese neo-Vaishnavite culture, initiated around the 16th century by the great Assamese saint-reformer Srimanta Sankerdeva and his disciple Madhavdeva.

About Charaichung Festival:

- **Legacy:** The festival commemorates the 392-year-old legacy of Asia's first protected Royal Bird Sanctuary, 'Charaichung', established in 1633 AD by Ahom king Swargadeu Pratap Singha.
- **Objective:** The four-day festival, being held from December 7 to 10, has been organised under the initiative of Majuli Sahitya and locals, with the aim of placing Charaichung on the global map and rejuvenating its bird habitat.
- **Exhibition:** The festival also features a special exhibition highlighting forest conservation efforts. The display sheds light on ongoing initiatives to protect Majuli's biodiversity and reflects the collective commitment to safeguarding the island's natural heritage.

CHILLAI-KALAN

Context:

- Recently, the higher reaches of Kashmir witnessed snowfall as 'Chillai-Kalan' brought much-needed respite for the people of the Valley after a prolonged dry spell.

About Chillai-Kalan:

- **Nature:** It is the 40-day period of the harshest winter cold in Kashmir region.
- **Nomenclature:** Chillai Kalan is a Persian term which means "Major Cold."

- **Timeline:** The Chillai Kalan (big cold) usually begins on December 21 and ends on January 30. The start of Chillai-Kalan coincides with the Winter Solstice, celebrated as the longest night of the year in Persian tradition.
- **Uniqueness:** During this time Kashmir Valley faces its harshest phase of the winter season, including widespread snowfall, sub-zero temperatures and intense cold waves.

- **Chronology:** Chillai Kalan is followed by 'Chillai-Khurd' (small cold)– a 20-day period of moderate winter from January 31 to February 19, and the 10-day 'Chillai-Bacha' (baby cold), towards the fag end of the winter season from February 20 to March 2.
- **Cultural significance:** According to Persian tradition, the night of 21st December is celebrated as Shab-e Yalda-"Night of Birth", or Shab-e Chelleh. – "Night of Forty".
- **Attire:** People use the Pheran (a long woollen cloak) and Kangri (a traditional earthenware fire-pot filled with hot embers) to stay warm.
- **Cuisine:** Traditional winter foods include Harissa (a slow-cooked mutton dish) and sun-dried vegetables (Hoke-Gaard and Wogij-Haak) to cope with supply shortages.
- **Impacts:** Traditionally, heavy snowfall during Chillai Kalan replenishes water reservoirs sustaining rivers, streams and lakes during the summer months. However, water bodies like the Dal Lake often freeze due to sub-zero temperatures.

ALAKNANDA GALAXY

Context:

- Indian researchers have discovered a massive galaxy that existed when the universe was just 1.5 billion years old and named it Alaknanda, after the Himalayan river.

About Alaknanda Galaxy:

- **Distance from Earth:** Alaknanda is located about 12 billion light-years away and shows a textbook spiral structure.
- **Age:** It formed when the universe was only about 10% of its current age, roughly 1.5 billion years old.
- **Discovery:** It is discovered by researchers at National Centre for Radio Astrophysics- Tata Institute of Fundamental Research (NCRA–TIFR), Pune.

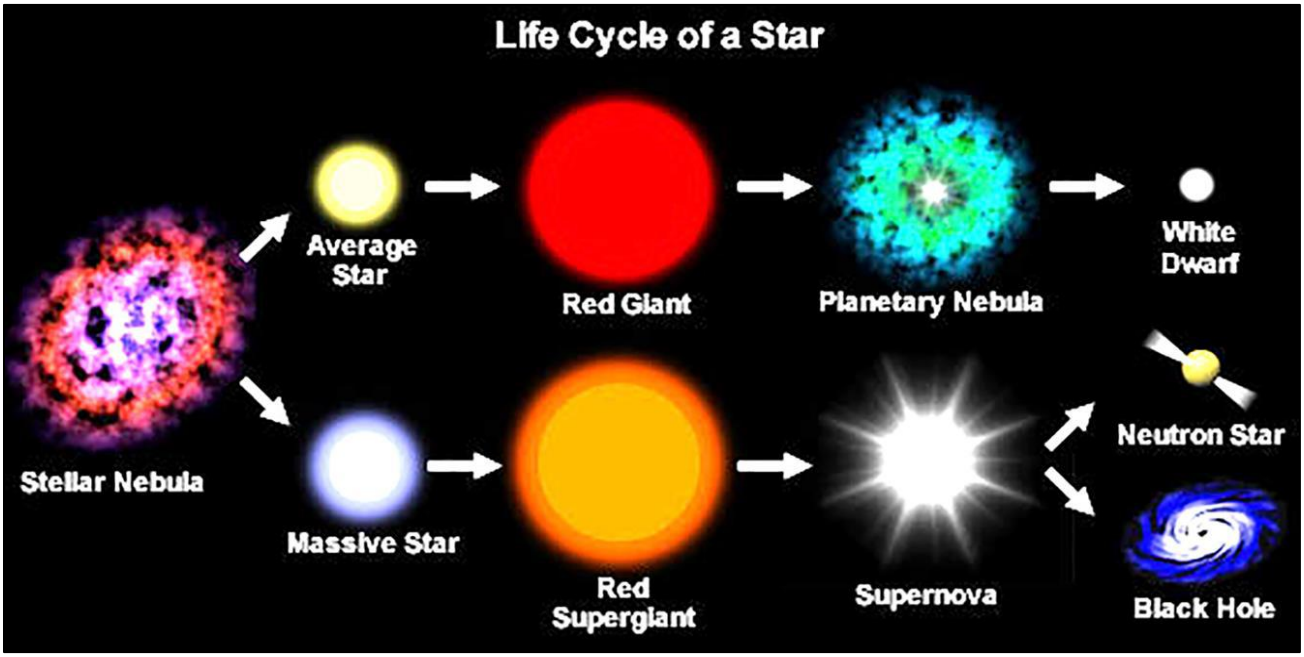
- **Telescope used:** The discovery was made using NASA's James Webb Space Telescope (JWST), the most powerful piece of observation equipment put into space.
- **Structure:** The galaxy has two well-defined spiral arms wrapping around a bright central bulge, spanning approximately 30,000 light-years in diameter.
- **Nomenclature:** It is named after the Himalayan river Alaknanda, which is considered the sister river of Mandakini (Hindi name for the Milky Way). The name reflects its resemblance to a distant sister of the Milky Way.

- **Uniqueness:** Early galaxies were expected to be chaotic, clumpy, hot, and unstable, but Alaknanda stands out as a mature and well-ordered spiral system.
- **Significance:** Its structure adds to growing evidence that the early universe was far more evolved than previously believed. The galaxy's unexpected maturity suggests that complex galactic structures began forming much earlier than current models predict.

SUPERNOVA

Context:

- Recently, rare supernova from 730 million years after the Big Bang was spotted by James Webb Space Telescope (JWST).



About Supernova:

- **Definition:** A supernova is a massive stellar explosion marking the end of a star's life
- **Uniqueness:** They are the largest explosions that take place in space.
- **Based on hydrostatic equilibrium:** A star maintains stability through a balance between the inward pull of gravity and the outward pressure from nuclear fusion in its core. A supernova occurs when this balance is lost.
- **Remnants:** Depending on the original mass of the star, a supernova can leave behind a dense neutron star or a black hole.
- **Energy emission:** It can emit more energy in a few seconds than our sun will radiate in its lifetime of billions of years.
- **Types:**
    - Type II Supernova (Core-Collapse): It occurs in single massive stars (at least 8-10 times the mass of the Sun) at the end of their life cycle. The core, having exhausted its nuclear fuel, collapses under its own immense gravity, triggering a shockwave that ejects the outer layers in a massive explosion.
    - Type Ia Supernova (Thermonuclear Runaway): It occurs in a binary star system where one star is a white dwarf. The white dwarf siphons matter from its companion star. Once it exceeds a critical mass limit (the Chandrasekhar limit), it completely destroys the white dwarf without leaving a remnant.

- **Spectacularity:** These spectacular events can be so bright that they outshine their entire galaxies for a few days or even months.
- **Source of heavy elements:** They can be seen across the universe and they are the primary source of heavy elements in the universe.
- **Frequency:** Astronomers believe that about two or three supernovas occur each century in galaxies like our own Milky Way. Because the universe contains so many galaxies, astronomers observe a few hundred supernovas per year outside our galaxy.
- **Significance:**
    - Element Creation: They are the primary source of all elements heavier than iron (e.g., gold, silver, uranium) through a process called nucleosynthesis.
    - Cosmic Recycling: The expelled material enriches the interstellar medium, providing the building blocks for subsequent generations of stars, planets, and life itself.
    - Cosmic Distance Indicators: Type Ia supernovae have a consistent peak brightness, making them "standard candles" for measuring vast cosmic distances and understanding the accelerating expansion of the universe.

SUBANSIRI LOWER HYDROELECTRIC PROJECT

Context:

- India's largest hydropower power project, Subansiri Lower Hydroelectric Project, finally began operating with one of its eight units after 20 years of work.

About Subansiri Lower Hydroelectric Project:

- **Nature:** It is a run-of-the-river hydro project being constructed on the Subansiri River, a tributary of the Brahmaputra.
- **Location:** It is located at Gerukamukh on the Arunachal Pradesh–Assam border.
- **Development:** The project is being developed by the state-run National Hydro Power Corporation (NHPC). The construction of the project has been underway since 2005.

- **Capacity:** Its capacity is 2,000 MW, and it consists of eight units of 250 MW each.
- **Uniqueness:** It will be the single largest hydroelectric plant in India when completed.
- **Financing:** The project cost was met through 70% equity and 30% debt financing by the provision of a term loan. The central government is providing budgetary support as part of the equity component.
- **Structure:** It consists of a concrete gravity dam, which will be 116 m high from the riverbed level and 130 m from the foundation. The length of the dam will be 284 m. The gross storage capacity of the reservoir will be 1.37 km3.
- **Other features:**
    - The powerhouse will comprise eight Francis-type turbines capable of generating 250 MW of electricity each.
    - It will also have eight horseshoe-shaped headrace tunnels, eight horseshoe-shaped surge tunnels , and eight circular penstocks.
    - A tailrace channel (35 m long and 206 m wide) will take the water discharged by the turbines back to the river

DULHASTI STAGE II HYDROPOWER PROJECT

Context:

- A panel under the Ministry of Environment, Forest and Climate Change recently approved the Dulhasti Stage-II hydropower project in Jammu & Kashmir.

About Dulhasti Stage II Hydropower Project:

- **Location:** It is a 260-megawatt hydropower project proposed on the Chenab River in the Kishtwar District of Jammu and Kashmir.
- **Nature:** It is an extension of the existing 390 MW Dulhasti Stage-I Hydroelectric Project (Dulhasti Power Station), which has been successfully operating since its commissioning in 2007.
- **Construction:** It is developed by the National Hydroelectric Power Corporation Limited (NHPC) Limited on a Build, Own, Operate, and Transfer (BOOT) basis.
- **Cost:** The project is estimated to cost more than Rs 3,200 crore.
- **Type:** It is a run-of-the-river project. It uses the natural flow and elevation drop of Chenab river to produce electricity without creating a large reservoir for water storage.

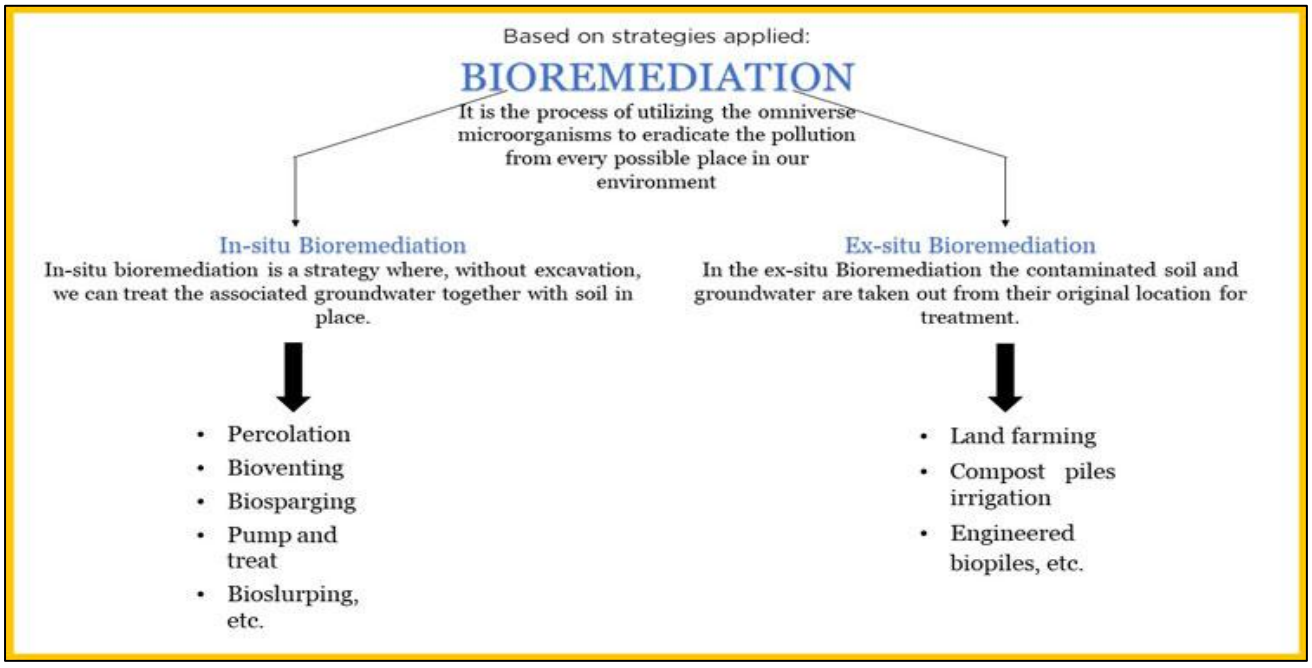
- **Composition:** The project includes a surge shaft, a pressure shaft, and an underground powerhouse housing two 130 MW units, resulting in a total installed capacity of 260 MW and an annual energy generation.
- **Mechanism:** Under the plan, water will be diverted from the Stage-I power station through a separate tunnel measuring 3,685 metres in length and 8.5 metres in diameter to form a horseshoe-shaped pondage for Stage-II.
- **Source of water:** The project will divert water from the Stage-I power station through a 3,685-metre-long tunnel. It also aims to draw water from the Marusudar River (a major tributary of the Chenab) via the Pakal Dul project to optimize generation.
- **Strategic significance:** The project gained momentum after the suspension of the Indus Water Treaty (IWT), 1960, following the Pahalgam terror attack.

ENVIRONMENT AND ECOLOGY

BIOREMEDIATION

Context :

- India's rapid industrialisation has come at a heavy environmental cost and to address this, India needs to focus on bioremediation.



About Bioremediation:

- **Definition:** Bioremediation is the use of living microorganisms to degrade environmental contaminants into less toxic forms.
- **Significance:** Bioremediation has gained significant attention in recent years due to its potential to address various environmental challenges, from oil spills to contaminated soil and groundwater.
- **Working Mechanism:** Bioremediation involves introducing specific microorganisms or creating conditions that favour the growth of naturally occurring microbes capable of degrading pollutants. This technique leverages the natural capabilities of bacteria, fungi, and other organisms to break down contaminants into less harmful or harmless substances.
- **Common micro-organisms used:** Some bacteria commonly used in bioremediation include Pseudomonas, Alcanivorax, Bacillus, and Deinococcus, as they can break down various toxic substances.
- **Monitoring:** Bioremediation can be monitored indirectly by measuring the oxidation-reduction potential or redox in soil and groundwater, along with pH, temperature, oxygen content, electron acceptor/donor concentrations and concentration of breakdown products (e.g. CO_2).
- **Types of Bioremediation:**
    - In Situ Bioremediation: It involves treatment of the contaminated material at the site. Prominent types of In Situ Bioremediation techniques include Bio-Venting, Bio-Sparging, Bio-Augmentation, etc.
    - Ex Situ Bioremediation: It involves the removal of the contaminated material to be treated elsewhere. Prominent types of Ex Situ Bioremediation techniques include Land Farming, Composting, Bio-Piles, Bio-Reactors, etc.

- **Applications of Bioremediation:**
    - Heavy Metal Bioremediation: It removes toxic heavy metals (lead, cadmium, chromium, copper) through degradation, absorption, and detoxification.
    - Soil Bioremediation: It degrades hydrocarbons in soils contaminated with oil and petroleum products, maintaining soil health and promoting natural recovery.
    - Marine Oil Spill Bioremediation: It involves use of indigenous oil-degrading microorganisms (Halomonas aquamarina, Alcanivorax) to break down oil, offering an eco-friendly alternative to chemical cleaners.
    - Rubber Waste Bioremediation: Bioremediation of rubber waste includes microbial treatments which reduce pollutants such as BOD, COD, and solids, alongside sulfur removal and rubber degradation for recycling.

SENNA SPECTABILIS

Context:

- The Tamil Nadu Forest Department has set an ambitious target to eradicate Senna spectabilis from all forest divisions by March 2026.

About Senna Spectabilis:

- **Origin:** It is native to the tropical regions of South and Central America.
- **Family:** It belongs to Fabaceae (legume) family.
- **Common names:** It is also known as Popcorn Bush Cedar, Archibald's Cassia, Calceolaria Cassia, Golden Shower, Scented Shower, Fetid Cassia.
- **Appearance:** It resembles Kerala's state flower Cassia fistula, known locally as kanikkonna.
- **Length:** It is a tree with a very dense, spreading crown; it can grow 7 – 18 metres tall.
- **Uses:** It is often planted for fuelwood, as an ornamental, and as a shade tree in agroforestry situations.

- **Status in India:** It is classified as a major invasive species in India.
- **IUCN Classification:** It is classified as Least Concern under the IUCN Red List.
- **Concerns:**
    - Aggressive growth rate: It has very aggressive growth rate and degrade lands in forest ecosystems which make it challenging to control its spread.
    - Suppression of Native Flora: Its thick foliage and canopy inhibit sunlight, while its shed leaves alter the soil chemistry through allelopathy, preventing native trees and grasses from growing.
    - Food Scarcity for Wildlife: The wiping out of native grasses and herbs leads to food shortages for herbivores like elephants, deer, and gaurs, which do not feed on Senna leaves as they are unpalatable.

CHAPRALA WILDLIFE SANCTUARY

Context :

- A rare striated grassbird was recorded in Chaprala Wildlife Sanctuary in Gadchiroli district, marking a major range extension for the species in Maharashtra.

About Chaprala Wildlife Sanctuary:

- **Location:** It is located in the Gadchiroli district of Maharashtra.
- **Establishment:** Chaprala Wildlife Sanctuary was officially notified as a wildlife sanctuary in February 1986.
- **Area:** It covers an area of approximately 134.78 sq.km (52.05 square miles).
- **Boundaries:** The Markhanda and Pedigundam hills flank the sanctuary from northeast and south, and the Pranhita River flows along its western boundary.
- **Rivers:** It is located on the bank of the confluence of the Wardha and Wainganga rivers. During the monsoons, river water swells and enters the sanctuary.


Animals of Chaprala Wildlife Sanctuary

- **Tanks:** Additionally, several water bodies, including the Murgikunta, Raikonta, and Komatkunta tanks, further contribute to the sanctuary's biodiversity.
- **Vegetation:** It is dominated by southern tropical dry deciduous forests interspersed with grasslands.
- **Flora:** The dominant tree species include teak, Arjun, salai, mahua, bel, dhawada, tendu, sissoo, and semal.
- **Fauna:** It is inhabited by Tiger, Leopard, Wild boar, Sloth bear, Wild dogs, Langurs, Blackbuck, Spotted Deer, Sambar, Jackal, Mongoose, etc. The sanctuary also supports a diverse aquatic fauna, including fish, prawns, and turtles.

SULTANPUR NATIONAL PARK

Context:

- Sultanpur National Park is once again echoing with the sounds of migratory birds, with their numbers rising significantly as temperatures drop.

About Sultanpur National Park:

- **Location:** Sultanpur National Park, formerly known as Sultanpur Bird Sanctuary, is located in the Gurgaon district in Haryana, 46 km from Delhi.
- **Area:** Spanning 1.42 sq.km., it consists primarily of marshy lakes and floodplains. It includes a core area of 1.21 sq. km containing the main Sultanpur Lake/Jheel.
- **Establishment:** It was declared a Bird Sanctuary in 1972. And, it was upgraded to a National Park in 1991.
- **Lake inside the National Park:** The Sultanpur Jheel is a seasonal freshwater wetland with fluctuating water levels throughout the year. This shallow lake is mostly fed by waters from River Yamuna's Gurgaon canal and the overflowing waters of the neighbouring agricultural lands.

- **National attention:** It gained national attention in the late 1960s due to the conservation efforts of ornithologists Peter Michel Jackson and Dr. Salim Ali, who frequently visited the site for birding.
- **Significance:** It was recognised as a Ramsar site in 2021. It has also been identified as an Important Bird Area by BirdLife International.
- **Flora:** The vegetation of this park is tropical and dry deciduous, and the flora includes grasses, dhok, khair, tendu, ber, jamun, banyan tree, neem, berberis, Acacia nilotica, and Acacia tortilis.
- **Fauna:** Over 320 bird species have been recorded at Sultanpur, making it a vital wintering ground. Other faunal species, such as Nilgai, Sambar, Golden jackals, wild dog, striped hyenas, Indian porcupine, mongoose, etc., are also found here.
- **Part of Central Asian Migratory Flyway:** It forms a part of the 'Central Asian Migratory Flyway' and thousands of migratory birds from the countries of Russia, Turkey, Afghanistan, and Europe visit the park during the winter months.
- **Important species:** Winter migrants include Greater Flamingos, Northern Pintails, Eurasian Wigeons, Common Teals, and Bar-headed Geese. Resident Birds include Indian Peafowl, Red-wattled Lapwings, Cattle Egrets, and White-throated Kingfishers. And, threatened species include Sarus Crane, Black-necked Stork, and Indian Courser.

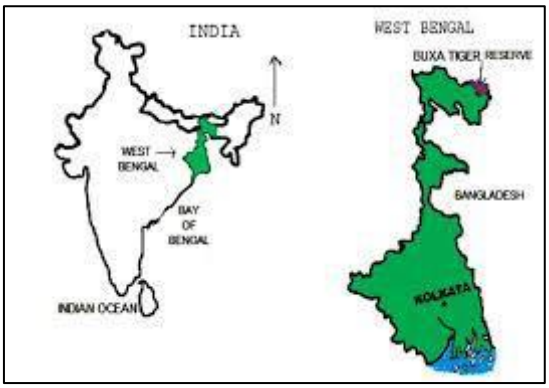
BUXA TIGER RESERVE

Context:

- Recently, the year's largest wildlife survey began across the Buxa Tiger Reserve, with an extensive four-month monitoring survey.

About Buxa Tiger Reserve:

- **Location:** It is located in the Alipurduar district of West Bengal. Its northern boundary runs along the international border with Bhutan.
- **Area:** Buxa Tiger Reserve and National Park covers about 760 square kilometers.
- **Landscape:** The fragile "Terai Eco-System" constitutes a part of this reserve.
- **Important for elephant migration:** It serves as an international corridor for elephant migration between India and Bhutan.
- **Connectivity:** The reserve has corridor connectivity across the border with the forests of Bhutan in the North, on the East it has linkages with the Kochugaon forests, Manas Tiger Reserve and on the West with the Jaldapara National Park.



- **Rivers:** The rivers Sankosh, Raidak, Jayanti, Churnia, Turturi, Phashkhawa, Dima, and Nonani flow through Buxa National Park.
- **Vegetation:** The forests of the reserve can be broadly classified as the 'Moist Tropical Forest'.
- **Flora:** Prominent tree species include Sal, Champ, Gamar, Simul, and Chikrasi, contributing to the reserve's diverse and vibrant ecosystem.
- **Fauna:** The primary wildlife species include the Asian Elephant, Tiger, gaur (Indian bison), Wild boar, Sambar, and Wild dog (Dhole). Endangered species in Buxa Tiger Reserve encompass the Leopard cat, Bengal florican, Regal python, Chinese Pangolin, Hispid hare, and Hog deer.
- **Conservation Initiatives:**
    - Introduction of chitals (spotted deer) to enhance the tiger's prey base, fostering favorable conditions for their return, and showcasing successful conservation efforts.

- Proactive measures have been taken to expand the grassland, creating an ideal habitat for tigers and other wildlife.
- Tiger Augmentation Project was launched in 2018, this collaborative project involves the state forest department, the Wildlife Institute of India, and the NTCA, focusing on monitoring and enhancing the tiger population.

CHAMPIONS OF THE EARTH AWARD

Context:

- Recently, ACS Ms Supriya Sahu of Tamil Nadu won the UN Environment Programme's 2025 Champions of the Earth Award.

About Champions of the Earth Award:

- **Establishment:** It was established in 2005 and awarded by the United Nations Environment Programme (UNEP).
- **Objective:** The award honours individuals and organizations for their innovative and sustainable efforts to address climate change, biodiversity loss, and pollution.
- **Uniqueness:** It is the UN's highest environmental honour, recognises trailblazers at the forefront of efforts to protect people and the planet.

- **Significance:** Every year, UNEP honours individuals and organizations working on innovative and sustainable solutions to address the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste.
- **Four Categories:** Champions of the Earth are Celebrated in 4 categories:
  - Policy leadership: Public sector officials leading global or national action for the environment. They shape dialogue, lead commitments and act for the good of the planet.
  - Inspiration and action: Leaders taking bold steps to inspire positive change to protect our world. They lead by example, challenge behavior and inspire millions.
  - Entrepreneurial vision: Visionaries challenging the status quo to build a cleaner future. They build systems, create new technology and spearhead a groundbreaking vision.
  - Science and innovation: Trailblazers pushing the boundaries of technology for profound environmental benefit.
- **Notable Indian Winners:** Notable Indian honourees include Prime Minister Narendra Modi (2018), Madhav Gadgil (2024) and Purnima Devi Barman (2022).

VELLODE BIRD SANCTUARY

Context:

- Migratory birds have begun arriving at the Vellode Bird Sanctuary at Vadamugam Vellode, as it serves as a breeding ground for both resident and migratory birds.

About Vellode Bird Sanctuary:

- **Location:** It is located in the Erode district of Tamil Nadu.
- **Area:** It was established in 1966 and it covers an area of around 0.77 sq km.

- **Designation:** It is built around the Periyakulam lake and has been designated a protected Ramsar site since 2022.
- **Significance:** It is part of an important migratory bird flyway (central Asian flyway). It also serves as a breeding ground for both resident and migratory birds.

- **Source of water:** The sanctuary receives rainfall from the Northeast monsoon between September and December. Seepage from the Lower Bhavani Project (LBP) canal and rainwater are the main sources of water during the migration period.
- **Fauna:** Migratory birds like Northern pintail, Northern Shoveler, Garganey, Blue tailed bee-eater, Wood Sandpiper, Common Sandpiper, Green Sandpiper, Chestnut tailed starling, Blyth's warbler, Skyes warbler are seen here.
- **Flora:** The Site is also an ideal habitat for notable plant species including Cayratia pedata, Tephrosia purpurea and Commelina tricolor.

BAR-HEADED GOOSE

Context:

- In a first-of-its kind study in eastern India, a bar-headed goose fitted with a GSM-GPS transmitter has revealed its migration route and flying pattern.

About Bar-headed Goose:

- **Nature:** It is a migratory bird species which is known to be one of the highest-flying birds in the world.
- **Uniqueness:** It can fly at altitudes of 25,000 feet, while migrating over the Himalayas, where oxygen and temperature levels are extremely low. They can cover distances of over 1,600 km in a single day.

- **Distribution:** It is native to central Asia, where the species breeds, Bar-headed Geese, are found in countries like India, Pakistan, Nepal, Kazakhstan, Bangladesh, Myanmar, Japan, and other nearby regions.
- **Geographical spread in India:** In India, their geographical range extends from the northeast to the southern parts of the country.
- **Wintering Sites in India:** Large congregations are often sighted at various Indian wetlands, including the Koonthankulam Bird Sanctuary in Tamil Nadu, Pong Dam Lake in Himachal Pradesh, and the East Calcutta Wetlands.
- **Habitat:** They reside near water bodies, preferring high-altitude lakes during the breeding season and freshwater lakes, rivers, and streams in their wintering habitats.
- **Wetland Health Indicator:** Their presence indicates healthy wetland ecosystems, as they are sensitive to habitat changes.

- **Appearance:** This species is grey and white with two horseshoe-shaped, brownish-black bars on the back of its white head. Although male and female birds appear similar, the male bird is slightly larger than the female.
- **Breeding pattern:** They usually form monogamous pairs and are seasonal breeders.
- **Conservation Status:** It is classified as 'Least Concern' under the IUCN Red List.

CHANNA BHOI

Context:

- Recently, scientists identified a new species of snakehead fish, Channa bhoi, in Meghalaya highlighting the state's importance as a hub of freshwater biodiversity.

About Channa Bhoi:

- **Nature:** It is a new species of snakehead fish.
- **Taxonomy:** It belongs to the Channidae family and the Gachua group. Phylogenetic analysis identified it as a sister species to Channa bipuli, another snakehead found in Northeast India.
- **Discovery:** It was discovered from a small mountain stream near Iewmawlong village in the Ri-Bhoi district of Meghalaya.
- **Nomenclature:** It has been named Channa bhoi, after the indigenous Bhoi people of the Khasi tribe who inhabit the Ri-Bhoi region.
- **Significance:** The discovery brings the total number of Channa species recorded from India to 26.

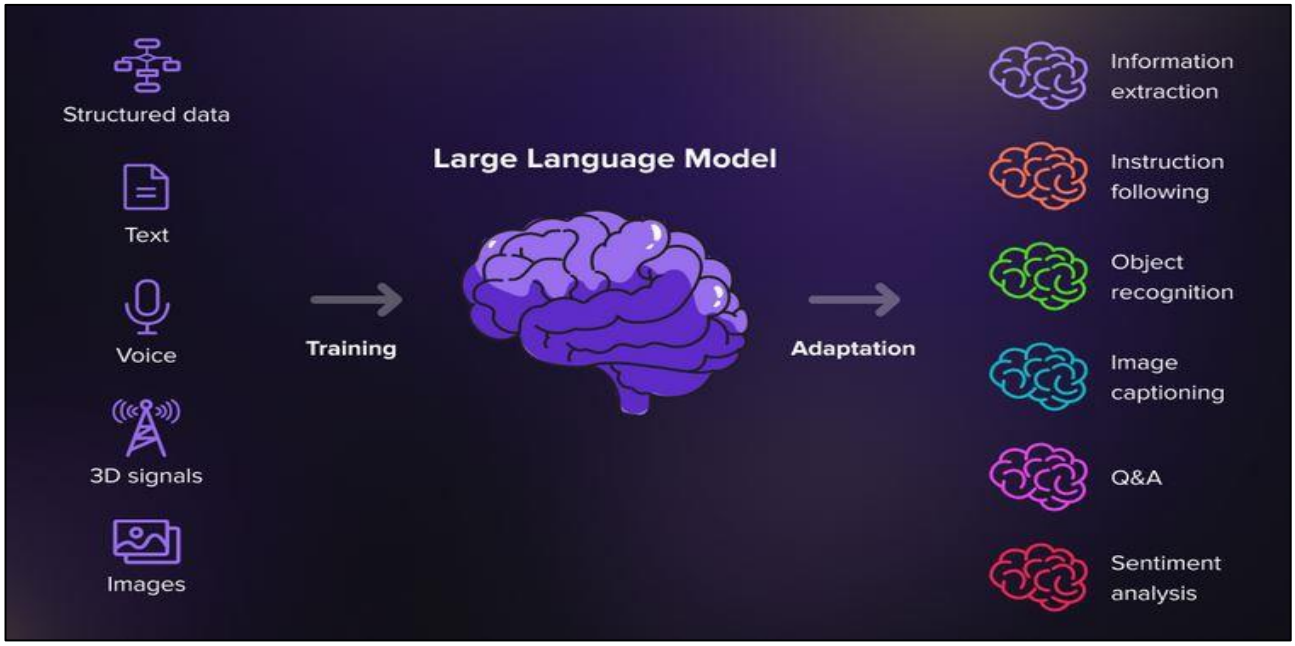
- **Uniqueness:** It is characterised by a bluish-grey body marked with minute black spots on each scale, forming eight to nine horizontal rows of broken lines along the sides. It can be distinguished from its close relatives by a unique colour pattern.
- **Physical Characteristics:** It has a bluish-grey body with black spots forming broken lines and distinctive banding on its pectoral fins.
- **Biodiversity Indicator:** Their presence suggests healthy stream ecosystems.
- **Concern:** It faces threats from rat-hole coal mining runoff and the illegal international aquarium trade.

SCIENCE & TECHNOLOGY

LARGE LANGUAGE MODELS (LLMS)

Context :

- A government working paper released recently suggested that AI large language models like ChatGPT should, by default, have access to content freely available online.



About Large Language Models (LLMs):

- **Definition:** An LLM is a type of artificial intelligence (AI) program that can recognize and generate text, among other tasks. In simpler terms, an LLM is a computer program that has been fed enough examples to be able to recognize and interpret human language or other types of complex data.
- **Nomenclature:** LLMs are trained on huge sets of data, hence the name "large." Since LLMs are now becoming multimodal (working with media types beyond text), they are now also called "foundation models."
- **Based on machine learning:** LLMs are based on Machine Learning (ML) specifically, a type of neural network called a transformer model, which excels at handling sequences of words and capturing patterns in text.
- **Training via tuning:** LLMs use a type of machine learning called deep learning in order to understand how characters, words, and sentences function together. They are fine-tuned or prompt-tuned to the particular task that the programmer wants them to do.
- **Curated data set:** Many LLMs are trained on data that has been gathered from the Internet—thousands or millions of gigabytes' worth of text. But the quality of the samples impacts how well LLMs will learn natural language, so LLM's programmers may use a more curated data set.
- **Applications:**
    - LLMs can perform various language tasks, such as answering questions, summarizing text, translating between languages, and writing content.
    - Businesses use LLM-based applications to help improve employee productivity and efficiency, provide personalized recommendations to customers, and accelerate ideation, innovation, and product development.

- LLMs serve as the foundational powerhouses behind some of today's most used text-focused generative AI (GenAI) tools, such as ChatGPT, Claude, Microsoft Copilot, Gemini, and Meta AI.

- **Challenges faced:** Though they are groundbreaking, LLMs face challenges that may include computational requirements, ethical concerns, and limitations in understanding context.

ADITYA-L1

Context :

- Aditya-L1 played a key role in helping scientists decode why the strongest solar storm that struck Earth in May 2024 behaved so unusually, ISRO said recently.

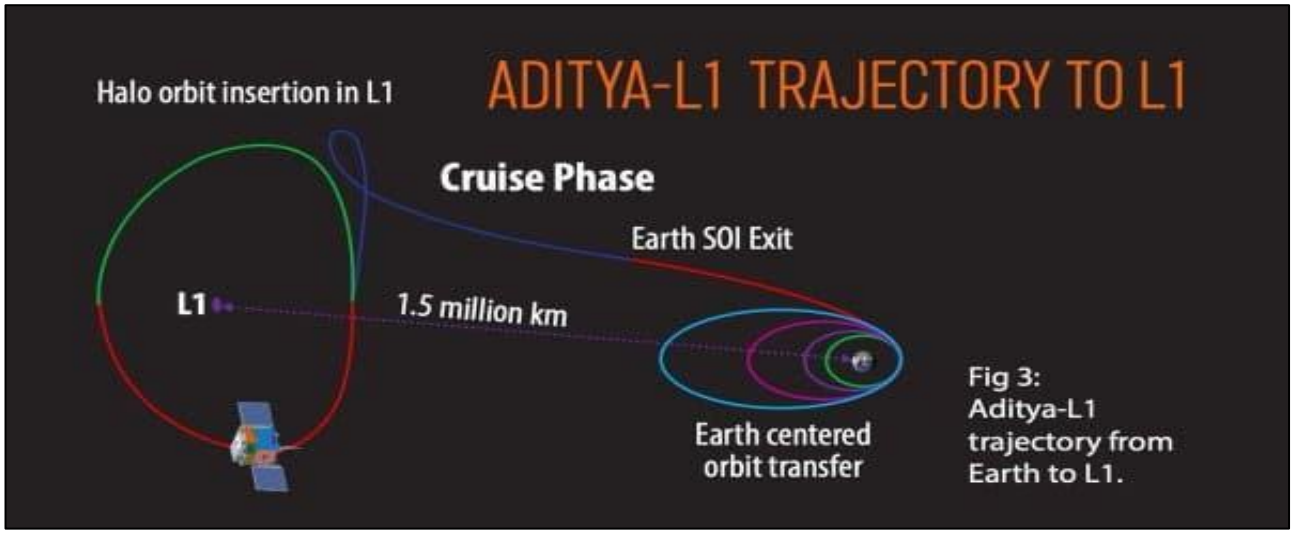


Fig 3: Aditya-L1 trajectory from Earth to L1.

About Aditya-L1:

- **Development:** It was developed and launched by the Indian Space Research Organisation (ISRO) in September 2023.
- **Launch vehicle:** It was launched using PSLV-C57 rocket.
- **Nature:** It is ISRO's second astronomy observatory-class mission after AstroSat (2015).
- Uniqueness: Aditya-L1 is the first space based observatory class Indian solar mission to study the Sun from a substantial distance of 1.5 million kilometers.
- **Objective:** The mission aims to provide valuable insights into the solar corona, photosphere, chromosphere, and solar wind.
- **Location in space:** The spacecraft is placed in a halo orbit around the Lagrangian point 1 (L1) of the Sun-Earth system, which has the major advantage of continuously viewing the Sun without any occultation.
- **Payloads:** The spacecraft carries seven scientific payloads for observations:
  - Visible Emission Line Coronagraph (VELC)
  - Solar Ultraviolet Imaging Telescope (SUIT)
  - Solar Low Energy X-ray Spectrometer (SoLEXS)
  - High Energy L1 Orbiting X-ray Spectrometer (HEL1OS)
  - Aditya Solar wind Particle Experiment (ASPEX)
  - Plasma Analyser Package For Aditya (PAPA)
  - Advanced Tri-axial High Resolution Digital Magnetometers
- **Major focus areas:**
  - Understanding Coronal Heating and Solar Wind Acceleration.

- Understanding initiation of Coronal Mass Ejection (CME), solar flares and near-earth space weather.
- Understanding coupling and dynamics of the solar atmosphere.
- Understanding solar wind distribution and temperature anisotropy.

NEWSPACE INDIA LIMITED (NSIL)

Context:

- Recently, NewSpace India Limited (NSIL) signed 70 Technology Transfer Agreements to transfer technologies developed at ISRO to Industry.

About NewSpace India Limited (NSIL):

- **Establishment:** NewSpace India Limited (NSIL) was incorporated on 6 March 2019 under the Companies Act, 2013.
- **Administrative control:** It is a wholly owned Government of India company, under the administrative control of Department of Space (DOS).
- **Headquarters:** Its headquarters is located in Bengaluru.
- **Association with ISRO:** It is the commercial arm of Indian Space Research Organisation (ISRO).
- **Difference from Antrix Corporation:** NSIL is India's second commercial space entity after Antrix Corporation, established in 1992. While Antrix primarily handled exports and marketing to international customers, NSIL focuses on capacity building within the domestic industry and commercializing technologies.

- **Relationship with IN-SPACe:** The Indian National Space Promotion and Authorization Centre (IN-SPACe), established in 2020, is an independent nodal agency that promotes and authorizes private non-governmental entities in space activities, acting as an interface with ISRO.
- **Significance:** NSIL (along with IN-SPACe) is part of broader reforms under the Indian Space Policy 2023 aimed at increasing private sector participation and India's share in the global space economy.
- **Primary responsibilities:**
  - Enabling Indian industries to take up high technology space related activities.
  - Promotion and commercial exploitation of the products and services emanating from the Indian space programme.
- **Major business areas:**
  - Production of Polar Satellite Launch Vehicle (PSLV) and Small Satellite Launch Vehicle (SSLV) through industry.
  - Building of Satellites (both Communication and Earth Observation) as per user requirements.
  - Transfer of technology developed by ISRO centres/units and constituent institutions of the Dept. of Space.
  - Marketing spinoff technologies and products/services emanating out of ISRO activities.
  - Consultancy services.

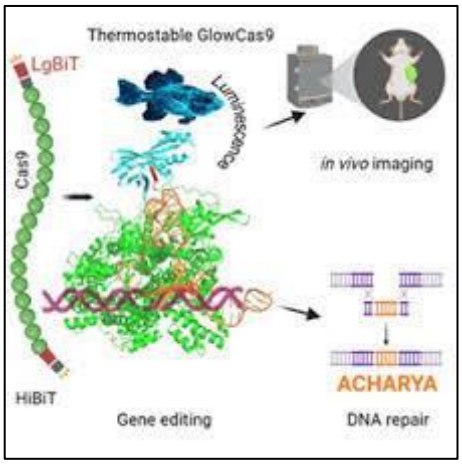
GLOWCAS9

Context:

- GlowCas9 protein could help scientists observe the molecular scissors called Cas9 enzyme as it enables gene editing for treating genetic diseases including cancer.

About GlowCas9:

- **Nature:** It is a CRISPR protein that lights up while performing gene editing. It is a bioluminescent version of Cas9 that glows inside cells.
- **Creation:** It is created by scientists at the Bose Institute in Kolkata.
- **Structure:** It is created by fusing Cas9 with a split nano-luciferase enzyme derived from deep-sea shrimp proteins.
- **Properties:** The GlowCas9 is very stable and maintains its structure and activity at higher temperatures compared to the conventional enzyme. It glows inside cells, allowing for real-time monitoring of CRISPR operations.
- **Working mechanism:** The split nano-luciferase enzyme pieces reconnect when Cas9 folds correctly, producing light. This glowing activity allows scientists to monitor CRISPR operations in living cells, tissues, and even plant leaves, without harming them.



- **Advantages:**
  - It provides a way to observe gene editing in real-time without harming cells.
  - The bioluminescence allows tracking of the gene-editing process in living cells, tissues, and even plant leaves.
  - It is more stable than conventional Cas9 and can maintain its structure and activity at higher temperatures. This increased stability is important for gene therapy, ensuring effective delivery of the Cas9 protein for treatment.
- **Applications:**
  - Gene Therapy Implications: GlowCas9 can aid in gene therapy by improving the precision of homology-directed repair (HDR), which is essential for fixing hereditary mutations linked to diseases like sickle cell anaemia and muscular dystrophy.
  - Theratracking: It also pioneers the emerging field of theratracking (visualizing molecular gene therapy in motion), which could greatly enhance the success rate of treatments for diseases like sickle cell anaemia and muscular dystrophy.
  - Applications in Crop Improvement: The technology is also applicable to plant systems, suggesting potential non-transgenic applications in crop improvement.

DHRUV64

Context:

- India has achieved a significant milestone in its semiconductor journey with the launch of DHRUV64, which is a fully indigenous microprocessor developed by C-DAC.

About DHRUV64:

- **Nature:** DHRUV64 is a fully indigenously developed microprocessor of India.

- **Development:** It is developed by the Centre for Development of Advanced Computing (C-DAC) under the Microprocessor Development Programme (MDP).
- **Uniqueness:** It is India's first homegrown 1.0 GHz, 64-bit dual-core microprocessor.
- **Speed:** It is a 64-bit dual-core processor running at 1.0 GHz, giving it the ability to handle multiple tasks smoothly.
- **Execution technique:** It uses superscalar execution, which allows the processor to start more than one instruction in the same moment for better speed.
- **Packaging:** It includes built-in communication and control functions inside an advanced FCBGA package, making the chip compact and ready for use in many systems.

- **Indigenisation:** It provides homegrown microprocessor technology designed for startups, academia, and industry to build, test, and scale indigenous computing products without relying on foreign processors.
- **Improved efficiency:** It supports out-of-order processing, meaning it can complete instructions that are ready first, improving overall efficiency.
- **Significance:** Following earlier processors like SHAKTI (IIT Madras) and AJIT (IIT Bombay), it paves the way for the upcoming Dhanush and Dhanush+ processors.
- **Applications:**
  - It is capable of supporting strategic and commercial applications.
  - It is suitable for sectors such as 5G infrastructure, automotive systems, consumer electronics, industrial automation and the Internet of Things (IoT).
  - It supports prototype development for new system architectures at lower cost.

ANNATTO

Context:

- The CSIR–CFTRI, Mysuru is participating in a project which envisages the development of Vitamin-E enriched annatto oil for use in food and cosmetic applications.

About Annatto:

- **Nature:** It is a natural food colouring and flavoring agent.
- **Scientific name:** Its scientific name is Bixa Orellana.
- **Native:** It is obtained from the seeds of the achiote tree, native to the tropical regions of the Americas.
- **Cultivation in India:** It is grown primarily in tropical states like Andhra Pradesh (cultivated by tribal communities in areas like Rampachodavaram).
- **Chemical constituents:** It contains carotenoids, primarily Bixin (oil-soluble) and Norbixin (water-soluble). It is also a rich source of Tocotrienols (a form of Vitamin E).

- **Significance:** About 70% of natural food colours come from annatto.

- **Colouring:** It adds a yellow-orange colour to foods like cheese, butter, yogurt, sausage, smoked fish, ice cream, and baked goods. The bold colour comes from carotenoids, which are plant pigments that are found in the coating of the seed.
- **Usage:** It is most often ground up into a powder or paste form for use.
- **Flavour:** It has a mild, peppery flavour when used in large amounts as well as a nutty and floral scent.
- **Safety:** It is safe for most people when used in normal food amounts. However, it might cause allergic reactions in some sensitive people.
- **Improved health:** It has been linked to various benefits, including reduced inflammation, improved eye and heart health, and anticancer properties.
- **Rich in antioxidants:** It is rich in antioxidants that help neutralize the effects of harmful free radicals that can cause damage to cells.
- **Applications:** It is used in lipsticks, soaps, and hair oils due to its safe, non-toxic nature. Traditionally, it is also used as a fabric dye.

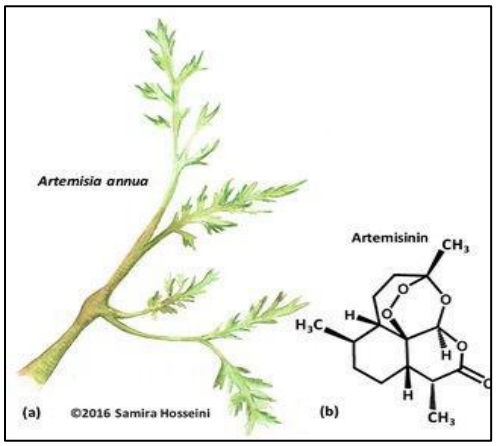
ARTEMISININ

Context :

- A new study warns that heavy artemisinin use may trigger resistance hotspots, with resistance markers gradually increasing in parts of Africa.

About Artemisinin:

- **Source:** It is an antimalarial drug derived from the sweet wormwood plant, Artemisia annua. The process involves drying the leaves and using a solvent to extract the active ingredient.
- **Discovery:** It was discovered in the 1970s by Tu Youyou (China) as part of "Project 523." She was awarded the Nobel Prize in Medicine (2015) for this discovery.
- **Significance:** It offered a new option when the malaria parasite was becoming resistant to older drugs like chloroquine and sulfadoxine-pyrimethamine. It is effective against all the malaria-causing protozoal organisms in the genus Plasmodium.

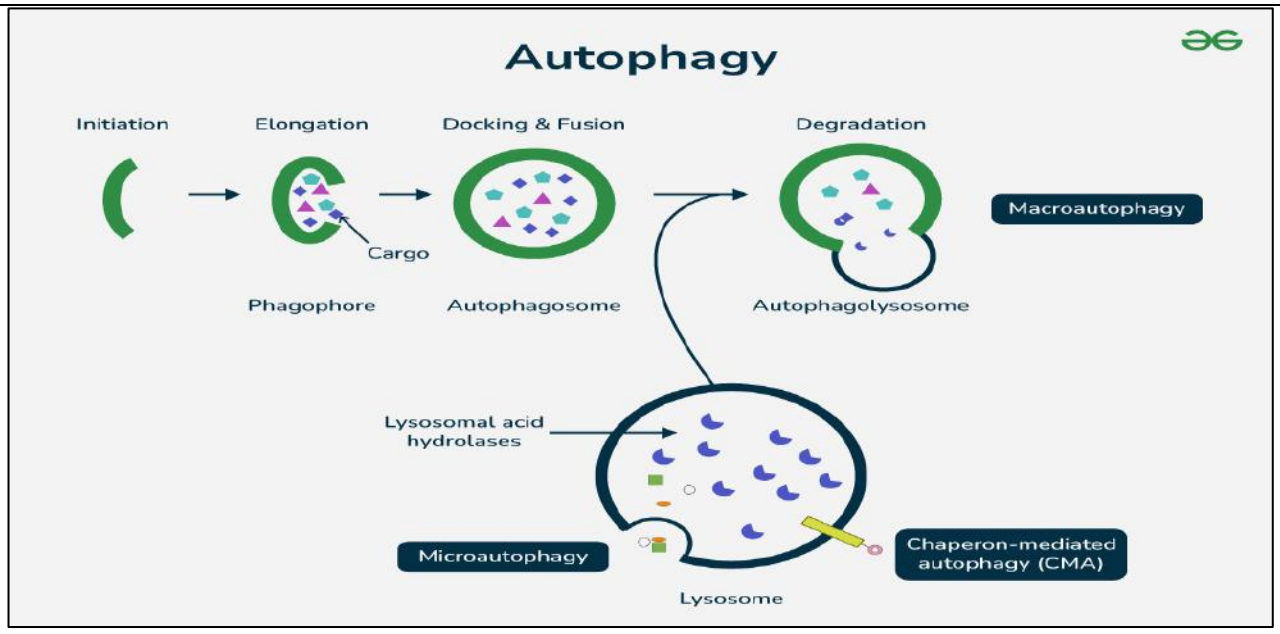


- **Mechanism:** It mainly targets the malaria parasite during the blood stage, disrupting the parasite's ability to replicate within red blood cells. It helps significantly reduce the parasites but doesn't stay in the body for a long time, being eliminated within hours.
- **Derivatives:** Its common derivatives include Artesunate (injectable for severe malaria), Artemether, and Dihydroartemisinin.
- **Used as a combination drug:** It is usually partnered with another drug that eliminates the remaining parasites over a longer period of time.
- **Recommended by WHO:** The World Health Organization (WHO) recommends artemisinin-based combination therapies (ACTs) as the go-to treatment for Plasmodium falciparum malaria.

AUTOPHAGY

Context :

- Recently, researchers uncovered a surprising player in autophagy that can pave the way for developing therapies for diseases such as Alzheimer's, Parkinson's, and cancer.



About Autophagy:

- **Nature:** Autophagy is the body's cellular recycling system. It is a key biological process where cells clear out damaged and unwanted materials.
- **Trigger factors:** It is triggered by stress (fasting, starvation, hypoxia, or infection), a cup-shaped double membrane called a phagophore begins to form.
- **Major functions:** It recycles damaged cell parts into fully functioning cell parts. It gets rid of nonfunctional cell parts that take up space and destroys pathogens in a cell that can damage it, like viruses and bacteria.
- **Types:**
    - Macroautophagy: The most common form, involving the formation of autophagosomes to transport large cargo to lysosomes.
    - Microautophagy: The lysosome directly "swallows" cytoplasmic material by folding its own membrane inward.
    - Chaperone-Mediated Autophagy (CMA): Specific proteins are identified by "chaperone" molecules and transported directly across the lysosomal membrane without forming a separate vesicle.
- **Significance:**
    - Anti-Aging: By clearing out damaged proteins that cause cellular "clutter," autophagy slows aging and promotes longevity.
    - Neuroprotection: It removes toxic protein aggregates associated with neurodegenerative diseases like Alzheimer's, Parkinson's, and Huntington's.
    - Immunity: In a process called xenophagy, cells use autophagy to identify and destroy invading viruses and bacteria.
- **The Cancer Paradox:** It initially prevents cancer but later supports tumour growth and acts as a tumour suppressor by maintaining genome integrity and cellular homeostasis. In certain types of cancer, cells hijack autophagy for their own survival and propagation.
- **Nobel connection:** Yoshinori Ohsumi won the 2016 Nobel Prize for discovering the genes (ATG genes) that regulate this process.
- **Relationship with Apoptosis:** While autophagy is "self-eating" for survival, apoptosis is "programmed cell death" for the benefit of the organism. They are distinct but highly interconnected processes.

MAVEN SPACECRAFT

Context:

- Recently, NASA lost contact with its MAVEN spacecraft that has worked for more than a decade to study how the planet's atmosphere is escaping into space.

About MAVEN Spacecraft:

- **Nature:** It is part of NASA's Mars Exploration Program, an unprecedented, multi-decade campaign to comprehensively understand Mars and its suitability to host past or present life.
- **Objective:** It aims to understand the role that loss of atmospheric gas to space played in changing the Martian climate over time.

- **Launch:** It was launched in November 2013 and arrived at Mars in September 2014.
- **Launch vehicle:** It was launched using Atlas V.
- **Uniqueness:** It is the first spacecraft mission dedicated to surveying the upper atmosphere of Mars.
- **Orbit:** It orbits Mars every 3.5 hours and gets as close as 150 km to its surface.
- **Payloads:** It carries three main instrument packages:
    - Solar Wind Package: It studies solar wind and its impact on the ionosphere.
    - Ultraviolet Spectrometer: It observes the upper atmosphere.
    - Mass Spectrometer: It analyses the composition of the upper atmosphere.
- **Recent discoveries:**
    - Loss of atmosphere: MAVEN confirmed that Mars lost about two-thirds of its early atmosphere primarily due to solar wind stripping, which transformed it from a warm, wet planet into a cold desert.
    - Plasma Waves: Scientists from the Indian Institute of Geomagnetism used MAVEN data to identify high-frequency plasma waves in the Martian atmosphere, aiding our understanding of how electrons behave in the absence of a magnetic field.
    - Auroras: MAVEN detected planet-wide "patchy" auroras caused by solar wind penetrating deeply into the atmosphere, unlike Earth's localized polar auroras.

PLASSER'S QUICK RELAYING SYSTEM (PQRS)

Context:

- The Alipurduar Division of the Northeast Frontier Railway has recorded its highest-ever single-day output of 1,033 track metres using Plasser's Quick Relaying System (PQRS).

About Plasser's Quick Relaying System (PQRS):

- **Nature:** It is a modern semi-mechanized system automatic machine used for quick railway track replacement.
- **Objective:** It aims to speed up track renewal while minimizing traffic disruption, enhancing safety, reliability, and maintenance efficiency.

- **Composition:** It consists of self-propelled cranes which move on an auxiliary track of 3400 mm gauge having the same centre line as that of track to be relayed. These portal cranes are capable of self-loading and unloading from BFRs (Bogie Flat Wagons).
- **Lifting capacity:** Newer models can lift up to 9 tonnes, allowing them to handle 13-meter-long Pre-stressed Concrete (PRC) sleeper panels.
- **Uses:** The system is widely used for new track construction as well as the modernisation of existing track infrastructure.

- **Significance:** It helps longer track lengths to be renewed within shorter traffic blocks. Further, it is cost effective, as it reduces manual labour and lifecycle maintenance costs.
- **Operational Sequence:**
  - New panels are prefabricated at a Base Depot.
  - Old panels are lifted and transferred directly to BFRs.
  - New panels are laid using the portal cranes.

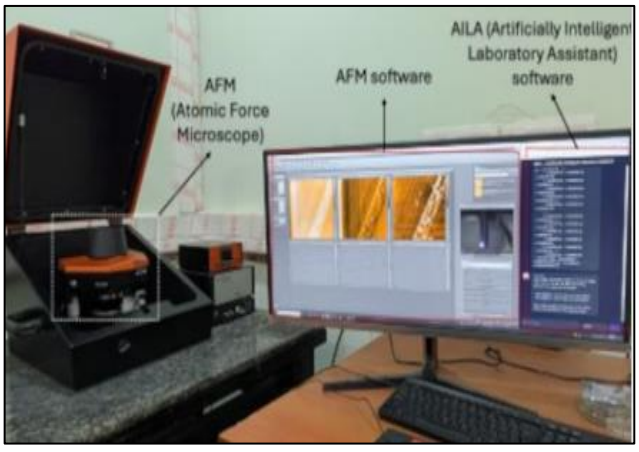
AILA (ARTIFICIALLY INTELLIGENT LAB ASSISTANT)

Context:

- Recently, researchers at IIT Delhi developed an AI system named AILA that can perform real scientific experiments, just like human scientists.

About AILA (Artificially Intelligent Lab Assistant):

- **Nature:** It is an AI agent which can independently run complex scientific experiments, analyse results, and make decisions in real time.
- **Development:** It was developed by IIT Delhi researchers in collaboration with scientists from Denmark and Germany.
- **Difference with earlier AI tools:** Unlike earlier AI tools that mainly helped with writing or data analysis, AILA works directly with laboratory instruments.
- **Significance:** It can operate real scientific equipment, particularly the Atomic Force Microscope (AFM), one of the most delicate and complex instruments used to study materials at the nanoscale.



- **Uniqueness:** The agent has helped reduce the time taken to optimize high-resolution AFM imaging from 24 hours to 7–10 minutes. It performs experiments much like a trained scientist.
- **Interface:** It utilizes a chat-based interface where instructions in plain English are converted into executable computer code.
- **Mechanism:** When AILA is instructed to perform an experiment, it writes the necessary code, operates the scientific instrument, collects data, and analyses the results on its own. The entire scientific workflow, data generation, processing, and interpretation, is automated through AILA.

BLUEBIRD 6 SATELLITE

Context :

- ISRO is scheduled to launch the US-based commercial BlueBird-6 satellite developed by US-based AST Spacemobile in December 2025 using ISRO's LVM-3 rocket.

About Bluebird 6 Satellite:

- **Nature:** It is a heavy-lift commercial communication satellite designed to provide direct-to-mobile broadband connectivity.
- **Origin:** It is developed by the US-based commercial company AST SpaceMobile for global mobile coverage.
- **Objective:** It is designed to provide direct-to-device internet connectivity, enabling mobile phones to access broadband without relying on traditional cell towers.
- **Mission Agency:** It will be launched by ISRO via its commercial arm, NewSpace India Limited (NSIL).
- **Launch Vehicle:** It will be launched using LVM3 (formerly GSLV Mk-III), also known as "Bahubali".
- **Structure:** It weighs around 6.5 tonnes, making it one of the heaviest satellites launched by ISRO.

- **Orbit:** It will operate in low-Earth orbit (LEO) to cover large regions of the Earth efficiently.
- **Technology:** It features one of the largest phased array antennas ever flown, which covers nearly 2,400 square feet, allowing it to communicate directly with standard mobile phones.
- **Capacity:** It is part of the "Block-2" series, offering up to 10,000 MHz of bandwidth and 10x higher data capacity than previous generations.
- **Collaboration:** It represents a significant step in Indo-US space cooperation and commercial space ventures.
- **Significance:** It enhances global mobile broadband connectivity, especially in remote and rural areas. Further, It is expected to help bridge the digital divide, providing internet access to regions without cellular infrastructure.

HISTORY AND ART & CULTURE

HORNBILL FESTIVAL

Context:

- Nagaland's Hornbill Festival, began recently amid renewed pushback by the state government against the Centre's re-imposition of the Protected Area Regime.

About Hornbill Festival:

- **Nomenclature:** It was named after the Hornbill bird is named after the hornbill bird, a symbol of fidelity, beauty, and grace in Naga folklore.
- **Location:** It is celebrated at Naga Heritage Village, Kisama which is about 12 km from Kohima in Nagaland.
- **Launch year:** It was first organized in the year 2000 and it showcases the heritage of its 17 Naga tribes.

- **Objective:** It aims to promote inter-tribal interaction and preserve Nagaland's heritage, blending the traditional with the contemporary in a harmonious display of unity.
- **Significance:** It is also called the festival of festivals and is held every year.
- **Organising authority:** It is organized by the State Tourism and Art & Culture Departments of the Government of Nagaland.
- **Evolution:** It has evolved into a celebration showcasing the diverse and vibrant cultural and traditional heritage of the tribes of Nagaland. It serves as a platform for the Naga tribes to display their rich traditions through performances, dances, and exhibitions.
- **Distinctive attire:** Warriors, dressed in full ceremonial attire, perform traditional dances and war cries that narrate stories of victories, harvests, love, and tribal legends. Their distinctive attire features hornbill feathers, boar tusks, and colourful woven sashes, creating a striking display of Naga heritage and pride.
- **About Hornbill Festival 2025:**
    - Theme of 2025 festival: Cultural Connect
    - This year Nagaland has officially named Switzerland and Ireland as country partners for the Hornbill Festival 2025.

CHAOLUNG SUKAPHA

Context:

- Union Minister of Ports, Shipping & Waterways (MoPSW) led a vibrant celebration of Assam Day at his official residence, paying rich tributes to Chaolung Sukapha.

About Chaolung Sukapha:

- **Founder of Ahom kingdom:** He was a visionary 13th-century ruler who founded the Ahom kingdom that ruled Assam for six centuries.
- **Other names:** He is widely referred to as the architect of "Bor Asom" or "greater Assam".

- **Establishment of first principality:** It was in Charaideo that Sukapha established his first small principality, sowing the seeds of further expansion of the Ahom kingdom.
- **Administration:** He divided the kingdom into territorial units called khels or phoids, each under an officer responsible for supplying a fixed number of paiks.
- **Military system:** Paiks are the able-bodied male population who owed labour and military service to the state. Every adult male between sixteen and fifty was registered as a paik and served the king for part of the year in agriculture, construction, or war. In return, he was allotted land for personal cultivation.

- **Emphasis on guerrilla tactics:** He emphasized guerrilla tactics suited to the terrain of rivers, jungles, and hills.
- **Association with tribal communities:** Sukapha developed very amiable relationships with the tribal communities living in Assam — especially the Sutias, the Morans and the Kacharis.
- **Relevance:** Sukapha's significance, especially in today's Assam lies in his successful efforts towards assimilation of different communities and tribes. He adopted a policy of conciliation and assimilation rather than annihilation.

HORI HABBA FESTIVAL

Context:

- The Karnataka High Court recently allowed the festival of "Hori Habba" but directed strict compliance of conditions laid by the Supreme Court in the Jallikattu matter.

About Hori Habba Festival:

- **Location:** It is primarily practiced in the rural areas of Karnataka, especially in the Shivamogga, Haveri, Davangere, and Uttara Kannada districts.
- **Nature:** It is an ancient bull-taming game native to Haveri district, and played on the lines of Jallikattu in Tamil Nadu and Kambala in Dakshina Kannada district.
- **Celebration time:** It is held during the harvest season, typically after the Diwali festival and extending up to Sankranti.
- **Other names:** It is also known as Hatti Habba or Kobbari Hori Competition.
- **Rituals:** Trained and decorated draught cattle and bulls are made to run through large crowds. Participants attempt to subdue the animals and snatch prizes, such as dried coconuts (copra), cash, or other gift items, that are tied to their necks or horns.

- **Cultural Significance:** It symbolizes the cultural bond between humans and bulls in the local community, showcasing courage and unity.
- **Symbol of Status:** In rural areas of Shivamogga and Haveri, the social status of an individual is often determined by the quality of the bulls they rear for the event, not by material possessions like cars.
- **Spectator Event:** The event attracts massive crowds, sometimes up to 50,000 people.

- **Regulation:** Following a 2017 Supreme Court ban, the festival's continuation has been contingent upon compliance with strict government conditions and High Court rulings.

UNESCO'S INTANGIBLE CULTURAL HERITAGE LIST

Context:

- Recently, Deepavali, the festival of lights, was inscribed on UNESCO's List of the Intangible Cultural Heritage of Humanity.

About UNESCO's Intangible Cultural Heritage List:

- **Definition:** Intangible heritage refers to "living heritage" passed across generations. It includes oral traditions, performing arts, social practices, rituals, festive events, knowledge/practices concerning nature, and traditional craftsmanship.
- **Objective:** The list aims to ensure the safeguarding, promotion, and transmission of these traditions for future generations, raise global awareness of their importance, and foster cultural diversity and international cooperation.
- **Administration:** The list is managed under the 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage. The Intergovernmental Committee makes decisions on inscriptions based on nominations submitted by member states.
- **5 Domains:** The UNESCO's 2003 proposes five broad 'domains' in which intangible cultural heritage is manifested:
    - Oral traditions and expressions, including language as a vehicle of the intangible cultural heritage;
    - Performing arts;
    - Social practices, rituals and festive events;
    - Knowledge and practices concerning nature and the universe;
    - Traditional craftsmanship.
- **List of 16 elements on the List (after inclusion of Deepavali):**
    - Tradition of Vedic chanting – 2008
    - Kutiyattam (Sanskrit theatre) – 2008
    - Ramlila (traditional performance of the Ramayana) – 2008
    - Ramman (festival & ritual theatre of Garhwal Himalayas) – 2009
    - Mudiyettu (ritual dance drama of Kerala) – 2010
    - Kalbelia folk songs & dances of Rajasthan – 2010
    - Chhau dance – 2010
    - Buddhist chanting of Ladakh – 2012
    - Sankirtana (ritual singing & drumming of Manipur) – 2013
    - Traditional brass & copper craft of Thatheras, Punjab – 2014
    - Yoga – 2016
    - Kumbh Mela – 2017
    - Durga Puja of Kolkata – 2021
    - Garba of Gujarat – 2023
    - Navroz/Nowruz – 2024
    - Deepavali (Diwali) – 2025

KHWAJA MOINUDDIN CHISTI

Context:

- Recently, the Supreme Court declined urgent hearing of a plea against the practice of offering a 'Chadar' by the Prime Minister at the Dargah of Khwaja Moinuddin Chishti.

About Khwaja Moinuddin Chisti:

- **Early Life:** He was born in 1141 CE in Sijistan (modern-day Sistan, Iran). He was later orphaned at age 14 and turned to spirituality after a meeting with the mystic Ibrahim Qandozi. He was a very important Sufi saint.
- **Other names:** People often call him Gharīb Nawāz, which means 'Benefactor of the Poor' (for his service to the needy).

- **Education:** He studied Islamic theology in the famous learning centres of Samarkand and Bukhara.
- **Spiritual Lineage:** A follower of Sunni Hanafi theology, he became the disciple of Hazrat Khwaja Usman Harooni, who later initiated him into the Chishti order.
- **Arrival in India:** He arrived in India around 1192 CE, coinciding with the Second Battle of Tarain. He finally settled in the city of Ajmer during the reign of Sultan Iltutmish in Delhi and Prithviraj Chauhan in Ajmer.
- **Significance:** He is famous for bringing the Chishti Order of Sufism to India. He preached love, tolerance, charity, and detachment from materialism, and established a Khanqah in Ajmer to serve the poor.
- **Prominent disciples:** His legacy was carried forward by notable saints like Qutbuddin Bakhtiyar Kaki (Delhi), Baba Farid (Punjab), and Nizamuddin Auliya (Delhi).
- **Dargah:** After his death in 1236 CE, Moinuddin Chishti was buried in Ajmer. His tomb is visited by people of all faiths and it is now known as the Dargah Sharif, or the Ajmer Sharif Dargah.
- **Architectural style of tomb:** The architectural style of Dargah Sharif purely reflects the Mughal style of architecture. All Mughal rulers from Humayun to Shah Jahan have made modifications in the structure.

THANJAVUR PAINTING

Context:

- Recently, Department of Posts undertook the transmission of a priceless Thanjavur painting of Shri Ram from Bengaluru to Ayodhya using its Logistics Post service.

About Thanjavur Painting:

- **Origin:** This classical South Indian art form developed under the Nayakas of Thanjavur, who were feudatories of the Vijayanagara Empire.
- **Zenith:** It reached its peak under the Maratha rulers of Thanjavur (17th–19th centuries), particularly under the patronage of King Serfoji II (Sarfoji Maharaj).
- **Influences:** It reflects a blend of Vijayanagara, Maratha, Deccani, and later European (Company) styles.

- **Base materials:** Tanjore or Thanjavur paintings are created on wooden panels, commonly known as palagai padam. These are traditionally created on canvas affixed to wooden planks, typically made from jackfruit or teak, and bound with Arabic gum.
- **Significance:** It has received the Geographical Indication tag.
- **Rich Colours:** These paintings are known for their vibrant colours. They often use bright shades of red, blue, green, and gold leaf-work to create an opulent effect.
- **Visual Style:** These are characterized by vibrant colours (red, blue, green), compact compositions, and figures with rounded, cherubic faces and almond-shaped eyes.
- **Theme:** Tanjore paintings typically depict Hindu gods and goddesses, especially figures like Lord Krishna, Lord Ganesha, and Goddess Lakshmi.
- **Technique:**
    - Gesso Work: A paste made of limestone powder and a binding agent (sukkan or makku) is used to create raised, embossed areas, giving a three-dimensional effect.
    - Gold Leaf: Genuine 22-carat gold foil is layered over the gesso work.
    - Embellishments: Inlays of glass beads, pearls, and precious or semi-precious stones (diamonds, rubies) are used for ornamentation.

SANTHALI LANGUAGE

Context:

- Recently, President Droupadi Murmu released the Constitution of India in the Santhali language at a function held at the Rashtrapati Bhavan.

About Santhali Language:

- **Linguistic Group:** It belongs to the Austroasiatic language family (Munda branch), making it distinct from Indo-Aryan and Dravidian families.
- **Linkage:** It is closely related to other Munda languages, such as Ho, Mundari, and Korku.
- **Nature:** These languages share common features such as their agglutinative nature (where words are formed by stringing together smaller units of meaning) and their use of tones.
- **Constitutional status:** It was included in the Eighth Schedule of the Constitution through the 92nd Amendment Act, 2003.
- **Geographic Reach:** It is spoken mainly in Jharkhand, West Bengal, Odisha, and Bihar. It also has speakers in Bangladesh, and Nepal.
- **Script:** Santhali uses the Ol Chiki script, a writing system that was developed in 1925 by Pandit Raghunath Murmu, a Santhal scholar and writer.
- **Speakers:** In India, it is spoken by an estimated 7 million people, according to recent census data.

- **Significance:** The language is central to the identity of the Santhal tribe, famous for the Santhal Hul (1855–56) rebellion led by Sidhu and Kanhu Murmu. Santhali has a unique and rich tradition, with its own script and oral literature, reflecting the culture and beliefs of the Santhal tribe.

NARASAPURAM LACE CRAFT

Context:

- Recently, Prime Minister Narendra Modi praised the lace products made by self-help groups in Narsapuram of West Godavari district during his "Man-Ki-Baat."

About Narasapuram Lace Craft:

- **Location:** This craft is associated with Narsapur, which is situated on the bank of Godavari River in the state of Andhra Pradesh.
- **Origin:** It was introduced in 1844 by a Scottish missionary, Macrae, and his wife.
- **History:** It is believed that the women of the farming community of this region started creating highly attractive artefacts from colourful lace, about 150 years ago.
- **Resilience:** The craft has survived the Indian famine (1899) and the Great Depression (1929). By the early 1900s, above 2,000 women were involved in the craft in the Godavari region.
- **Significance:** It was recognized with the Geographical Indication tag in 2024.

- **Raw materials:** It primarily uses fine cotton threads in various thicknesses and colours. Artisans also incorporate silk, rayon, or synthetic threads for decorative pieces, with beads and sequins added to enhance export-quality designs.
- **Technique:** Artisans use crochet needles and fine cotton thread to create intricate floral, geometric, and paisley patterns.
- **Tools:** The main tool is the crochet hook, available in different sizes to create diverse patterns and textures.
- **Design:** This craft showcases intricate floral, geometric, and paisley patterns inspired by nature and traditional motifs.
- **Famous products:** Narsapuram's famed hand-made crochet industry produces doilies, pillow covers, cushion covers, bed spreads, table-runners, and table cloths etc.

DEFENCE & SECURITY

INS TARAGIRI

Context :

- INS Taragiri was delivered to the Indian Navy recently at MDL, Mumbai, marking a major milestone in achieving self-reliance in warship design and construction.

About INS Taragiri:

- **Nature:** It is a reincarnation of the erstwhile INS Taragiri, a Leander-class frigate that was part of the Indian Naval fleet from 1980 to 2013.
- **Construction:** It is the fourth ship of Nilgiri Class (Project 17A) built by Mazagon Dock Shipbuilding Ltd (MDL).
- **Design:** Designed by the Warship Design Bureau (WDB) and overseen by the Warship Overseeing Team (Mumbai), P17A frigates reflect a generational leap in indigenous ship design, stealth, survivability, and combat capability.

- **Significance:** Taragiri is the fourth P17A ship to be delivered to Indian Navy in the last 11 months. The experience gained from construction of first two P17A ships have enabled the build period of Taragiri to be compressed to 81 months, in comparison to 93 months taken for First of the Class (Nilgiri).
- **Step towards Aatamanirbhar Bharat:** With an indigenisation content of 75%, the project has involved over 200 MSMEs and has enabled employment generation of approximately 4,000 personnel directly and more than 10,000 personnel indirectly.
- **Propulsion:** It is configured with Combined Diesel or Gas (CODOG) propulsion plants, comprising a diesel engine and a gas turbine that drive a Controllable Pitch Propeller (CPP) on each shaft, and state-of-the-art Integrated Platform Management System.
- **Weapon suit:** The potent weapon and sensors suite comprises BrahMos SSM, MFSTAR and MRSAM complex, 76mm SRGM, and a combination of 30 mm and 12.7 mm close-in weapon systems, along with rockets and torpedoes for anti-submarine warfare.

INS ARIDHAMAN

Context:

- INS Aridhaman, India's third indigenously built nuclear-powered submarine, is set to be commissioned soon and it is in the final stages of its trial.

About INS Aridhaman:

- **Nature:** It is the second Arihant-class submarine.
- **Construction:** It is being built under the Advanced Technology Vessel (ATV) project to build nuclear submarines at the Ship Building Centre in Visakhapatnam.
- **Significance:** It is the second nuclear-powered ballistic missile submarine (SSBN) being built by India and it reinforces the commitment to the no-first-use (NFU) policy and credible minimum deterrence.

- **Structure:** It has a length of 112 m (367 ft) overall, a beam of 15 m (49 ft), and a draft of 10 m (33 ft). It also features an underwater communications system.
- **Payload:** With a displacement of 7,000 tonnes and a length of 125 metres, it has the capacity to carry a larger number of K-4 missiles. The hull features twin flank-array sonars and Rafael broadband expendable anti-torpedo countermeasures.
- **Crew:** It can accommodate about 95 crew members, including officers and sailors.
- **State of the art systems:** It will be fitted with a combination of two sonar systems – USHUS and Panchendriya. USHUS is a state-of-the-art sonar meant for Kilo-class submarines. Panchendriya is a unified submarine sonar and tactical control system, which includes all types of sonar (passive, surveillance, ranging, intercept and active).
- **Strategic capability:** The submarine enhances India's strike capability and extends its patrolling range into deeper oceans, which is crucial for protecting trade routes and projecting influence in the Indian Ocean Region.

EXERCISE DESERT CYCLONE II

Context:

- Recently, an Indian Army contingent departed for the United Arab Emirates to participate in the second edition of the Joint Military Exercise Desert Cyclone II.

About Exercise Desert Cyclone II:

- **Countries involved:** Desert Cyclone II is the second edition of the India–U.A.E. Joint Military Exercise.
- **Origin:** The Exercise was first held in 2024 between the Indian Army and the U.A.E. Land Forces.
- **Objective:** The core objective of the exercise is to enhance interoperability and strengthen defence cooperation between the Indian Army and the U.A.E. Land Forces.
- **Indian representation:** The Indian contingent comprises 45 personnel, primarily drawn from a Mechanised Infantry Regiment battalion of the Indian Army.
- **Follows UN mandate:** The exercise focuses on sub-conventional operations in urban environments under a United Nations mandate, preparing forces for peacekeeping, counter-terrorism, and stability operations.

- **Focus areas:**
  - Joint training includes fighting in built-up areas, heliborne operations, and detailed joint mission planning.
  - A key feature is the integration of Unmanned Aerial Systems (UAS) and counter-UAS techniques for conducting urban military operations.
  - It reflects deepening military diplomacy, shared strategic interests, and growing operational synergy between India and the U.A.E.

EXERCISE HARIMAU SHAKTI

Context:

- The Fifth edition of Joint Military exercise "Exercise Harimau Shakti -2025" commenced today in Mahajan Field Firing Range, Rajasthan.

About Exercise Harimau Shakti:

- **Countries involved:** It is a joint military exercise conducted between India and Malaysia.
- **Objective:** The aim of the exercise is to jointly rehearse conduct of Sub Conventional Operations under Chapter VII of United Nations Mandate.
- **Origin:** Started in 2012, it reinforces India's Act East Policy and commitment to global peacekeeping frameworks.
- **Significance:** The exercise will foster strong bilateral relations between the two nations.
- **Indian representation:** The Indian contingent is being represented mainly by troops from the DOGRA Regiment.
- **Other Military Exercises between India and Malaysia:** These are Samudra Laksamana (bilateral maritime exercise), and Udara Shakti (bilateral air force exercise).
- **Key Highlights of Exercise Harimau Shakti 2025:**
    - In this exercise both sides will rehearse drills to secure helipads and undertake casualty evacuation during counter-terrorist operations.
    - Both sides will practice tactical actions such as cordon, search and destroy missions, heliborne operations, etc.
    - Both sides will exchange views and practices of joint drills on a wide spectrum of combat skills that will facilitate the participants to mutually learn from each other.
    - Sharing of best practices will further enhance the level of defence cooperation between Indian Army and Royal Malaysian Army.

BORDER ROADS ORGANISATION (BRO)

Context :

- Defence Minister recently inaugurated 125 border infrastructure projects, marking the highest number of inaugurations by Border Roads Organisation in a single day.

About Border Roads Organisation (BRO):

- **Nature:** It is a road construction executive force in India that provides support to the Indian Armed Forces.
- **Establishment:** It was formed on 7 May 1960 to secure India's borders and develop infrastructure in remote areas of the north and northeastern states of the country.
- **Mandate:** It develops and maintains road networks in India's border areas and friendly neighbouring countries. This includes infrastructure operations in 19 states and three union territories (including Andaman and Nicobar Islands) and neighbouring countries such as Afghanistan, Bhutan, Myanmar, Tajikistan, and Sri Lanka.
- **Nodal ministry:** It was entirely brought under the Ministry of Defence in 2015 to enhance border connectivity and operational efficiency (though it previously received funds from the Ministry of Road Transport & Highways).

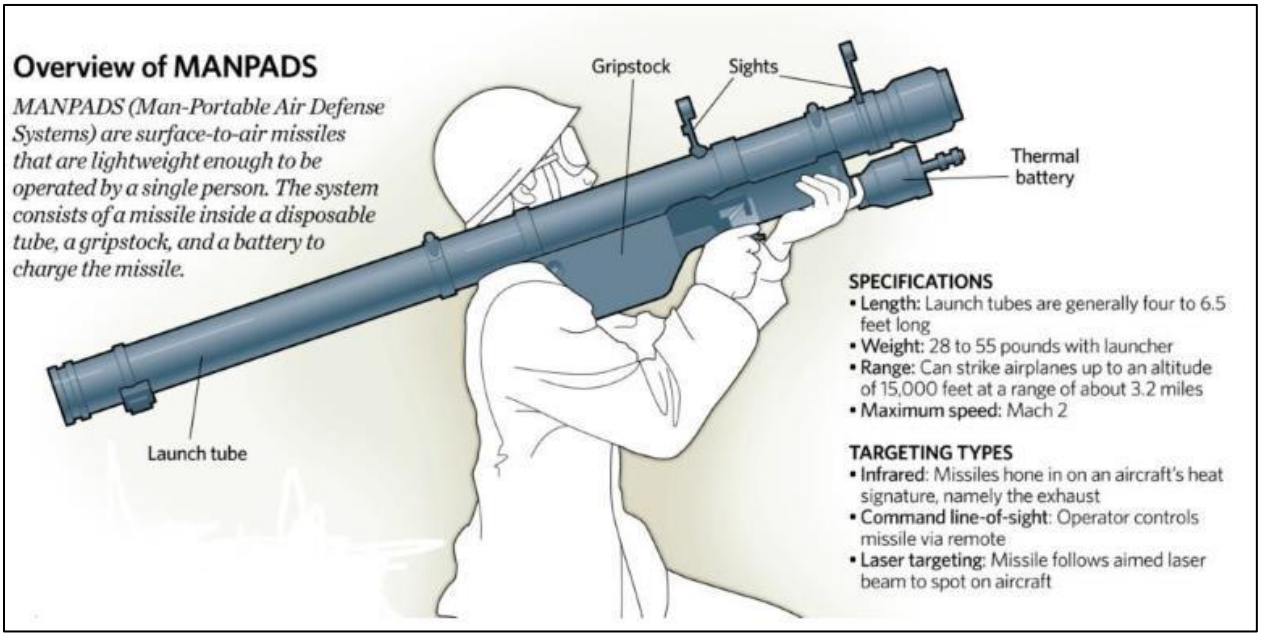
- **Motto:** Its motto is 'Shramena Sarvam Sadhyam (everything is achievable through hard work).'
- **Specialisation:** It specialises in constructing and maintaining Roads, Bridges, Tunnels, Airfields and Marine Works across some of the world's most challenging terrains.
- **Role during national emergencies:** It has an operational role during national emergencies, when it provides direct support to the Army in the maintenance of roads in the forward zones. It also provides the workforce for the rehabilitation of certain forward airfields of the Indian Air Force during operations.
- **Inclusion in Order of Battle:** It is included in the Order of Battle of the Armed Forces, ensuring their support at any time.
- **Leadership:** The Government of India has set up the Border Roads Development Board (BRDB) with the Prime Minister as Chairman of the Board and the Defence Minister as Deputy Chairman.

- **Cadre:** Officers and personnel from the General Reserve Engineer Force (GREF) form the parent cadre of the BRO. It is also staffed by officers and troops drawn from the Indian Army's Corps of Engineers on extra-regimental employment (on deputation).

MANPADS

Context :

- Indian Army is undertaking a strategic shift in its air defence operations, repurposing its MANPADS to specifically counter the rising threat of sub-sonic cruise missiles.



About MANPADS:

- **Full form:** MANPADS stands for Man-Portable Air Defence Systems.
- **Nature:** MANPADS are surface-to-air missiles that can be fired by an individual or a small team of people against aircraft. These weapon systems often are described as shoulder-fired anti-aircraft missiles.
- **Structure:** MANPADS are generally less than 2 metres in length and weigh approximately 10–20 kg,

- **Range:** MANPADS are most effective against low-flying aircraft (helicopters, UAVs, and cruise missiles) within a range of 8 km and an altitude of up to 4.5 km.
- **First deployment:** The United States and the Soviet Union first deployed MANPADS—the Redeye and Strela systems, respectively—in the 1960s to provide their infantries with portable anti-aircraft weapons.
- **Global operation:** The militaries of about 105 countries across the world operate MANPADS, although only 12 countries, including India, produce them.
- **Famous varieties:** The most famous MANPADS are the US-made 'Stinger' and the Soviet 9K32 Strela-2, or simply 'SA-7' with the China-made 'FN-16' being the latest entrant.
- **Types:** Three general types of MANPADS exist: command line of sight, laser guided, and infrared seekers.
    - Command line-of-sight MANPADS are guided to their targets through the use of a remote control.
    - Laser-guided or laser beam rider MANPADS follow a laser projected onto the target.
    - The most common MANPADS, frequently called heat seeking missiles, however, are infrared seekers that acquire their target by detecting the heat of an aircraft's engine.
- **India's MANPADS arsenal:** India is one of the 12 countries that produce these systems.
    - Igla-S: A Russian-origin system recently inducted to replace the aging Igla-M. It has a range of up to 6 km.
    - VSHORADS: An indigenously developed system by DRDO (Research Centre Imarat). As of now, it has undergone successful flight trials to neutralize drones and low-altitude threats.

ICG SHIP AMULYA

Context :

- Recently. Indian Coast Guard (ICG) Ship 'Amulya', the third in the series of eight new-generation Adamya-class Fast Patrol Vessels, was commissioned in Goa.

About ICG Ship Amulya:

- **Nature:** It is the third in the series of eight new-generation Adamya-class Fast Patrol Vessels.
- **Construction:** It is designed and built indigenously by Goa Shipyard Limited (GSL).
- **Indigenization:** It features more than 60% indigenous content, aligning with the "Make in India" and Atmanirbhar Bharat missions.
- **Location:** It will be based at Paradip, Odisha, operating under the administrative and operational control of the Commander, Coast Guard Region (North East).
- **Design:** It integrates modern design philosophy focused on efficiency, endurance, and rapid response capability.

- **Functions:** It will undertake functions like surveillance, interdiction, Search & Rescue, anti-smuggling operations, and pollution response.
- **Propulsion:** It is powered by two 3000 KW advanced diesel engines.
- **Speed:** The ship delivers a top speed of 27 knots and an operational endurance of 1,500 nautical miles.

- **Armaments:** It is fitted with indigenous state-of-the-art weapons/systems, offering superior manoeuvrability, operational flexibility and enhanced performance at sea.

ANJADIP SHIP

Context :

- Recently, 'Anjadip', the third of eight ASW SWC (Anti-Submarine Warfare Shallow Water Craft), was delivered to the Indian Navy at Chennai.

About Anjadip Ship:

- **Nature:** It is the third of eight Anti-Submarine Warfare Shallow Water Craft.
- **Construction:** It is indigenously designed and built by Garden Reach Shipbuilders and Engineers (GRSE), Kolkata, in collaboration with L&T Shipyard, Kattupalli, under a Public-Private Partnership (PPP).
- **Nomenclature:** The ship derives its name from Anjadip Island located off the coast of Karwar, Karnataka.
- **Legacy:** The ship is a reincarnation of the erstwhile INS Anjadip, a Petya class Corvette decommissioned in 2003.

- **Role:** It is primarily designed for sub-surface surveillance in coastal waters, anti-submarine operations, mine-laying, and Low Intensity Maritime Operations (LIMO).
- **Capacity:** It has displacement capacity of 900 tons with a maximum speed of 25 knots and an endurance of 1,800 nautical miles.
- **Uniqueness:** It is the largest Indian Naval Warship propelled by Waterjets, which are equipped with state-of-the-art Lightweight Torpedoes, indigenously designed Anti-Submarine Rockets and shallow water SONAR.
- **Indigenisation:** The ship stands as a testament to the growing domestic defence manufacturing ecosystem. It boasts over 80% indigenous content, aligning with the 'Aatmanirbhar Bharat' and 'Make in India' initiatives.
- **Significance:** The ship will strengthen Navy's Anti-Submarine, coastal surveillance and mine laying capabilities.

AKASH-NG MISSILE SYSTEM

Context :

- Recently, DRDO successfully completed the User Evaluation Trials of Next Generation Akash missile (Akash-NG) system.

About Akash-NG Missile System:

- **Nature:** Akash Next Generation (Akash-NG) is a state-of-the-art surface-to-air missile (SAM) defence system.
- **Development:** It was developed by the Defence Research and Development Organisation (DRDO) and produced by Bharat Dynamics Limited (BDL).
- **Objective:** It is designed to protect vulnerable areas and points from air attacks.
- **Legacy:** It succeeds the original Akash missile system, which has been operational with the Indian Air Force since 2014 and the Army since 2015.

- **Weight:** The next-generation variant is lighter, weighing approximately 350 kilograms compared to the original's 720 kilograms.
- **Advanced features:** It features an indigenously developed Active Electronically Scanned Array (AESA), multi-function radar and an Active Radio Frequency (RF) Seeker for high precision.
- **Range:** It is designed to engage multiple targets simultaneously, with a range of up to 30 km and an altitude of 18 km.
- **Firing rate:** It has the ability to engage up to 10 targets simultaneously, with a firing rate of one missile every 10 seconds.
- **Speed:** It can reach speeds up to Mach 2.5.
- **Propulsion:** It uses a dual-pulse solid rocket motor, which is lighter and more efficient than the older ramjet engine.

- **Deployment:** The system can also be deployed in various configurations, including mobile and fixed installations.
- **Indigenization:** It reflects the "Atmanirbhar Bharat" initiative, with nearly all subsystems, including the seeker and command-and-control units, being developed in-house.
- **Enhanced Mobility:** The system is canisterized, meaning it is stored in specialized compartments that improve shelf life and allow for rapid deployment across different terrains.

K-4 MISSILE

Context :

- Recently, India tested an intermediate-range ballistic missile called K-4, from the nuclear-powered submarine INS Arighaat in the Bay of Bengal.

About K-4 Missile:

- **Nature:** Kalam-4 or K-4 Missile, is a nuclear-capable intermediate-range submarine-launched ballistic missile (SLBM) designed mainly for deployment on Arihant-class submarines. Each Arihant-class submarine can carry four K-4 missiles.
- **Development:** K-4 was indigenously developed by the Defence Research and Development Organisation (DRDO).
- **Structure:** The 12-metre-long missile weighing 17 tonnes has a two-stage solid-fuel system.
- **Range:** It has a range of around 3,500 km. It is a major improvement over the older K-15 missile, which had a much shorter range of only 750 kilometers.

- **Payloads:** It can carry payloads, up to 2 tons, including a nuclear warhead.
- **Uniqueness:** One of its key features is its ability to be cold-launched from underwater, which allows the missile to be ejected from the submarine before the engine ignites.
- **Accuracy:** It is guided by an advanced inertial navigation system supported by GPS and India's NavIC system. This combination ensures high accuracy, with a reported circular error probable of less than 10 metres.
- **Launch Mechanism:** It is a "cold-launched" missile, meaning it is ejected from the submarine using gas pressure before its engine ignites once it clears the water. The missile is also equipped with manoeuvring features that help it evade missile defence systems.

SAMUDRA PRATAP

Context :

- Recently, the Indian Coast Guard inducted the first in-built Pollution Control Vessel (PCV), SAMUDRA PRATAP under the 02 PCV project of Goa Shipyard Limited (GSL).

About Samudra Pratap:

- **Nature:** It is the largest ship in the ICG fleet, significantly enhancing the Coast Guard's operational reach and capability.
- **Construction:** It is indigenously designed and constructed by Goa Shipyard Limited (GSL).
- **Uniqueness:** It is the first indigenously designed and built Pollution Control Vessel of the Indian Coast Guard.
- **Significance:** It is the first Indian Coast Guard ship to be equipped with Dynamic Positioning capability (DP-1), with FiFi-2 / FFV-2 notation certificate.
- **Structure:** It is approximately 114.5 meters long and 16.5 meters wide, with a displacement of 4,170 tonnes.

- **Capacity:** It has a displacement capacity of 4,170 tonnes.
- **Capability:** It is equipped with advanced systems to detect oil spills. It is capable of high precision operations, recover pollutants from viscous oil, analyse contaminants, and separate oil from contaminated water.
- **Armament:** The vessel is equipped with state-of-the-art technology, including a 30mm CRN-91 gun, two 12.7mm stabilised remote-controlled guns with integrated fire control systems.
- **Advanced systems:** It consists of Integrated Bridge System, Integrated Platform Management System, Automated Power Management System, and a high-capacity external firefighting system.

GOVT. INITIATIVES, SCHEMES AND POLICIES, ORGANISATION

NATIONAL MISSION FOR MENTORING (NMM)

Context:

- UGC has instructed the Higher Education Institutions (HEIs) to select college professors to train school teachers under National Mission for Mentoring (NMM).

About National Mission for Mentoring (NMM):

- **Launch:** It was launched on 29th July 2022 in selected 30 Central Schools (15 KVs, 10 JNVs, 5 CBSE) across the country.
- **Objective:** It aims to create a supportive environment, enhance mentorship experiences and contribute to individual and collective growth.
- **Nodal ministry:** It is the flagship initiative of the Department of School Education and Literacy, Ministry of Education.
- **Functions:** It provides platforms for professionals and experts where they can share knowledge, skills and expertise as a Mentor with Mentee teachers and help them in their journey to become effective teachers.
- **In sync with NEP 2020:** It is in line with the National Education Policy (NEP) 2020.
- **Implementing authority:** National Council for Teacher Education (NCTE) has been assigned to develop and design the modalities for the mission. NCTE released a comprehensive document on the mission (NMM – The Blue Book) with a detailed roadmap of its framework and implementation strategy.
- **Phases of implementation:**
    - Pilot phase: It was first tested in 30 Central Schools (15 Kendriya Vidyalayas, 10 Jawahar Navodaya schools, and 5 CBSE schools) with 60 mentors, some even Padma Awardees.
    - Building capacity: Seminars and workshops are conducted to teach "Master Mentors" who can subsequently teach others.
    - Incentivisation: Although participation is voluntary, the NMM manual encourages participants to do so with certificates, performance credits and other incentives.

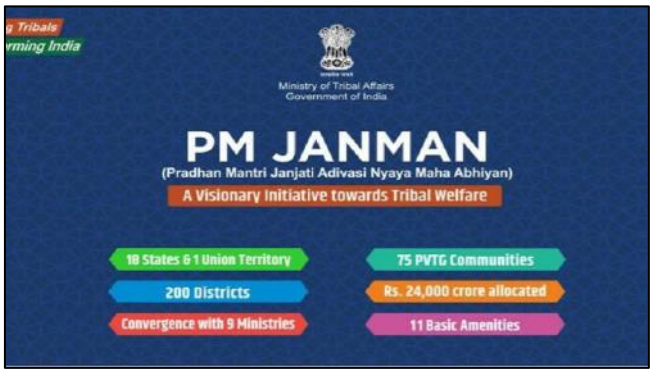
PM-JANMAN SCHEME

Context:

- Members of the Bonda community in Odisha's Malkangiri are set to transition from fragile thatched huts to permanent pucca houses under the PM-JANMAN Scheme.

About PM-JANMAN Scheme:

- **Full form:** PM-JANMAN stands for Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan.
- **Launch:** PM JANMAN was launched on 15th November 2023, a day also celebrated as Janjatiya Gaurav Divas.
- **Objective:** It aims to enhance the socio-economic conditions of Particularly Vulnerable Tribal Groups (PVTGs) by providing comprehensive development interventions and by recognizing their unique contribution to national and global development.



- **Beneficiaries:** The scheme targets 75 PVTG communities across 18 states and 1 Union Territory (Andaman & Nicobar Islands) as its beneficiaries.
- **Budgetary Outlay:** The total budgetary outlay for the scheme is Rs 24,104 crore, with the central share being Rs 15,336 crore and the state share being Rs 8,768 crore.
- **Coverage Period:** The scheme extends from 2023-24 to 2025-26.
- **Focus areas:** The scheme is aimed at providing PVTG households and habitations with:
    - basic facilities such as safe housing, clean drinking water and sanitation,
    - improved access to education, health and nutrition,
    - road and telecom connectivity, and sustainable livelihood opportunities.
    - In addition, saturation will also be ensured for schemes like Pradhan Mantri Jan Arogya Yojana (PMJAY), Sickle Cell Disease Elimination, TB Elimination, 100% immunisation, PM Poshan, PM Jan Dhan Yojana, etc
- **Implementation:** The scheme (comprising Central Sector and Centrally Sponsored Schemes) will be implemented by the Ministry of Tribal Affairs, in collaboration with the State governments and the PVTG communities.
- **Other provisions:** 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.

UMEED PORTAL

Context:

- Government of India recently said that it will not impose any penalties for next three months against those who have not registered waqf properties on the UMEED Portal.

About UMEED Portal:

- **Full form:** UMEED stands for 'Unified Waqf Management, Empowerment, Efficiency, and Development.'
- **Mandate:** It acts as the centralized digital platform for real-time uploading, verification, and monitoring of Waqf properties.

- **Nodal Ministry:** It comes under Ministry of Minority Affairs, Government of India.
- **Legal Support:** It was formed under the Unified Waqf Management, Empowerment, Efficiency and Development Act, 1995.
- **Management:** Under this initiative, the registrations of properties are facilitated by respective State Waqf Boards.
- **Key Features of the portal:**
    - Time-Bound Registration: All Waqf properties must be registered within 6 months of launch.
    - Geotagging and Digitization: Properties must include precise measurements and geolocation data during registration.
    - Dispute Resolution: Unregistered properties after deadline will be declared disputed and sent to Waqf Tribunal.

  - User Support Services: Provides legal awareness tools and clarifies rights under amended law.
  - Women-Centric Provision: Properties under women's names cannot be designated as Waqf, but women, children, and EWS will remain eligible beneficiaries.
- **Major objectives of the portal:**
  - To ensure transparent and time-bound registration of Waqf properties.
  - To empower beneficiaries with digital access to rights, obligations, and legal safeguards.
  - To resolve long-standing property disputes and enhance accountability.
  - To facilitate policy-level insights through real-time data and geotagged mapping.

SAMPANN PORTAL

Context:

- Controller General of Communication Accounts recently inaugurated the onboarding of all MTNL employees retiring in November 2025 onto the SAMPANN portal at Delhi.

About SAMPANN Portal:

- **Nature:** SAMPANN stands for "System for Accounting and Management of Pension," and it is a Comprehensive Pension Management System (CPMS).
- **Nodal ministry:** It is an initiative undertaken by the Controller General of Communication Accounts (CGCA), Department of Telecommunications, Ministry of Communications.
- **Launch:** It was launched on 29th December, 2018.
- **Objective:** It aims to bring the pension processing, sanctioning, authorisation, and payment units under a common platform. It also provides direct credit of pension into the bank accounts of pensioners.
- **Significance:** The system has helped the Department in faster settlement of pension cases, improved reconciliation, and ease of accounting. It also provides online grievance management for the pensioners and faster processing of arrears and revision of pension.
- **Use of DBT:** Pensions are disbursed directly into the bank accounts of pensioners, ensuring timely and secure payments.
- **Single-Window System:** It serves as a unified platform for all aspects of the pension process, including online grievance management and tracking of pension status.
- **Enhanced transparency:** Pensioners can track their pension status from home and access key information like payment history and e-PPOs (electronic Pension Payment Orders) through a personalized dashboard.

APAAR ID

Context:

- Recently, the Orissa High Court directed education authorities to amend the consent form used for generating APAAR IDs to include an explicit opt-out option.

About APAAR Id:

- **Full Form:** It is an acronym for Automated Permanent Academic Account Registry.
- **Nature:** It is a specialised identification system designed for all students in India, beginning from an early age.
- **Objective:** It aims to streamline and enhance the academic experience for students throughout India by assigning a unique and permanent 12-digit ID to each student, consolidating their academic records into a single accessible platform.

- **In sync with NEP:** It is introduced in accordance with the National Education Policy (NEP) of 2020 and the National Credit and Qualifications Framework (NCrF).
- **Voluntary:** Registration for an APAAR ID is voluntary, not mandatory.
- **Tracks academic progress:** Under the initiative, each student would get a lifelong APAAR ID, making it easy for the learners, schools, and governments to track academic progress from pre-primary education to higher education.
- **Linked to Academic Bank of Credits (ABC):** Every individual will have a unique APAAR ID, which will be linked to the Academic Bank of Credit (ABC). With the APAAR ID, students would be able to store all their certificates and credits, whether they come from formal education or informal learning.
- **Gateway to Digilocker:** It would serve as a gateway to Digilocker. When a student would complete a course or achieve something, it would be digitally certified and securely stored in his/her account by authorised institutions.
- **Enhanced transparency:** It ensures accountability and transparency in education by streamlining academic records. It enhances efficiency, combats fraud, and includes co-curricular achievements for holistic student development.
- **Data-driven decision-making:** With multiple use cases, APAAR facilitates a smooth transfer process and supports data-driven decision-making in educational institutions.

COALSETU POLICY

Context:

- The Union Cabinet Committee on Economic Affairs recently approved the CoalSETU Policy by creation of new window in the NRS Linkage Policy.

About CoalSETU Policy:

- **Full Form:** CoalSETU stands for Coal Linkage for Seamless, Efficient & Transparent Utilisation.
- **Nature:** It is a new auction-based coal linkage window under the Non-Regulated Sector (NRS) Linkage Policy, allowing any domestic industrial buyer to secure long-term coal linkages for own use or export (up to 50%), except resale within India.

- **Objective:** It will allow allocation of coal linkages on auction basis on long-term for any industrial use and export.
- **Nodal ministry:** It is implemented by Ministry of Coal, Government of India.
- **Participation:** Any domestic buyer requiring coal can participate in the linkage auction. Traders are not allowed to bid under this window.
- **Key features of the policy:**
    - New CoalSETU Window in NRS Policy (2016): It allows any industrial consumer to participate in coal linkage auctions. Existing NRS auctions for cement, sponge iron, steel, aluminium, CPPs will continue.
    - No End-Use Restrictions: Coal can be used for own consumption, washing, or export (up to 50%). Coking coal is excluded from this window.

- Export Flexibility: Companies may export up to 50% of allotted coal. Coal can also be shared across group companies as per operational needs.
- Alignment with Coal Sector Reforms: It complements the 2020 reform allowing commercial mining without end-use restrictions.

- **Focus areas:**
  - To ensure transparent, seamless and efficient utilisation of domestic coal resources.
  - To promote ease of doing business and reduce dependence on coal imports.
  - To boost availability of washed coal and support export opportunities.

SHAKTI SCHOLARS YOUNG RESEARCH FELLOWSHIP

Context:

- Recently, NCW launched SHAKTI Scholars Young Research Fellowship programme, inviting applications to undertake policy-oriented research on issues affecting women.

About Shakti Scholars Young Research Fellowship:

- **Nature:** It is a six-month program aimed at supporting emerging scholars in researching women's issues in India.
- **Launched by:** It is an initiative of the National Commission for Women.
- **Duration:** The fellowship lasts for six months.
- **Objectives:**
  - To encourage research on women's issues from a multidisciplinary perspective.
  - To promote academic and policy-oriented studies that contribute to gender equality, safety, and empowerment.
  - To provide opportunities for young scholars to engage in meaningful research that can support the Commission's mandate

- **Eligibility:**
  - Academic: Must hold at least a graduate degree; preference is given to those completed or pursuing Masters, M.Phil., or Ph.D. in relevant fields.
  - Nationality & Age: The fellowship is open to Indian citizens aged between 21 and 30 years who hold at least a graduation degree from a recognised institution.
  - Financial Support: Selected candidates will receive a research grant of Rs 1 lakh to undertake a six-month study.
- **Research areas:** These include women's safety and dignity, gender-based violence, legal rights and access to justice, cyber safety, implementation of the Prevention of Sexual Harassment (POSH) framework, etc.

MISCELLANEOUS

ASIA POWER INDEX

Context :

- India has secured third ranking in the Asia Power Index 2025, while the U.S. and China occupy the first and second spots.

About Asia Power Index:

- **Publishing agency:** It is published annually by the Australia-based think tank, Lowy Institute.
- **Launch:** It was launched in 2018, and it assesses the power dynamics across 27 Asia-Pacific countries.
- **Objective:** It assesses the ability of nations, particularly of those in the Asian continent, to influence their external environment.

- **Criteria:** It is based on 131 indicators across eight thematic measures, including Military Capability and Defence Networks, Economic Capability and Relationships, Diplomatic and Cultural Influence and Resilience and Future Resources.
- **Key highlights of Asia Power Index 2025:**
  - India has secured third ranking in the Asia Power Index 2025, while the U.S. and China occupy the first and second spots.
  - India ranks third for two measures: economic capability and future resources.
  - India's economic and military capability have both increased in the 2025 edition of the Asia Power Index.
  - India's economy has continued to grow strongly and made small gains in terms of its geopolitical relevance – defined in terms of international leverage, connectivity, and technology.

PARAM VIR CHAKRA (PVC)

Context:

- Portraits of all 21 Param Vir Chakra awardees are now on display at Rashtrapati Bhavan, replacing the previously displayed portraits of 96 British Aide-de-Camps.

About Param Vir Chakra (PVC):

- **Establishment:** It was introduced on January 26, 1950, on the first Republic Day with retrospective effect from 15 August 1947.
- **Nomenclature:** Literally, Param Vir Chakra means 'Wheel (or Cross) of the Ultimate Brave'.
- **Uniqueness:** It is India's highest military decoration, awarded for displaying the most exceptional acts of valour, courage, and self-sacrifice during war.
- **Order of Precedence:** It is followed by the Ashoka Chakra (peacetime), Maha Vir Chakra, Kirti Chakra, Vir Chakra, and Shaurya Chakra.
- **Eligibility:** It can be awarded to officers, men, and women of all ranks of the Army, the Navy, and the Air Force; of any of the Reserve Forces, of the Territorial Army Militia; and of any other lawfully constituted Armed Forces. It can be, and often has been, awarded posthumously.
- **Similarity:** It is similar to the British Victoria Cross, the US Medal of Honor, the French Legion of Honor, or the Russian Cross of St. George.
- **Design:** The medal was designed by Mrs. Savitri Khanolkar.
- **Structure:** The medal is cast in bronze and circular in shape. In the centre, on a raised circle, is the state emblem, surrounded by four replicas of Indra's Vajra, flanked by the sword of Shivaji.
- **First winner:** Major Somnath Sharma, from the Kumaon regiment was the first recipient of the award for his actions in the 1947 Indo-Pak War.
- **Recipients:** Till now, only 21 people had been given the Param Vir Chakra award, of which 14 are posthumous.

HAKA DANCE

Context :

- Recently, a Sikh Nagar Kirtan or religious procession in South Auckland, New Zealand, was protested in the form of a traditional tribal "haka" dance.

About Haka Dance:

- **Origin:** It is a traditional dance of the indigenous Māori people of New Zealand.
- **Nature:** It is known for its powerful energy, fierce facial expressions (pukana), and physical movements like stamping, hand gestures, and chanting.
- **Mythology:** Rooted in Māori mythology, the dance is associated with Tāne-rore, the son of the sun god Tama-nui-te-rā. The shimmering heat of a summer day is seen as the spirit of Tāne-rore dancing, represented by the trembling hand movements (wiri) in the Haka.

- **Significance:** Haka varies by tribal region, with many haka telling the story of significant events in a tribe's history. It symbolizes tribal pride, strength, and unity.
- **Evolution:** Traditionally, the haka was performed for war, to celebrate achievements, or to welcome guests. Today, it is performed at important occasions like sporting events, weddings, and funerals.
- **Popularity:** It became known to the world at large when, in the early 20th century, it was incorporated into the pregame ritual of New Zealand's national rugby union team, the All Blacks.

It also made headlines globally in November 2024 when two lawmakers used Haka to protest against a bill in the New Zealand parliament.

RASHTRIYA PRERNA STHAL

Context:

- Recently, Prime Minister Narendra Modi inaugurated the Rashtra Prerna Sthal in Lucknow, dedicated to Atal Bihari Vajpayee, marking his 101st birth anniversary.

About Rashtriya Prerna Sthal:

- **Location:** It is located on the banks of the Gomti River in Lucknow, Uttar Pradesh.
- **Development:** It is developed by the Lucknow Development Authority (LDA) on a 65-acre site along the Gomti Riverfront (Vasant Kunj Yojana).
- **Area:** It is spread across 65 acres.
- **Environmental significance:** The site was notably constructed on reclaimed land that previously held approximately 6.5 lakh metric tonnes of legacy waste, serving as a model for urban environmental restoration.

- **Dedicated leaders:** The memorial honours three primary nationalist icons:
  - Atal Bihari Vajpayee: Former PM and Bharat Ratna recipient.
  - Dr. Syama Prasad Mookerjee: Founder of Bharatiya Jana Sangh.
  - Pandit Deendayal Upadhyaya: Proponent of the "Integral Humanism" philosophy.
- **Statues:** The sprawling complex also features 65-foot-high bronze statues of BJP ideologues Syama Prasad Mookerjee and Pandit Deendayal Upadhyaya, alongside Vajpayee. Each statue weighs 42 tonnes and has a water body surrounding their platforms.
- **Museum:** It consists of a state-of-the-art lotus-shaped museum covering 98,000 square feet. It uses digital and immersive technologies (3D projection, holographs) across five galleries to showcase India's national journey.
- **Cost:** Constructed at an approximate cost of ₹230 crore, the complex is envisioned as a permanent national asset dedicated to fostering leadership values, national service, cultural consciousness, and public inspiration.
- **Public Amenities:** It includes an amphitheatre with a capacity for 3,000 people, meditation and yoga centres, and a large rally ground.
- **Significance:** It has been developed as a landmark national memorial and inspirational complex of enduring national significance.

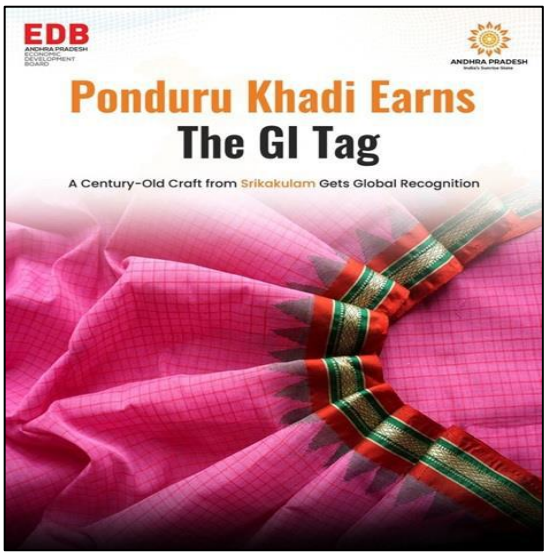
PONDURU KHADI

Context :

- Ponduru Khadi, which was appreciated by Mahatma Gandhi 100 years ago, recently received Geographical Indication (GI) tag.

About Ponduru Khadi:

- **Location:** Ponduru Khadi, is a famous handspun and handwoven cotton fabric from Andhra Pradesh.



- **Other names:** It is locally known as Patnulu and it is produced in Ponduru village in Srikakulam district.
- **Associated schemes:** It has been nominated for the One District One Product (ODOP) scheme from the Srikakulam district.
- **Historical significance:** During the pre-independence era, Mahatma Gandhi mentioned its virtues in his Young India (the national weekly that Gandhiji edited).
- **Raw material:** It is produced from one of three types of cotton: hill cotton, punasa cotton, or red cotton.
- **Source of cotton:** Cotton is indigenous to Srikakulam district and is grown in and around Ponduru. The entire process, from cotton to fabric, is carried out manually.
- **Uniqueness:** The process of cleaning the cotton with the jawbone of Valuga fish is unique to Ponduru khadi and is not practiced anywhere else in the world. Ponduru is the only place in India where spinners still use single-spindle charkhas with 24 spokes, also known as the "Gandhi Charkha".
- **High quality fabric:** The fabric is known for its very high yarn count of about 100–120, indicating extreme fineness.

DARJEELING MANDARIN ORANGE

Context :

- Recently, the 'Darjeeling Mandarin Orange' has officially been granted the Geographical Indication (GI) tag.

About Darjeeling Mandarin Orange:

- **Scientific name:** It is botanically known as Citrus reticulata Blanco
- **Nature:** The Mandarin Orange is a major cash crop of the Darjeeling Hills and it is widely recognised for its rich aroma and flavour.
- **Growing areas:** It is grown in the hills of Darjeeling in West Bengal.
- **Other names:** It is commonly known as "suntala" is the pride of Darjeeling hills due to its delightful aroma and flavour.
- **Significance:** It is the third product from the region, after Darjeeling Tea and Dalley Khursani chilli, to get the tag.
- **Required Climatic Conditions for its growth:**
    - It is cultivated at elevations ranging from 600 to 1500 meters above sea level,
    - They grow successfully in all frost free tropical and sub-tropical regions upto 1,500 m. above mean sea level.
    - Annual rainfall should be 100-120 cm.
    - Temperature should range from 10–35°C is suitable for cultivation of the crop.
    - The preferred soil is medium or light loamy soils.

CHENCHU TRIBE

Context :

- NSU organised an exhibition on Ahobila Paruveta Utsavam, highlighting the Chenchu tribe's unique traditional association with Ahobilam shrine and Lord Narasimha.

About Chenchu Tribe:

- **Location:** The Chenchus are a food-gathering tribe primarily residing in the Nallamalai forests of Andhra Pradesh. They are also found in Telangana, Karnataka, and Odisha.
- **Uniqueness:** They are one of the Particularly Vulnerable Tribal Groups (PVTGs) in Andhra Pradesh.
- **Language:** They speak variants of Telugu, the Dravidian language of the region.

- **Habitat:** A Chenchu village is known as "Penta". Each penta consists of a few huts that are spaced apart and are grouped together based on kinship patterns.
- **Social order:** "Peddamanishi" or the village elder, is generally the authority to maintain social harmony in a family or a village.
- **Norms of equality:** Small conjugal families predominate, women taking equal rank with men and marrying only upon maturity.
- **Rituals:** Their rituals are few and simple; religious and political specializations are slight.
- **Livelihood:** The Chenchu live life with exemplary simplicity. Most of them still gather food from the forest and roam in it to find things to meet their needs. The bow and arrow and a small knife are all the Chenchus possess to hunt and live.
- **Work with cooperatives:** The Chenchus collect forest products like roots, fruits, tubers, beedi leaf, mohua flower, honey, gum, tamarind, and green leaves and make a meagre income from it by selling these to traders and government cooperatives.
- **Religion:** Chenchus worship a number of deities. Chenchus have also adopted certain religious practices from Hindus.
- **Association with Srisailam temple:** For ages, the Chenchus have been associated with the famous Srisailam temple (dedicated to Lord Shiva and Devi Brahmaramba) in Andhra Pradesh, situated at the heart of Chenchu land. The Chenchus enjoy special privileges at Srisailam temple.

MAINS

PAPER 1

MIGRATION AS A STRUCTURAL FORCE RESHAPING INDIAN DEMOCRACY

Context (Introduction):

- India is witnessing unprecedented population mobility due to urbanisation, labour markets, education and marriage. With over one-third of Indians classified as migrants, migration is no longer marginal but a structural force reshaping democracy, representation, and governance.

Scale and Nature of Migration in India

- **Magnitude:** Census 2011 recorded **45.3 crore migrants**, constituting **37.7% of India's population**, up from 31% in 2001.
- **Internal Dominance:** Over **99% of Indian migrants are internal migrants**, making migration primarily a domestic governance challenge.
- **Gender Composition:** Around **68–70% of migrants are women**, largely due to marriage, while male migration is predominantly economic.
- **Economic Drivers:** NSS and Periodic Labour Force Survey (PLFS) show **employment and livelihood** as the leading reasons for long-distance male migration.

Migration and Urbanisation Linkages

- **Urban Pull:** Economic Survey highlights that **urban areas generate over 60% of GDP**, accelerating rural-to-urban migration.
- **City Transformation:** Cities like Delhi, Mumbai, Bengaluru and Hyderabad have migrant populations exceeding **35–45%**.
- **Labour Dependence:** Construction, manufacturing, logistics, domestic work and services are heavily migrant-dependent.
- **Invisible Citizenship:** Despite economic centrality, migrants remain politically under-represented in destination cities.

Citizenship–Territory Mismatch

- **Territorial Assumption:** Democratic rights presume stable residence within a fixed constituency.
- **Mobility Reality:** Migrants live, work and pay taxes in destination regions but vote (if at all) in source regions.
- **Political Dislocation:** This weakens accountability of urban local bodies and distorts representative democracy.
- **Global Parallel:** Similar challenges are visible in the U.S., EU, Gulf states and Southeast Asia, where mobility outpaces political inclusion.

Migration and Electoral Governance

- **Electoral Roll Stress:** Election Commission cites migration as a key cause of **duplicate and outdated voter entries**.

- **Special Intensive Revision (SIR):** Triggered by rapid mobility, urbanisation and multiple registrations across constituencies.
- **Voting Exclusion:** Migrant workers often fail to vote due to distance, documentation gaps and work constraints.
- **Policy Gap:** Unlike postal ballots for service voters, **no nationwide migrant voting mechanism exists** for internal migrants.

Migration and Federal Representation

- **Uneven Flows:** Bihar, Uttar Pradesh, Rajasthan and Odisha are net migrant-sending States, while Maharashtra, Delhi, Gujarat, Tamil Nadu and Kerala are net receivers.
- **Political Consequence:** Voting location determines political weight; migrants voting in source States dilute representation in destination States.
- **Delimitation Impact:** Post–Census 2027 delimitation will redistribute Lok Sabha seats, reflecting migration-driven population shifts.
- **Silent Federal Shift:** Migration is altering Centre–State political balance without explicit constitutional amendment.

Social and Political Dimensions

- **Identity Politics:** Migration reshapes language, culture and electoral strategies, reducing viability of rigid nativism over time.
- **Urban Politics:** Parties increasingly field migrant-origin candidates, reflecting demographic realities.
- **Inequality Risk:** Migrants often lack access to housing, healthcare, education and political voice despite economic contribution.
- **Demographic Dividend:** Migrant youth sustain ageing urban economies, making inclusion economically rational.

Key Challenges

- **Political Exclusion:** Large migrant populations remain weakly represented in local governance.
- **Administrative Capacity:** Tracking mobile populations strains electoral and welfare databases.
- **Policy Fragmentation:** Migration is addressed sectorally (labour, elections, housing) rather than holistically.
- **Public Anxiety:** Migration becomes politicised through fears of demographic change and "outsider" narratives.

Way Forward

- **Recognise Migration as Structural:** Treat mobility as a permanent feature of development, not an anomaly.
- **Migrant Voting Reform:** Explore secure absentee, remote or portable voting models for internal migrants.
- **Data Integration:** Use Census, Aadhaar-linked residence data (with safeguards) to update rolls without exclusion.
- **Urban Political Inclusion:** Strengthen local governance and service-based representation in migrant-heavy cities.

- **National Migration Framework:** Integrate labour, housing, welfare and political rights into a unified migration policy.

Conclusion

- Migration is not merely a social phenomenon but a democratic force reshaping representation, federal balance and citizenship itself. India's challenge is to adapt its political institutions to a mobile population without compromising inclusion, equity or democratic legitimacy.

CHILD TRAFFICKING IN INDIA: CAUSES, STATE RESPONSE AND THE WAY FORWARD

Context (Introduction):

- A recent **Supreme Court of India** judgment describing child trafficking as a "deeply disturbing reality" brings renewed focus on India's persistent trafficking networks, despite constitutional safeguards, special laws, and multiple government schemes aimed at child protection.

Scale and Nature of Child Trafficking in India

- **Magnitude of the Problem:** As per NCRB *Crime in India* data, over **2,200 children were trafficked in 2022**, with girls constituting a majority. States such as West Bengal, Telangana, Bihar, Maharashtra and Assam consistently report high numbers due to poverty, migration corridors and porous borders.
- **Organised Crime Networks:** Trafficking operates through decentralised yet interconnected verticals—recruitment, transportation, harbouring and exploitation—often spread across States, complicating detection and prosecution, as noted by the Supreme Court.
- **Forms of Exploitation:** Children are trafficked for **commercial sexual exploitation**, forced labour, domestic work, begging, and increasingly for online sexual abuse material, reflecting adaptation to digital platforms.

Reasons for Persistence of Child Trafficking

- **Socio-Economic Drivers:** Poverty, seasonal migration, debt bondage, lack of schooling, family disintegration and disasters push children into vulnerability. UNICEF notes that children from migrant and informal labour households face disproportionately higher trafficking risks.
- **Demand-Side Factors:** Urban informal economies, tourism hubs, construction sites and domestic work markets sustain demand. NCRB data shows trafficking hotspots align with major urban and industrial centres.
- **Weak Preventive Governance:** Limited surveillance in source areas, understaffed Child Welfare Committees, and poor inter-State coordination weaken early detection. Parliamentary Standing Committee reports have flagged capacity gaps in child protection institutions.
- **Low Conviction Rates:** Conviction rates under trafficking-related provisions remain low (often below **30%**), reflecting poor investigation quality, victim intimidation, and insensitive evidentiary standards—issues directly addressed by the recent Supreme Court judgment.

Legal and Policy Framework

- **Constitutional Mandate:** Articles **23 and 24** prohibit trafficking and child labour; Articles **15(3), 21 and 39(f)** mandate special protection for children's dignity and development.
- **Statutory Architecture:** The Immoral Traffic (Prevention) Act, Juvenile Justice Act, POCSO Act and IPC Sections 370/370A collectively criminalise trafficking, exploitation and abuse.

- **Judicial Reinforcement:** The Supreme Court has clarified that trafficked children are **injured witnesses**, whose testimony cannot be discarded due to minor inconsistencies, aligning with trauma-informed justice principles.

Government Schemes and Institutional Response

- **Anti-Human Trafficking Units (AHTUs):** Established in many districts to focus on detection, rescue and investigation, supported by the Ministry of Home Affairs, though uneven operational capacity persists.
- **Ujjawala Scheme:** Targets prevention, rescue, rehabilitation and reintegration of women and child victims of trafficking for commercial sexual exploitation; however, CAG audits have pointed to gaps in coverage and monitoring.
- **Mission Vatsalya (Child Protection Services):** Supports Child Welfare Committees, shelter homes, counselling and education, forming the backbone of post-rescue care.
- **Operation Smile / Muskaan:** Police-led initiatives that have traced **thousands of missing children annually**, reducing trafficking risks through coordinated rescue operations.
- **TrackChild Portal:** A national digital platform integrating police and child welfare data to track missing and found children, improving inter-State coordination.

Gaps and Criticisms

- **Implementation Deficit:** Reports by NCPCR and CAG highlight overcrowded shelters, staff shortages, and inadequate psychosocial care, increasing risks of re-trafficking.
- **Reactive Policy Bias:** Most interventions focus on rescue after exploitation, while preventive measures such as livelihood security, schooling and social protection in source areas remain weak.
- **Fragmented Governance:** Multiple ministries—Home, Women & Child Development, Labour—operate in silos, diluting accountability and follow-up.
- **Reintegration Challenges:** Without sustained education, skill training and income support, rescued children often return to vulnerable environments.

Way Forward

- **Shift to Prevention-Centric Strategy:** Strengthen social protection, universal schooling, nutrition, and livelihood programmes in trafficking-prone districts, in line with SDG **8.7** (ending child trafficking).
- **Trauma-Informed Justice System:** Mandatory training for police, prosecutors and judges on child psychology and victim-sensitive evidence handling, institutionalising Supreme Court guidelines.
- **Strengthen Rehabilitation and Aftercare:** Improve quality of shelters, long-term education, skill development and family reintegration to prevent re-trafficking.
- **Data-Driven Monitoring:** Enhance NCRB data granularity, map trafficking corridors, and track repeat offenders to improve deterrence and accountability.

Conclusion

- Child trafficking in India reflects deep socio-economic inequalities and governance gaps. While judicial interventions have strengthened victim-centric justice, eliminating trafficking requires a preventive, welfare-oriented and institutionally coordinated approach that protects children before exploitation occurs.

PAPER 2

RETREAT OF THE LEGISLATURE: ETHICAL-CONSTITUTIONAL CONCERNS IN INDIA'S PARLIAMENTARY DECLINE

Context (Introduction):

- As Parliament reconvenes, concerns deepen about its shrinking sittings, weakened oversight, rigid party whips, and executive dominance — raising fundamental questions about legislative independence, democratic deliberation, and constitutional morality.

Main Arguments

- **Declining Parliamentary Sittings:** Lok Sabha sittings have fallen from **135 days (1952–57)** to just **55 days**recently, indicating a shrinking space for deliberation and accountability.
- **Anti-Defection Distortion:** The Tenth Schedule, meant to prevent opportunistic floor-crossing, now curtails conscience and constituency-based voting, reducing MPs to numbers bound by party diktat.
- **Eroded Oversight Functions:** When members cannot vote independently, core constitutional duties — financial scrutiny, impeachment, legislative review — lose credibility and meaning.
- **Executive Dominance:** Systematic dismissal of Opposition notices, rushed legislation, and disregard for committee processes tilt the balance heavily in favour of the executive.
- **Weakening of Neutral Offices:** Constitutional authorities meant to be impartial guardians of parliamentary privilege have increasingly acted as instruments of discipline rather than neutrality.

Challenges / Criticisms

- **Majoritarian Monologue:** Parliament risks becoming an approval chamber where debate is stifled and accountability sidelined.
- **Committee System Dilution:** Parliamentary committees, crucial for cross-party, evidence-based legislative scrutiny, are bypassed or weakened.
- **Opposition Marginalisation:** When discussions are blocked, disruption becomes the only tool left — a symptom, not the cause, of parliamentary dysfunction.
- **Loss of Westminster Spirit:** India's model is diverging from mature democracies like the UK, Canada, and Australia, where executive accountability mechanisms remain robust.
- **Democratic Erosion:** Reduced legislative independence undermines constitutional morality, weakening checks on concentrated power.

Way Forward

- **Limit the Anti-Defection Law (UK/Canada Model):** In the UK and Canada, party discipline is applied only to budget and confidence motions, allowing MPs to vote independently on policy matters; India should similarly confine whips to core confidence issues to restore legislators' autonomy.
- **Mandated Parliamentary Sitting Days (UK/Australia Model):** The UK Parliament meets **120–150 days annually**, and the Australian Parliament follows a pre-announced, mandatory session calendar; India needs a statutory minimum sitting requirement to prevent executive control over when Parliament meets.

- **Strengthened Committee System (U.S./UK Model):** U.S. Congressional committees have the power to summon senior officials, demand documents, and hold public hearings, while UK Select Committees routinely question ministers; India must empower its committees with compulsory referrals and ministerial accountability.
- **Prime Ministerial Question Time (UK Model):** The British PM must answer questions directly every Wednesday in a televised session; India should institutionalise a weekly **Prime Minister's Questions** segment to enhance direct executive accountability.
- **Neutral Presiding Officers (New Zealand/Australia Model):** The Speakers of New Zealand and Australia resign from their party positions upon election and operate under strict neutrality norms; India should adopt similar safeguards to ensure impartial handling of parliamentary business.
- **Independent Parliamentary Budget Office (U.S./Canada Model):** The U.S. Congressional Budget Office and Canada's Parliamentary Budget Officer scrutinise government finances independently; India should create an autonomous fiscal watchdog reporting directly to Parliament.
- **Stronger Opposition Rights (Germany Model):** Germany reserves committee chairs and agenda-setting rights for the opposition, ensuring checks on majority power; India must secure guaranteed discussion time and procedural tools for the Opposition.
- **Mandatory Public Consultation for Bills (Nordic Model):** Sweden, Norway, and Finland require open public consultations before major laws are passed; India should adopt compulsory pre-legislative scrutiny for all significant bills.

Conclusion

- Legislatures decline when dissent is penalised, debate is curtailed, and executive power overwhelms constitutional checks. Reviving Parliament's role requires structural reforms, political restraint, and a renewed commitment to the original spirit of India's democratic architecture.

SC ORDERS CBI PROBE INTO DIGITAL ARRESTS

Context (Introduction):

- The Supreme Court has directed the CBI to lead a nationwide probe into "digital arrest" scams—cybercrimes costing Indians over ₹3,000 crore—overriding State consent and highlighting the growing threat of behavioural exploitation, weak cyber policing, and transnational criminal networks.

Main Arguments

- **Pan-India Crime Architecture:** Digital arrest scams involve interstate mule accounts, SIM misuse, and foreign cybercrime hubs (notably Southeast Asia), necessitating a national agency with jurisdiction beyond State boundaries.
- **Exceptional Circumstances:** The SC invoked extraordinary powers to bypass State consent under the DSPE Act, noting the magnitude of losses (₹3,000 crore), vulnerable victims (mainly elderly), and deep institutional coordination gaps.
- **Behavioural & Cognitive Exploitation:** Scamsters weaponise India's high authority bias (79% trust government), fear of law enforcement, and availability heuristics using familiar names (e.g., CJI Chandrachud) to coerce victims into compliance.
- **State-Level Inadequacies:** Telecom negligence in SIM issuance, poor cyber forensics, and fragmented State cybercrime cells created an enforcement vacuum that only the CBI can fill.

- **National Security Angle:** The Supreme Court recognised that digital arrests may be exploited in cognitive warfare—where adversaries use psychological manipulation to undermine citizen trust and destabilise society.

Challenges / Criticisms

- **Federal Tensions:** Centralising the probe raises concerns about cooperative federalism but was justified due to States' uneven consent and capacities.
- **Cross-Border Crime:** Many scams originate from Southeast Asian cybercrime hubs; cooperation through Interpol and international MLATs remains slow and inconsistent.
- **Institutional Bottlenecks:** State cyber cells lack trained personnel, behavioural analysts, and cyber-forensic tools necessary to counter advanced scam networks.
- **Technological Gaps:** Inadequate AI/ML deployment by banks and telecom firms allows "layering" of funds through multiple mule accounts.

- **Cognitive Vulnerabilities:** Cultural predispositions—paternalism, fear of police, acquiescence bias (highest among 51 studied cultures)—make Indian citizens uniquely susceptible to authority-driven fraud.

Way Forward

- **Centralised Cyber Command (Estonia Model):** Build a unified national cyber command integrating CBI, I4C, CERT-In, RBI, and telecom regulators to respond to real-time scams.
- **AI-Driven Fraud Detection (UK/US Banks):** Implement machine-learning systems to flag unusual transfers, mule accounts, and rapid fund movement (layering).
- **Mandatory E-KYC and SIM Regulation (South Korea Model):** Enforce stricter telecom KYC, biometric validation, and real-time SIM audit to prevent identity-based fraud.
- **Behavioural Risk Education (Singapore Model):** Launch national behavioural-science campaigns explaining salience bias, authority bias, and coercion tactics used in digital arrests.
- **Cross-Border Cyber Cooperation:** Expand Interpol coordination, sign targeted cybercrime treaties with Southeast Asian nations, and set up joint investigation teams.
- **Legal Modernisation:** Update the IT Act to explicitly recognise digital coercion, impersonation of authorities, and online psychological manipulation as aggravated offences.

Conclusion

- The Supreme Court's intervention reflects a shift from viewing cybercrime as a technical violation to understanding its deeper cognitive, behavioural, and transnational dimensions. Protecting citizens demands not only law enforcement coordination but a whole-of-society response combining technology, regulation, behavioural science, and international cooperation.

COLOMBO SECURITY CONCLAVE: A TEMPLATE FOR INDIAN OCEAN SECURITY COOPERATION

Context (Introduction):

- The 7th NSA-level Colombo Security Conclave (CSC) summit in 2025 reflects India's efforts to build a cooperative security framework in the Indian Ocean, as regional geopolitics, China's growing footprint, and non-traditional maritime threats reshape strategic priorities.

Main Arguments

- **Regional Security Platform:** CSC provides a **dedicated Indian Ocean security forum**, unique in a region lacking a unified architecture despite high maritime vulnerabilities.
- **Evolution of the Group:** Originally a trilateral (India–Sri Lanka–Maldives), CSC expanded to include **Mauritius (2022), Bangladesh (2024), and Seychelles (2025)**, signalling widening trust and strategic convergence.
- **Addressing Non-Traditional Threats:** The platform prioritises **maritime security, counter-terrorism, trafficking, organised crime, and cyber threats**, central to the economic and livelihood needs of littoral states.
- **Development–Security Link:** For CSC members, maritime security is inseparable from **blue economy prospects**, fisheries protection, disaster resilience, and sea-borne trade.
- **India's Strategic Moment:** The summit strengthens India's leadership at a time when the Indo-Pacific security environment is shifting due to **China's expanding influence** and geopolitical volatility.

Challenges / Criticisms

- **China Divergence:** India views China's presence in the Indian Ocean as a strategic risk, but many CSC members depend on China economically and do not share New Delhi's threat assessment.
- **Institutional Weakness:** CSC still functions primarily through **NSA-level meetings**, lacking a deeper, standing institutional mechanism for sustained cooperation.
- **Domestic Uncertainties:** Political instability in key states, especially **Bangladesh**, may affect continuity of engagement and weaken long-term group cohesion.
- **Fragmented Regional Architecture:** The Indian Ocean remains divided among **multiple, overlapping but weak security groupings**, diluting collective action.
- **Uneven Capacity:** Smaller island states lack resources for maritime domain awareness, search-and-rescue, and cyber defence, limiting CSC's effectiveness.

Way Forward

- **Institutionalisation:** Create **permanent secretariat, working groups, and annual joint exercises**, similar to ASEAN-led mechanisms, ensuring policy continuity.
- **Capacity Building:** India can expand **IT, maritime domain awareness (MDA), and coast guard training** through IORA, SAGAR, and I4F initiatives.
- **Balanced China Strategy:** CSC should frame cooperation around **non-traditional security**, avoiding overt anti-China signalling to maintain consensus among smaller states.
- **Economic-Security Integration:** Promote **blue economy partnerships**, port security, anti-piracy collaboration, and disaster preparedness, reflecting member priorities.
- **Incremental Expansion:** Gradually include Malaysia (guest in 2025) and other Indian Ocean states, ensuring the group grows without overstretching.

Conclusion

- The CSC has emerged as a promising mini-lateral model for Indian Ocean security governance, overcoming historical fragmentation. Its future strength will depend on institutional resilience, balanced strategic messaging, and sustained cooperation that aligns security priorities with the developmental needs of littoral states.

DO WE NEED TO REFORM URBAN GOVERNANCE IN INDIA?

Context (Introduction):

- The debate on whether Indian cities require structural reform in governance has intensified as major metros face prolonged absence of municipal elections, weak mayors, parastatal dominance, and excessive State-level control, undermining urban accountability and service delivery.

Why Are Indian Mayors Invisible?

- **Structural Centralisation:** Indian cities are effectively governed by Chief Ministers' offices, not municipal leaders — reversing the logic of the 74th Amendment.
- **Historical Drift:** Unlike pre-1960s India where Mayors were politically influential, today's system sidelines them due to a State Assembly–centric political culture.
- **Weak Municipal Mandate:** Mayors lack executive authority over budgets, personnel, planning, leaving them overshadowed by bureaucrats and parastatals.
- **Party Hierarchy Domination:** MLAs/MPs as ex-officio members reduce corporators and Mayors to subordinates within party structures, not autonomous local representatives.
- **Low Public Demand:** Urban citizens rarely prioritise municipal empowerment, enabling political elites to ignore or delay municipal elections.

Why Has the 74th Amendment Not Delivered?

- **Supply-Driven Reform:** Decentralisation was introduced top-down, without societal mobilisation, resulting in weak local accountability.
- **Parallel Bureaucratic Structures:** Multiple parastatals (BDA, BWSSB, MMRDA, DDA, HMDA, etc.) fragment authority and limit municipal agency.
- **No Financial Autonomy:** Municipalities have tiny revenue bases; ward offices struggle to access funds even for basic functions.
- **Political Resistance:** State leaders are reluctant to devolve power, seeing cities as territory to manage, not jurisdictions to empower.

- Issues with Current Reorganisation Experiments (e.g., BBMP split, GHMC merger)
- **Election Postponement Tool:** Frequent restructuring is often a pretext to delay elections, reducing democratic legitimacy.
- **Symbolic, Not Functional:** Splitting or merging corporations does not matter when CM–bureaucracy dominance remains unchanged.
- **Jurisdictional Confusion:** Delhi's arrangement shows the failure of overlapping authorities without clear functional demarcation.

- **Governance Not Geography:** The issue is power distribution, not the size or number of municipal bodies.

What Should Urban Governance Reform Focus On?

- **Institutional Clarity:** Clearly demarcate responsibilities of municipalities, parastatals, and State agencies to eliminate overlapping mandates.
- **Fiscal Empowerment:** Ensure direct revenue streams, predictable transfers, and ward-level budgeting to make local governments functional.
- **Political Realism:** Reform must engage with actual political structures — addressing the dominance of MLAs and CMs in city affairs.
- **Empowered Mayoral System:** Strengthen stable, directly elected or meaningfully empowered Mayors with executive authority.
- **Citizen Demand:** Urban residents must push for decentralisation; without popular pressure, political elites will not devolve power.

Conclusion

- India's cities cannot be governed effectively through State-centric control, bureaucratic dominance, and weakened municipalities. Genuine reform requires empowering local governments with clear authority, finances, and accountability — not cosmetic restructuring. Democratic urban governance will remain elusive unless the political system and citizens both recognise the city as a legitimate, autonomous sphere of government.

INDIGO MELTDOWN: REGULATORY PREPAREDNESS, AIRLINE RESPONSIBILITY AND PASSENGER RIGHTS

Context (Introduction):

- The recent disruption in India's civil aviation sector, marked by large-scale flight cancellations by IndiGo, India's largest airline, has brought regulatory implementation and corporate responsibility into sharp focus. The crisis emerged after the Directorate General of Civil Aviation (DGCA) began enforcing revised Flight Duty Time Limitations (FDTL) intended to reduce pilot fatigue and enhance safety.

What Are the New FDTL Norms?

The DGCA's revised FDTL framework, notified in early 2024, sought to improve safety by addressing chronic pilot fatigue. Key provisions include:

- Increasing mandatory weekly rest for pilots from **36 to 48 hours**.
- Extending "night hours" from **12 AM–5 AM** to **12 AM–6 AM**.
- Limiting night landings per pilot to **two per week**.
- Stricter caps on duty periods involving night operations.
- Rosters to be issued at least **15 days in advance** and compulsory fatigue reporting.

These measures parallel global aviation best practices (FAA, EASA) and are essential to preventing fatigue-induced errors. Implementation was deliberately phased to allow airlines time to prepare.

Why IndiGo Was Hit Hardest

Despite long prior notice, IndiGo faced a severe staffing shortfall, exposing gaps in workforce planning:

1. Inadequate Pilot Strength: IndiGo's fleet expansion was not matched with proportionate hiring. Its lean crew model, designed for maximal utilisation, collapsed once rest periods and night-duty limits became stricter.
2. Overdependence on Night Operations: A large share of IndiGo's network involves late-night and early-morning flights. With night-duty norms tightened, existing crew could not legally operate many scheduled sectors.
3. Poor Transition Planning: Despite having more than a year to adjust, IndiGo allegedly maintained hiring freezes and failed to build buffer capacity. As FDTL rules kicked in, scheduling became unmanageable.
4. Lack of Contingency Preparedness: The absence of alternative planning, surge-hiring, or rostering buffers led to a domino effect: crew unavailability → mass delays → cancellations → nationwide disruption.
The crisis therefore reflects corporate mismanagement rather than flaws in safety regulations.

Impact: Passengers, Economy, and Aviation Ecosystem
1. Passenger Hardship: Thousands faced severe disruptions — missed exams, medical appointments, visas, funerals, and business commitments. Refunds, the standard compensation, often fail to cover consequential losses.
2. National-Level Disruption: IndiGo controls over **60%** of India's domestic aviation market. A breakdown in such a dominant airline creates macro-level ripple effects:

- sharp surge in airfares,
- capacity strain on other carriers,
- cascading delays across airports,
- increased burden on trains and road transport.

3. Reputational Damage: The incident dents public trust in both airline reliability and regulatory oversight mechanisms.

Governance and Regulatory Lessons
1. Regulation–Implementation Gap: Even well-crafted rules fail without enforcement audits. Regulators must assess industry preparedness before activating major reforms.
2. Need for Compliance Milestones: DGCA could enforce interim hiring targets, fatigue-risk audits, and progress reports to prevent last-minute collapse.
3. Balancing Safety and Service Continuity: Safety cannot be compromised, but sudden enforcement without ensuring workforce readiness undermines essential services. A calibrated roadmap linking rules with capacity benchmarks is crucial.
4. Strengthening Passenger Rights: The crisis highlights the inadequacy of India's compensation framework. Globally, EU norms mandate compensation beyond refunds. India may need similar provisions, especially for overnight stranding or vulnerable passengers.
5. Oversight of Dominant Market Players: Large carriers must maintain resilience standards, including mandatory operational buffers, emergency staffing pools, and compliance reporting — particularly in sectors affecting public convenience.

Conclusion

- The IndiGo meltdown underscores a fundamental governance lesson: **regulations achieve their purpose only when supported by institutional preparedness, accountability, and robust monitoring**. FDTL norms are essential for aviation safety, but IndiGo's failure to plan, hire, and adapt converted a safety reform into a public crisis. India's aviation sector, poised for global growth, must balance safety imperatives with service reliability, strengthen consumer protection, and ensure that dominant market players comply with resilience standards.

INDIA–RUSSIA: STRATEGIC PARTNERSHIP REDEFINED 2025

Context (Introduction):

- The friendship between India and Russia stands as one of the most enduring bilateral relationships in Asia. What began as an alliance during the Cold War has evolved into a "Special and Privileged Strategic Partnership", encompassing politics, defence, energy, economy, culture and more. In the context of a shifting global order — marked by great-power competition, economic realignments and regional instability — India-Russia ties continue to offer New Delhi strategic depth, energy security and diplomatic flexibility.

1. Historical Context and Evolution of Strategic Partnership

- The bilateral relationship traces back to the Cold War era, when the erstwhile Soviet Union was a key security partner for India. Over decades, cooperation deepened across defence, politics and economic support.
- In October 2000, the two countries signed the "Declaration on India–Russia Strategic Partnership." Subsequently, in 2010, it was elevated to "Special and Privileged Strategic Partnership," reflecting deeper trust and broader cooperation.
- Institutional mechanisms such as annual summits, inter-governmental commissions (for trade, economy, science & technology), 2+2 ministerial dialogues, and regular high-level visits ensure continuity and structured engagement.

2. Key Areas of Cooperation

a) Defence & Security

- Defence has long been the backbone of the relationship. Joint exercises (e.g., INDRA — tri-service naval exercise) ensure operational interoperability.
- Under initiatives such as "Make in India," both nations now co-produce defence hardware: from tanks and aircraft to the indigenous manufacturing of rifles (e.g., via the joint venture Indo-Russia Rifles Private Limited — IRRPL).
- Beyond supplies, the cooperation is shifting towards joint R&D, co-development, and long-term strategic collaboration in defence manufacturing.

b) Energy, Nuclear, and Economic Cooperation

- Energy security remains central: Russia has been a reliable supplier of crude oil and natural gas, and provides critical support for India's civil nuclear energy ambitions (e.g., projects like Kudankulam Nuclear Power Plant).
- Economic ties have witnessed considerable growth: bilateral trade in FY 2024-25 reached a record high of approximately **USD 68–69 billion**.
- However, there remains a structural imbalance: Indian exports to Russia are still relatively modest (under USD 5 billion), while imports — especially energy and raw materials — dominate.
- Recognizing this, both sides during the 2025 summit adopted a "Programme 2030 for Strategic Economic Cooperation," targeting enhanced trade, diversification beyond hydrocarbons, smoother supply-chains (fertilizers, critical minerals), labour mobility, and improved trade mechanisms (e.g., regulatory harmonization, payment systems).

c) Multilateral Cooperation & Global Strategy

- India and Russia coordinate closely in global fora such as BRICS, Shanghai Cooperation Organisation (SCO), United Nations and other multilateral platforms, promoting a multipolar world order — a core shared objective.
- Their strategic alignment helps in balancing great-power pressures, giving India diplomatic flexibility and Russia a reliable partner in Asia.

d) Cultural, Educational & People-to-People Links

- The partnership is not limited to state-level deals. There is a robust foundation of cultural exchange, student mobility, academic cooperation, and mutual interest in arts, literature and traditional practices. Such interactions foster mutual understanding and goodwill, strengthening the "soft" dimension of the friendship.

Recent Developments (2025) — Reaffirmation & New Strategic Economic Focus

The December 2025 state visit of President Putin marked a turning point: both countries reaffirmed their "Special and Privileged Strategic Partnership," at the 23rd summit — coinciding with the 25th anniversary of its formalisation.

During the visit:

- A strategic economic roadmap (Programme 2030) was adopted to diversify trade beyond hydrocarbons, promote cooperation in fertilizers, critical minerals, shipping, labour mobility, and high-technology manufacturing.
- Mutual commitment was made to strengthen energy-security, nuclear cooperation, and co-development under "Make in India" framework.
- Leaders emphasized that despite global turbulence — including sanctions on Russia and Western pressures — India-Russia ties remain resilient, mutually respectful, and a stabilising factor in a multipolar world.

This recent shift underscores a broader transformation: from a defence-centric partnership to one increasingly driven by economic interdependence, diversification, and institutional depth.

Challenges and Areas for Improvement

- **Trade Imbalance & Export Deficit:** Indian exports to Russia remain low relative to imports. Without diversification and facilitation of Indian goods — pharmaceuticals, agro-products, technology — the trade imbalance may deepen.
- **Geopolitical Pressure & External Sanctions:** Russia's confrontation with the West — especially post-Ukraine conflict — can expose India to diplomatic and economic pressure, complicating India's multi-alignment strategy.
- **Dependence Risk:** Over-reliance on Russia for defence and energy could limit India's strategic autonomy. India must continue diversifying its suppliers and building indigenous capabilities.
- **Need for Private Sector & People-to-People Engagement:** Much of the relationship remains government-driven. Greater involvement of private businesses, academic and cultural institutions can deepen and sustain long-term ties beyond geopolitical flux.

Conclusion

- The India–Russia friendship stands today at a critical juncture: a quarter-century of formal strategic partnership has matured into a broader collaboration across defence, energy, economy, technology and culture. The 2025 summit and the new Programme 2030 reflect a conscious shift toward economic diversification, making the relationship more resilient and future-ready. For India,

maintaining this partnership offers strategic depth, energy security, and diplomatic flexibility in an uncertain global environment.

TECH-BASED SURVEILLANCE IN WELFARE DELIVERY: ACCOUNTABILITY OR ILLUSION?

Context (Introduction):

- Digital monitoring tools such as biometric attendance, facial recognition, geo-tagging apps, and photo-based verification are increasingly used in welfare delivery to curb corruption and enforce accountability. Evidence from MGNREGA, PDS, Poshan Tracker and frontline health services, however, shows mixed outcomes and new risks.

Why Governments Are Turning to Tech-Surveillance Tools?

- **Accountability-Deficit:** Chronic absenteeism, delayed service delivery, and petty corruption push governments toward tech-based enforcement mechanisms.
- **Ease-of-Monitoring Narrative:** Apps offer the appearance of real-time oversight, creating political incentives to adopt them regardless of their real effectiveness.
- **Centralised Control:** Digital systems allow higher bureaucratic layers to monitor frontline workers without investing in stronger local governance systems.
- **Pressure for Quick Fixes:** Complex administrative failures are seen as solvable through simple technological tools, avoiding deeper systemic reforms.
- **Perception of Objectivity:** Authorities often believe biometrics or photographs ensure foolproof verification, despite evidence of manipulation.

Limitations & Risks of Tech-Fixes in Welfare Delivery

- **Manipulation Persists:** Digital attendance is routinely gamed (e.g., NMMS photos fudged, ABBA misuse), proving that technology cannot eliminate human collusion.
- **Exclusion Risks:** Elderly, disabled, and remote beneficiaries struggle with biometric failures, weak connectivity, or app glitches, leading to welfare denial.
- **Worker Demotivation:** Excessive surveillance erodes dignity of frontline workers, shifting focus from service quality to compliance with app requirements.
- **Privacy Violations:** Photo uploads of breastfeeding mothers or home visits raise ethical concerns and weaken trust in welfare systems.
- **False Sense of Accountability:** Monitoring tools check presence, not performance—workers may appear compliant digitally without delivering quality services.
- **Administrative Overload:** Requirements like "100% verification of photographs" divert attention from program management to digital paperwork.
- **New Corruption Channels:** Officials can falsely claim "biometric failure" or demand bribes to resolve digital discrepancies.
- **Agnotology Concern:** The deliberate ignorance of failures suggests vested interests and commercial incentives influencing policy choices.

But Technology Also Offers Meaningful Opportunities

- **Improved Transparency:** Digital trails, as seen in *Andhra Pradesh's e-PDS system*, reduce leakages when paired with community audits, unlike systems relying solely on biometrics.

- **Real-Time Data:** Apps can strengthen planning — *Tamil Nadu's Integrated Child Nutrition dashboard* and *Rajasthan's e-Hospital*systems show how analytics (not surveillance) can map stock-outs and service gaps.
- **Reduced Middlemen:** Direct digital records, similar to *Kenya's mobile-money welfare transfers*, minimise manual manipulation when interfaces remain simple and staff-friendly.
- **Targeted Interventions:** Geo-tagging, used effectively in *Brazil's Bolsa Família monitoring*, helps locate underserved habitations, enabling more rational deployment of health, nutrition, and sanitation services.
- **Complementary Role, Not a Substitute:** Technology supports — but cannot replace — local institutional reforms, as demonstrated by *Indonesia's village governance model*, where apps assist audits but accountability rests with empowered councils.

Way Forward

- **Strengthening Institutions:** Empowering local bodies and social audits — as *Philippines' community-driven development model* shows — ensures human oversight over digital processes.
- **Investing in Workers:** Training and supportive supervision, like *Thailand's upskilling of community health volunteers*, build responsibility better than punitive surveillance apps.
- **Reducing Last-Mile Burdens:** Countries such as *Estonia* cut inefficiency by simplifying workflows before digitising; India must similarly reduce redundant photo uploads and paperwork.
- **Context-Specific Design:** *Uganda's mHealth projects* succeed because apps work offline; India must adapt tools to low-connectivity regions to prevent exclusion of genuine beneficiaries.
- **Ethical & Privacy Framework:** The EU's *GDPR* and Kenya's Data Protection Act demonstrate how strict limits on biometric and photo-based data protect dignity and prevent misuse in welfare delivery.
- **Participatory Technologies:** Japan's model of co-designing municipal apps with users shows that when frontline workers and communities shape the tool, accountability deepens, and compliance becomes organic.

Conclusion

- Tech-surveillance tools in welfare may create the illusion of accountability, but without institutional reforms, they often substitute one form of manipulation for another. True accountability requires a shift from *coercive monitoring* towards *cultivating responsibility*, professional ethos, and trust within public systems. Technology can enable this journey—but cannot drive it alone.

A NEW STEP IN THE DRAGON–ELEPHANT TANGO: RECALIBRATING INDIA–CHINA ENGAGEMENT

Context (Introduction):

- China's 15th Five-Year Plan signals renewed economic outreach and developmental ambition, projecting opportunities for India–China cooperation even amid strategic tensions. As both nations pursue modernisation, the article highlights complementarities but also necessitates a careful assessment of challenges and calibrated engagement.

Main Arguments

- **Developmental Convergence**: China's high-quality growth agenda under its 15th Five-Year Plan aligns with India's Viksit Bharat 2047 vision, creating shared incentives for cooperation in technology, industry, and global governance.

- **Trade Interdependence**: Bilateral trade touched **$138.46 billion in 2024**, with 11% growth in 2025, establishing China as one of India's largest trading partners and creating platforms like the **Canton Fair** for export diversification.
- **Industrial Complementarity**: China's strength in electronics, renewables and manufacturing complements India's capabilities in IT, pharma and digital innovation, offering potential for supply-chain synergy during global technological transitions.
- **People-to-People Revival**: Resumption of Kailash–Mansarovar pilgrimages, restoration of tourist visas, and direct flights enhance cultural linkage, building societal goodwill crucial for long-term stability.
- **Multilateral Cooperation Imperative**: India and China, as major economies within **BRICS, SCO, G20**, hold shared stakes in climate action, South–South cooperation, and shaping a more equitable multipolar order.

Challenges / Constraints

- **Border Tensions & Trust Deficit**: The post-2020 Line of Actual Control (LAC) standoff has significantly eroded strategic trust, limiting the space for expansive cooperation despite economic complementarities.
- **Ballooning Trade Imbalance**: India's exports remain narrow and China-centric supply chains deepen a **trade deficit exceeding $85 billion**, posing vulnerability risks to critical sectors.
- **Technology & Security Concerns**: Chinese investments in telecom, digital infrastructure and apps have triggered national security concerns leading to bans, restrictions, and scrutiny of FDI inflows.
- **Geopolitical Rivalry in Indo-Pacific**: China's assertive posturing in the Indian Ocean, growing footprint in South Asia, and closer ties with Pakistan complicate India's strategic calculus.
- **Asymmetry in Power & Influence**: China's GDP (~$20 trillion) and manufacturing scale create structural asymmetries that limit India's bargaining leverage unless balanced by partnerships elsewhere.

Way Forward

- **Dual-Track Diplomacy**: Adopt a "**guardrails approach**" similar to the U.S.–China model — manage security disputes while keeping economic and cultural channels open.
- **Strategic Export Diversification**: Replicate **Vietnam's targeted export strategies** to expand India's footprint in electronics, pharma, agro-products and services in Chinese markets.
- **Resilient Supply Chains**: Build "China-plus-one" frameworks with Japan, South Korea and ASEAN to reduce overdependence without disengaging economically from China.
- **Revitalised Boundary Negotiations**: Institutionalise more frequent WMCC and SR-level talks; emulate the **India–Bangladesh model** of incremental confidence-building to stabilise border dynamics.
- **People-Centric Connectivity**: Strengthen educational, tourism and cultural exchanges, learning from EU–China people-to-people dialogue formats that build societal resilience.

Conclusion

- India–China ties require a mature blend of engagement and vigilance. While economic complementarities offer shared gains, unresolved strategic frictions demand calibrated, interest-driven cooperation. A stable "dragon–elephant tango" will depend on restoring trust while safeguarding national priorities.

PAPER 3

ELECTORAL ROLL INTEGRITY AND SIR 2025

Context (Introduction):

- India's electoral rolls have increasingly suffered from duplicates, outdated entries and inaccuracies due to rapid migration and urbanisation. The Election Commission's Special Intensive Revision (SIR) 2025 seeks to rebuild accuracy and trust in electoral rolls amid constitutional, administrative and political scrutiny.

Main Arguments (Need for SIR)

- **Constitutional Mandate**: Article 324 entrusts the ECI with superintendence and control over electoral roll preparation, making periodic intensive verification essential for maintaining universal adult franchise under Article 326.
- **Demographic Shifts**: Rapid migration and urban churn have rendered summary revisions insufficient, necessitating door-to-door SIR to correct duplicates, shifted electors, and outdated entries.
- **Global Comparisons**: Countries like **Germany and Canada**, which seamlessly update rolls using civil registries, avoid inaccuracies; India, lacking such integrated databases, depends on independent verification by ECI.
- **Enhanced Documentation Framework**: SIR 2025 expands admissible documents to **11 types (up from four in 2003)** and includes Aadhaar as proof of identity, making enumeration more citizen-friendly.
- **Technological Integration**: Digitisation of records, online claim/objection filing, and uploading of supporting documents mark a governance shift toward transparency and accessibility.

Challenges / Criticisms

- **Fear of Disenfranchisement**: Civil society concerns stem from the requirement of producing documents afresh, raising apprehensions of mass deletions or exclusion of vulnerable voters.
- **Citizenship Verification Complexity**: India lacks a central population registry, making citizenship screening difficult—particularly in States with high migration or porous borders.
- **Administrative Burden**: Door-to-door verification of **7.5 crore entries in Bihar alone** strains field machinery and raises questions of uniform implementation quality nationwide.
- **Political Sensitivities**: Opposition parties fear misuse of SIR for targeted disenfranchisement, amplifying mistrust in electoral processes.
- **Public Awareness Gap**: Only **2.5 lakh objections** were filed after 65 lakh deletions, suggesting limited voter engagement, digital divide issues, and low citizen understanding of the process.

Way Forward

- **Integrated Population Registry**: Adopt a model similar to **Estonia's digital population registry**, enabling seamless updates across departments and reducing manual verification burdens.
- **Granular Transparency Measures**; Publish booth-level deletion, addition, and verification statistics in machine-readable formats to allow third-party audits, increasing confidence in revisions.

- **Targeted Voter Outreach**: Use **Kerala-style decentralised awareness campaigns**, deploying local bodies, civil society and digital platforms to ensure every elector understands their rights and obligations.
- **Strengthening Appeal Mechanisms**: Establish simple, offline-friendly grievance redress systems and mandates for **time-bound disposal** of objections at BLO and ERO levels.
- **Continuous Roll Updating System**: Shift from episodic revisions to a rolling system—like **Australia's continuous electoral roll update**—allowing real-time corrections via municipal and utility data.

Conclusion

- Electoral roll revision is indispensable to ensure the integrity of India's democratic process. SIR 2025 represents an ambitious yet constitutionally grounded effort to restore accuracy, provided transparency, public engagement and safeguards against exclusion remain central to its implementation.

IS INDIA'S 8.2% GROWTH RATE SUSTAINABLE?

Context (Introduction):

- India's Q2 GDP growth of **8.2%** signals strong economic momentum, driven by manufacturing, services, and consumption revival. Yet the **IMF's Grade C rating** for India's national accounts raises questions over data credibility, structural weaknesses, and sustainability of long-term growth.

Main Arguments: What Drives the 8.2% Growth Momentum ?

- **Manufacturing Revival :** Manufacturing grew **9.1%**, reflecting stronger industrial demand, better capacity utilisation, and healthy credit growth across sectors.
- **Services-Led Expansion :** The services sector now forms **60% of GDP**, growing at **9.2%**, with financial services at 10.2%—indicating high transaction volumes and strong urban consumption.
- **Real GVA Strength :** GVA rose from **₹82.88 lakh crore to ₹89.41 lakh crore**, showing genuine value addition across agriculture, industry and services rather than inflation-led growth.
- **Consumption Recovery :** Private Final Consumption Expenditure (PFCE) grew **7.9%**, signalling household optimism; agriculture growth at **3.5%** reflects improved reservoir status and horticulture output.
- **Macro Stability :** Low inflation, strong GST and direct tax collections, and stable foreign exchange reserves provided a supportive macroeconomic base for high GDP growth.

Challenges / Criticisms

- **IMF Grade C on Data Quality :** Outdated **2011–12 base year**, reliance on WPI as deflator, absence of producer price indices, large GDP estimation discrepancies, and lack of seasonally adjusted data weaken statistical credibility.
- **Sectoral Unevenness :** Mining grew only **0.04%** and utilities **4.4%**, revealing stress in foundational sectors that employ millions and support industrial supply chains.
- **Employment Structure Mismatch :** Agriculture employs ~45% of workforce but generates only 14% of GVA; services contribute 60% of GDP but not equivalent job creation—raising concerns on inclusive growth.
- **External Sector Pressures :** RBI notes rising global protectionism, tariff uncertainties, and geopolitical risks affecting India's goods exports—limiting long-term growth drivers.
- **Financial Market Fragility :** A weakening rupee near 90 per USD, fluctuating FPI flows, and one of the world's highest real interest rates (3.5%+) may suppress investment and growth momentum.

Way Forward: Ensuring Sustainable Long-Term Growth

- **Modernise National Accounts :** Update GDP base year to **2017–18 or 2020–21**, introduce producer price indices, adopt OECD-style **seasonally adjusted quarterly GDP**, and improve estimation of the informal sector.
- **Strengthen State-Level Capacity :** Build better fiscal databases and statistical systems at the State level—similar to **Brazil's IBGE** or **Mexico's INEGI**—to improve accuracy and transparency.
- **Export Competitiveness Strategy :** Shift from tariff protection to **Vietnam-like export-led manufacturing**, integrate into global value chains, and scale electronics, renewables, pharmaceuticals, and textiles.
- **Labour Productivity Reforms :** Enhance skilling, MSME upgrading, and formalisation incentives—learning from **South Korea's SME modernisation** and China's productivity-driven employment strategy.
- **Investment-Friendly Financial Conditions :** Lower real interest rates to ~1%, stabilise the rupee through diversified reserves, and deepen corporate bond markets to support long-term capital formation.
- **Climate-Resilient Core Sectors :** Infrastructure, mining, and utilities need climate-proof planning (Japan model), given their vulnerability to monsoon variability and extreme weather.

Conclusion

- India's 8.2% growth reflects genuine momentum, yet its sustainability hinges on addressing structural deficits in data integrity, productivity, export capacity, and institutional depth. Growth is strong today, but long-term resilience demands statistical reform, economic diversification, and stronger State-level capacity.

SHIFTING SAVINGS AND INDIA'S CAPITAL MARKETS: STABILITY WITH NEW RISKS

Context (Introduction):

- India's capital markets are undergoing a structural shift as domestic household savings increasingly replace Foreign Portfolio Investors (FPIs). While this boosts market stability and reduces external vulnerability, it poses new risks involving participation inequality, investor protection gaps, and rising exposure to high-risk assets.

Main Arguments: What Is Driving the Shift Toward Domestic Savings?

- **Rise of Domestic Market Power:** NSE Market Pulse shows FPI ownership down to **16.9%**, while domestic mutual funds and direct investors now own nearly **19%**, the highest in two decades. Systematic Investment Plans (SIPs) have become the market's anchor.
- **Reduced External Vulnerability:** Domestic inflows help buffer volatility, allowing the Reserve Bank of India (RBI) greater policy space. With **CPI inflation at 0.3% (Oct 2025)** and strong GST/direct tax receipts, macroeconomic stability has improved.
- **Booming Primary Markets:** FY25 saw **71 IPOs raising ₹1 lakh crore**, backed by investment announcements exceeding **₹32 lakh crore**. Private sector participation in new investments has risen to **~70%**, signalling renewed domestic confidence.
- **Shift in Monetary Policy Space:** With declining dependence on volatile foreign capital, the RBI can prioritise **credit growth**, rather than defend the rupee. This aligns with India's long-term growth goals.

- **Household Savings as New Market Drivers:** India's financialisation of savings—through MFs, SIPs, online brokers, and UPI-enabled platforms—is reshaping retail participation, marking a deeper integration of households into capital markets.

Challenges / Criticisms

- **Uneven Participation and Wealth Concentration:** Equity ownership is concentrated in higher-income, financially literate urban groups. Retail losses—such as the recent **₹2.6 lakh crore wealth erosion**—hit vulnerable investors disproportionately.
- **Performance Problem in Active Funds:** Only a small share of active fund managers beat the market after accounting for risk and fees. With **active funds holding 9%** and passive funds only **1%**, retail investors are often exposed to high costs and low returns.
- **IPO Overvaluation Risks:** High-profile IPOs (Lenskart, Mamaearth, Nykaa) reveal stretched valuations, raising concerns that retail investors are being pulled into exuberant, high-risk segments without adequate safeguards.
- **Access Asymmetry:** Large sections—women, rural households, informal workers—lack financial literacy and advisory support. Market deepening without parallel investor capacity building risks long-term exclusion.
- **Corporate Governance Concerns:** Promoter holdings in NIFTY 50 have fallen to a **23-year low of 40%**, raising questions about whether dilution is driven by capital-raising or opportunistic disinvestment.

Way Forward

- **Correcting Access Asymmetry:** Shift from mere disclosures to **proactive investor protection**, risk warnings, suitability norms, and easily understandable product classification (EU-style traffic-light model).
- **Promoting Low-Cost Passive Investing:** Global evidence (U.S., U.K., Japan) shows passive index funds deliver higher long-term returns for retail investors. India must expand ETF penetration, reduce costs, and incentivise index investing.
- **Improving Market Governance:** Strengthen SEBI oversight on IPO pricing, related-party transactions, and promoter dilution. Adopt stricter stewardship codes similar to the U.K. and Australia.
- **Financial Literacy at Scale:** Leverage post office networks, digital literacy missions, and women's SHGs to democratise financial capability—similar to Brazil's Bolsa Família-linked financial education model.
- **Data-Driven Inclusion:** Use gender, geography, and income-based data to tailor interventions—modelled on Canada's Financial Consumer Agency approach.
- **Strengthening Advisory Standards:** Create a clear distinction between agents and fiduciary advisors (U.S. SEC model). Require lower-cost advisory channels for small investors.

Conclusion

- India's shift from foreign-driven to domestically anchored capital markets marks a major structural strengthening. Yet stability built on unequal participation, low financial literacy, and overexposure to high-risk products can create long-term vulnerabilities. For markets to genuinely support inclusive growth and "Viksit Bharat 2047," India must address access asymmetry, strengthen investor protection, expand passive low-cost products, and deepen market governance.

FREEING INDIAN ENTREPRENEURS: THE PROMISE OF THE JAN VISHWAS SIDDHANT

Context (Introduction):

- India's regulatory environment remains heavy with compliances, permissions, and criminal penalties inherited from the Licence Raj. The proposed **Jan Vishwas Siddhant** seeks to transform this landscape by shifting from permission-driven governance to self-registration, rationalised compliances, and transparent regulatory processes—crucial for unlocking entrepreneurial growth and non-farm job creation.

Main Arguments: What Holds Back Indian Entrepreneurs?

- **Regulatory Over-Criminalisation:** Thousands of business activities—many minor procedural lapses—carry criminal penalties. Jail provisions rarely lead to successful prosecution but are routinely used for harassment, clogging courts (e.g., **43 lakh cheque bouncing cases forming 10% of pendency**).
- **Instrument Proliferation:** Instead of the constitutional hierarchy of **Acts + Rules**, India has created **12,000+ non-law instruments** (notifications, circulars, FAQs, SOPs, orders). Entrepreneurs must comply with this vast, unclear ecosystem, breeding confusion and corruption.
- **Compliance Blind Spot:** India began 2025 with **69,000+ compliances**. Policymakers focus on legislation but forget cumulative compliance burdens. Regulations micro-specify processes rather than target outcomes, ignoring global best practices in smart regulation.
- **Enforcing the Unenforceable:** One inspector monitoring **3.3 lakh weighing instruments**, or numerous field requirements that cannot be realistically enforced, convert noble intentions into corruption and inefficiency. This weakens rule of law and creates a culture of discretion.
- **Process as Punishment:** Entrepreneurs face disproportionate penalties, long delays, and microspecification-heavy rules. The combination of low prosecution probability and high harassment potential produces a system where the innocent suffer and risk-taking is discouraged.
- **Lack of a Single Source of Truth:** Regulatory obligations remain scattered across outdated databases. Entrepreneurs often cannot verify whether a compliance requirement was legally issued, enabling rent-seeking and discretion.

What the Jan Vishwas Siddhant Proposes?

- **Perpetual Self-Registration:** All licences outside **national security, public safety, human health, and environment** will be replaced with self-registration. Everything is permitted unless explicitly prohibited.
- **Risk-Based, Randomised Inspections:** Inspections will shift from inspector raj to **third-party, algorithm-based, and risk-weighted** checks.
- **Decriminalisation of Business Laws:** DPIIT's decriminalisation guidelines will apply across ministries; punishments will be proportionate and non-custodial for economic offences.
- **Regulatory Discipline:** No new regulatory obligations without consultation; all transitions implemented on a fixed date annually (e.g., January 1). Only **Acts and Rules** may carry penal provisions—ending proliferation of informal instruments.
- **Digital Governance & IndiaCode Modernisation:** A live, comprehensive, gazette-integrated digital repository (IndiaCode) will be the **single source of truth** for all regulations, eliminating ambiguity and corruption.

- **Annual Regulatory Impact Assessment:** All ministries will assess compliance burdens and publish annual reports on enforcement, making regulation transparent and outcomes-driven.

Why These Reforms Matter for India's Growth Model?

- **Unlocking Entrepreneurship:** India has **6.3 crore enterprises**, yet only **30,000 companies** have paid-up capital above ₹10 crore. Over-regulation creates "dwarfs, not babies"—firms that stay small due to compliance fear, not lack of ambition.
- **Boosting Non-Farm Job Creation:** Entrepreneurship is key to India's employment challenge. Freeing MSMEs from the "ijaazat raj" enables innovation, formalisation, and productivity growth—critical for labour absorption.
- **Transforming Governance:** Moves from permission-based rule to trust-based governance—turning *praja* into *nagrik*, and *ruling* into *governing*.

Conclusion

- The **Jan Vishwas Siddhant** is a foundational shift in India's regulatory philosophy—prioritising trust, proportionality, transparency, and ease of compliance. By dismantling regulatory cholesterol and unleashing entrepreneurial energy, India can accelerate non-farm job creation and build a governance model where entrepreneurship is iterative experimentation, not a battle against bureaucracy.

THE INDIAN OCEAN AS THE CRADLE OF A NEW BLUE ECONOMY

Context (Introduction):

- As climate pressures mount on the Indian Ocean—one of the world's most vulnerable basins—India is positioned to reshape regional ocean governance. The article argues that India can lead a new Blue Economy model rooted in sustainability, resilience, and equitable growth.

Main Arguments:

- **Historical Maritime Leadership:** India has a legacy of advocating global ocean justice, from supporting "common heritage of mankind" during UNCLOS to Nehru's early recognition of oceans as vital to India's prosperity. This credibility uniquely positions India to lead again.
- **Rising Oceanic Threats:** Climate change has intensified ocean warming, acidification, sea-level rise, and IUU (Illegal, Unreported, Unregulated) fishing. The Indian Ocean basin—home to one-third of humanity—is among the world's most climate-vulnerable regions.
- **Blue Economy Opportunity:** A modern Blue Economy must integrate **stewardship**, **resilience**, and **inclusive growth**. India can shape sustainable fisheries, ecosystem restoration, green shipping, marine biotechnology, and offshore renewable energy.
- **Emerging Global Finance Momentum:** New commitments—€25 billion existing pipelines, €8.7 billion new at BEFF 2025; $7.5 billion annually from the Finance in Common Ocean Coalition; Brazil's $20 billion One Ocean Partnership—signal unprecedented ocean-focused funding.
- **Security Through Sustainability:** Ecosystem collapse, not naval rivalry alone, is the deeper source of insecurity. India's SAGAR doctrine aligns security with stewardship, enabling integrated maritime domain awareness, climate preparedness, and disaster response.

Challenges / Criticisms

- **Fragmented Regional Governance:** Indian Ocean governance remains scattered across multiple forums; unlike the Pacific, there is no unified ocean strategy guiding littoral cooperation.
- **Climate Vulnerability:** Sea-level rise, storm surges, coral bleaching, and fisheries depletion threaten economies from East Africa to Southeast Asia—creating regional instability and migration pressures.
- **Finance–Implementation Gap:** Despite growing global pledges, most Indian Ocean states lack institutional mechanisms to absorb and deploy Blue Economy investments effectively.
- **Capacity Deficits in Small States:** Small Island Developing States (SIDS) struggle with scientific capacity, monitoring, early warning systems, and access to marine technology—limiting regional collective action.
- **Geopolitical Overhang:** Indo-Pacific security narratives often overshadow environmental priorities, reducing room for cooperation as military competition intensifies.

Way Forward:

- **Stewardship of the Global Commons:** Champion biodiversity protection, sustainable fisheries, deep-sea governance, and ecosystem restoration—mirroring India's earlier UNCLOS role as a fairness-driven leader.
- **Regional Ocean Resilience Hub:** Create an Indian Ocean Resilience & Innovation Centre to support SIDS and African states with ocean observation, early warning systems, climate modelling, and technology transfer—similar to IOC-UNESCO frameworks.
- **Indian Ocean Blue Fund:** Establish a multilateral financing mechanism seeded by India and open to development banks, philanthropy, and private capital—turning global pledges into actionable regional projects.
- **Sustainable Blue Growth Sectors:** Promote green shipping corridors, offshore wind and wave energy, sustainable aquaculture, marine biotech, and ocean-based carbon removal—aligned with BBNJ and UNOC3 pathways.
- **Security–Environment Integration:** Through SAGAR, align naval and coast guard cooperation with environmental monitoring, IUU fishing control, and climate-driven disaster management—mirroring Australia's and Japan's integrated maritime models.
- **BBNJ Ratification & Norm Leadership:** Ratify the Biodiversity Beyond National Jurisdiction treaty early to signal India's readiness to shape global norms on deep-sea mining, marine genetic resources, and equitable benefit-sharing.

Conclusion

- The Indian Ocean, once central to early global civilisation, can now anchor a new global Blue Economy where prosperity and sustainability are inseparable. India—drawing on historic moral leadership, strategic geography, and scientific capability—can redefine ocean governance through stewardship, regional cooperation, and inclusive development. Leading with the principle **"From the Indian Ocean, for the World"** would allow India to turn a climate-risked ocean into a model of resilience and shared prosperity.

STEPPING STONE: INDIA'S NUCLEAR GOVERNANCE NEEDS REGULATORY INDEPENDENCE

Context (Introduction):

- Nuclear power contributes only about 3% of India's electricity generation, yet the government has set an ambitious target of installing 100 GW of nuclear capacity by 2047. The proposed SHANTI Bill seeks to

enable private participation in civil nuclear energy to mobilise capital, reduce project risks, and accelerate capacity expansion, including through indigenous small modular reactors.

Rationale Behind the SHANTI Bill

- **Need for Capital Mobilisation:** Achieving the 100 GW target requires large-scale capital investment, which cannot be met by public resources alone.
- **Expansion of Eligible Operators:** Allowing licensed government entities, joint ventures, and private companies broadens the pool of project developers and distributes construction risk.
- **Controlled Private Participation:** Sensitive nuclear fuel cycle activities remain under state control, while private participation is limited to plant construction, operation, and parts of the supply chain relevant to power generation.
- **Legal Clarity for Investors:** Consolidating safety, enforcement, dispute resolution, and participation terms within a single statute reduces regulatory ambiguity for new entrants.
- **Reduced Project Delays:** Streamlined approvals and clearer liability structures can lower transaction costs and shorten commissioning timelines.

Key Challenges and Concerns

- **Inadequate Liability Cap:** The operator liability ceiling of ₹3,000 crore raises concerns about sufficiency for victim compensation and environmental remediation in the event of a major nuclear accident.
- **Asymmetric Public Accountability:** Exemption of central government nuclear installations from mandatory insurance or financial security necessitates stronger public accounting and transparency.
- **Weak Supplier Accountability:** Operator recourse against suppliers depends largely on contractual terms, leading to uneven accountability across projects.
- **Regulatory Independence Deficit:** Significant executive influence over appointments to the nuclear regulator and the Atomic Energy Commission undermines institutional autonomy.
- **Public Trust and Investor Confidence:** Limited regulatory independence risks eroding public confidence in nuclear safety and may deter long-term private investment.

Way Forward

- **Strengthen Regulatory Autonomy:** Ensure functional and appointment-level independence of the nuclear regulator from executive control.
- **Revisit Liability Framework:** Align liability limits with international best practices to balance investor certainty with adequate victim compensation.
- **Standardise Supplier Liability:** Establish minimum statutory supplier accountability norms beyond contractual arrangements.
- **Enhance Transparency:** Mandate uniform financial disclosure and risk coverage for both public and private nuclear installations.
- **Build Public Confidence:** Embed safety oversight, accountability, and grievance redress mechanisms to sustain social acceptance of nuclear expansion.

PROTECTION OF THE ARAVALLI RANGE: ECOLOGICAL, LEGAL AND GOVERNANCE DIMENSIONS

Context (Introduction):

- **Judicial Intervention**: In November 2025, the Supreme Court of India settled a long-standing ambiguity by adopting a **uniform definition of the Aravalli hills** and **paused fresh mining leases** across Delhi,

Haryana, Rajasthan and Gujarat, responding to decades of ecological degradation and regulatory evasion.

Ecological Significance of the Aravalli Range

- **Ancient Mountain System**: One of the world's oldest fold mountain ranges, nearly **2 billion years old**, stretching ~650 km from Delhi to Gujarat.
- **Desertification Barrier**: Acts as a **climatic shield**, preventing the eastward expansion of the **Thar Desert** into Haryana, western Uttar Pradesh and the Indo-Gangetic plains.
- **Groundwater Recharge**: Supports aquifer systems and regulates hydrology in semi-arid regions with low rainfall.
- **River Origins**: Source region for rivers such as **Chambal, Sabarmati and Luni**, crucial for regional water security.
- **Biodiversity Corridor**: Hosts forest patches, wildlife corridors and tiger movement routes connecting Rajasthan and Madhya Pradesh ecosystems.
- **International Commitments**: India is obligated under the **UN Convention to Combat Desertification (UNCCD)** to protect ecologically fragile landscapes like the Aravallis.

Mining-Induced Degradation: The Core Challenge

- **Excessive Quarrying**: Four decades of legal and illegal mining for stone, sand and minerals caused habitat fragmentation and dust pollution.
- **Air Quality Impact**: Mining and stone-crushing worsened particulate pollution in NCR and adjoining regions.
- **Water Table Decline**: Removal of hill structures disrupted natural recharge, accelerating groundwater depletion.
- **Regulatory Failure**: Environmental restrictions imposed since the early 1990s were routinely violated at the State level.

Judicial and Institutional Responses

- **2009 Supreme Court Ban**: Blanket prohibition on mining in **Faridabad, Gurugram and Mewat (Haryana)**due to rampant violations.
- **2024–25 Judicial Review**: Supreme Court directed the **Central Empowered Committee (CEC)** to examine mining impacts across the entire Aravalli system.
- **CEC Recommendations (2024)**:
    - **Scientific Mapping** of the Aravalli range across States.
    - **Macro-Level Environmental Impact Assessment** (cumulative, not project-wise).
    - **Absolute Mining Prohibition** in ecologically sensitive zones — wildlife habitats, aquifer recharge areas, NCR region, water bodies.
    - **Strict Regulation of Stone-Crushing Units**.
    - **Moratorium on New Mining Leases** until mapping and assessments are completed.
- **Judicial Acceptance**: Supreme Court incorporated these recommendations in its November 2025 order.

Uniform Definition of the Aravalli Hills: Why It Matters

- **Earlier Inconsistencies**: States and agencies used divergent criteria, enabling regulatory arbitrage and illegal mining.

- **Forest Survey of India (2010)**: Proposed slope-based and buffer-based definitions (slope >3°, foothill buffer 100 m, valley width 500 m).
- **Expert Committee (2025)**: Included MoEFCC, FSI, Geological Survey of India, State Forest Departments and CEC.
- **Final Judicial Definition**: Hills **above 100 metres elevation** classified as Aravalli hills.
- **Rationale**: Court held this definition to be **more inclusive**, preventing exclusion of large hill systems while enabling enforceability.
- **Criticism Addressed**: Concerns about hills below 100 m being opened to mining were countered by broader ecological zoning and management planning.

Why the Supreme Court Did Not Impose a Total Mining Ban?

- **Past Experience**: Absolute bans historically fuelled **illegal mining syndicates and sand mafias**.
- **Governance Reality**: Enforcement gaps led to violence, corruption and ecological damage outside legal frameworks.
- **Calibrated Approach**:
    - **Existing legal mining** continues under strict scrutiny.
    - **Fresh leases paused** until scientific planning is completed.
    - **Permanent no-go zones** demarcated for ecologically critical areas.

Management Plan for Sustainable Mining (MPSM): Court Directions

- **Landscape-Level Planning**: Entire Aravalli system to be treated as a single ecological unit.
- **Zoning Framework**:
    - Absolute prohibition zones
    - Highly regulated limited mining zones
- **Ecological Carrying Capacity**: Assessment before any activity approval.
- **Wildlife and Habitat Mapping**: Identification of corridors and breeding zones.
- **Restoration Obligations**: Mandatory mine reclamation and ecological rehabilitation.
- **Enforcement Mechanisms**: Monitoring, compliance audits and penalties.

Complementary Executive Initiative

- **Aravalli Green Wall Project (2025)**:
    - Expansion of green cover in a **5-km buffer zone** across **29 districts** of Delhi, Haryana, Rajasthan and Gujarat.
    - Contribution to restoring **26 million hectares of degraded land by 2030**, aligned with national land degradation neutrality goals.

Conclusion

- The Supreme Court's intervention marks a shift from fragmented regulation to **science-based landscape governance**. By rejecting both unregulated exploitation and blanket bans, the Court has prioritised ecological integrity, enforceability and livelihood concerns. Protecting the Aravallis is central to **climate resilience, groundwater security and desertification control** in northern and western India.

SIGNIFICANCE OF A STRONG DEFENCE INDUSTRIAL BASE FOR INDIA

Context (Introduction):

- India's aspiration to become a developed nation by 2047 is inseparable from strategic self-reliance. A strong defence industrial base is central to national security, economic resilience, technological advancement, and India's emergence as a credible global power.

Main Arguments: Why a Robust Defence Industrial Base Matters

- **Correcting Historical Vulnerabilities:** For decades, India followed a paradoxical approach—excluding domestic private industry while relying heavily on foreign private suppliers. This led to excessive import dependence, constrained innovation, and strategic vulnerability during crises or supply-chain disruptions.
- **Reform-Driven Ecosystem Maturation:** Recent reforms—private sector entry, liberalised FDI, corporatisation of the Ordnance Factory Board, expanded 'Make' procurement categories, and innovation promotion—have transformed the ecosystem. Defence production has increased, and exports now reach over 80 countries, signalling ecosystem maturity.
- **Strategic Autonomy and Resilience:** Global conflicts in Europe, West Asia, and Asia have highlighted the fragility of international supply chains. Countries with strong domestic defence industries have demonstrated greater resilience. For India, facing persistent land and maritime security challenges, defence self-reliance is indispensable.
- **Economic and Geopolitical Leverage:** Defence manufacturing generates high-skilled employment, stimulates advanced manufacturing, and integrates India into global supply chains. Defence exports also enhance geopolitical influence by positioning India as a reliable security partner.
- **Emerging Global Opportunities:** Rising defence spending in Europe, saturation of traditional suppliers, and demand for cost-effective platforms create export opportunities. India's strategic location in the Indian Ocean Region and expanding diplomatic footprint strengthen its prospects as a defence supplier.

Challenges and Criticisms

- **Regulatory and Procedural Bottlenecks:** Complex export licensing, slow approvals for joint ventures and technology transfers, and fragmented institutional coordination continue to deter private investment, especially for MSMEs and startups.
- **Uncertain Demand Signals:** Absence of long-term demand projections reduces investor confidence for capital-intensive defence manufacturing.
- **DRDO's Evolving Role:** While **Defence Research and Development Organisation** has built strategic capabilities, overlapping roles in research, development, and production dilute efficiency and delay commercialisation.
- **Financial and Testing Constraints:** Manufacturers face high-cost credit, stringent domestic standards, limited testing facilities, and prolonged trials, reducing competitiveness against established global players.
- **Fragmented Export Facilitation:** Multiple ministries and agencies handle defence exports, creating coordination gaps and slowing market outreach.

Reforms and Way Forward

- **Simplify and Stabilise Regulations:** Streamline export licensing, technology-transfer approvals, and joint venture clearances, ensuring policy continuity to meet the target of ₹50,000 crore in defence exports by 2029.
- **Reorient DRDO–Industry Roles:** DRDO should focus on frontier research, while production, scaling, and commercialisation shift decisively to public and private industry, aligning with global best practices.
- **Create Dedicated Export Facilitation Agency:** A professionally staffed, single-window defence export agency can coordinate outreach, financing, certifications, and government-to-government engagements.
- **Strengthen Financial and Testing Ecosystems:** Introduce specialised export financing instruments, expand integrated testing facilities, adopt international certification norms, and ensure time-bound trials.
- **Leverage Strategic Instruments:** Use lines of credit, government-to-government agreements, and long-term service commitments to enhance India's credibility as a defence supplier.

Conclusion

- A strong defence industrial base is not merely about reducing imports; it underpins national security, economic growth, technological leadership, and diplomatic influence. Deepening reforms and sustaining policy momentum will define India's transition into a confident and influential global power by 2047.

WHY MANUFACTURING HAS LAGGED IN INDIA

Context (Introduction):

- Despite beginning the 20th century at income levels comparable to **China** and **South Korea**, India's manufacturing sector has stagnated, limiting job creation, productivity growth and broad-based income expansion.

Current Status of Manufacturing in India (with data)

- **Low and Stagnant GDP Share:** Manufacturing contributes **~15% of India's GDP** (World Bank, 2023), compared to **~27% in China** and **~25% in South Korea** during their peak industrialisation phases.
- **Weak Employment Absorption:** As per the **Periodic Labour Force Survey (2022–23)**, manufacturing employs only **~11.6–12% of India's workforce**, far below East Asian peers during their growth phase.
- **Services-Dominated Growth:** I ndia's services sector contributes **over 55% of GDP** but employs a much smaller share of workers, leading to jobless or low-quality employment growth.
- **Rising Inequality:** Oxfam (2023) notes that the **top 10% in India hold over 77% of national wealth**, reflecting growth without mass employment or wage gains.

Reasons for Manufacturing Underperformance

- **Public Sector Wages and 'Dutch Disease' Effect:** Economist **Arvind Subramanian** argues that relatively high government salaries raised economy-wide wages and prices. Manufacturing firms, with lower productivity, could not match these wages, making Indian manufacturing less competitive.
- **Real Exchange Rate Pressure:** Higher domestic prices increased imports and reduced price competitiveness of exports, even without sharp nominal rupee appreciation.
- **Cheap Labour Trap:** India's abundant labour reduced incentives for firms to invest in automation and productivity-enhancing technology.

- **Evidence from ASI:** The **Annual Survey of Industries (2022–23)** shows fixed capital grew by **10.6%**, while employment grew only **7.4%**, with capital per worker rising to **₹23.6 lakh**, indicating capital deepening without mass job creation.

Why High Wages Did Not Trigger Innovation

- **Missed 'Induced Innovation' Pathway:** In countries like Britain, Germany and South Korea, high wages pushed firms to innovate. In India, manufacturing failed to respond similarly.
- **Stagnant Private Sector Wages:** Entry-level salaries in IT and manufacturing-linked services have shown **minimal real growth since the early 2000s** (ILO and NITI Aayog studies), despite rapid firm-level expansion.
- **Platform Economy without Productivity Gains:** Many Indian unicorns (food delivery, ride-hailing) rely on labour abundance rather than technological upgrading, reinforcing low-wage equilibrium.

Way Forward

- **Technology-Led Industrialisation:** Promote adoption of Industry 4.0 technologies—automation, robotics, AI and advanced manufacturing—through targeted incentives and R&D support.
- **Human Capital and Skill Deepening:** Align skilling missions with industrial needs, focusing on technical education, apprenticeships, and continuous reskilling.
- **Labour Market Reforms with Security:** Balance flexibility with social security to encourage formal employment and productivity-linked wage growth.
- **Strengthen Industrial Ecosystems:** Develop integrated manufacturing clusters with plug-and-play infrastructure, logistics connectivity, and supplier networks beyond existing coastal hubs.
- **MSME Upgradation and Scale:** Support MSMEs in technology adoption, access to credit, and integration into global value chains.
- **Stable and Predictable Policy Regime:** Ensure consistency in industrial, trade, and tax policies to reduce uncertainty and encourage long-term investment.
- **Export Competitiveness with Value Addition:** Shift focus from low-cost exports to high-value manufacturing through standards, quality upgrading, and innovation.
- **Balanced Wage Policy:** Encourage wage growth aligned with productivity to induce innovation rather than suppress wages through labour abundance.
- **Public–Private Collaboration:** Leverage partnerships between government, industry and academia to drive innovation, technology diffusion, and skill development.

Conclusion

- India's manufacturing lag stems not only from policy choices like high public sector wages but from a deeper failure to induce technological upgrading. Without productivity-led manufacturing growth, India risks persistent jobless growth, rising inequality, and incomplete structural transformation.

BUREAU OF PORT SECURITY (BOPS): STRENGTHENING INDIA'S COASTAL AND PORT SECURITY ARCHITECTURE

Context (Introduction):

- Amid rapid maritime expansion and rising non-traditional security threats, India has established the **Bureau of Port Security** under the Merchant Shipping Act, 2025 to create a unified, statutory framework for port and coastal security governance.

What is the Bureau of Port Security (BoPS)?

- **Statutory Basis:** BoPS has been constituted under **Section 13 of the Merchant Shipping Act, 2025** as a dedicated regulatory authority for port and ship security.
- **Administrative Control:** It functions under the **Ministry of Ports, Shipping and Waterways**, and is modelled on the **Bureau of Civil Aviation Security**.
- **Core Mandate:** BoPS provides **regulatory oversight, coordination, and standard-setting** for security of ships, ports, and port facilities across major and non-major ports.
- **International Compliance:** It is empowered to enforce global norms such as the **International Ship and Port Facility Security Code**, ensuring India's ports meet international maritime security standards.

Why Was BoPS Needed? (Challenges in Coastal Security)

- **Fragmented Security Architecture:** Currently, coastal and port security responsibilities are divided among multiple agencies — **Indian Coast Guard**, **Central Industrial Security Force**, State maritime police, and the Navy — leading to coordination gaps and delayed response.
- **Expanding Threat Spectrum:** India faces growing risks of maritime terrorism, arms and drug smuggling, human trafficking, illegal migration, piracy, and poaching. Increasing digitalisation of ports has also exposed vulnerabilities to **cyber-attacks on port IT systems**.
- **Rapid Maritime Growth:** According to official data, India's cargo handling rose from **974 MMT in 2014 to 1,594 MMT in 2025**; inland waterways cargo increased **eightfold** to **145.5 MMT**. Higher traffic amplifies security risks if governance does not keep pace.
- **Absence of a Single Regulator:** Earlier, no single statutory body existed exclusively for port security regulation, audits, and compliance monitoring.

How BoPS Addresses These Challenges

- **Single-Point Regulatory Authority:** BoPS acts as the nodal body for security oversight, reducing inter-agency overlaps and closing coordination gaps.
- **Standardisation of Security Protocols:** Under BoPS, the **CISF** is designated as a recognised security organisation to prepare uniform security plans, conduct risk assessments, and train personnel across ports.
- **Graded Security Framework:** Security measures will be implemented based on threat perception, ensuring flexibility without compromising vigilance.
- **Cybersecurity Focus:** BoPS is expected to host a dedicated cybersecurity division to protect port IT and logistics systems, in coordination with national cyber agencies.
- **Information Sharing and Intelligence Coordination:** BoPS will facilitate collection and exchange of maritime security intelligence, strengthening preventive and deterrent capacity.

Link with India's Maritime Vision and Legal Reforms

- **Maritime India Vision 2030:** BoPS aligns with India's goal of developing **"best-in-class port infrastructure"**, where security is integral to efficiency and investor confidence.
- **Modernised Port Laws:** The creation of BoPS complements the replacement of the Indian Ports Act, 1908 with the **Indian Ports Act, 2025**, along with the Coastal Shipping Act, 2025, aimed at ease of doing business, safety, and sustainability.
- **Global Standing:** Nine Indian ports now feature in the World Bank's Container Port Performance Index, making robust security governance essential for maintaining credibility.

Concerns and Criticisms

- **Maritime Federalism:** Coastal States have raised concerns that new port laws expand Union control over non-major ports, potentially diluting State autonomy.
- **Powers of Inspection:** Critics argue that broad inspection and entry powers under the new laws lack explicit judicial safeguards, raising civil liberty concerns.
- **Implementation Capacity:** The effectiveness of BoPS will depend on staffing, technical expertise, and seamless coordination with existing maritime forces.

Way Forward

- **Clear Centre–State Coordination Protocols** to address federal concerns while ensuring uniform security standards.
- **Capacity Building** through specialised training in maritime and cyber security.
- **Strong Accountability and Audit Mechanisms** to balance security powers with procedural safeguards.
- **Technology Integration** using AI, surveillance systems, and real-time data sharing for proactive threat detection.

Conclusion

- The Bureau of Port Security represents a critical institutional reform to match India's expanding maritime footprint with a coherent security architecture. Its success will hinge on cooperative federalism, technological capacity, and transparent governance.

HOW LOWER-INCOME STATES ARE CATCHING UP: INDIA'S QUIET GROWTH SHIFT

Context (Introduction):

- India's recent growth story shows an important shift: several historically poorer States are now growing faster than richer ones, driven mainly by sustained public investment in infrastructure and supportive Centre–State fiscal coordination.

What Has Changed in India's Growth Pattern?

- **Earlier Divergence, Now Convergence:** Before the pandemic, richer States consistently outpaced poorer ones; after FY19, lower-income States began growing faster, reversing the earlier trend.
- **Key Catch-Up States:** Uttar Pradesh, Rajasthan and Bihar have shown a clear improvement in relative growth performance.
- **Why This Matters Nationally:** Since India's GDP is the sum of State GSDPs, faster growth in populous lagging States significantly lifts overall national growth.
- **Unexpected Post-Pandemic Outcome:** Contrary to fears, poorer States did not suffer lasting damage from COVID and instead improved growth momentum.
- **Early but Broad-Based Trend:** The convergence is recent but visible across multiple States, suggesting structural change rather than a one-off rebound.
- **Inclusive Growth Signal:** Narrowing regional growth gaps strengthen the foundations of long-term, inclusive development.

The Main Engine: State Capital Expenditure

- **Public Investment Drives Growth:** Higher State spending on roads, urban infrastructure and logistics emerged as the strongest factor explaining faster growth.

- **Infrastructure Catch-Up:** Emerging States sharply increased infrastructure investment, improving connectivity and reducing costs for businesses.
- **Crowding-In Private Investment:** Public capex boosted investor confidence, encouraging private firms to invest alongside the State.
- **Stronger Growth Multipliers:** Capital spending generates more output and jobs than routine revenue spending.
- **Governance Signal:** Sustained capex signals policy stability and reform intent, shaping long-term growth expectations.
- **Complements Central Projects:** State investments filled critical gaps around national highways, railways and logistics corridors.

How Centre–State Finance Made This Possible

- **Post-Pandemic Revenue Support:** Higher transfers after COVID improved State finances and enabled investment.
- **Capex Loans to States Programme:** Low-cost, ring-fenced loans ensured funds were used only for capital projects.
- **Rapid Scale-Up:** The programme expanded significantly over six years, giving States predictable funding.
- **Protection of Capex:** States chose to widen deficits rather than cut infrastructure spending.
- **Fiscal Coordination Success:** Cooperation between Centre and States reduced pro-cyclical investment cuts.
- **Stability Despite GST Changes:** Capex loans cushioned States even after GST compensation ended.

Risks to the Convergence Momentum

- **Slower Central Tax Growth:** Recent moderation in nominal GDP growth and successive direct and indirect tax cuts have slowed the Centre's gross tax revenues. Since around **41% of the divisible tax pool** is shared with States, any slowdown directly compresses State revenues, as seen in the decline in aggregate State receipts in **FY25** after several years of steady growth.
- **Rising State Fiscal Deficits:** To protect capital expenditure, many States allowed deficits to widen post-pandemic. As a result, several States are now operating close to or above **3% of GSDP**, limiting their capacity to absorb future revenue shocks without cutting spending.
- **Expansion of Welfare and Cash Transfers:** Ahead of recent State elections, governments in States such as **Rajasthan, Madhya Pradesh, Chhattisgarh and Telangana** expanded cash transfer and subsidy schemes. While socially important, these schemes raise committed revenue expenditure and reduce fiscal space for infrastructure.
- **Risk of Capital Expenditure Squeeze:** State budgets show that when revenue pressure intensifies, capex is often the first adjustment variable. With revenues already softening in FY25, prolonged stress could force States to scale back infrastructure projects.
- **Uneven Fiscal Capacity Across States:** Richer States have stronger own-tax bases and borrowing capacity, while poorer States remain more dependent on central transfers. This makes emerging States such as **Bihar and Assam** more vulnerable to revenue volatility.
- **Fragility of Policy Continuity:** Infrastructure investment requires multi-year commitment, but past experience shows that changes in political priorities or fiscal stress can abruptly interrupt capex cycles, diluting long-term growth benefits.

What Needs to Be Done to Sustain Catch-Up?

- **Expand Capex Loans Programme:** Larger and more predictable multi-year funding can stabilise State investment planning.
- **Protect Infrastructure Spending:** Capex should be prioritised over short-term revenue expenditure.
- **Use Deregulation Fully:** States must implement labour and business reforms to convert infrastructure into jobs.
- **Attract Labour-Intensive Manufacturing:** Emerging States can leverage wage advantages in textiles, footwear and furniture.
- **Link Capex with Private Investment:** Public projects should be designed to crowd in private capital.
- **Leverage Global Supply-Chain Shifts:** States can integrate into mid-tech manufacturing as firms diversify production locations.

Conclusion

- India's future growth hinges on sustained State-led convergence. With State capital expenditure now exceeding **4% of GDP** and the Centre targeting **Viksit Bharat by 2047**, emerging States are poised to drive growth. If infrastructure investment, fiscal discipline and reforms continue, convergence can deepen. However, revenue stress and policy discontinuity could derail progress, making long-term Centre–State coordination essential.

INDIA'S R&D DEFICIT: THE MISSING LINK IN THE VISION OF VIKSIT BHARAT

Context (Introduction):

- Despite its demographic strength and economic scale, India's ambition to emerge as a global power is constrained by chronic underinvestment in research and development, weak private-sector participation, and deep structural gaps in its innovation ecosystem.

Current Status

- **Talent–Output Mismatch:** India accounts for about **17.5% of the global population**, yet contributes only **around 3% of global research output**, reflecting poor conversion of human capital into knowledge creation.
- **Persistently Low R&D Spending:** India's **Gross Expenditure on R&D (GERD)** has stagnated at **0.6–0.7% of GDP**, far below innovation-driven economies such as the U.S. (~3.5%), China (~2.4%) and Israel (>5%).
- **Patent Growth without Depth:** India ranked **6th globally in patent filings (2023)**, but its share of global applications remains under **2%**, and resident patents per million population remain low, indicating shallow innovation intensity.
- **Corporate R&D Gap:** India's total national R&D expenditure is lower than the R&D spending of some global firms; a single multinational like Huawei spends more annually on R&D than India's combined public–private outlay.
- **Incremental, Not Disruptive Innovation:** Much of India's research output focuses on incremental improvements rather than frontier technologies.
- **Competitiveness Risk:** Low R&D intensity weakens India's position in strategic areas such as semiconductors, AI, quantum technologies and advanced materials.

Structural Weaknesses in the Innovation Ecosystem

- **Government-Dominated Funding Model:** Nearly **two-thirds of India's R&D funding** comes from the government, unlike advanced economies where private industry leads innovation spending.

- **Risk-Averse Private Sector:** Indian firms prefer technology imports and licensing over long-gestation, high-risk research investments.
- **Academia–Industry Disconnect:** Universities and industry operate largely in silos, with limited collaboration, technology transfer or commercialisation.
- **Brain Drain of High-End Talent:** Top researchers and PhDs migrate abroad due to better infrastructure, funding certainty and career incentives.
- **Bureaucratic Frictions:** Slow approvals, fragmented funding channels and procedural rigidity hinder large-scale, mission-oriented research.
- **Weak Intellectual Property Ecosystem:** Patent enforcement, monetisation and incentives for inventors remain underdeveloped.

Why the R&D Deficit Matters for India's Development

- **Low Productivity Growth:** Without strong R&D, manufacturing and services struggle to move up global value chains.
- **Strategic Dependence:** Reliance on imported technologies undermines economic sovereignty and national security.
- **Missed Demographic Dividend:** A large skilled workforce without research opportunities leads to underemployment or emigration.
- **Uneven Industrial Upgradation:** Low R&D explains why many Indian firms rely on labour cost advantages rather than technology leadership.
- **Innovation-Led Growth Foregone:** Historical evidence shows countries with sustained R&D investment achieve faster income and productivity growth.
- **Risk to *Viksit Bharat* Vision:** A transition to a developed economy is unlikely without a strong domestic innovation base.

Government Efforts to Strengthen R&D

- **Anusandhan National Research Foundation (ANRF):** The establishment of ANRF marks a structural shift to coordinate, fund and promote research across disciplines, universities and national laboratories, with an emphasis on outcome-oriented research.
- **₹1 Lakh Crore Research, Development and Innovation (RDI) Fund:** The RDI Fund aims to crowd in private investment, support long-term financing for deep-tech research, and de-risk innovation in frontier areas.
- **Mission-Oriented Technology Programmes:** Focused initiatives in semiconductors, artificial intelligence, green energy and quantum technologies signal strategic intent.
- **Higher Education Reforms:** Steps are underway to strengthen research universities, doctoral training and interdisciplinary research capacity.
- **Startup and Innovation Ecosystem:** Expansion of incubators, startups and innovation hubs has improved early-stage innovation, though deep-tech funding remains limited.
- **Patent System Improvements:** Digitalisation and faster processing have improved patent filings, though quality and commercialisation gaps persist.

Way Forward:

- **Raise R&D Spending to at Least 2% of GDP:** Experts argue this threshold is essential within the next 5–7 years to sustain innovation-led growth.

- **Rebalance Public–Private Roles:** Private sector contribution should rise to **50% or more** of total R&D spending, supported by tax incentives and co-funding.
- **Adopt Mission-Based Research Strategy:** Concentrate resources on national missions in strategic domains with long-term, uninterrupted funding.
- **Transform Universities into Research Hubs:** Increase PhD funding, attract global faculty, and invest in world-class laboratory infrastructure.
- **Bridge Academia–Industry Divide:** Institutionalise industry-sponsored research chairs, joint labs, incubation centres and technology transfer offices.
- **Strengthen IP and Commercialisation:** Improve patent enforcement, monetisation frameworks and financial incentives for inventors.

Conclusion

- India possesses the talent and ambition to become a global innovation leader, but its chronic R&D deficit remains a binding constraint. Unless funding, governance and private-sector participation scale up decisively in the next decade, the promise of *Viksit Bharat* risks remaining aspirational beyond 2047.

PAPER 4

INSTITUTIONALISING ANIMAL REPRESENTATION: A DEMOCRATIC AND ETHICAL IMPERATIVE

Context (Introduction)

- The proposal to formally represent animal interests within democratic institutions challenges deeply embedded **anthropocentric assumptions** and highlights the ethical need to protect vulnerable beings who cannot articulate their interests in political or administrative processes.

Main Arguments

- **Moral Considerability:** Animals possess *sentience and vulnerability*, giving rise to ethical obligations that go beyond charity and require institutional protection grounded in justice.
- **Anthropocentric Bias:** Modern democracies treat animals as property rather than moral subjects, creating a structural gap wherein their interests are consistently overridden by human economic and political power.
- **Duty of Stewardship:** Ethical governance demands that humans act as *trustees of the voiceless*, ensuring decisions on land use, food systems, environment, and security account for animal welfare impacts.
- **Equality of Moral Concern:** Judging animals by human-centric standards like rationality or cognitive similarity is ethically flawed and excludes most species from protections they morally deserve.
- **Preventive Ethics:** Existing welfare systems are reactive; ethical institutions must offer *ex ante* protection to prevent harm before it occurs.

Challenges / Criticisms

- **Institutional Vacuum:** Democracies lack dedicated structures to represent non-human interests, leading to systemic neglect and normalisation of cruelty.
- **Majoritarian Limitations:** Animals have no electoral power, lobbying influence, or economic leverage, making them structurally invisible in democratic decision-making.
- **Conflict of Interest:** Governments benefit from industries that exploit animals, creating an ethical conflict that undermines impartial protection.
- **Weak Fiduciary Bodies:** Existing committees often become symbolic, bureaucratic, or captured by vested interests — as seen in the dysfunctional elephant welfare committee.
- **Epistemic Constraints:** Determining animal interests requires scientific expertise in behaviour and welfare — an area where political institutions are underprepared.

Way Forward

- **Fiduciary Guardians:** Establish independent bodies with the sole mandate of representing animal interests, similar to institutions that protect children, environment, or data rights.
- **Rule-Based Functioning:** Create legally mandated procedures requiring animal-impact assessments for policies, urban planning, agriculture, and environmental decisions.
- **Independent Oversight:** Ensure operational independence through fixed terms, expert appointments, non-political selection processes, and dedicated budgets.

- **Transparency & Accountability:** Publish all decisions, welfare metrics, and audits to build public trust and enable scrutiny of ethical performance.
- **Pilot & Scale Approach:** Start with pilot projects — e.g., animal impact reviews in city planning — and gradually institutionalise across ministries and legislatures.

Conclusion

- Institutionalising animal representation is an ethical evolution of democracy — moving from compassion-based voluntarism to rights-based stewardship. It expands the moral horizon of public institutions by ensuring that even beings without voice are protected through independence, accountability, and scientifically informed decision-making.

CASE STUDY

You are a civil servant posted in a remote district of central India. Your work primarily involves implementing government schemes related to water conservation and rural infrastructure. Despite working diligently, you have been awaiting your promotion for over a year. Financially, things are not easy — your family is struggling due to some urgent medical and educational expenses. Recently, the government has announced a new National Award for Innovative Water Conservation Initiatives, which includes a medal and a substantial monetary reward. You learn that the selection process is largely AI-driven, relying on digital reports and photographic evidence. Informal discussions among colleagues and batchmates reveal that some have manipulated images to showcase exaggerated outcomes, and many are confident of being shortlisted as a result. In this environment, you face an ethical dilemma. On one hand, submitting exaggerated data or edited images could secure you the award, financial relief, and visibility — possibly strengthening your promotion prospects. On the other hand, such an act would compromise your integrity and violate the values expected of a civil servant. The pressure from home makes the decision even more taxing. Under these circumstances, what course of action would you take?

Questions:

What are the ethical issues involved in this situation?

Which values of public service are being tested here?

What options are available to you, and what are the consequences of each?

Suggest a course of action that aligns with ethical decision-making in public service.