RUNGTA IAS
FOR THE IAS EDGE

RUNGTA INTERNATIONAL SKILLS UNIVERSITY

CURRENT AFFAIRS
MONTHLY MAGAZINE

MARCH
2026

INDEX

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POLITY & GOVERNANCE

1.1. POLITICAL IMPLICATIONS OF ELECTIONS

Context: Recently, the Election Commission of India (ECI) announced biennial elections for 37 Rajya Sabha seats across 10 states, including Maharashtra, Tamil Nadu, and West Bengal, with polling scheduled for March 16, 2026.

1. **Constitutional Framework**
   - **Article 80:** Deals with the composition of the Council of States (Rajya Sabha).
   - **Maximum Strength:** 250 members (238 representing States/UTs and 12 nominated by the President).
   - **Current Strength:** 245 members (233 elected, 12 nominated).
   - **Fourth Schedule:** Specifies the allocation of seats to each State and Union Territory based on population.
2. **The Election Process**
   - **Electorate:** The representatives of each State are elected by the **elected members of the State Legislative Assembly (MLAs)**. Nominated members of the Assembly do not participate.
   - **System of Election:** Proportional Representation by means of a **Single Transferable Vote (STV)**.
   - **The Quota System:** To win, a candidate needs a specific number of votes (Quota).

$$\text{Quota} = \left(\frac{\text{Total Valid Votes}}{\text{Number of Seats to be filled} + 1} \right) + 1$$

   - **Voting Method:** Each voter (MLA) marks preferences (1, 2, 3...) against the names of candidates. If a candidate reaches the quota with first-preference votes, they are elected. Surplus votes are then transferred to the next preferred candidate.
3. **Key Legal Provisions (RPA 1951 & Amendments)**
   - **Open Ballot System (2003):** To curb "cross-voting" and corruption, the secret ballot was replaced with an open ballot. An MLA belonging to a political party must show their marked ballot paper to the **authorized agent** of that party.
   - **Domicile Requirement:** The 2003 amendment removed the requirement that a candidate must be an elector in the same state from which they are contesting. A person can now contest from any state as long as they are a registered voter in any parliamentary constituency in India.
   - **Cross-Voting & Anti-Defection:** Interestingly, the Supreme Court (Kuldip Nayar case) held that voting against the party's direction in Rajya Sabha elections does not automatically attract disqualification under the **Tenth Schedule (Anti-Defection Law)**, though the party can take disciplinary action.
4. **Duration and Nature of the House**
   - **Permanent Body:** Unlike the Lok Sabha, the Rajya Sabha is not subject to dissolution.

- **Staggered Terms:** Members are elected for a **six-year term**, with one-third of the members retiring every two years.

1.2. VVP-II EXPANSION TO BORDER VILLAGES

Context: Recently, the **Ministry of Home Affairs (MHA)** announced the launch of the second phase of the **Vibrant Villages Programme (VVP-II)**. The programme is expanding its reach from the northern borders to include **1,954 strategic villages** along the international land borders with Pakistan, Nepal, Bangladesh, Bhutan, and Myanmar across 15 States and 2 Union Territories. This expansion, highlighted by Home Minister Amit Shah's visit to the Bangladesh border in Assam, aims to counter demographic changes and provide a civilian "eyes and ears" deterrence against trans-border crimes and external security threats.

1. Overview and Evolution

The Vibrant Villages Programme was initially announced in the Union Budget 2022-23 to develop villages along India's northern border. It has since evolved into two distinct phases to cover the entirety of India's international land borders.

Feature	Vibrant Village Programme-I (VVP-I)	Vibrant Village Programme-II (VVP-II)
Launch/Approval	February 15, 2023	April 2, 2025
Scheme Type	**Centrally Sponsored Scheme**	**Central Sector Scheme** (100% Central Funding)
Time Period	FY 2022-23 to 2025-26	FY 2024-25 to 2028-29
Financial Outlay	₹4,800 Crore	₹6,839 Crore
Coverage	Northern Border (Arunachal, HP, Sikkim, Uttarakhand, Ladakh)	All other International Land Borders (17 States/UTs)

2. Objectives and Key Goals

- **Reversing Out-migration:** The primary goal is to provide enough livelihood opportunities and amenities so that border residents do not migrate to urban centers.
- **"Eyes and Ears" Strategy:** By encouraging a civilian presence, the government aims to turn local residents into the first line of intelligence and observation for border-guarding forces like the ITBP.
- **Saturation Model:** The programme seeks to achieve 100% saturation of all Central and State government schemes (e.g., Jal Jeevan Mission, PM-AWAS) in the identified villages.
- **Connectivity:** Ensuring all-weather road connectivity (via PMGSY-IV), 4G telecom connectivity, and 24x7 electricity including renewable energy.

3. Implementation Framework

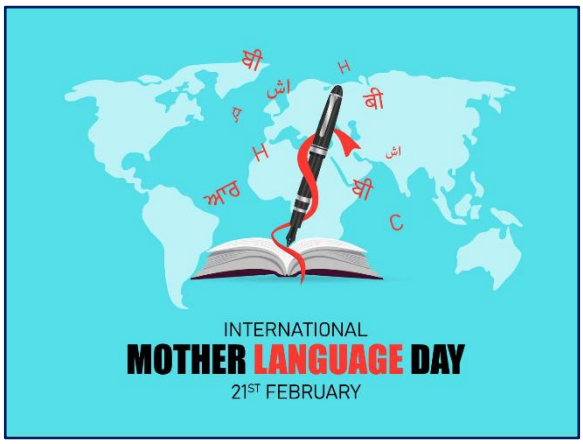
- **Village Action Plans:** These are prepared by the **District Administration** in collaboration with **Gram Panchayats** to ensure a bottom-up approach to development.

- **Hub and Spoke Model:** Growth centers are developed as "hubs" to support nearby "spoke" villages through social entrepreneurship and skill development.
- **Governance:** A **High-Powered Committee** chaired by the **Cabinet Secretary** oversees the implementation and provides necessary relaxations in schematic guidelines for remote areas.
- **Convergence:** The programme explicitly avoids duplication with the **Border Area Development Programme (BADP)** by focusing on specific village-level interventions.

4. **Key Focus Interventions**

- **Economic Drivers:** Development of sustainable eco-agribusinesses based on the **"One Village-One Product"** concept.
- **Tourism:** Promoting "Frontier Tourism" and cultural heritage to create local jobs in the hospitality sector.
- **Digital Integration:** Utilizing the **PM Gati Shakti** platform for integrated planning and real-time monitoring of infrastructure projects.
- **Social Infra:** Establishment of Smart Classes in schools and Ayushman Arogya Mandirs (Health & Wellness Centers) for every 1,000–1,500 people.

1.3. INTERNATIONAL MOTHER LANGUAGE DAY



Context: Recently, on February 21, 2026, the global community observed International Mother Language Day, marking the **Silver Jubilee (25th anniversary)** of its first worldwide celebration in 2000. The day was commemorated in India with high-level events emphasizing the integration of technology and mother tongues under the 2026 theme, **"Youth voices on multilingual education."** This year's observance is particularly significant as it coincides with the midpoint of the **International Decade of Indigenous Languages (2022–2032)**, prompting renewed calls for the preservation of India's 197 endangered languages.

1. **Historical Evolution**

- **The Origin:** The initiative to observe this day was a proposal by **Bangladesh** to honor the martyrs of the 1952 Language Movement (Bhasha Andolan).
- **The 1952 Incident:** On February 21, 1952, students in Dhaka were killed by police fire while protesting for the recognition of **Bengali** as a national language of Pakistan.
- **Recognition:** UNESCO approved the proclamation in **1999**, and the first official celebration was held in **2000**. The UN General Assembly formally recognized the day in its 2002 resolution.

2. **Theme 2026: Youth & Technology**

- **Theme:** "Youth voices on multilingual education."
- **Significance:** It highlights the role of young people in using digital tools and AI to revitalize underrepresented languages and ensure inclusive education.

3. **Constitutional Safeguards in India**

India provides extensive protection for linguistic diversity:

- **Article 29:** Protects the right of any section of citizens to conserve their distinct language, script, or culture.

- **Article 30:** Grants linguistic and religious minorities the right to establish and administer educational institutions.
- **Article 350A:** Mandates that states and local authorities provide instruction in the **mother tongue at the primary stage** of education for linguistic minority children.
- **Article 350B:** Directs the appointment of a **Special Officer for Linguistic Minorities** by the President of India.
- **Eighth Schedule:** Lists **22 recognized languages**. Currently, English is NOT included in this schedule.

4. UNESCO's Categories of Language Endangerment

UNESCO classifies languages based on their "intergenerational transmission":

- **Vulnerable:** Children speak the language, but it may be restricted to specific areas (e.g., home).
- **Definitely Endangered:** Children no longer learn the language as their mother tongue in the home.
- **Severely Endangered:** Spoken by grandparents; the parent generation may understand it but does not speak it to children.
- **Critically Endangered:** The youngest speakers are grandparents and older, and they speak it only partially and infrequently.

5. Government of India Initiatives

- **NEP 2020:** Encourages the medium of instruction to be in the mother tongue/regional language at least until Grade 5.
- **Bhashini Initiative:** An AI-led language translation platform to break language barriers in digital services.
- **SPPEL:** The "Scheme for Protection and Preservation of Endangered Languages" documents languages spoken by fewer than 10,000 people.

1.4. SANKALP: SKILL DEVELOPMENT FOR EMPOWERING YOUTH

Context: Recently, the Public Accounts Committee (PAC) of Parliament pulled up the government for the slow pace of implementation of the **SANKALP scheme**. While the government emphasized its commitment to the "Sankalp" (sacred duty) of empowering the underprivileged during the Budget 2026–27 session, the PAC flagged significant gaps in utilizing the World Bank-assisted funds and achieving targets for decentralizing the skilling ecosystem at the district level.

1. Overview of SANKALP

- **Full Form:** Skill Acquisition and Knowledge Awareness for Livelihood Promotion.
- **Nodal Ministry:** Ministry of Skill Development and Entrepreneurship (**MSDE**).
- **Type of Scheme:** It is a **Centrally Sponsored Scheme**.
- **Launch Date:** January 19, 2018 (with implementation periods recently extended to meet outcome-based targets).
- **Objective:** To strengthen institutional mechanisms at the National, State, and District levels and to increase access to quality, market-relevant training for the workforce.

2. **Funding and Implementation**
   - **World Bank Assistance:** The scheme is supported by a loan from the **World Bank** (International Bank for Reconstruction and Development).
   - **Instrument:** It uses the **"Program for Results" (PforR)** instrument, meaning funds are disbursed by the World Bank only upon the achievement of pre-agreed **Disbursement Linked Indicators (DLIs)**.
   - **Verification:** The **Indian Institute of Management (IIM) Indore** acts as the Independent Verification Agency (IVA) to verify the achievements before fund release.
3. **Key Result Areas (KRAs)**

   The scheme focuses on four core result areas to transform the skilling landscape:
   1. **Institutional Strengthening:** Building the capacity of State Skill Development Missions (SSDMs) and District Skill Committees (DSCs).
   2. **Quality Assurance:** Improving the quality of skill development programs through better trainers, standardized assessments, and certification.
   3. **Inclusion:** Ensuring access to skilling for marginalized populations, including women, Scheduled Castes (SC), Scheduled Tribes (ST), and Persons with Disabilities (PwD).
   4. **Expanding Skills through PPPs:** Engaging the private sector through Public-Private Partnerships to make skilling demand-driven.
4. **SANKALP vs. STRIVE**
   - **SANKALP:** Focuses on the **institutional and governance** aspect of skilling (short-term training, district planning, and policy convergence).
   - **STRIVE:** (Skills Strengthening for Industrial Value Enhancement) Focuses on improving the **relevance and efficiency of ITIs** (Industrial Training Institutes) and apprenticeship programs.
5. **Key Initiatives under SANKALP**
   - **Mahatma Gandhi National Fellowship (MGNF):** A two-year academic program that combines classroom sessions at IIMs with intensive field immersion at the district level to help District Skill Committees (DSCs) in preparing District Skill Development Plans (DSDPs).
   - **Skill India Portal:** A digital platform to aggregate and converge skill-related data across various central and state ministries.
   - **Awards for Excellence in District Skill Development Planning:** An initiative to incentivize districts to prepare high-quality, data-driven skilling plans.

1.5. PROPOSAL TO RENAME KERALA AS KERALAM

Context: Recently, the Union Cabinet chaired by Prime Minister Narendra Modi approved the proposal to rename the state of "Kerala" to **"Keralam."** This decision follows a unanimous resolution passed by the Kerala Legislative Assembly in June 2024, which urged the Central Government to align the official name with its Malayalam pronunciation and cultural heritage. The Union Cabinet has now set in motion the **Kerala (Alteration of Name) Bill, 2026**, which will be referred to the State Assembly by the President before being introduced in Parliament.

1. **Constitutional Provisions**

The power to change the name of a state is exclusively vested in the **Parliament of India**.

- **Article 3:** This article empowers Parliament to form new states and alter the areas, boundaries, or names of existing states.
- **Procedure for Name Change:**
  - A Bill for renaming a state can be introduced in either House of Parliament only on the **prior recommendation of the President**.
  - Before recommending the Bill, the President **must refer** it to the concerned State Legislature for expressing its views within a specified time frame.
  - The views of the State Legislature are **not binding** on either the President or the Parliament; Parliament is free to accept or reject them.
- **Article 4:** It specifies that laws made under Article 3 (for renaming or boundary changes) are **not considered amendments** to the Constitution under **Article 368**. Consequently, such a Bill can be passed by a **Simple Majority** (majority of members present and voting).

2. **Historical and Linguistic Roots**

- **Etymology:** The word "Keralam" is believed to have originated from **"Cheram,"** referring to the Chera dynasty. In Malayalam, "alam" means region or land, making it the "land of the Cheras." Another theory suggests the root is "keram" (coconut), reflecting the state's dominant agricultural produce.
- **Ancient References:** The earliest epigraphic record of the region is found in **Emperor Ashoka's Rock Edict II (257 BCE)**, where the local ruler is referred to as **"Keralaputra"** (Sanskrit for "son of Kerala").
- **Linguistic Reorganisation:** During the 1956 reorganisation of states on a linguistic basis, the state was formed for Malayalam speakers. While the native population has always used "Keralam," the English spelling "Kerala" was an anglicized version that persisted in the **First Schedule** of the Constitution.

3. **Comparison with Other States**

- **Recent Precedents:** Several states have changed their names previously, including **United Provinces to Uttar Pradesh (1950)**, **Madras to Tamil Nadu (1969)**, **Mysore to Karnataka (1973)**, **Uttaranchal to Uttarakhand (2007)**, and **Orissa to Odisha (2011)**.
- **Pending Proposals:** The West Bengal government's proposal to rename the state as **"Bangla"** remains pending with the Centre, highlighting that the Union Government's "No Objection" and subsequent Cabinet approval are critical hurdles.

1.6. NCERT ALIGNS WITH LEGAL DIRECTIVE

Context: Recently, after a blanket and complete ban imposed by the Supreme Court of India, the National Council of Educational Research and Training (NCERT) withdrew a Class 8 Social Science textbook containing a section on "corruption in the judiciary" in the chapter titled "Role of Judiciary in Our Society."

The Court held that selective references to "corruption in judiciary" could instil institutional distrust in "impressionable minds", affecting long-term public confidence in constitutional governance.

1. Key Aspects of NCERT

- The National Council of Educational Research and Training (NCERT), established in **1961** by the Government of India, is an **autonomous organization** under the **Ministry of Education.**
- **The major objectives of NCERT:** To undertake, promote and coordinate research in areas related to school education; prepare and publish model textbooks, supplementary material, newsletters, journals and develops educational kits, multimedia digital materials, etc.
- **Role:** Acts as the nodal agency for school education, supporting policies like the National Education Policy 2020 (NEP 2020).
- **Cultural exchange**: NCERT is an implementation agency for bilateral cultural exchange programmes with other countries in the field of school education.
- **Key Organizational Structure of NCERT:**
  - The council headquarter is located at **Sri Aurobindo Marg, New Delhi.**
  - **The Union Minister of Education** is the President (ex-officio) of the General Body of NCERT.
  - **Members:** Includes Education Ministers of all States and Union Territories.

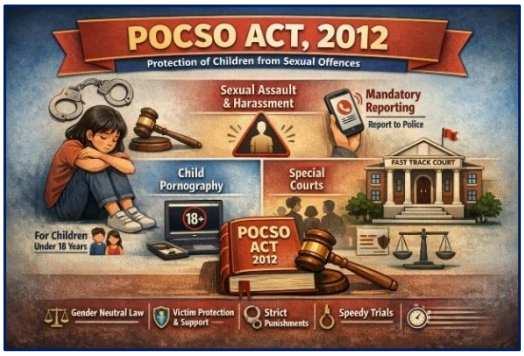
2. Educational Governance

- **Originally**, education was in the State List (prior to 1976), granting states exclusive, total control over curriculum, schools, and universities.
- **The 42nd amendment, 1976** changed the status of education by putting it on the concurrent list.
- While both Central and State governments can legislate on subjects mentioned under the Concurrent List, however, in case of any conflict, the law made by the Central Government prevails.

3. Constitutional and Legal Dimensions

- **Judicial independence**: It is a component of the **Basic Structure doctrine**, as established in the Kesavananda Bharati (1973) judgment, making the protection of institutional credibility constitutionally essential.
- **Freedom of Expression vs Institutional Integrity**: Article 19(1)(a) of the Indian Constitution guarantees freedom of speech and expression, enabling citizens to express views, publish, and circulate information. This right is **not absolute** and is balanced by **"reasonable restrictions" under Article 19(2),** which include protecting institutional integrity against contempt of court, defamation, and public order.
- **Contempt of Court:** It is classified in India under the **Contempt of Courts Act, 1971**. It is categorized as either civil (willful disobedience of orders/undertakings) or criminal (scandalizing the court or interfering with justice).
- **Article 129** declares the Supreme Court of India a Court of Record with the power to punish for its own contempt, while High Courts exercise a similar authority under **Article 215.**

1.7. JUDICIAL CONCERNS ON POCSO APPLICATION



Context: Recently, the Supreme Court of India highlighted concerns over the misuse of the Protection of Children from Sexual Offences (POCSO) Act in consensual adolescent relationships and urged the Centre to consider introducing a "Romeo–Juliet clause" to balance child protection with personal liberty.

Introducing a "Romeo–Juliet clause" aims to exempt genuine consensual adolescent relationships- where the age difference between the parties is minimal-from the strict application of the POCSO law.

Historical Background

- Rising child sexual abuse cases in the 1990s–2000s exposed gaps in **IPC provisions** and the lack of child-friendly procedures. India's ratification of the **UN Convention on the Rights of the Child** in 1992 created obligations to strengthen protection laws, leading to the enactment of the POCSO Act, 2012.
  - **United Nations Convention on the Rights of the Child (UNCRC)**The UN Convention on the Rights of the Child (UNCRC), adopted in 1989 (came into force in 1990), is **a legally binding** international treaty outlining the civil, political, economic, social, and health rights of everyone under 18. **India ratified the convention in 1992.**

About POCSO Act

1. **Enactment:** The POCSO Act was passed in **2012** to provide a comprehensive legal framework for protecting children (below 18 years) from sexual offences.
2. **Objective:** To safeguard children from **sexual assault, harassment, pornography**, and ensure child-friendly justice procedures.
3. **Gender-neutral law: Defines a child** as any person below 18 years and applies irrespective of the gender of the child or offender.
4. **Types of offences covered:**
   - Penetrative sexual assault
   - Aggravated assault
   - Sexual harassment
   - Use of children in pornography
5. **Not reporting abuse is an offence:** A key and widely debated feature of the POCSO Act is **mandatory reporting under Section 19**, which requires anyone who suspects or knows of a sexual offence against a child to report it to the local police or the Special Juvenile Police Unit.
6. **No time limit for reporting abuse:** A victim can report an offence at any time, even a number of years after the abuse has been committed.
7. **Maintaining confidentiality of the victim's identity:** Section 23 of the POCSO Act prohibits disclosure of the victim's identity in any form of media, except when permitted by the special courts established under the act.
8. **Special Courts:** They ensure speedy, in-camera trials-ideally **within one year**-protect children from exposure to the accused or hostile questioning, and provide for compensation and rehabilitation of child victims.

9. The POCSO Amendment Act, 2019:

- It was enacted to strengthen the Protection of Children from Sexual Offences Act, 2012, introduced stricter punishments, including the death penalty, for aggravated sexual assault against children.
- The Act defines **child pornography** as an offence and penalises storing **such material** for commercial purposes with up to three years' imprisonment, a fine, or both.

POCSO E-Courts and Fast-track Special Courts (FTSCs):

1. The Fast Track Special Courts (FTSCs) Scheme has been formulated exclusively for the expeditious trial of cases related to rape and offences under the POCSO Act and is funded through the Nirbhaya Fund, which is dedicated to initiatives aimed at enhancing the safety and security of women and children.
2. **Structure:** These courts are established under a **Centrally Sponsored Scheme** (initiated in 2019, extended to 2026) in districts with high pending cases.
3. **Time-Bound Trial Mandate under POCSO Act:** Investigation to be completed in 1 month and trial ideally within 1 year.

1.8. OUT-OF-STATE MPLADS FUND UTILIZATION

Context:

According to an analysis based on data from the Empowered Indian MPLADS dashboard, a significant portion of MPLADS funds recommended for works outside a Member of Parliament's (MP's) home State or constituency is being directed toward a single State in India.

1. **MPLADS Fund Utilization Patterns**
   - **Geographical Concentration of Funds**:
     - Uttar Pradesh received over **84%** of all MPLADS funds recommended for works outside an MP's home State or constituency.
     - Uttar Pradesh utilizes more than **twice** the MPLADS funds compared to the second-highest State, Tamil Nadu, which accounts for around 9% of the total funds.
2. **About MPLADS Scheme**
   - The MPLAD Scheme is a Central Sector Scheme(introduced in 1993), fully funded by the Government of India.
   - **The main objective of the Scheme:** To enable each Member of Parliament to recommend works of developmental nature with emphasis on the creation of **durable community assets** based on the locally felt needs of the people.

- **Nodal Ministry**: Initially, MPLADS was administered by the Ministry of Rural Development, but since October 1994 it has been managed by the **Ministry of Statistics and Programme Implementation.**
- **Funds Allocation: Each MP is entitled to ₹5 crore per annum**
  - **An elected Lok Sabha MPs** can recommend works in their Lok Sabha constituencies. **Rajya Sabha MPs** can recommend works within the state of election.
  - **Nominated members** can recommend works anywhere in the country.
  - However, an elected MP can recommend works anywhere in the country outside their usual area, with a limit of **₹25 lakh per financial year**, except in cases of calamity.
- **Special Provisions:** MPs are to recommend every year, works costing **at least 15 per cent** of the MPLADS entitlement for the year for areas inhabited by Scheduled Caste population and **7.5 per cent** for areas inhabited by **S.T. population**.
- **Nature of Funds:** This fund is non-lapsable and can be carried forward if not utilised in a given year.
- **Types of Projects Funded under MPLADS:**
  - Construction of roads, pathways, and small bridges
  - Environment, wild animals, forest and other natural resources
  - Installation of street lights and drainage systems
  - Building school classrooms, libraries, and labs
  - Providing drinking water facilities in schools
  - Development of health centres and purchase of medical equipment
  - Creation of drinking water supply systems and hand pumps
  - Construction of community halls, parks, and playgrounds
  - Building sanitation facilities and Anganwadi centres
  - Energy supply and distribution systems

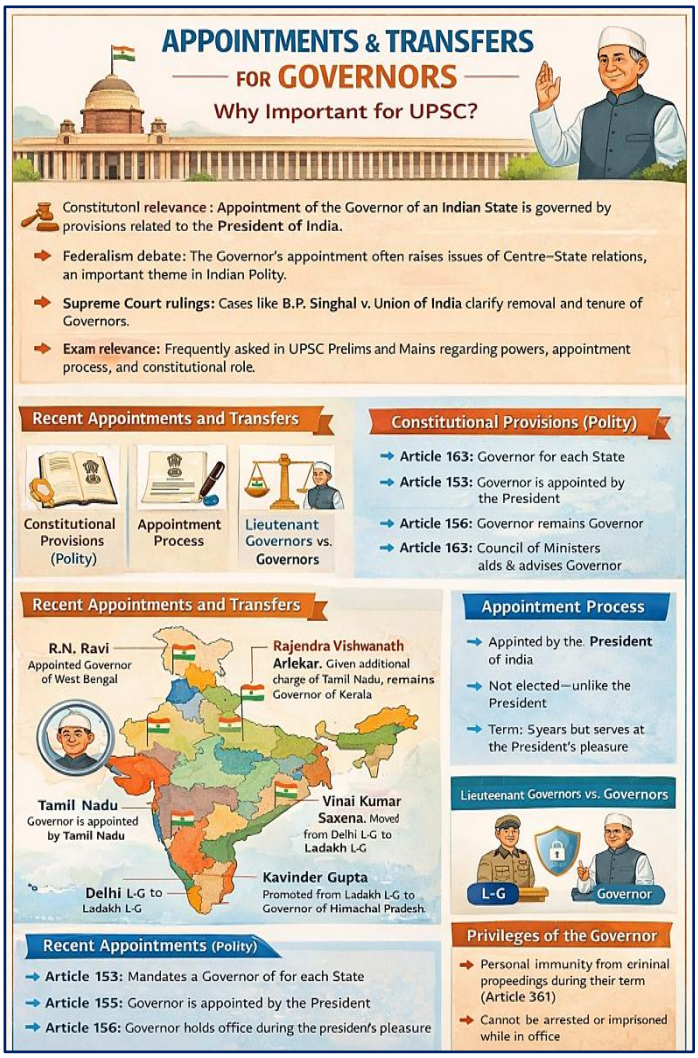
3. Monitoring and Implementation:

- **Ministry of Statistics and Programme Implementation** shall regularly monitor the implementation of the MPLADS, including overall position of funds released, cost of works sanctioned, funds utilized, etc.
- **Role of Central Nodal Agency:** It shall periodically review the physical and financial progress of MPLADS funds, and take up the matter with the State Nodal Authority, Nodal District Authority, or the Implementing District Authority.
- **Role of the State/ UT Governments**: It shall designate a Department of the State/ UT to be the State Nodal Department, and the Administrative Secretary of that department to be the State Nodal Authority to coordinate and monitor the implementation of the MPLADS in that State/ UT. A State Monitoring Committee, **chaired by the Chief Secretary**, reviews MPLADS implementation and fund utilization with concerned authorities and MPs at least once a year.
- **Role of the District Authority:**
  - They shall be responsible for overall monitoring and supervision of the works under the scheme at the district level.
  - They shall inspect at least 10% of the works under implementation every year.

1.9. APPOINTMENTS AND TRANSFERS FOR GOVERNORS

Context:

The President of India recently announced new appointments and transfers for Governors across seven States and Lieutenant Governors (L-Gs) for two Union Territories. This reshuffle comes amidst significant political shifts, upcoming Assembly elections, and the resignation of high-profile officials like West Bengal Governor C.V. Ananda Bose.



I. Recent Appointments and Key Changes

The latest round of appointments highlights the constitutional power of the President to move and appoint heads of states:

- **West Bengal**: R.N. Ravi (formerly Governor of Tamil Nadu) has been appointed as the new Governor.
- **Tamil Nadu**: Rajendra Vishwanath Arlekar (Governor of Kerala) has been given the additional charge of Tamil Nadu.
- **Bihar**: Lt. Gen. (Retd.) Syed Ata Hasnain has been appointed as the Governor, replacing Arif Mohammed Khan.
- **Transfers**: Shiv Pratap Shukla was moved from Himachal Pradesh to Telangana, and Jishnu Dev Varma was transferred from Telangana to Maharashtra.
- **Union Territories**: Vinai Kumar Saxena was moved from Delhi to Ladakh, while Kavinder Gupta was elevated from Ladakh L-G to Governor of Himachal Pradesh.

II. Static Linkages: The Office of the Governor

1. Constitutional Provisions (Polity)

- **Article 153**: Mandates that there shall be a Governor for each State. The 7th Constitutional Amendment Act of 1956 facilitated the appointment of the same person as a Governor for two or more States (relevant to the additional charge given for Tamil Nadu).
- **Article 155**: The Governor is appointed by the President by warrant under his hand and seal.
- **Article 156**: The Governor holds office during the pleasure of the President. The article also mentions a standard term of five years, but this is subject to the President's pleasure.
- **Article 163:** There is a Council of Ministers with the Chief Minister at the head to aid and advise the Governor in the exercise of his functions, except in some conditions where discretion is allowed.

2. **What is the Appointment Process for the Governor?**

- The **Governor of an Indian State** is the **constitutional head and chief executive of the state**. The office has been **inspired by the Canadian constitutional model**.
- By convention, the Governor is usually **appointed from outside the state** to keep the office free from local political influences.
- Although the **President of India** appoints the Governor, it is generally expected that the **Chief Minister of the concerned state** is consulted to facilitate smooth functioning of the constitutional system.
- Unlike the **President of India**, the Governor is **neither directly elected by the people nor indirectly elected by an electoral college**.
- Instead, the Governor is **appointed by the President through a warrant under his hand and seal**. The Governor **holds office at the pleasure of the President** and may be removed at any time.

3. **Key Conditions of the Governor's Office**

- **Legislative Separation:** The Governor cannot be a member of either House of Parliament or any House of a State Legislature. If a sitting member is appointed, they are deemed to have vacated their seat on the date they assume office.
- **No Other Office of Profit:** The Governor must not hold any other position of profit.
- **Official Residence:** The Governor is entitled to use the official residence (Raj Bhavan) without paying rent.
- **Emoluments and Allowances:** Parliament determines the salary, allowances, and privileges of the Governor. These cannot be reduced during their term.
- **Shared Expenses:** If one person acts as Governor for two or more states, the expenses and salaries are shared among the states as determined by the President.
- **Immunity:** The Governor enjoys immunity from criminal proceedings for personal acts during their term, and civil proceedings require two months' notice.
- **Qualification:** Must be a citizen of India and Must have completed 35 years of age(Article 157).

4. **Lieutenant Governors vs. Governors**

- **Governors**: Act as the constitutional head of a State, bound by the aid and advice of the Council of Ministers (except in discretionary matters).
- **Lieutenant Governors (L-Gs)**: Administer Union Territories (UTs) like Delhi, Ladakh, and Puducherry as representatives of the President. Their powers often differ based on whether the UT has a Legislative Assembly.

5. **Privileges:**

- Under **Article 361 of the Constitution of India**, the **Governor of an Indian State** enjoys **personal immunity from legal liability for acts performed in the exercise of official powers**.
- During the tenure of office, the Governor is **immune from criminal proceedings**, even for actions of a personal nature, and **cannot be arrested or imprisoned**.

- However, **civil proceedings related to personal acts may be initiated during the term**, provided **a two-month prior notice** is given.

1.10. KARNATAKA & ANDHRA PRADESH SOCIAL MEDIA BAN FOR CHILDREN

Context:

Recently, the state governments of **Karnataka** and **Andhra Pradesh** have proposed significant legislative measures to ban or strictly restrict the use of social media for children. While presenting the State Budget for 2026-27, Karnataka Chief Minister Siddaramaiah announced a proposed ban on social media for children **under the age of 16** to curb digital addiction and protect mental health.

Simultaneously, Andhra Pradesh Chief Minister N. Chandrababu Naidu stated that his government is working to implement a similar restriction for children **below 13 years** of age within 90 days, while also deliberating on extending the policy to the 13-16 age group.

Key Highlights of the Proposal

1. **State-Specific Provisions**
   - **Karnataka:** The proposal was introduced in the **2026-27 Budget**. It targets children below 16 years, citing concerns over "excessive screen time," "eye fatigue," and "academic decline."
   - **Andhra Pradesh:** The state plans to enforce a ban for those below 13 years within **90 days**. A **Group of Ministers (GoM)** led by Nara Lokesh is currently studying the technical feasibility and international models.
2. **Major Objectives**
   - **Mental Health:** Combatting rising cases of anxiety, depression, and body image issues among adolescents.
   - **Safety:** Protecting minors from cyberbullying, online grooming, and exposure to age-inappropriate content.
   - **Digital Literacy:** Encouraging physical activities and reading habits through campaigns like Karnataka's **'Mobile Bidi, Pustaka Hidi'** (Leave the phone, pick a book).
3. **Global Trends**

   The moves by Indian states align with a growing global "Age-Gate" movement:
   - **Australia:** Passed a landmark law in late 2025 banning social media for anyone under 16.
   - **France:** Introduced a "digital puberty" age of 15, requiring parental consent for social media.
   - **Spain:** Mandated age verification for minors under 16.

4. Legal and Constitutional Challenges

- **Jurisdictional Issue:** Under the **Seventh Schedule** of the Indian Constitution, "Communication" and "Information Technology" (Intermediaries) fall under the **Union List**. Critics argue that states may lack the legislative competence to mandate platform-level blocks.
- **Fundamental Rights:** The ban may be challenged under **Article 19(1)(a)** (Freedom of Speech and Expression), as even minors possess certain rights to access information, subject to "reasonable restrictions."
- **Digital Personal Data Protection (DPDP) Act, 2023:** This central law already defines a "child" as someone under 18 and mandates **verifiable parental consent** before processing their data.
- **Implementation Hurdles:** Difficulties in "Age Verification" without infringing on the **Right to Privacy** (K.S. Puttaswamy judgment).

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INTERNATIONAL RELATIONS

2.1. NEW START TREATY NEARS EXPIRY

Context:

Recently, the global security landscape has reached a critical juncture as the **New START (Strategic Arms Reduction Treaty)**, the final remaining pillar of bilateral nuclear arms control between the United States and Russia, is set to **expire on February 5, 2026**.

1. **Basic Overview**
   - **Full Name:** Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms.
   - **Signatories:** Signed by U.S. President **Barack Obama** and Russian President **Dmitry Medvedev** on April 8, 2010, in Prague.
   - **Timeline:** It entered into force on **February 5, 2011**. Originally set for ten years, it was extended in 2021 for an additional five years, concluding in February 2026.
2. **Core Limitations (The 700-800-1550 Rule)**

   The treaty imposes three central aggregate limits on strategic offensive arms:
   - **700 Deployed:** Limit on deployed Intercontinental Ballistic Missiles (ICBMs), Submarine-Launched Ballistic Missiles (SLBMs), and heavy bombers.
   - **1,550 Warheads:** Limit on nuclear warheads on deployed ICBMs, SLBMs, and heavy bombers (calculated by specific counting rules).
   - **800 Launchers:** Limit on both deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers.
3. **Verification and Transparency**

   To ensure neither side "cheats," the treaty includes a robust verification regime:
   - **On-site Inspections:** Up to 18 inspections per year divided into two types (Type One for operational bases and Type Two for non-deployed storage).
   - **Data Exchanges:** Biannual exchange of detailed data on the status and basing of treaty-accountable systems.
   - **Bilateral Consultative Commission (BCC):** A dedicated body that meets at least twice a year to resolve compliance issues and technical ambiguities.
   - **National Technical Means (NTM):** Permission to use satellites and other remote sensing tools for monitoring without interference.
4. **Current Challenges and "Suspension"**
   - **Suspension by Russia (2023):** In February 2023, Russia officially announced the "suspension" of the treaty, citing U.S. involvement in the Ukraine conflict.

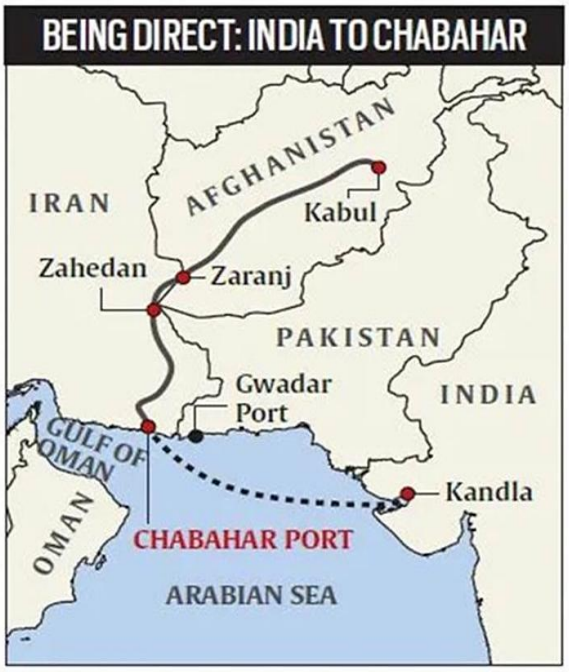
- **Operational Status:** While Russia stopped providing notifications and allowing inspections, both nations have largely indicated they would continue to respect the central numerical limits (the 1,550 warhead cap) until the formal expiration in 2026.

2.2. STRATEGIC IMPORTANCE OF CHABAHAR PORT

Context:

The government recently told Parliament that it has completely paid up its commitment of $120 million for the Chabahar port, well before the U.S. sanctions waiver runs out in April 2026.

Further, the Ministry of External Affairs (MEA) said the U.S. has extended a conditional sanctions waiver for the Chabahar project until April 26, 2026, following India–U.S. discussions, and added that India remains engaged with all stakeholders amid uncertainty over any further extension.



About the Chabahar Port Project

- In January 2015, **India Ports Global Limited (IPGL)** was incorporated under the Companies Act, 2013 for the development of ports overseas.
- **April 2016:** India, Iran, and Afghanistan signed a **trilateral agreement** to develop Chabahar Port.
- **December 2017:** The **first phase of Shahid Beheshti Port** was inaugurated after rapid development by India's Shipping Ministry.
- In December 2018, IPGL took over part of the operations at Shahid Beheshti Port.
- Two years later, Afghan exports to India passed through the port for the first time. India received four such consignments that year.

Key Geographic and Operational Features

- **Location:** Situated in the **Gulf of Oman**, it provides direct access to the Indian Ocean, bypassing the sensitive **Strait of Hormuz** choke point.
- **Structure:** The port consists of two separate complexes: **Shahid Beheshti** and **Shahid Kalantari**, each featuring five berths.
- **Infrastructure:** It is a deep-sea port capable of handling massive cargo ships that cannot be accommodated at other Iranian ports like Bandar Abbas.

Strategic Significance

- **Alternative trade route:** Provides India an alternative trade route to **Afghanistan and Central Asia**, bypassing Pakistan.
- **Regional Connectivity:** Enhances India's connectivity to Central Asia, Russia, and Europe via the **International North–South Transport Corridor (INSTC).**
- INSTC is a multi-modal transportation route **linking** the Indian Ocean and the Persian Gulf to the Caspian Sea via Iran and onward to northern Europe via St. Petersburg in Russia.

- **Counterbalance:** Acts as a **counterbalance to Gwadar Port (Pakistan)** developed with Chinese assistance.
- **Energy security:** The port facilitates India's access to regional energy reserves and secures a stable supply chain by enabling direct investment in Iran's energy infrastructure

2.3. INDIA HOSTS AI IMPACT SUMMIT 2026

Context: The fourth AI Impact Summit 2026 commenced at the **Bharat Mandapam in New Delhi**, marking a significant step in India's leadership within the digital domain. Unlike developed nations that often focus primarily on regulatory frameworks, India is championing a "human-centric" approach that prioritizes "economic good" for all.

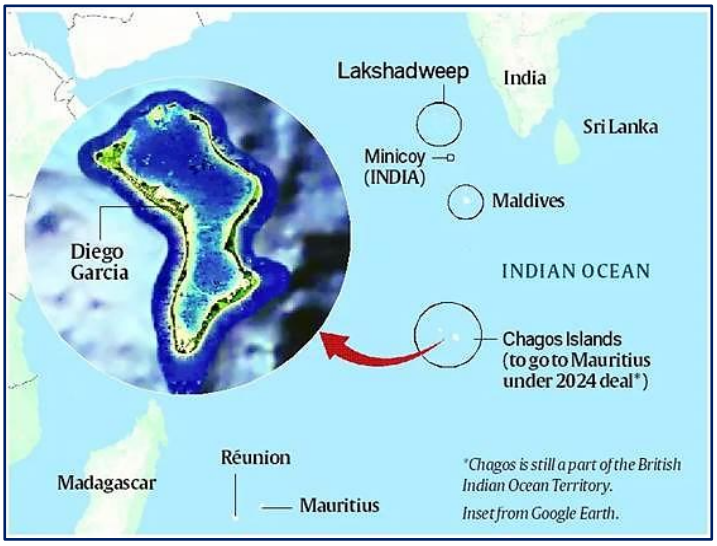
This summit serves as a platform for India to advocate for equitable access to AI resources and fair rule-making, particularly for developing economies in the Global South.

1. **Core Pillars and Thematic Structure**
   - **The Three "Chakras"**: The summit is structured across three thematic pillars—**People, Planet, and Progress**.
   - **Scale of Participation**: The event features over **3,000 speakers** across **500 sessions**, with participation from approximately **100 countries**.
   - **India AI Expo**: Prime Minister Narendra Modi inaugurated the "India AI Expo 2026," showcasing AI technology demonstrations from start-ups and pavilions from 13 countries.
2. **Strategic Diplomacy and Global Leadership**
   - **Bilateral Engagements**: The summit facilitates high-level diplomacy, including bilateral talks between Prime Minister Modi and French President **Emmanuel Macron**, as well as engagements with Brazilian President **Luiz Inácio Lula da Silva**.
   - **Tech Industry Collaboration**: Global tech leaders, including **Sundar Pichai (Google)**, **Sam Altman (OpenAI)**, and **Bill Gates**, are expected to participate, highlighting the intersection of private tech innovation and public policy.
   - **UN Involvement**: UN Secretary-General **António Guterres** is among the attendees, emphasizing the summit's importance in the global governance of Artificial Intelligence.
3. **Key Focus Areas for Prelims**
   - **Venue**: Bharat Mandapam, New Delhi (the same venue as the 2023 G-20 Summit).
   - **Event Frequency**: This is the **fourth AI Summit**, following previous iterations held in the U.K., South Korea, and **France.**
   - **Inclusive Innovation**: A notable feature is the scheduled **"all-woman" hackathon** aimed at fostering diversity in the AI development space.

- **The AI for ALL Global Impact Challenge**: It received over 1,350 applications from more than 60 countries, focusing on scalable AI solutions across healthcare, agriculture, climate resilience, governance, education, and financial inclusion.
- **The AI by HER**: It is Global Impact Challenge, which received over 800 applications from more than 50 countries, is dedicated to advancing women-led innovation in artificial intelligence.
- **The YUVAi Global Youth Challenge:** which received over 2,500 applications from 38 countries, showcases the innovation and problem-solving capabilities of young AI leaders aged 13 to 21.

2.4. CHAGOS SOVEREIGNTY DISPUTE REVIVES

Context: Recently, the sovereignty dispute over the **Chagos Archipelago** has returned to the spotlight following ongoing diplomatic negotiations between the **United Kingdom and Mauritius**, as reported in major dailies. The discussions center on the historic transfer of authority over the islands, specifically addressing the status of the strategic military base at **Diego Garcia** and the right of return for the displaced Chagosian people.



1. **Geography and Location**
   - The Chagos Archipelago is a group of seven atolls comprising more than 60 individual tropical islands in the **Indian Ocean**.
   - It is situated approximately 500 kilometers south of the **Maldives** archipelago.
   - The largest and most southerly island is **Diego Garcia**, which hosts a vital strategic military base operated by the United States and the United Kingdom.
2. **Historical and Political Background**
   - Originally, the Chagos Islands were part of the French colony of Mauritius, which was later ceded to the **United Kingdom** in 1814.
   - In 1965, three years before Mauritius gained independence, the UK detached the Chagos Archipelago to create the **British Indian Ocean Territory (BIOT)**.
   - Between 1968 and 1973, the local population (Chagosians) was forcibly relocated to Mauritius and the Seychelles to make way for the military base on Diego Garcia.
3. **Legal and Diplomatic Developments**
   - **ICJ Advisory Opinion (2019):** The International Court of Justice ruled that the decolonization of Mauritius was not lawfully completed and that the UK is under an obligation to end its administration of the Chagos Archipelago as rapidly as possible.
   - **UN General Assembly Resolution:** Following the ICJ ruling, the UNGA passed a resolution demanding that the UK withdraw its colonial administration.
   - **Current Status:** The UK has agreed to hand over sovereignty to Mauritius, provided that the long-term operation of the Diego Garcia military base is secured through a treaty.

4. **Strategic Significance**
    - The archipelago sits at the "crossroads" of the Indian Ocean, providing a surveillance and strike capability covering the **Middle East, Africa, and South Asia**.
    - It is a critical node for maintaining **maritime security** and freedom of navigation in the Indo-Pacific region.

2.5. ESCALATING CONFLICT ON AFGHANISTAN-PAKISTAN BORDER

Context: Recently, the Afghan military forces attacked Pakistani forces along the border, citing retaliation for deadly air strikes that occurred days earlier.

A spokesperson for the Taliban regime, Zabiullah Mujahid, stated that large-scale offensive operations were launched against Pakistani military bases and installations in response to repeated violations by the Pakistani military.

Key Aspects of Afghanistan

- Afghanistan, officially the Islamic Emirate of Afghanistan, is a landlocked, mountainous nation in **South-Central Asia** with a population of 38–50 million and Kabul as its capital.
- **Political Features:** It is a landlocked, mountainous country in Southern Asia, often referred to as the **"Gateway to Asia."**
- **Demographics & Language**: Multiethnic population with Pashtun, Tajik, and Hazara as major groups. Official languages are **Pashto and Dari.**
- **Bordering Nations:** Turkmenistan, Uzbekistan, and Tajikistan to the north, Iran to west, Pakistan to the southeast, India and China to the northeast.
- **Geographical Features:**
    - Hindu Kush Mountains: Dominant range, acting as a barrier.
    - **Wakhan Corridor:** A narrow strip in the northeast connecting Afghanistan to China's Xinjiang.
    - **Rivers:** Amu Darya (North), Helmand River (Longest, Southwest), Kabul River (East).
    - **Passes:** Khyber Pass (connects to Pakistan/Indian subcontinent).
    - **Desert:** The Registan Desert, also called the **Sistan Desert**, is an extremely arid plateau in southeastern Afghanistan between Helmand Province and Kandahar Province.
    - **Highest Point:** Mt. Nowshak
    - **Major Cities:** Kabul (capital), Kandahar, Herat, Mazar-i-Sharif
    - **Climate & Extremes:** Mostly arid to semi-arid climate with cold winters and hot summers.
    - **Key dams in Afghanistan:** These are critical for irrigation and hydroelectric power, include the **Salma Dam** (Afghan-India Friendship Dam), Kajaki Dam (Helmand river), Kamal Khan Dam, and Dahla Dam.
- **Economy & Resources:**
    - **Main industries:** textiles, carpets, cement, fertilizer.
    - **Agriculture:** wheat, fruits, nuts, wool, opium.

- **Minerals:** Rich in natural resources like natural gas, lithium, copper, coal, iron ore, and precious stones.
- **Major exports:** carpets, wool, fruits, gems.
- **Major imports:** petroleum products, food, machinery.

Global Perspective

- **INSTC:** The International North–South Transport Corridor (INSTC) is a multi-modal trade route (ship–rail–road) connecting India with Central Asia, Russia, and Europe to reduce time and cost of transport.
  - **Regions involved:** India, Iran, Afghanistan, Azerbaijan, Russia, Central Asia and Europe.
- **BRI:** China is integrating Taliban-led Afghanistan into the Belt and Road Initiative (BRI) to secure regional stability, access mineral resources, and boost trade connectivity, particularly by extending the China-Pakistan Economic Corridor (CPEC).

2.6. ISRAEL MAPPING GAINS STRATEGIC FOCUS

Context: Recently, Prime Minister Narendra Modi's high-profile visit to Israel has brought the geography and strategic mapping of the Levant region back into sharp focus. The visit emphasized the "Special Strategic Partnership" between the two nations, highlighting key geographical corridors like the **India-Middle East-Europe Economic Corridor (IMEC)** and the strategic importance of the Port of Haifa.

1. **Political Geography & Borders**

   Israel is located at the eastern end of the **Mediterranean Sea** in West Asia, forming part of the **Levant** region.

   - **Northern Border:** Lebanon (separated by the Blue Line).
   - **Northeastern Border:** Syria (Golan Heights is the flashpoint).
   - **Eastern Border:** Jordan and the West Bank.
   - **Southwestern Border:** Egypt (Sinai Peninsula) and the Gaza Strip.
   - **Coastlines:** It has a long western coastline on the **Mediterranean Sea** and a small southern exit to the **Red Sea** via the **Gulf of Aqaba**.

2. **Disputed & Strategic Territories**

   - **West Bank:** A landlocked territory west of the Jordan River. It contains Judean **Hills** and key cities like Ramallah and Hebron.
   - **Gaza Strip:** A coastal enclave on the Mediterranean, bordering Egypt at the **Rafah Crossing**.
   - **Golan Heights:** A rocky plateau captured from Syria in 1967. It is strategically vital as it overlooks the Jordan River valley and provides a significant portion of Israel's freshwater.
   - **Shebaa Farms:** A small, disputed strip of land at the intersection of the Lebanese-Syrian border and the Israeli-occupied Golan Heights.

3. **Physical Features**

   - **The Negev Desert:** Occupies the southern half of the country; it is a triangular-shaped semi-desert region.

- **The Dead Sea:** The lowest point on Earth (approx. 430m below sea level), shared with Jordan. It is hyper-saline.
- **Sea of Galilee (Lake Tiberias):** The primary freshwater lake in the north, fed by the **Jordan River**.
- **Mountain Ranges:** Includes **Mount Hermon** (highest point in the north), **Mount Carmel** (near Haifa), and the **Judean Mountains**.

4. **Important Cities and Ports**

- **Jerusalem:** Located in the Judean Mountains; the seat of government.
- **Tel Aviv:** The economic and technological hub on the Mediterranean coast.
- **Haifa:** The largest northern port city, critical for the IMEC project.
- **Eilat:** Israel's only port on the Red Sea, located at the southern tip.
- **Ashkelon & Ashdod:** Major coastal cities and ports south of Tel Aviv.

2.7. INDIA–BRAZIL STRATEGIC COOPERATION EXPANDS

Context: Recently, India and Brazil signed a series of landmark agreements during the state visit of President Luiz Inácio Lula da Silva to New Delhi. These agreements focus on strategic cooperation in **critical minerals** (specifically rare earths and lithium), **steel mining**, and **digital public infrastructure**.

1. **Political Location and Borders**

- **Vast Landmass:** Brazil is the **fifth-largest country** in the world and occupies nearly **47% of the South American continent**.
- **Latitudinal Extent:** It is the only country in the world through which both the **Equator** and the **Tropic of Capricorn** pass.
- **Neighboring Countries:** Brazil shares a border with every South American country except for **Chile and Ecuador**.
- **Coastline:** It has an extensive coastline along the **Atlantic Ocean** to the east.

2. **Major Physical Features**

- **The Amazon Basin (North):** This is the world's largest drainage basin, covered by the **Selvas** (equatorial rainforests). It is a major carbon sink and is often called the "Lungs of the Earth."
- **The Brazilian Highlands (South-East):** This is an ancient plateau composed of old crystalline rocks. It includes sub-ranges like the **Serra do Mar** and the **Serra da Mantiqueira**.
- **The Pantanal (West):** Located primarily in the state of Mato Grosso do Sul, the Pantanal is the **world's largest tropical wetland**. It is an internal delta where several rivers converge.
- **Mato Grosso Plateau:** This is a central upland region that acts as a water divide between the Amazon and La Plata river systems.

3. **Drainage Systems**
    - **Amazon River:** It originates in the **Andes Mountains (Peru)** and flows into the Atlantic Ocean. Its major tributaries in Brazil include the **Rio Negro** (black water) and the **Madeira**.
    - **São Francisco River:** Known as the "river of national integration," it is the longest river that runs **entirely within Brazilian territory**.
    - **Paraná-Paraguay System:** These rivers flow southward and contribute to the **Itaipu Dam**, one of the world's largest hydroelectric power producers, shared with Paraguay.
4. **Economic Geography & Resources**
    - **The Iron Quadrangle (Quadrilátero Ferrífero):** Located in the state of **Minas Gerais**, this is one of the world's richest iron-ore mining regions.
    - **Carajás Mine:** Situated in the state of **Pará**, it is the world's largest iron ore mine.
    - **Critical Minerals:** Brazil is a global leader in **Niobium** production and holds significant reserves of **Lithium** and **Graphite**, which are vital for India's EV battery supply chain.
    - **Agriculture:** Brazil is the world's largest producer of **Coffee** (grown in "Fazendas") and a leading producer of **Soybeans** and **Sugar**.

2.8. INDIA–CANADA CRITICAL MINERALS PARTNERSHIP

Context: Recently, the visit of Canadian Prime Minister **Mark Carney** to India on February 27, 2026, has brought Canada's geographical and strategic assets into sharp focus. A central pillar of the bilateral talks involves the **India-Canada Critical Minerals Partnership**. Canada's geography is not merely a matter of topography but a repository of global resources; the Canadian Shield, often called the "Mineral House," is vital for India's transition to green energy, containing massive deposits of **uranium, potash, and nickel**.

1. **Physiographic Regions**

Canada is divided into seven distinct physiographic regions, each with unique geological features:

- **The Canadian Shield:** An ancient, horseshoe-shaped region of Precambrian rock surrounding **Hudson Bay**. It covers 50% of the country and is the primary source of metallic minerals (Iron, Nickel, Copper, Gold).
- **The Western Cordillera:** High, rugged mountains on the Pacific coast, including the Rockies and the Coast Mountains.
- **The Interior Plains:** The "Breadbasket of Canada," stretching between the Shield and the Cordillera, known for wheat and fossil fuels.
- **Appalachian Region:** Older, eroded mountains in the southeast (Atlantic provinces).
- **The Arctic Archipelago:** A vast group of thousands of islands in the far north.
- **St. Lawrence Lowlands:** The most densely populated region, featuring fertile land and the Great Lakes.
- **Hudson Bay Lowlands:** A flat, swampy region located on the southern shore of Hudson Bay.

2. Mountain Systems and Ranges

- **Western Cordillera (Pacific Coast):**
  - **The Rockies:** Extend from the US through British Columbia and Alberta.
  - **Coast Mountains:** Run along the Pacific shore; they are heavily glaciated.
  - **Saint Elias Mountains:** Home to **Mount Logan** (5,959m), Canada's highest point.
- **Eastern Systems:**
  - **Torngat Mountains:** Located in Labrador, part of the Canadian Shield.
  - **Appalachians:** Low, rolling mountains in Newfoundland, New Brunswick, and Nova Scotia.

3. Hydrography: Rivers and Lakes

Canada contains 7% of the world's renewable freshwater.

- **Major Rivers:**
  - **Mackenzie River:** Longest in Canada (4,241 km); flows from Great Slave Lake to the **Beaufort Sea**.
  - **St. Lawrence River:** Connects the Great Lakes to the Atlantic Ocean; a major commercial artery.
  - **Yukon River:** Flows through the Yukon Territory into Alaska.
  - **Nelson River:** Drains Lake Winnipeg into Hudson Bay.
- **Key Lakes:**
  - **The Great Lakes:** Superior, Huron, Erie, and Ontario (Shared with the US). **Lake Michigan** is entirely in the US.
  - **Great Bear Lake:** Largest lake entirely within Canada (Northwest Territories).
  - **Great Slave Lake:** Deepest lake in North America (Northwest Territories).
  - **Lake Winnipeg:** Located in Manitoba; a remnant of the glacial Lake Agassiz.

4. Strategic Islands and Straits

- **Arctic Archipelago Islands: Baffin Island** (largest), Victoria Island, and Ellesmere Island (northernmost).
- **Strategic Straits:**
  - **Davis Strait:** Between Greenland and Baffin Island; connects Baffin Bay and the Labrador Sea.
  - **Hudson Strait:** Connects Hudson Bay to the Atlantic Ocean.
  - **Strait of Belle Isle:** Separates Newfoundland from the Labrador Peninsula.
  - **Juan de Fuca Strait:** Between Vancouver Island and Washington State (US).

5. Major Minerals Found in Canada

Metallic Minerals

- **Uranium:** A globally significant resource. Canada possesses one of the world's largest high-grade uranium reserves, primarily centered in the **Athabasca Basin** in northern Saskatchewan.
- **Nickel:** Extensive deposits are mined around **Sudbury** and **Timmins** in Ontario, making Canada a leading global producer.
- **Potash:** Essential for global agriculture. Canada is the world's largest producer of potash, with major mines located across Saskatchewan.
- **Iron Ore:** Heavily concentrated in the **Labrador Trough** (the border region of Quebec and Newfoundland and Labrador).
- **Copper, Gold, and Zinc:** Widely distributed, with notable production centers in Ontario (Sudbury, Timmins) and Quebec.

Energy Minerals

- **Crude Petroleum:** Concentrated in Western Canada, specifically the **Athabasca Oil Sands** in Alberta. The **Hibernia** oil field off the coast of Newfoundland is also a major offshore producer.
- **Natural Gas:** Found extensively in British Columbia, Alberta, and Saskatchewan.
- **Coal:** Mined primarily in British Columbia, Alberta, and Saskatchewan.

2.9. WEST BANK LAND REGISTRATION CONTROVERSY

Context: Recently, the West Bank has dominated global headlines as 85 countries issued a joint statement at the United Nations strongly condemning Israel's latest plan to begin a massive land registration process in the territory.

1. Geographical Overview

- **Location:** The West Bank is a landlocked territory in West Asia, located on the western bank of the **Jordan River**.
- **Borders:** It is bordered by **Jordan** and the **Dead Sea** to the east, and by **Israel** to the north, west, and south along the "Green Line" (1949 Armistice Line).
- **Terrain:** The region is characterized by a north-south orientation of limestone hills, namely the **Samarian Hills** in the north and the **Judean Hills** in the south.
- **Key Water Bodies:** The Jordan River serves as the primary freshwater source and the natural eastern boundary, while the Dead Sea is the lowest point on Earth.

2. The Oslo Accords and Administrative Divisions

- **Oslo II Accord (1995):** This interim agreement divided the West Bank into three distinct administrative zones to facilitate a gradual transition to Palestinian self-rule.
- **Area A (18%):** Full civil and security control lies with the **Palestinian Authority (PA)**; it includes major cities like Ramallah and Nablus.
- **Area B (22%):** The PA handles civil administration (health, education), while security is jointly controlled by Israel and the PA.

- **Area C (60%):** Israel retains full civil and security control; this area contains the vast majority of Israeli settlements and is the current focus of land registration disputes.

3. **Strategic Cities and Locations**
   - **Ramallah:** Serves as the de facto administrative capital of the Palestinian Authority.
   - **Hebron (Al-Khalil):** A major flashpoint city containing the **Cave of the Patriarchs**, a site holy to both Jews and Muslims.
   - **Jericho:** Located in the Jordan Valley, it is one of the oldest continuously inhabited cities in the world and lies below sea level.
   - **Jenin:** Home to a significant refugee camp and a frequent center for security operations.
4. **International Legal Framework**
   - **Status:** The United Nations and the International Court of Justice (ICJ) categorize the West Bank as **occupied territory** rather than a part of Israel.
   - **Resolutions: UNSC Resolution 242** (1967) and **Resolution 338** (1973) form the legal basis for the "Land for Peace" principle, calling for Israeli withdrawal from territories occupied in the Six-Day War.

2.10. IRAN MAPPING

Context:

Recently, Iran has become a central focus of global geopolitics following significant military escalations in the Middle East. Israeli and U.S. strikes targeted key Iranian strategic locations, including the capital **Tehran**.

These events have reignited concerns regarding the security of the **Strait of Hormuz**, a vital global energy chokepoint, and the stability of the **International North-South Transport Corridor (INSTC)**, which connects India to Eurasia via the Iranian port of **Chabahar**.

1. **Political Geography and Borders**

   Iran is a West Asian country situated at the crossroads of Central Asia, South Asia, and the Middle East. It shares land borders with seven nations:

   - **North:** Armenia, Azerbaijan, and Turkmenistan.
   - **East:** Afghanistan and Pakistan.
   - **West:** Iraq and Turkey.
   - **Maritime Borders:** The **Caspian Sea** to the north (shared with Russia, Kazakhstan, Turkmenistan, and Azerbaijan) and the **Persian Gulf** and **Gulf of Oman** to the south.
2. **Major Mountain Systems**

   Iran's topography is dominated by a rugged mountainous rim surrounding a central plateau.

   - **Alborz Mountains:** Located in the north, they run along the southern coast of the Caspian Sea. They house **Mount Damavand**, a dormant stratovolcano and the highest peak in Iran (approx. 5,671 m).

- **Zagros Mountains:** This massive fold-and-thrust belt stretches from the northwest (borders with Turkey/Iraq) to the southeast (Strait of Hormuz). It is a major source of Iran's oil and gas reserves located in its western foothills.
- **Kopet Dag:** Forms the northeastern border with Turkmenistan.

3. **The Central Plateau and Deserts**

The interior of Iran consists of the **Iranian Plateau**, which is largely arid and contains two of the world's most extreme deserts:

- **Dasht-e Kavir (Great Salt Desert):** Located in the north-central region, it is characterized by salt marshes and "Kavirs" (salt wastes).
- **Dasht-e Lut (Desert of Emptiness):** Located in the southeast, it is one of the hottest places on Earth and is a UNESCO World Heritage site known for its spectacular "Yardangs" (wind-sculpted rock formations).

4. **Critical Water Bodies and Ports**

- **Lake Urmia:** Situated in the northwest, it is an endorheic (terminal) hypersaline lake. It was once the largest lake in the Middle East but has faced significant shrinking due to drought and damming.
- **Strait of Hormuz:** A narrow waterway connecting the Persian Gulf to the Gulf of Oman. It is the world's most important oil chokepoint, through which nearly **20% of global oil consumption** passes.
- **Chabahar Port:** Located on the Makran coast in the Sistan-Baluchistan province (Gulf of Oman). It is strategically vital for India as it bypasses Pakistan to provide a trade route to Afghanistan and Central Asia.

2.11. INDIA-US FOUNDATIONAL DEFENSE PACTS: A STRATEGIC ROADMAP

Context:

Recently, the strategic partnership between India and the United States has gained significant momentum following the signing of a landmark **10-year Defence Framework Agreement** (2025–2035) and a major **Interim Trade Deal** in early 2026.

This progress is built upon the successful operationalization of the four "Foundational Agreements"—GSOMIA, LEMOA, COMCASA, and BECA—which have institutionalized military interoperability, secure communication, and real-time intelligence sharing between the two nations, particularly in the context of maintaining a free and open Indo-Pacific.

Foundational Agreements: An Overview

The U.S. signs these "foundational" or "enabling" agreements with its close partners to facilitate military cooperation. For India, these were modified into "India-specific" versions to address concerns regarding sovereignty and strategic autonomy.

1. **GSOMIA (General Security of Military Information Agreement)**

- **Signed:** 2002 (Extended by the **Industrial Security Annex/ISA** in 2019).
- **Function:** It allows the two militaries to share intelligence gathered by them.

- **Impact:** It provides a framework for the exchange of classified military information between the governments and, with the ISA, it now includes private sector defense manufacturers.

2. **LEMOA (Logistics Exchange Memorandum of Agreement)**
   - **Signed:** 2016.
   - **Function:** It provides a framework for mutual logistical support, allowing the militaries to use each other's bases for **replenishment and refueling**.
   - **Key Point:** It is purely a logistical arrangement and **does not** involve the stationing of U.S. troops on Indian soil. It is particularly vital for Navy-to-Navy cooperation in the Indo-Pacific.
3. **COMCASA (Communications Compatibility and Security Agreement)**
   - **Signed:** 2018 (India-specific version of CISMOA).
   - **Function:** It allows the transfer of encrypted communication equipment so that Indian and U.S. military commanders, ships, and aircraft can communicate through secure, specialized networks.
   - **Impact:** It ensures "interoperability" during joint exercises or disaster relief operations, preventing the interception of data by third parties.
4. **BECA (Basic Exchange and Cooperation Agreement)**
   - **Signed:** 2020.
   - **Function:** It facilitates the exchange of **geospatial intelligence**, including high-resolution maps, nautical/aeronautical charts, and satellite imagery.
   - **Impact:** It significantly enhances the accuracy of Indian automated hardware and weapons systems, such as cruise missiles and armed drones, by providing high-quality GPS and topographical data.
5. **Strategic Significance**
   - **Interoperability:** These agreements allow the two militaries to "talk" to each other and "act" together seamlessly.
   - **Countering Regional Threats:** The pacts provide India with a technological edge, especially in monitoring movements in the Indian Ocean and along the Line of Actual Control (LAC).
   - **Shift in Policy:** Moving from "Strategic Autonomy" in a traditional sense to "Strategic Convergence" with the U.S. without entering a formal military alliance.

2.12. FINLAND MAPPING

Context:

Recently, the President of Finland, Alexander Stubb, conducted a significant four-day state visit to India (March 4–7, 2026) to participate in the Raisina Dialogue and hold bilateral talks with Prime Minister Narendra Modi. During this visit, both nations elevated their relationship to a **Strategic Partnership in Digitalization and Sustainability**, focusing on trade, critical technologies, and a shared commitment to a rules-based international order.

1. **Geographical Location and Borders**

   Finland is a Nordic country situated in **Northern Europe**. It is the northernmost country in the European Union.

   - **Land Borders:**
     - **East:** Russia (shares a massive 1,340 km border, now the longest NATO-Russia frontier).
     - **North:** Norway.
     - **Northwest:** Sweden.
   - **Water Bodies:**
     - **South:** Gulf of Finland (separates Finland from Estonia).
     - **West:** Gulf of Bothnia (separates Finland from Sweden).
     - **Southwest:** Baltic Sea.

2. **Physical Features**

   - **The Fennoscandian Shield:** Finland sits on an ancient, stable segment of the Earth's crust known as the Baltic or Fennoscandian Shield, composed of Precambrian granites.
   - **Land of Lakes:** Known as "the land of a thousand lakes," Finland actually has approximately **188,000 lakes**. **Lake Saimaa** is the largest and is famous for the endangered Saimaa ringed seal.
   - **Archipelagos:** The **Åland Islands**, an autonomous, Swedish-speaking region of Finland, lie at the entrance to the Gulf of Bothnia. The **Archipelago Sea** between the Finnish mainland and Åland contains the world's largest number of islands.
   - **The Arctic Circle:** About **one-third** of Finland lies north of the Arctic Circle (66.5° N), encompassing the region of **Lapland**.
   - **Highest Point: Mount Halti** (Haltitunturi), located on the border with Norway.

3. **Key Maritime Geography**

Feature	Details
Gulf of Bothnia	The northernmost arm of the Baltic Sea; water salinity is very low (brackish) due to numerous calving rivers.
Gulf of Finland	Extends between Finland (north), Estonia (south), and Russia (east). Helsinki and Tallinn face each other across this gulf.
Saimaa Canal	A transportation canal that connects Lake Saimaa to the Gulf of Finland, passing through Russian territory (Vyborg).

4. **Climate and Vegetation**

   - **Taiga Biome:** Finland is Europe's most heavily forested country (over 70% coverage), dominated by Scots pine, Norway spruce, and birch.
   - **Isostatic Rebound:** Due to the removal of heavy ice sheets after the last Ice Age, the land in Finland is still rising (post-glacial rebound), particularly in the Kvarken Archipelago (a UNESCO World Heritage site).

***

ECONOMY

3.1. TOBACCO TAX REFORM 2026

Context: The Union Finance Ministry has notified a comprehensive restructuring of the tobacco taxation regime effective **February 1, 2026**, following the passage of the **Central Excise (Amendment) Act, 2025**. This marks a shift from general revenue compensation to a dedicated health-cum-security fiscal framework.

1. **Structural Changes in Levies**

   I. **Phase-out of GST Compensation Cess**

   - The GST compensation cess on tobacco products has officially ended, as the original objective of bridging state revenue gaps has been fulfilled.
   - This temporary instrument is replaced by a permanent levy under the **Health Security-cum-National Security Act, 2025**.
   - The new cess creates a non-lapsable revenue stream specifically for long-term security preparedness and health capacity building.

   II. **Revised GST Slabs and Divergent Rates**

   - **Standard Tobacco Products:** Cigarettes and chewing tobacco have been moved to the **40% GST slab** to reduce affordability.
   - **Beedi Taxation:** Beedis are categorized in a significantly lower **18% GST slab**.
   - **Demerit Goods:** All tobacco products remain classified as "demerit goods," justifying higher tax brackets compared to essential items.

   III. **Retail Sale Price (RSP) Valuation Mechanism**

   - For smokeless tobacco (gutkha, khaini, jarda), GST is now calculated based on the **Retail Sale Price (RSP)** declared on the packaging.
   - This mechanism aims to curb under-reporting and tax evasion prevalent in the unorganized tobacco sector.

2. **Socio-Economic and Health Facts**

   I. **Consumption Patterns and Demographics**

   - **Rural Prevalence:** Beedi smoking is twice as prevalent in rural areas (8.3%) compared to urban centers (4.5%) among men.
   - **Wealth Correlation:** Beedi use is inversely proportional to wealth; consumption is highest among the poorest 20% of the population.
   - **Intensity of Use:** Over **80% of beedi smokers** consume more than five sticks daily, surpassing the frequency observed among cigarette users.

   II. **Comparative Health Risks**

   - **Respiratory Impact:** Beedi smokers are **2.87 times** more likely to suffer from asthma, compared to 1.82 times for cigarette smokers.
   - **Mortality Risks:** Beedi consumption is associated with a **2.6 times** higher risk of tuberculosis mortality.

- **Cancer Profile:** Beedi smoking is linked to elevated risks for lung and laryngeal cancers, often exceeding the risks associated with cigarettes.

3.2. NEW INTERVENTIONS UNDER EPM

Context: Recently, the Ministry of Commerce and Industry launched seven additional interventions under the **Export Promotion Mission (EPM)**, a comprehensive ₹25,060-crore initiative aimed at strengthening India's export ecosystem until 2030-31.

1. **Export Promotion Mission (EPM)**

   Announced in the Union Budget 2025-26, the EPM serves as an umbrella framework to consolidate various fragmented schemes into a single, result-oriented mechanism.

   - **Structure:** It operates through two categories:
   - **Niryat Protsahan (Financial):** Focuses on interest subvention, credit guarantees, and export factoring to lower the cost of credit.
   - **Niryat Disha (Non-Financial):** Focuses on market readiness, international branding, quality compliance, and logistics support.
   - **Key Interventions:** Includes the **Direct E-commerce Credit Facility** (up to ₹50 lakh with 90% guarantee) and support for **Overseas Warehousing** (up to 30% of project cost).

2. **RoDTEP Scheme (Remission of Duties and Taxes on Exported Products)**

   The RoDTEP scheme replaced the Merchandise Exports from India Scheme (MEIS) to ensure Indian exports are **WTO-compliant**.

   - **Objective:** To refund "embedded" central, state, and local duties (like Mandi tax, coal cess, and electricity duty) that are not rebated under GST.
   - **Mechanism:** Rebates are issued as **transferable e-scrips** maintained in an electronic ledger by the CBIC.
   - **Extension:** The scheme is currently valid for all sectors, including SEZ and EOU units, until **March 31, 2026**.

3. **EPCG Scheme (Export Promotion Capital Goods)**

   - **Feature:** Allows the import of **capital goods** (machinery) at **zero customs duty**.
   - **Obligation:** The exporter must fulfill an **Export Obligation (EO)** equivalent to **6 times the duty saved**, within a period of 6 years.
   - **Target:** Primarily aimed at technological upgradation and modernization of the manufacturing and service sectors.

4. **Advance Authorization Scheme (AAS)**

   - **Feature:** Allows **duty-free import of inputs** (raw materials) that are physically incorporated into an export product.
   - **Requirement:** It requires a minimum **15% value addition**.
   - **Condition:** Inputs are subject to "Actual User" condition and are not transferable even after the export obligation is met.

3.3. INDIA SHIFTS TO NEW GDP BASE YEAR (2022–23)

Context:

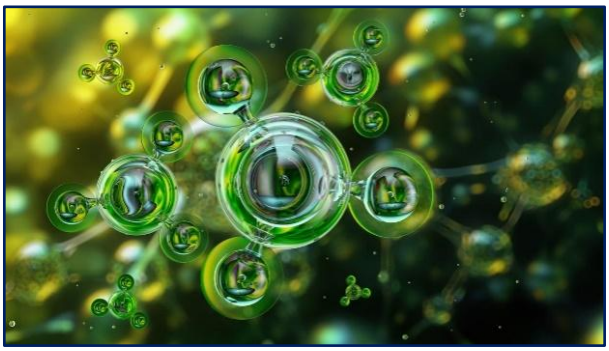
- Recently, the Ministry of Statistics and Programme Implementation (MoSPI) has officially transitioned the Indian economy to a new GDP series by shifting the base year from 2011–12 to 2022–23. This change aims to capture the structural transformations of the Indian economy, particularly the rapid growth of the digital economy, gig work, and updated consumption patterns.
- Along with the rebasing, the National Statistical Office (NSO) has released the Second Advance Estimates for FY 2025-26, projecting a real GDP growth rate of approximately 7.4-7.6%.

Key Highlights of India's New GDP Data

1. **Revision of Base Year (2022-23)**
   - The base year for Gross Domestic Product (GDP) and the Index of Industrial Production (IIP) has been updated to **2022–23** to replace the decade-old 2011–12 series.
   - The Consumer Price Index (CPI) base year is also being aligned to **2023–24** to better reflect the modern consumption basket of Indian households.
   - Rebasing is a standard statistical practice recommended by the United Nations System of National Accounts (SNA) to ensure that economic data remains relevant to current market realities.
2. **Methodological Upgrades**
   - **Double Deflation:** One of the most significant changes is the adoption of the "Double Deflation" method, where output and intermediate inputs are deflated separately to calculate Real Gross Value Added (GVA) more accurately.
   - **New Data Sources:** The NSO is now leveraging big data from the **Goods and Services Tax Network (GSTN)**, digital payment portals (though UPI value is used cautiously), and the **Vahan dashboard** for vehicle registrations.
   - **MCA-21 Database:** Enhanced use of the Ministry of Corporate Affairs' digital filings (MCA-21) allows for better coverage of the organized corporate sector compared to earlier survey-based methods.
3. **Macroeconomic Projections (FY 2025-26)**
   - **Real GDP Growth:** The economy is estimated to grow at **7.4% to 7.6%** in real terms, maintaining India's status as the fastest-growing major economy.
   - **Nominal GDP Growth:** Projected at approximately **8.0%**, reflecting a narrowing gap between real and nominal growth due to easing inflationary pressures (GDP Deflator).
   - **Sectoral Performance:**
   - **Services:** Expected to grow at a robust **9.1%**, driven by financial and professional services.
   - **Manufacturing:** Estimated to rebound to **7.0%** growth from lower levels in previous years.
   - **Agriculture:** Anticipated to see a moderate growth of **3.1%**.
4. **Impact on Fiscal Indicators**

- **Denominator Effect:** A potential upward revision in the absolute size of the GDP due to rebasing often leads to a statistical reduction in the **Fiscal Deficit as a % of GDP** and the **Debt-to-GDP ratio**, even if the absolute debt remains the same.
- **Investment Rates:** Indicators like Gross Fixed Capital Formation (GFCF) as a percentage of GDP may appear lower if the GDP base expands significantly.

3.4. GREEN AMMONIA IN INDIA'S ENERGY TRANSITION



Context: At the inaugural session of India Energy Week (IEW) in January 2026, India announced a shift from **energy security to energy independence** and positioned **$500 billion investment opportunities** across the energy sector.

The strategy emphasizes clean energy transition, with **green hydrogen** as a key pillar and **green ammonia** identified as a critical derivative for decarbonizing **fertilizers, clean energy, and marine fuel**.

1. **About Green Ammonia**
   - Green ammonia, also known as **renewable ammonia**, is a form of ammonia that is produced using renewable energy sources and which is proposed as a **sustainable, emission-free alternative** with a multitude of applications in industry and other sectors.
   - Unlike traditional **"grey" ammonia** that uses fossil fuels, green ammonia **emits zero carbon**, offering a sustainable solution for environment.
2. **Production and Technology Process:**
   - **Green hydrogen** is first produced through **water electrolysis**, where water is split into **hydrogen and oxygen** using renewable electricity.
   - The process relies on clean energy sources like **solar or wind power to keep it carbon-free.**
   - The hydrogen is then combined with **atmospheric nitrogen** using the **Haber-Bosch process** under **high pressure, temperature, and a catalyst**.
   - This results in the production of green ammonia made **entirely from green hydrogen and nitrogen.**
3. **What are the main uses/importance of green ammonia?**
   - **Efficient Hydrogen Carrier:** Green ammonia is produced by combining nitrogen with green hydrogen. Ammonia has a much **higher volumetric energy density** than hydrogen gas, making it an excellent medium for storing and releasing hydrogen for various industrial applications.
   - **Power generation fuel:** Can be burned or co-fired in thermal power plants with low emissions.
   - **Marine fuel:** Emerging zero-carbon fuel option for ships and the shipping industry.
   - **Industrial decarbonization:** Used in chemicals, steel, and other hard-to-abate sectors.
   - **Ease of Storage and Transport:** Hydrogen gas is difficult to handle because it requires extremely high pressure or cryogenic temperatures. Ammonia, however, can be liquefied at much more modest pressures and temperatures, making it significantly easier to store and transport using existing infrastructure

4. **Comparison of Types: Blue Ammonia vs Green Ammonia**

Feature	Blue Ammonia	Green Ammonia
Hydrogen Source	Natural Gas (Fossil Fuel)	Water (Electrolysis)
Energy Source	Fossil Fuels + CCS	Renewable Energy (Solar/Wind)
Carbon Status	Low-Carbon (Carbon Captured)	**Zero-Carbon**
Cost	Lower cost than green, utilizes existing infrastructure	**Currently more expensive**

5. **India's Green Ammonia Auction Model**
   - **Implementing Agency:** Solar Energy Corporation of India (SECI) under the National Green Hydrogen Mission.
6. **Challenges**
   - **Costs:** Currently, green ammonia is more expensive to produce than conventional ammonia, though costs are decreasing with advancements.
   - **Energy-intensive process:** Electrolysis and Haber-Bosch synthesis require large amounts of energy.
   - **Infrastructure gaps:** Limited facilities for storage, transport, and large-scale handling.
   - **Safety concerns**: Ammonia is toxic and requires strict safety measures.

3.5. UNION HOME MINISTER LAUNCHES BHARAT TAXI

Context: Recently, the Union Home Minister launched 'Bharat Taxi', **a cooperative-led** ride-hailing platform for auto drivers from Delhi-NCR and Gujarat, aimed at providing a more democratic and profitable alternative to private aggregators.

1. **Bharat Taxi: The "Amul Model" of Transportation**
   - **Operational Philosophy**: The platform follows the successful **'Amul model'**, which transformed India's dairy sector by returning maximum value to the primary producers (drivers).
   - **Profit Sharing**: Unlike private aggregators that retain high commissions, Bharat Taxi will distribute **80% of its profits to the drivers** based on the kilometers driven.
   - **Cooperative Capital**: The remaining **20% of the profits** will be retained as cooperative capital to sustain and grow the organization.
   - **Fixed Base Rate**: To ensure fair earnings, the platform guarantees a **minimum base rate per kilometer** for all its associated drivers.
2. **Ownership and Governance Structure**
   - **Representation**: As the membership grows, seats on **Bharat Taxi's Board of Directors** will be specifically reserved for driver representatives.
   - **Self-Governance**: This structure allows driver representatives to challenge policies that might be unfavorable to the workforce, ensuring the board remains accountable to the workers.

3. 'Saarathi Didi' and Safety Features

- **Women's Empowerment**: The app features a dedicated **'Saarathi Didi'** mode, which prioritizes **female drivers** for women passengers traveling alone.
- **Safety and Livelihood**: This feature is a "collective responsibility" to ensure both the safety of female commuters and increased livelihood opportunities for women in the transport sector.

3.6. SECURITIES AND EXCHANGE BOARD OF INDIA (SEBI)

Context:

- Recently, the Securities and Exchange Board of India (SEBI) has intensified its technological crackdown on market manipulators and "finfluencers" to preserve market integrity. Chairman **Tuhin Kanta Pandey** highlighted the successful deployment of **'Sudarshan'**, an AI-powered surveillance system that has already led to the removal of over 1.2 lakh misleading financial posts.
- Furthermore, SEBI launched the **'SEBI Check'** tool within the UPI interface to help investors verify registered intermediaries before making payments.

1. Evolution and Legal Status

- **Origin:** SEBI was first established on **April 12, 1988**, as a non-statutory body through a government resolution.
- **Statutory Status:** It was granted statutory autonomous status through the **SEBI Act, 1992**, following the Harshad Mehta scam to provide the regulator with enforcement powers.
- **Headquarters:** The main office is located in **Mumbai**, with regional offices in New Delhi, Kolkata, Chennai, and Ahmedabad.

2. Composition of the Board

The SEBI Board is a multi-member body consisting of **nine members**:

- **Chairman:** Nominated by the Union Government of India.
- **Two Members:** Officers from the Union Ministry of Finance.
- **One Member:** From the Reserve Bank of India (RBI).
- **Five Other Members:** Nominated by the Union Government, of which at least three must be whole-time members.

> **Note on Appointment:** The Chairman is recommended by the **Financial Sector Regulatory Appointments Search Committee (FSRASC)**, headed by the Cabinet Secretary. The final appointment is approved by the Appointments Committee of the Cabinet (ACC).

3. Functions of SEBI

SEBI operates as a watchdog for the capital markets with three primary objectives:

- **Protective Functions:** Prohibiting insider trading, preventing price rigging, and promoting fair trade practices while educating investors.

- **Developmental Functions:** Promoting the training of intermediaries, encouraging self-regulatory organizations (SROs), and modernizing trading infrastructure.
- **Regulatory Functions:** Registering and regulating stockbrokers, merchant bankers, mutual funds, and credit rating agencies.

4. **Triple Powers of SEBI**

SEBI is one of the most powerful regulators in India because it combines three types of powers:

- **Quasi-Legislative:** It drafts regulations and rules for the capital market (e.g., Listing Obligations and Disclosure Requirements).
- **Quasi-Executive:** It conducts investigations, audits, and inspections. It has the power to call for data, including telephone call records, during investigations into insider trading.
- **Quasi-Judicial:** It passes rulings and orders. It can impose heavy monetary penalties and bar entities from accessing the capital markets.

5. **Regulatory Ambit and Important Mechanisms**

- **Collective Investment Schemes (CIS):** SEBI regulates any money-pooling scheme involving **₹100 crore or more**, ensuring they are not fraudulent "ponzi" schemes.
- **SCORES:** The **SEBI Complaints Redress System** is a web-based centralized platform for investors to lodge grievances against listed companies or intermediaries.
- **Appellate Mechanism:** Any entity aggrieved by an order of SEBI can appeal to the **Securities Appellate Tribunal (SAT)**. A further appeal against SAT's order can be made directly to the **Supreme Court of India**.

3.7. COCONUT CULTIVATION

Context:

- Recently, a scientific study highlights that the **future of coconut cultivation depends more on sustainability practices than simply increasing productivity**, due to climate change, soil degradation, water stress, and market risks.
- **The Union Budget 2026–27** announced a **Coconut Promotion Scheme** to boost productivity by rejuvenating old, unproductive gardens with high-yield varieties and promoting new coastal plantations.
- **The Coconut Development Board** is already running a similar scheme that has rejuvenated old gardens and expanded coconut cultivation into non-traditional regions like Gujarat and Assam, helping partly offset disease-related losses in Kerala and Tamil Nadu.

1. **Key Aspects of Coconut Promotion Scheme**

- **Primary Objective**: To improve productivity by rejuvenating old, low-yielding gardens and establishing new plantations..
- **Shift in Focus**: The scheme must move beyond just distributing high-yield seedlings.
- **Priority Areas**:
  - Development and mass multiplication of **climate-resilient varieties** for farms along the east coast and in peninsular regions.

- Development of **wilt-tolerant varieties** for coconut-growing regions along the west coast.

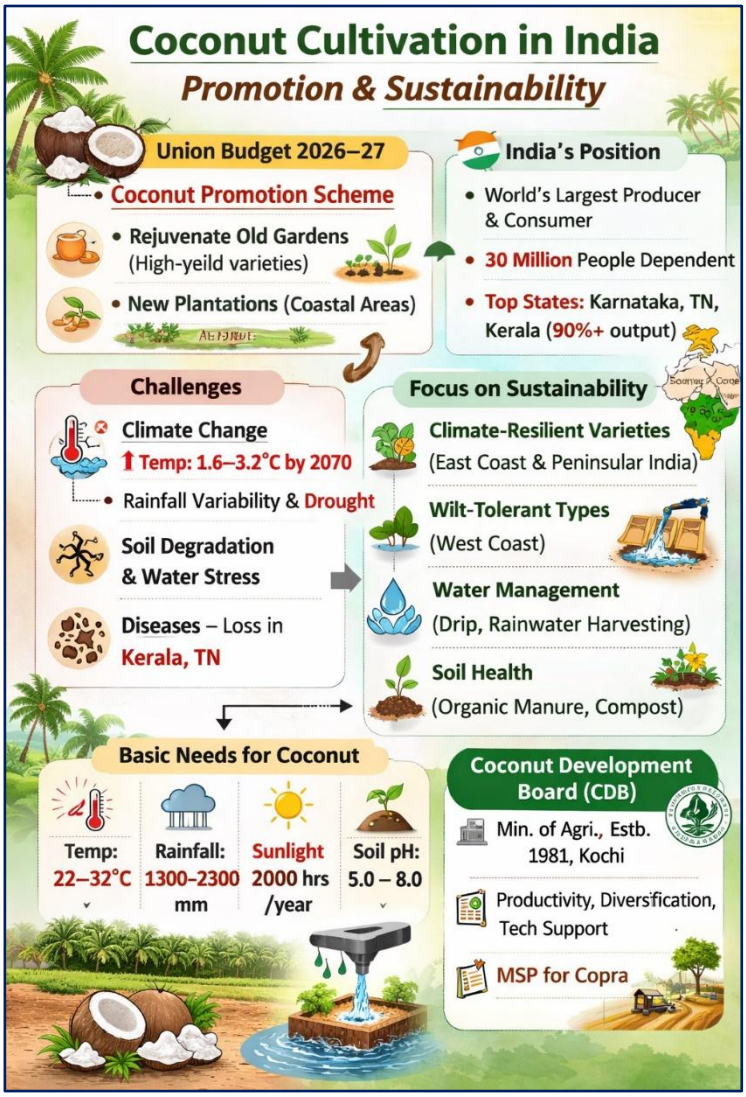
2. Challenges to Productivity and Sustainability

- **Climate Change**:
  - Research projects that temperatures in regions with plantations may rise by **1.6-2.1°C by 2050** and up to **3.2°C by 2070**.
  - Increased temperatures and significant changes in rainfall patterns will increase moisture deficit and intensify **drought stress**.
- **Geographical Vulnerability**:
  - Parts of interior peninsular India, including **Karnataka and Andhra Pradesh**, along with southern **Tamil Nadu** and the east coast, could be less suitable for coconut cultivation due to climate change and diseases.
- **Disease Impact**:
  - Widespread destruction of coconut palms in **Kerala and Tamil Nadu** has been caused by diseases.

3. Basic of Coconut

I. Production Status and Ranking

- **Global Position:** India is the **largest producer and consumer** of coconuts in the world.
- **Livelihood:** Approximately **30 million people** and nearly **10 million farmers** in India depend on coconut cultivation for their livelihoods.
- **Major Producing States:** As of 2023-**2024Karnataka is the top coconut-producing state** in India, accounting for over 28% of the total, followed closely by Tamil Nadu and Kerala, with these three southern states contributing over 90% of the national output.
- **Expansion:** Cultivation is expanding to non-traditional areas, including the North-Eastern states (Assam and Tripura) and coastal regions of Odisha and West Bengal.



II. Climatic and Geographical Requirements

- **Nature of Crop:** It is essentially a **tropical plant**, typically grown between **20°N and 20°S latitudes**.

- **Temperature:** It requires an ideal mean annual temperature of **22°C-32°C** Reproductive growth is hindered if temperatures fall below **10°C**.
- **Rainfall:** A well-distributed annual rainfall of **1300 mm to 2300 mm** is preferred. In areas with uneven rainfall, irrigation is essential.
- **Sunlight:** The palm requires plenty of sunlight (roughly **2000 hours** of sunshine annually) and **does not thrive in heavily shaded or cloudy regions.**
- **Soil:** It can grow in diverse soil types including laterite, coastal sandy, alluvial, and saline soils. A pH range of **5.0 to 8.0** is tolerable, provided there is proper drainage.

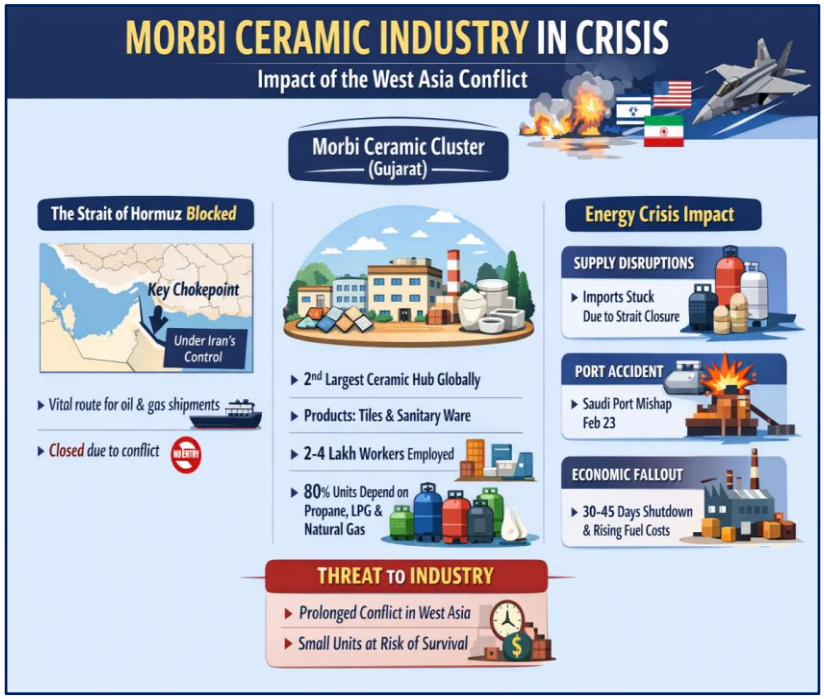
III. Institutional and Regulatory Framework

- **Coconut Development Board (CDB):** It is a **statutory body** established in 1981 under the **Ministry of Agriculture and Farmers Welfare**. Its headquarters is located in **Kochi, Kerala**.
- **Mandate:** The CDB focuses on integrated development, productivity increase, product diversification, and providing technical advice to the coconut industry.
- **Minimum Support Price (MSP):** The government fixes the MSP for **Milling Copra** and **Ball Copra**.

3.8. MORBI CERAMIC INDUSTRY

Context:

The escalating military turmoil in West Asia, involving Israel, the U.S., and Iran, has severely disrupted energy supply chains. This has direct consequences for energy-dependent industrial clusters in India, specifically the ceramic industry in **Morbi, Gujarat.**



1. **Key Geographic Bottleneck: The Strait of Hormuz**
   - **Significance:** It is a major global passage for vessels carrying petroleum and gas shipments from the Gulf countries.
   - **Conflict Impact:** The strait is currently closed to vessels due to the war.
   - **Strategic Control:** The article identifies the Strait of Hormuz as being under Iran's control.
2. **Industrial Profile: Morbi Ceramic Cluster**
   - **Location:** It is situated on the **Kathiawar peninsula**. The city is on the **Machhu River**.
   - **Scale:** Morbi is famously known as the **"Ceramic City of India."** This city plays a vital role in producing a wide range of ceramic products and is recognized for its significant contribution to the industry. Morbi is the **second-largest ceramic production hub** in the world.
   - **Products:**
     - **Ceramic tiles:** Floor tiles, wall tiles, vitrified tiles, and digital tiles.
     - **Sanitary ware:** Toilets, Basins, and bathroom accessories.

- **Employment:** It provides direct and indirect livelihoods to an estimated 2 to 4 lakh workers.
- **Energy Dependency:** The industry relies heavily on **propane**, **LPG**, and **natural gas** for firing kilns and drying processes.
  - Nearly 80% of units are dependent on propane.
  - Natural gas is primarily supplied to the region by **Gujarat Gas Ltd**.

3. Vulnerabilities in Energy Supply Chains

- **Import Reliance:** Essential fuels like propane and natural gas for this sector are sourced from the Gulf region.
- **Supply Disruptions:** Shipments are stuck due to the closure of the Strait of Hormuz.
  - Propane supplies were further hampered by an accident at a port in Saudi Arabia on February 23.
- **Economic Impact:** A prolonged conflict (4 weeks or more) could lead to an industry-wide shutdown lasting 30 to 45 days, with sharp rises in fuel prices threatening the survival of smaller units.

3.9. INDIA'S OIL AND GAS IMPORTS

Context:

- **Recently**, the Union Minister of Petroleum and Natural Gas, Hardeep Singh Puri, briefed the media on India's robust energy preparedness amidst escalating hostilities in West Asia and potential disruptions in the **Strait of Hormuz**.
- India has witnessed a significant strategic shift in its oil sourcing; while Russia remained a top supplier for much of 2025, imports from Russia fell to a 44-month low in January 2026 as India increased procurement from **Saudi Arabia** and the **United States** to balance geopolitical pressures and emerging trade frameworks.

1. High Import Dependency & The Energy Basket

- **Crude Oil:** India's dependence on imported crude has climbed to a record **88.5%** in FY 2025-26. This is driven by a steady 3-4% annual rise in fuel demand coupled with declining domestic production from mature fields.
- **Natural Gas (LNG):** India imports roughly **50%** of its natural gas. The government is rapidly expanding regasification capacity, aiming for an 80% increase by 2026 to support the goal of a **"Gas-based Economy"** (targeting 15% share in the energy mix by 2030).
- **LPG:** India is the world's second-largest LPG consumer. It imports over **60%** of its LPG, with a historic first-ever long-term contract signed with the **U.S. Gulf Coast** in late 2025 to supply 10% of India's annual requirement starting in 2026.

2. Strategic Shift in Import Destinations (2025-26)

Destination	Current Status (2026)	Strategic Context
Russia	Significant Decline	Share fell to ~19% due to regulatory risks and a pivot toward U.S./Gulf sources.
Iraq	Top Supplier	Consistently India's #1 or #2 source due to refinery compatibility and stable pricing.
Saudi Arabia	Major Rebound	Reclaimed a larger share (~17.5%) as India re-strengthened ties with OPEC+ leaders.
USA	Emerging Partner	Share rose to **6.8%**; imports include crude oil, LNG, and now large-scale LPG.

3. Energy Security: Strategic Petroleum Reserves (SPR)

India manages its vulnerability through a "9.5 + 64.5" day buffer system:

- **Phase I (Completed):** 5.33 MMT capacity in underground rock caverns at **Visakhapatnam (AP)**, **Mangaluru (KA)**, and **Padur (KA)**. This covers roughly 9.5 days of India's crude requirement.
- **Phase II (Ongoing):** Includes additional commercial-cum-strategic facilities at **Chandikhole (Odisha)** and a second unit at **Padur**.
- **Institutional Framework:** Managed by **ISPRL** (Indian Strategic Petroleum Reserves Ltd), a subsidiary of the Oil Industry Development Board (OIDB).

4. Economic Impact

- **Current Account Deficit (CAD):** Every **$10/barrel** increase in global crude prices typically widens India's CAD by approximately **$9 billion** (0.4% of GDP).
- **Trade Chokepoint:** Over **50%** of India's crude and **60%** of its LNG pass through the **Strait of Hormuz**. Any disruption here forces ships to take the longer **Cape of Good Hope** route, increasing freight costs by 3-5% and insurance premiums significantly.

5. Mitigation: Transitioning to Self-Reliance

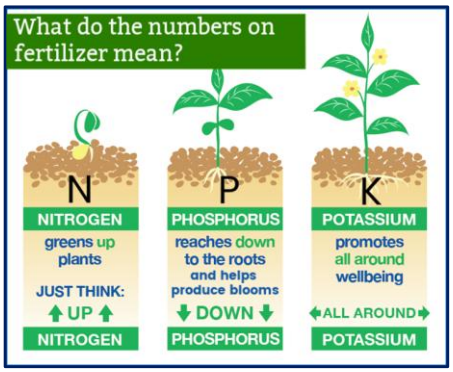
- **E20 Mandate:** From **April 1, 2026**, the government has mandated a **20% Ethanol Blending** (E20) in petrol nationwide. This is expected to save over **₹45,000 crore** in foreign exchange annually.
- **Green Hydrogen:** Part of the **National Green Hydrogen Mission** to replace "Grey Hydrogen" in refineries and fertilizer plants, further cutting gas imports.

3.10. FERTILIZER CRISIS & PRICE SURGE

Context:

The escalation of war-like situations in West Asia has triggered a significant hike in the prices of critical fertilizers such as **Urea** and **DAP (Di-ammonium Phosphate)**. This is driven by rising crude oil prices and the shortage of **Liquefied Natural Gas (LNG)**, which serves as a key feedstock for fertilizer production.

1. **Market Dynamics: Urea and DAP Prices**
   - **Price Projections**: Urea and DAP prices are expected to breach the **$1,000 per tonne** mark due to supply disruptions and rising demand for India's upcoming sowing season.
   - **Feedstock Dependency**: Urea production is highly sensitive to the price of **LNG**, which is trending upward due to the conflict.
   - **Impact of Global Alliances**: Fertilizer industry experts note that military actions by the U.S.-Israel alliance against Iran have triggered immediate price spikes (e.g., DAP reaching $530 per tonne in some regions).
2. **India's Fertilizer Statistics (April–December 2025-26)**



   - Today, India stands as the **second-largest consumer** and the **third-largest producer** of fertilizers globally.
   - Around 87% of urea consumption is domestically met.
   - **90% of NPK Fertilizers** are also produced within the country.
   - However, for **DAP**, only about **40%** comes from local production.
   - In the case of **Muriate of Potash (MOP**), **100% is still imported.**
   - **Sector-Wise Contribution (**During 2023–24):
   - The **public sector** contributed about 17.43% to total Fertilizer production.
   - The **cooperative sector** accounted for 24.81%.
   - The **private sector** contributed the largest share at 57.77%.
3. **Global Resource Concentration**
   - **Phosphate Reserves**: **Morocco** holds **70%** of the world's phosphate reserves, which are essential for DAP production.
   - **Potash Producers**: **Canada and Belarus** are the primary global producers of **Potash**.
4. **Government's Initiatives in the Fertilizer Sector**
   - Fertilizer Subsidy and Budgetary Support:
   - For 2024–25, the Department of Fertilizers received a final budget of₹1,91,836 crore, a notable rise from the ₹1,68,131 crore originally allocated. This increase was made possible through supplementary demands approved by Parliament.
   - Under the **Nutrient Based Subsidy scheme**, the allocation was raised from ₹45,000 crore in Budget Estimate (BE) 2024-25 to ₹54,310 crore, ensuring sustained support for **phosphatic and potassic Fertilizers.**
   - **Nano Fertilizer Initiatives:** Nano Fertilizers are plant nutrients that are packed within very small particles called nanomaterials. This coating allows the nutrients to be released slowly and steadily into the soil. The controlled release ensures that plants absorb them more effectively and with less wastage.
   - **Neem Coated Urea (NCU):** Neem-coated urea is urea fertilizer coated with neem oil that slows nitrogen release in soil. This improves crop growth, reduces nitrogen loss and fertilizer misuse, and allows farmers to use about 10% less urea for similar results.
   - **One Nation One Fertilizer (ONOF):** One Nation One Fertilizer aims to ensure uniform branding and transparency by selling all subsidised fertilizers under the common **"Bharat" brand (e.g., Bharat Urea, Bharat DAP),** with the manufacturer's name shown in smaller font.

Nutrient Based Subsidy scheme

- The Government introduced the Nutrient Based Subsidy (NBS) scheme on **1 April 2010** for **phosphatic and potassic Fertilizers**. Under this scheme, a **fixed subsidy** is provided for subsidised **P and K Fertilizers**, including **di-ammonium phosphate**, based on their nutrient content.
- **Coverage:** Applicable to Phosphatic and Potassic (P&K) fertilizers, including DAP.
- **Subsidy Basis:** A fixed subsidy per nutrient content is announced annually or bi-annually.
- **Pricing:** The P&K fertilizer sector is decontrolled; companies can fix MRP, monitored by the government.
- **Urea exclusion:** Urea is not covered under NBS

3.11. IMPACT OF IRAN-ISRAEL WAR ON INDIA'S EXPORTS TO GULF COUNTRIES

Context:

- **Recently**, the security architecture of West Asia has faced severe destabilization following direct military escalations between **Iran and Israel** in early March 2026. This conflict has moved beyond proxy warfare to direct strikes on sovereign territories and strategic maritime corridors, including the **Strait of Hormuz**. Reports indicate that the escalation has triggered "War Risk Surcharges" and significant disruptions in the shipping lanes of the Persian Gulf, directly impacting India's trade momentum with the **Gulf Cooperation Council (GCC)** countries.
- The ongoing conflict poses a multi-dimensional threat to the **USD 180 billion** annual trade with the GCC and Iran.

1. General Impact on Logistics and Costs

- **Freight and Insurance:** Shipping companies have hiked freight rates by **30–50%**. The Indian Rice Exporters Federation has advised members to avoid **CIF (Cost, Insurance, and Freight)** contracts due to "unacceptable" insurance risks.
- **Strait of Hormuz & Bab el-Mandeb:** Disruptions here force rerouting via the **Cape of Good Hope**, adding approximately **two weeks** to transit times and significantly compressing profit margins.
- **Payment & Regulatory Hurdles:** Banking sanctions on Iran and heightened KYC scrutiny in the region are causing severe payment settlement delays.

2. Sector-Wise Impact on India's Exports

2.1 Agricultural Exports (Basmati Rice)

India is the world's largest exporter, with the Middle East (Saudi Arabia, Iran, Iraq, UAE, and Yemen) accounting for nearly **50% of export value (₹50,000 crore)**.

- **Price Drop:** Following the late February 2026 escalation, domestic prices fell by **5–6%** as shipments stalled.
- **Iran Specifics:** India's exports to Iran (~$1.24 billion) consist largely of rice, tea, and sugar, all of which are now deemed "unviable" due to airspace closures and port congestion.

2.2 Petroleum Product Exports

India leverages its massive refining capacity in **Jamnagar, Vadinar, and Paradip**.

- **Volume at Risk:** Approximately **74,000 bpd** of refined products flow through the Strait of Hormuz.
- **The Paradox:** While rising oil prices theoretically benefit refiners, the physical inability to transport products profitably neutralizes these gains.

2.3 Gems, Jewellery, and Diamonds

This sector is critically dependent on **Dubai** as a global re-export center.

- **Supply Chain:** About **50–60%** of India's gold imports transit through Dubai.

- **Manufacturing Risk:** Airspace closures disrupt the pipeline of rough diamonds bound for cutting and polishing centers in **Surat and Mumbai**.

2.4 Pharmaceuticals

India is the world's "pharmacy," but the conflict strains the supply of **APIs (Active Pharmaceutical Ingredients)**.

- **Double Squeeze:** Sustained disruption adds cost to the processing of Chinese APIs in India for re-export to the Middle East and Iran.

2.5 Textiles, Engineering Goods, and Chemicals

- **Textiles:** Manufacturers in **Tiruppur and Surat** face thin margins as freight costs to Europe and North America skyrocket.
- **Chemicals:** Rising crude prices increase the cost of **petrochemical feedstocks**, while simultaneously high freight costs compress the margins of export-heavy players.

3. Summary of Major Products and Status

Gulf Country	Major Export Products	Present Status & Impact
UAE	Gems & Jewellery, Refined Petroleum.	**Disrupted:** Dubai hub operations are hampered by airspace closures and high insurance.
Saudi Arabia	Basmati Rice, Engineering Goods.	**Stalled:** New contracts are being avoided; massive inventory build-up at Indian ports.
Iran	Tea, Rice, Pharmaceuticals.	**Critical:** Trade is at a near standstill due to sanctions and kinetic warfare.
Oman	Minerals, Textiles, Engineering.	**Strategic Hub:** Ports like **Duqm** are serving as vital alternative landing points.

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ENVIRONMENT & GEOGRAPHY

4.1. LOGGERHEAD TURTLES UNDER STRESS

Context: Recently, a 17-year study published in the journal *Animals* (2026) has highlighted that **Loggerhead sea turtles (*Caretta caretta*)** are shrinking in size and producing fewer eggs due to the dual pressures of **warming oceans** and declining marine productivity.

1. **Physical Characteristics**
   - **Appearance:** They are named for their **massive heads** and exceptionally strong jaws, which allow them to crush hard-shelled prey.
   - **Size:** They are the **world's largest hard-shelled turtles**. In terms of overall size, they are second only to the leatherback turtle (which has a soft shell).
2. **Habitat and Distribution**
   - **Global Range:** They have a **cosmopolitan distribution**, inhabiting the temperate and subtropical waters of the Atlantic, Pacific, and Indian Oceans, as well as the Mediterranean Sea.
   - **Indian Context:** While five species of sea turtles are found in Indian waters (Olive Ridley, Green, Hawksbill, Leatherback, and Loggerhead), the **Loggerhead is not known to nest on Indian beaches**. It is occasionally spotted in the Gulf of Mannar and offshore waters during migration.
3. **Unique Behavioral Traits**
   - **Diet:** They are **omnivorous but primarily carnivorous**, feeding on bottom-dwelling invertebrates like crabs, clams, mussels, and jellyfish.
   - **Magnetoreception:** These turtles use the **Earth's geomagnetic field** as both a map and a compass to navigate thousands of kilometers during trans-oceanic migrations.
   - **Temperature-Dependent Sex Determination (TSD):** Like many reptiles, the sex of the hatchlings is determined by the temperature of the sand. **Warmer temperatures** produce females, while cooler temperatures produce males.
4. **Conservation Status and Protection**
   - **IUCN Red List: Vulnerable**.
   - **CITES: Appendix I** (prohibits international trade).
   - **Wildlife Protection Act (WPA), 1972: Schedule I** (highest level of legal protection in India).
5. **Threats**
   - **Climate Change:** Rising temperatures lead to a "feminization" of the population (excessive female hatchlings) and reduced body size.
   - **Bycatch:** Accidental entanglement in fishing gear (trawls and longlines) is a leading cause of mortality.
   - **Pollution:** Ingestion of marine debris, particularly plastics which are mistaken for jellyfish.

- **Light Pollution:** Artificial lights on beaches disorient hatchlings, preventing them from finding the ocean.

6. Major turtle spice in India

Species Name	IUCN Status	Key Characteristics	Presence in India
Olive Ridley (*Lepidochelys olivacea*)	**Vulnerable**	Smallest and most abundant; famous for **Arribada** (mass nesting).	**Major nesting:** Odisha (Gahirmatha, Rushikulya, Devi River).
Green Turtle (*Chelonia mydas*)	**Endangered**	Only **strictly herbivorous** species as adults; named for the color of its fat.	**Major nesting:** Gujarat, Lakshadweep, and Andaman & Nicobar.
Hawksbill (*Eretmochelys imbricata*)	**Critically Endangered**	Distinctive hawk-like beak; hunted for its beautiful shell (tortoiseshell).	Found in coral reefs of **Andaman, Nicobar, and Lakshadweep**.
Leatherback (*Dermochelys coriacea*)	**Vulnerable**	**Largest** of all sea turtles; has a rubbery shell instead of a hard one.	Nesting restricted to **Andaman and Nicobar Islands**.

4.2. NILGIRI TAHR SURVEY SHOWS POPULATION GROWTH

Context: Recently, on February 20, 2026, the **Tamil Nadu Forest Department**, in collaboration with the Kerala Forest Department, released the findings of the **First Synchronised Nilgiri Tahr Survey 2026**, which revealed a 21% increase in the species' population over the last two years.

1. Biological & Behavioral Profile

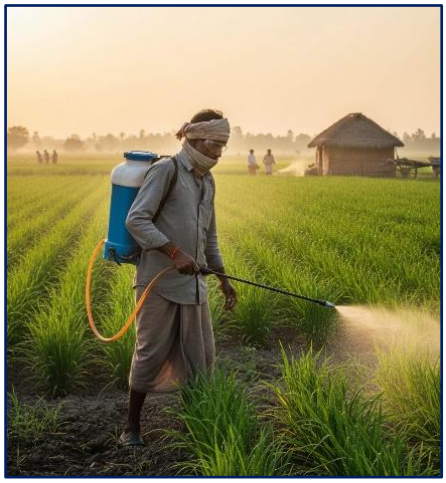
- **Endemicity:** It is the only mountain ungulate endemic to the **Western Ghats** of India (found only in Tamil Nadu and Kerala).
- **Saddlebacks:** Adult males develop a light grey or white patch on their backs as they mature, leading to the nickname "Saddlebacks."
- **Physical Traits:** They are diurnal (active during the day), stocky goats with curved horns and specialized hooves with a rubbery core for gripping steep, slippery cliffs.
- **State Symbol:** It is the **State Animal of Tamil Nadu**.

2. Habitat & Ecosystem

- **Shola-Grassland Mosaic:** They reside in high-altitude **montane grasslands** (1,200m to 2,600m) interspersed with stunted evergreen forests known as **Sholas**.
- **Preferred Terrain:** They are highly adapted to steep cliffs and rocky outcrops, which serve as crucial escape routes from predators like tigers, leopards, and dholes.
- **Key Populations:**
  - **Eravikulam National Park (Kerala):** Holds the largest and densest single population globally.
  - **Mukurthi National Park (Tamil Nadu):** Established specifically for the conservation of the Nilgiri Tahr.
  - **Anamalai Tiger Reserve (Grass Hills):** Another significant stronghold.

3. **Conservation Status & Threats**
    - **IUCN Red List: Endangered**.
    - **Wildlife (Protection) Act, 1972: Schedule I** (Highest level of legal protection in India).
    - **Primary Threats:**
    - **Habitat Fragmentation:** Caused by invasive species (Wattle, Eucalyptus), hydroelectric projects, and monoculture plantations.
    - **Climate Change:** Scientists predict a loss of nearly 60% of their suitable habitat by the 2030s due to rising temperatures.
    - **Infectious Diseases:** Vulnerability to diseases transmitted from domestic livestock.
4. **Project Nilgiri Tahr (2022–2027)**
    - **Launch:** Inaugurated by the Tamil Nadu government with an outlay of ₹25 crore.
    - **Objectives:** Radio-telemetry studies, reintroduction to historical habitats, and clearing invasive species from grasslands.

4.3. RISING TOTAL APPLIED TOXICITY WORLDWIDE



Context: Recently, a high-profile study published in the journal *Science* has brought the concept of **Total Applied Toxicity (TAT)** to the forefront of environmental discourse. The research reveals a concerning global trend where, despite stable or slightly declining volumes of pesticide use in some regions, the actual ecological harm—measured as TAT—is rising. This is particularly significant as the **United Nations Biodiversity Conference (COP15)** set a target to reduce pesticide-related risks by **50% by 2030**, yet current TAT data suggests that most nations are moving in the opposite direction.

What is Total Applied Toxicity (TAT)?

Total Applied Toxicity (TAT) is a comprehensive environmental indicator used to assess the potential impact of pesticides on biodiversity. Unlike traditional metrics that merely track the **weight/volume** of pesticides applied, TAT integrates two critical factors:

1. **Pesticide Use Data:** The quantity (kilograms or tons) of specific active ingredients applied to crops.
2. **Toxicity Metrics:** The inherent toxicity of those chemicals to specific non-target species groups (e.g., honeybees, fish, aquatic invertebrates).

Why the Shift to TAT?

For decades, regulators focused on the **amount** of pesticides used. However, the industry has shifted toward high-potency chemicals. This means a farmer might use a smaller volume of a "new generation" pesticide, but that small amount could be thousands of times more toxic to the environment than the larger volume of an older chemical. **TAT captures this "decoupling" of volume and toxicity.**

Key Findings & Global Trends

- **Species-Specific Impact:** Recent data shows that while toxicity to vertebrates (like birds and mammals) has generally decreased due to stricter regulations, the TAT for **invertebrates** (like pollinators and aquatic insects) and **terrestrial plants** has increased significantly.

- **The Global Leaders:** Countries with the highest TAT intensities include **Brazil, China, Argentina, and the United States**, largely driven by intensive monoculture farming and the use of highly toxic herbicides and insecticides.
- **Pest Resistance:** As pests develop resistance, farmers often increase the frequency of application or use more toxic mixtures, further driving up the TAT.
- **The 50% Target:** The **Kunming-Montreal Global Biodiversity Framework (Target 7)** aims to reduce the risk of pesticides by half. Currently, TAT is the primary indicator proposed to track progress toward this goal.

India's Regulatory Framework: 1968 vs. 2025

India is currently overhauling its domestic laws to align with modern toxicity standards and farmer safety.

1. **The Insecticides Act, 1968 (Current)**
   - **Focus:** Regulating the import, manufacture, sale, and distribution of insecticides to prevent risk to human beings or animals.
   - **Limitation:** Enacted during the Green Revolution, it prioritizes "availability" and "efficacy" over environmental "toxicity" and long-term ecological health.
   - **Institutions:** Established by the **Central Insecticides Board (CIB)** and **Registration Committee (RC)**.
2. **The Pesticides Management Bill, 2025 (Proposed)**

   The 2025 Bill (replacing earlier 2020 and 2008 drafts) seeks to modernize the sector:
   - **Broader Scope:** Covers "Pesticides" (including biologicals) rather than just "Insecticides."
   - **Risk-Based Governance:** Introduces a formal definition of "risk" (aligning with TAT concepts), allowing regulators to ban substances based on environmental harm even if they are effective for crops.
   - **Farmer Welfare:** Includes provisions for **compensation** to farmers in case of poor-quality pesticides and establishes a **Pesticide Management Fund**.
   - **Stricter Penalties:** Heavy fines (up to ₹40 lakh) and imprisonment for selling spurious or unregistered pesticides.
   - **Digital Traceability:** Mandatory use of QR codes and digital portals to track pesticides from factory to farm.

Global Conventions & India's Obligations

Convention	Focus Area	India's Status
Stockholm Convention	Eliminating **Persistent Organic Pollutants (POPs)** like DDT and Endosulfan.	Party (Ratified). Recently banned 7 additional POPs.
Rotterdam Convention	**Prior Informed Consent (PIC)** procedure for trading hazardous chemicals.	Party. Helps India decide whether to allow the import of toxic chemicals.
Basel Convention	Regulating the transboundary movement of **hazardous waste** (including pesticide containers).	Party. Focuses on safe disposal of chemical waste.
Kunming-Montreal GBF	**Target 7:** Reduce pollution risk from pesticides by **50% by 2030**.	Committed. TAT is the indicator for this target.

4.4. EURASIAN DIVING DUCK SPOTTED IN ASSAM

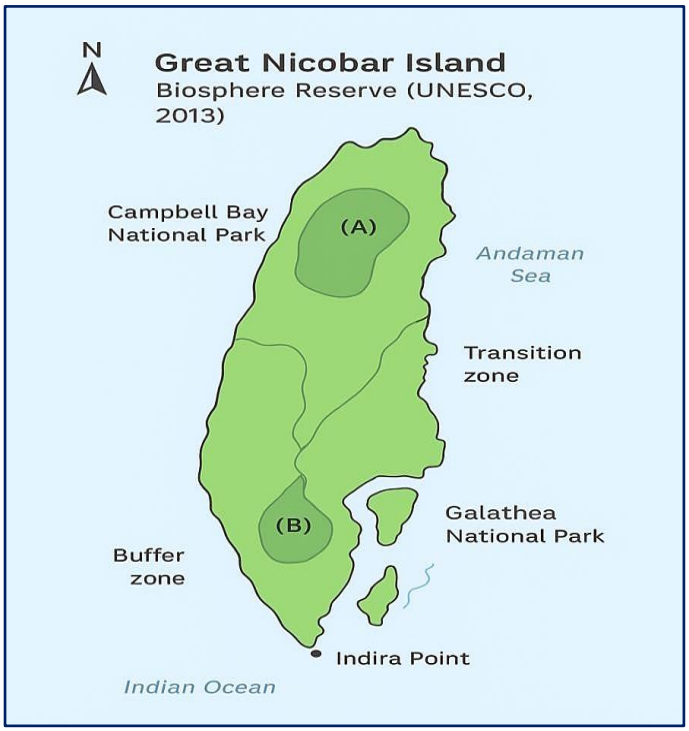
Context: Recently, the seventh waterbird census at the **Kaziranga National Park and Tiger Reserve** in Assam spotlighted a rare avian guest—the **Smew** (*Mergellus albellus*), a striking **Eurasian diving duck**. This first-ever recorded sighting of the Smew in the Kaziranga landscape occurred at the **Rowmari-Donduwa beels** in the Laokhowa-Burhachapori Wildlife Sanctuaries. While the sighting is a testament to the health of Assam's wetlands, ornithologists have expressed concern that such sporadic sightings of "vagrant" species may be linked to **climate-driven range shifts** and the degradation of traditional wintering habitats.

1. **Biological Profile of the Smew (*Mergellus albellus*)**
    - **Appearance:** They are medium-sized ducks. Males are distinctively white with a "black mask" and fine black lines on the body, while females (often called 'redheads') have a chestnut-colored head and mottled grey body.
    - **Feeding Behavior:** As a diving duck, it specializes in catching small fish, aquatic insects, and crustaceans. Their presence typically indicates a **fish-rich, sheltered water body**.
    - **Breeding Grounds:** They primarily breed in the **Eurasian Taiga** (northern coniferous forests) and are rare winter visitors to the Indian subcontinent.
2. **Habitat and Distribution**
    - **Global Range:** They are found across the Palearctic region, from Scandinavia across Siberia.
    - **In India:** They are considered **vagrants** or rare winter migrants. Previous sightings have been recorded in northern and central India, such as the **Haiderpur wetland** in Uttar Pradesh.
    - **Recent Sighting:** The discovery in the **Rowmari-Donduwa beels** (floodplain lakes) within the Kaziranga landscape highlights the importance of the **Central Asian Flyway**.
3. **Conservation Status**
    - **IUCN Red List:** The Smew is currently categorized as **Least Concern** globally, but its population is declining due to habitat loss and human activities.
    - **Other Related Species:** The **Common Pochard** (another Eurasian diving duck found in India) is listed as **Vulnerable**, emphasizing the precarious state of migratory diving ducks.
4. **Ecological Indicators**
    - The arrival of rare diving ducks underscores the **resilience of floodplains**.
    - They serve as **bio-indicators**; their presence signals a healthy aquatic food chain and relatively low levels of human disturbance in the wetland.

4.5. NGT APPROVES ₹92,000-CR GREAT NICOBAR PROJECT

Context: The **National Green Tribunal (NGT)** recently cleared the path for the ₹92,000-crore mega-infrastructure project on Great Nicobar Island. The tribunal dismissed petitions challenging the project's **Environmental Clearance (EC)**, noting the project's "strategic importance" and the adequacy of existing environmental safeguards.

1. **Components of the Project**



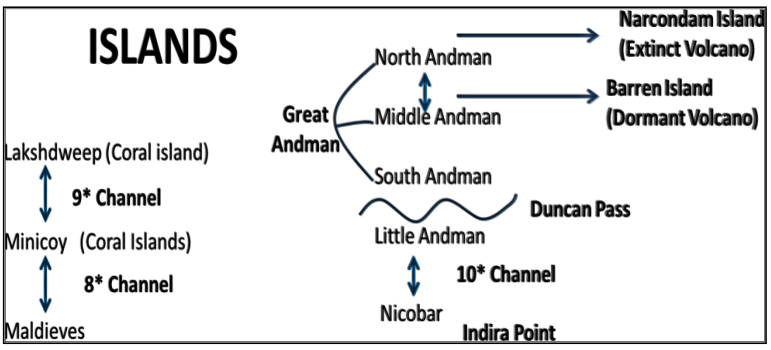
- The integrated project is designed to transform the island into a major hub through the following developments: International Transshipment Port, **International Airport**, **Power Plant, Greenfield Township**.
- **Promoting Body:** NITI Aayog
- **Implementing Agency:** Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO)
  - ANIIDCO was incorporated on 28th June 1988 under the Companies Act 1956 for rapid economic growth of the Islands.
- **Operates under:** Ministry of Home Affairs

2. **Environmental Safeguards and Directions**

The NGT and the Ministry of Environment have laid down specific conditions to mitigate ecological damage:

- **Coral Reef Protection**: The Ministry is directed to protect existing coral reefs and undertake **coral regeneration** through proven scientific methods.
- **Shoreline Management**: The Environment Ministry is responsible for ensuring that constructions do not lead to **shoreline erosion** or changes in the coast.
- **Species Protection**: Specific focus is placed on protecting the nesting sites of **Leatherback turtles** and avoiding the loss of turtle nesting beaches.
- **Implementation Plan**: The Ministry must prepare and approve a formal "implementation plan" for these conservation efforts

3. **About Andaman and Nicobar Islands (ANI)**



- ANI is a UT with 572 islands (Bay of Bengal), of which 38 are inhabited.
- **Comprises two groups:** Andaman Islands and Nicobar Islands, divided by the 10° Channel.
- **Duncan Passage** separates Little Andaman from South Andaman.
- **Closer to equator**: Located between 6° to 14°
- Separated from Thailand and Myanmar by the **Andaman Sea**.
- Island chain is a submerged extension of the **Arakan Mountains.**

- **Dugong** (sea mammal) is the official animal, endemic to the Indo-Pacific coast, especially Andaman.
- In 2018, three islands were renamed to honour **Subhas Chandra Bose**:
  - Ross → Netaji Subhash Chandra Bose Island
  - Neil → Shaheed Island
  - Havelock → Swaraj Island
- In September 2024, the capital of the ANI (Port Blair) was renamed **Sri Vijaya Puram.**

4. **PVTGs in Andaman & Nicobar Islands (ANI)**
   - ANI has **five PVTGs**: Great Andamanese, Jarawa, Onge, Sentinelese, and Shompen.
   - They are geographically isolated, depend on hunter-gathering or simple horticulture, have very small populations, and are **highly vulnerable.**
   - **Recently,** members of the **Shompen tribe voted for the first time** in the ANI Lok Sabha constituency.
5. **Hotspot Status and biodiversity:**
   - Nicobar fall under the Sundaland Biodiversity Hotspot.
   - **Great Nicobar Biosphere Reserve:** It covers 885 km² across **Campbell Bay and Galathea National Parks (core zone).**

4.6. INDIA'S AIR QUALITY CRISIS: ANALYZING THE 2026 CREA REPORT

Context:

Recently, an air quality analysis by the **Centre for Research on Energy and Clean Air (CREA)** revealed that **204 out of 238** monitored Indian cities failed to meet the **National Ambient Air Quality Standards (NAAQS)** for PM 2.5 during the winter season of 2025–26.

This marks a significant deterioration from the previous winter, when 173 cities breached the national limits. The study, based on data from the Central Pollution Control Board (CPCB), identified **Ghaziabad** as the most polluted city in India, followed by **Noida** and **Delhi**, underscoring the persistent failure of current mitigation strategies like the National Clean Air Programme (NCAP) to achieve nationwide clean air targets.

Key Highlights of the CREA 2026 Report

1. **Extent of Non-Compliance**
   - **Breach of Standards:** 204 out of 238 cities (approx. 86%) recorded PM2.5 levels exceeding the Indian national standard of **60 ug/m^3** (24-hour average).
   - **Global Comparison:** Not a single monitored city in India complied with the **World Health Organization (WHO)** daily safe guideline of **15 ug/m^3**.
   - **Regional Clusters:** The **Indo-Gangetic Plain (IGP)** remains the most affected region, with 75 out of 79 monitored cities exceeding the national limits.

2. **City Rankings (Winter 2025–26)**
   - **Most Polluted: Ghaziabad** topped the list with an average PM2.5 concentration of 172 ug/m^3, followed by **Noida** (166 ug/m^3) and **Delhi** (163 ug/m^3).
   - **Cleanest City: Chamarajanagar** in Karnataka was recorded as the cleanest, with an average PM2.5 of 19 ug/m^3. Notably, 8 of the top 10 cleanest cities are located in **Karnataka**.
3. **National Clean Air Programme (NCAP) Performance**
   - The report highlights a "structural disconnect" in the NCAP. Out of 96 NCAP cities with adequate data, **84 failed** the national standards.
   - **Funding Issues:** Although nearly **₹13,415 crore** has been released since the NCAP's inception (2019), only about **74%** has been utilized.
   - **Skewed Spending:** Approximately **68%** of the funds were spent on road dust management, while critical sectors like industrial emission control and public outreach received less than **1%** of the allocation.
4. **Major Air Pollution Policies of India**
   - **National Clean Air Programme (NCAP):** Ministry of Environment, Forest and Climate Change (MoEFCC) launched National Clean Air Programme (NCAP) in January, 2019 with an aim to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States/UTs by engaging all stakeholders.
     - The programme envisages to achieve reductions up to 40% or achievement of National Ambient Air Quality Standards for Particulate Matter10 (PM 10) concentrations by 2025-26.
   - **National Ambient Air Quality Standards (NAAQS):** These standards, set by the **Central Pollution Control Board (CPCB)**, provide a legal framework to ensure air quality in both industrial and residential areas.
   - **Indo-Gangetic Plain (IGP) Focus:** Special monitoring is carried out in northern Indian states during winter to address pollution, as **75 cities in this region were listed for violating air quality standards in the 2026 report.**

4.7. PERSISTENCE OF RAT-HOLE MINING

Context:

The recent tragic explosion in an **illegal rat-hole mine in Meghalaya**, which claimed **18 lives**, serves as a grim indicator of the systemic failure to curb clandestine mining operations. Despite a decade-long judicial ban, the persistence of these "**death traps**" highlights the complex intersection of **tribal land rights**, **economic desperation**, and **regulatory paralysis**.

About Rat-Hole Mining

- **Concept: Rat-hole mining** is characterized as a primitive, hazardous, and labor-intensive extraction technique. It involves excavating extremely narrow tunnels—typically **3 to 4 feet high and 2 to 3 feet wide**—resembling the burrows of rodents.
  - Due to these restrictive dimensions, miners (**often including children**) must crawl through the shafts to **manually extract coal** using basic tools.

  - **Practiced**: This form of mining is predominantly practiced in **Northeastern India**, especially in the states of **Meghalaya** and **Assam**, where coal seams are thin and scattered.
- **Techniques of Extraction**
  - **Side-Cutting Procedure:** Used primarily in **hilly terrains**, miners dig **horizontal tunnels** directly into the slopes to reach thin coal seams, which generally measure less than 2 meters in thickness.
  - **Box-Cutting Method:** This involves excavating a **large rectangular pit** (ranging from 10 to 100 square meters) to a depth of **100 to 400 feet**. Once the coal seam is exposed, horizontal "**rat-holes**" are branched out from the vertical shaft for extraction.

Drivers Behind the Persistence of Rat-Hole Mining

- **Poverty and Livelihood Insecurity: Limited employment opportunities** compel local tribal populations to rely on rat-hole mining for survival.
  - The prospect of **quick and assured cash income** from coal sales, despite serious health and safety risks, makes this activity economically attractive to vulnerable households.
- **Land Ownership and Regulatory Gaps: Unclear land titles** and weak enforcement mechanisms allow illegal mining to flourish.
  - These **governance loopholes** are routinely exploited, enabling operations to continue with little oversight or accountability.
  - In some instances, the overlap between political interests and coal ownership prevents the rigorous implementation of the **National Green Tribunal (NGT) ban**.
- **Sustained Demand for Coal:** Ongoing demand for coal in both **formal and informal markets** keeps the practice economically viable.
  - The involvement of **middlemen and illegal traders** strengthens underground supply chains, ensuring a steady market for illegally extracted coal.
- **Geological Suitability and Low Overhead:** The coal seams in the **North Eastern** region are often **extremely thin** (**less than 2 meters**), making **large-scale mechanical mining economically** unviable for **small-scale owners**. The **primitive, labor-intensive** nature of rat-hole mining requires negligible capital investment, making it an "easy-entry" business for local contractors.

Critical Challenges Associated with Rat-Hole Mining

The unscientific extraction of coal through rat-hole mining creates a multifaceted crisis involving human safety, ecological health, and social ethics.

- **Severe Occupational Safety Hazards:** Due to the absence of structural reinforcements, these narrow shafts are chronically **prone to collapses and flooding**, trapping miners deep underground. **Poor ventilation** systems further lead to fatal asphyxiation and the buildup of explosive gases.
  - **Instances:** The **2018 Ksan flooding** (17 deaths) and the **2024 Wokha explosion** (6 deaths) exemplify these risks.
- **Ecological Degradation and Toxicity:** Operations trigger large-scale **deforestation and soil erosion**. The most significant impact is **Acid Mine Drainage (AMD)**, where **sulfur-rich runoff** contaminates water bodies, turning **rivers** like the **Lukha** acidic and destroying aquatic biodiversity.

- **Impact:** Productive agricultural lands in Nagaland's **Wokha and Mon districts** have suffered severe degradation and water pollution.

- **Systemic Social Exploitation:** The industry thrives on the **exploitation of child labor**, as their small size is utilized to navigate narrow tunnels. This practice involves approximately **70,000 children** (**largely from Bangladesh and Nepal**), as reported by **NGO Impulse**, and leads to the displacement of local communities and hazardous working conditions.

Regulatory Framework Governing Rat-Hole Mining

The governance of rat-hole mining in India involves a complex interplay between judicial bans, central legislation, and the unique constitutional protections granted to Northeastern states.

I. Regulatory Status in India

- **Legal Standing:** Currently, rat-hole mining is classified as an **illegal activity**. Its enforcement is primarily the responsibility of the **State and District administrations**, who treat the persistence of such mines as a significant **law and order challenge**.
- **The National Green Tribunal (NGT) Ban:** In **2014**, the NGT imposed a **comprehensive ban** on this practice. The tribunal cited the **unscientific nature of the mines** and the alarming frequency of worker fatalities, especially during the **monsoon flooding**, as the primary reasons for the prohibition.
- **Supreme Court Intervention (2019):** In July 2019, the **Supreme Court of India** upheld the **NGT's ban in Meghalaya**. The apex court explicitly ruled that rat-hole mining is prohibited under the **Mines and Minerals (Development and Regulation) Act, 1957**, and cannot proceed without approved scientific mining plans and environmental clearances.
- **Justice (Retd.) B.P. Katakey Committee**: Constituted by the **Meghalaya High Court in 2022** following a **suo motu PIL**, the committee was tasked with monitoring **illegal coal mining** in the state.
    - **Key Findings:** Found **widespread illegal mining**, especially in the **East Jaintia Hills** district, despite existing judicial bans. Highlighted serious **enforcement failures** and regulatory non-compliance.
    - The **Meghalaya High Court** sharply noted that *"no authority in the state, except the High Court, appears to be taking the issue seriously,"* pointing to deep **administrative apathy and lack of accountability**.

II. State-Specific and Constitutional Provisions

- **Nagaland Coal Policy, 2006:** In Nagaland, the state attempted to bring small-scale operations under a regulatory umbrella by issuing **Small Pocket Deposit Licences (SPDLs)** to individual landowners. These licenses are subject to stringent conditions intended to ensure safety.
- **Meghalaya Environment Protection and Restoration Fund (MEPRF):** Established following NGT orders, this fund utilizes a **10% royalty on coal** to restore areas affected by mining.
- **Article 371A (Nagaland):** This constitutional provision grants Nagaland significant **autonomy** regarding land ownership, resources, and customary laws. These special protections often create legal friction when trying to enforce uniform federal mining regulations.

- **The Sixth Schedule (Meghalaya, Mizoram, Tripura, and Assam):** Under the Sixth Schedule, **Autonomous District Councils (ADCs)** possess the authority to manage tribal lands.
    - Since **local tribal communities** traditionally own both the surface land and the minerals beneath it, **central oversight** is severely restricted.
    - Conflicts frequently arise between ADC legislation and the **MMDR Act, 1957**, leading to regulatory gaps and ambiguities that illegal operators exploit.

III. International Regulatory Context

- **Global Standards:** No specific international law targets rat-hole mining directly; however, global protocols advocate for **sustainable mining** and **worker safety**.
- **Indirect Influence:** International labor and environmental standards pressure member states to transition from primitive methods toward regulated, scientific extraction.

Way Forward: A Strategic Roadmap to Resolve Illegal Rat-Hole Mining Practice

To resolve the crisis of illegal rat-hole mining, a multi-dimensional approach is required that balances **strict enforcement**, **technological innovation**, and a transition toward a **Green Steel economy**.

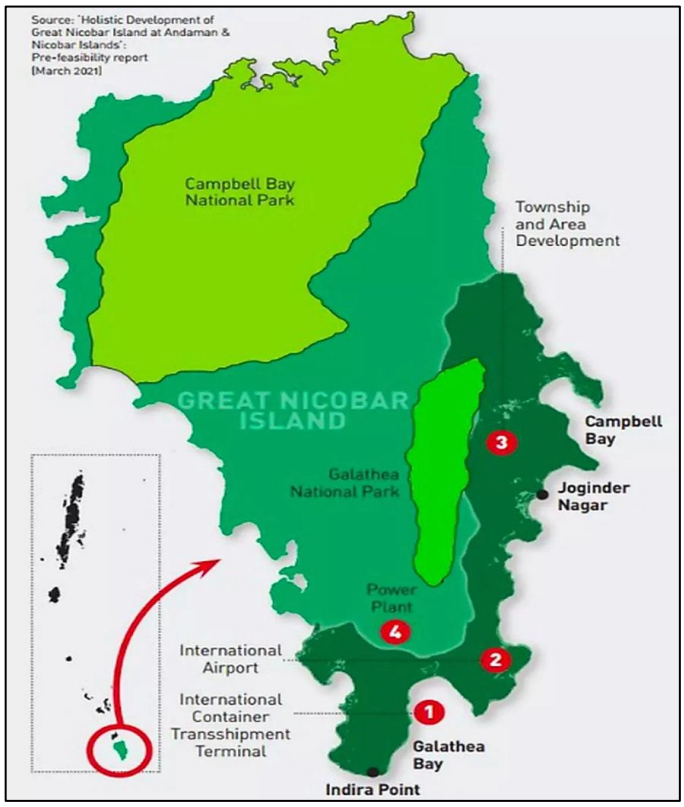
- **Deployment of Technological Surveillance:** States must integrate **Satellite Remote Sensing** and **Drone Patrols** with centralized control rooms to monitor remote terrains. This allows for the **real-time detection** of new illegal pit openings and unscientific excavations, effectively bypassing the limitations of physical inspections in difficult landscapes.
- **Transitioning to a Green Steel Trajectory:** India should accelerate the shift toward **Green Steel** by incentivizing industries to replace **coking coal** with **Green Hydrogen-based Direct Reduced Iron (DRI)**. By reducing the national industrial demand **for low-grade, high-sulfur coal** at the source, the economic incentive for illegal rat-hole mining can be structurally dismantled.
- **Mandatory Logistics and Supply Chain Tracking:** Implementing **GPS-enabled tracking** and digital transit passes for all coal carriers is essential to prevent the **"laundering"** of illegally mined coal into the formal market. Dedicated check-posts and CCTV monitoring at industrial hubs (**cement and coke plants**) ensure only legally sourced coal is utilized.
- **Economic Diversification and Livelihood Support:** The state must displace mining as a primary income source by facilitating **credit linkages** and market access for **Horticulture, Ecotourism, and Sustainable Manufacturing**. Providing viable economic alternatives is the only long-term solution to the **poverty-driven** participation in hazardous mining.
- **Social Accountability and Community Monitoring:** Empowering **Village Councils (Durbars)** and **Autonomous District Councils** to act as environmental stewards is critical. By providing a portion of recovered penalties to local bodies, the government can incentivize **community-led surveillance** and foster local ownership of environmental protection.
- **Formalization and Worker Rehabilitation:** A comprehensive **registry for migrant laborers** should be created to pull workers out of the informal "shadow" economy. These individuals should be prioritized for **re-skilling programs** and absorbed into public works, such as the ecological restoration of abandoned mine sites or emerging green energy projects.
- **Strict Adherence to Scientific Mining Standards:** The transition from illegal pits to **Scientific Mining** must be accelerated. This involves granting leases only to operators who provide **Environmental Impact Assessments (EIA)**, ensure structural safety (engineered supports), and implement proper **Acid Mine Drainage (AMD)** treatment protocols.

Conclusion

The "**distressing regularity**" of mine tragedies in Meghalaya proves that a ban is a tool, not a solution. Real change requires a dual approach: **ruthless enforcement** against the coal mafia and a **compassionate transition** for the labor force. Aligning Meghalaya's mineral economy with India's **Green Steel trajectory** is not just an environmental necessity but a moral imperative to ensure that "development" does not come at the cost of human lives in dark, narrow holes.

4.8. GREAT NICOBAR PROJECT: DEVELOPMENT VS. ENVIRONMENT

Context: Recently a special bench of the **National Green Tribunal (NGT)** cleared Great Nicober Project, citing its "strategic importance" despite ongoing ecological and tribal rights litigation.



Origin of the Great Nicobar Project:

- **Conceived by:** NITI Aayog in 2021.
- **Implementing Agency:** Andaman and Nicobar Islands Integrated Development Corporation (**ANIIDCO**).
- **Scale:** Covers ~166 sq. km (~18% of the island's 910 sq. km area).

Key Components of the Great Nicobar Project:

The project is built on four major pillars designed to create a self-sustaining economic ecosystem:

I. International Container Transshipment Terminal (ICTT)

1. **Location:** Strategically sited at **Galathea Bay** on the island's southeastern coast.
2. **Capacity:** Planned to handle **16 million TEUs** (Twenty-foot Equivalent Units) at full capacity, with Phase-I (4 million TEUs) expected by 2028.
3. **Advantage:** Features a natural water depth of over **20 meters**, allowing it to host "Ultra Large Container Vessels" without the need for extensive, expensive dredging.

II. Greenfield International Airport

1. **Dual-Use Facility:** Designed for both civilian tourism and defense/military logistics.
2. **Capacity:** Capable of handling a peak hour traffic of **4,000 passengers**. It will bolster the Andaman and Nicobar Command (ANC) for rapid deployment in the Indo-Pacific.

III. Gas and Solar-Based Power Plant

1. **Capacity:** A **450-MVA** hybrid power plant.
2. **Function:** Intended to provide uninterrupted, "de-dieselized" energy to the terminal, airport, and new township using a mix of conventional gas and renewable solar energy.

IV. Greenfield Smart City / Township

1. **Vision:** A modern township spread over 160 sq. km to support a projected population of **3.5 lakh residents** (currently ~8,000).

2. **Infrastructure:** Includes residential zones, luxury tourism resorts, a cruise ship terminal, and industrial hubs to attract global investment.

Significance of the Great Nicobar Project:

Great Nicobar is often referred to as India's **"unsinkable aircraft carrier"** in the Bay of Bengal.

1. **Geostrategic & Security**
   - **Maritime Chokepoint Control:** Located approx 90 nautical miles from the **Strait of Malacca**; provides a "vantage point" to monitor 40% of global trade.
   - **Counter-Balancing China:** Acts as a strategic bulwark against the **"String of Pearls"** (e.g., Gwadar, Hambantota) and presence in the Coco Islands.
   - **Tri-Service Command (ANC):** The project enhances the operational reach of the **Andaman and Nicobar Command (ANC)**—India's only integrated tri-service command, facilitating rapid deployment of air and naval assets.
2. **Economic & "Blue Economy"**
   - **Transshipment Sovereignty:** Aims to capture the **75% of Indian cargo** currently transshipped at Colombo or Singapore, saving approx. **200–220 million** annually in forex.
   - **Natural Advantage: Galathea Bay** offers a depth of >20m, accommodating "Ultra Large Container Vessels" without heavy dredging.
   - **Blue Economy Growth:** It aligns with the **Maritime India Vision 2030**, fostering ancillary industries like ship repair, bunkering (refueling), and duty-free trade zones.
   - **Tourism Potential:** Aim to position the Andaman and Nicobar Islands as a global tourism destination, competing with the Maldives and Mauritius.
3. **Diplomatic & Regional Leadership**
   - **"Act East" Policy:** Serves as a physical and economic bridge to **ASEAN** nations.
   - **Net Security Provider:** Enhances India's capacity for **HADR** (Humanitarian Assistance and Disaster Relief) and anti-piracy operations in the Bay of Bengal.
   - **Multilateral Influence:** Strengthens India's central role in **BIMSTEC** and the Indian Ocean Rim Association (**IORA**).
4. **Socio-Economic Impact**
   - **Employment:** Projected creation of **1 lakh jobs** (direct and indirect).
   - **Infrastructure Frontier:** Introduces a dual-use airport and a 450-MVA power plant, providing modern amenities to India's southernmost remote frontier, potentially improving the quality of life for the local populace (if balanced with tribal rights).

Key Concerns of the Great Nicobar Project:

1. **Ecological & Environmental Risks**
   - **Massive Deforestation:** Diversion of **130 sq. km** of primary tropical rainforest. Official estimates state **9.64 lakh trees** will be felled, though independent experts suggest the number could exceed **30 lakhs**.
   - **Endangered Flagship Species:**
     - **Giant Leatherback Turtle:** Galathea Bay is India's largest nesting site; construction threatens this globally unique habitat.
     - **Nicobar Megapode:** An endemic mound-building bird whose habitat is directly in the project zone.
     - **Nicobar Macaque:** Habitat fragmentation will lead to increased human-animal conflict.

- **Coral Reefs & Mangroves:** Dredging for the port will lead to siltation, choking **20,000+ coral colonies** and destroying mangroves that act as natural tsunami buffers.

2. **Tribal Rights and Social Concerns**
   - **Threat to PVTGs:** The island is home to the **Shompen** (a Particularly Vulnerable Tribal Group) and the **Nicobarese**.
   - **Constitutional & Legal Violations:**
   - **Forest Rights Act (FRA), 2006:** Allegations that the "Free, Prior, and Informed Consent" (FPIC) of the Tribal Council was coerced or bypassed.
   - **Article 338-A:** The National Commission for Scheduled Tribes (NCST) was reportedly not consulted as mandated.
   - **Cultural Genocide:** Genocide experts have warned that the influx of 3.5 lakh people (compared to the current ~8,000) could expose isolated tribes to "outside" diseases and lead to the loss of their nomadic hunter-gatherer lifestyle.
3. **Geological and Disaster Vulnerability**
   - **Seismic Zone V:** The island lies in the highest earthquake-risk zone. It is situated on the **Andaman-Sumatra subduction zone**, the same fault line that triggered the 2004 Tsunami.
   - **Tectonic Subsidence:** During the 2004 event, Great Nicobar underwent a permanent **15-foot subsidence** (sinking).
4. **Regulatory and Institutional Gaps**
   - **"Opaque" Clearances:** Many environmental clearance details were withheld under the "national security" clause, hindering public and scientific scrutiny.
   - **Flawed Impact Assessment:** The Environmental Impact Assessment (EIA) was criticized for being based on **single-season data** and downplaying the likelihood of future mega-earthquakes.
   - **Denotification:** The government denotified the **Galathea Bay Wildlife Sanctuary** and parts of the **Tribal Reserve** specifically to facilitate the port construction.

Way Forward

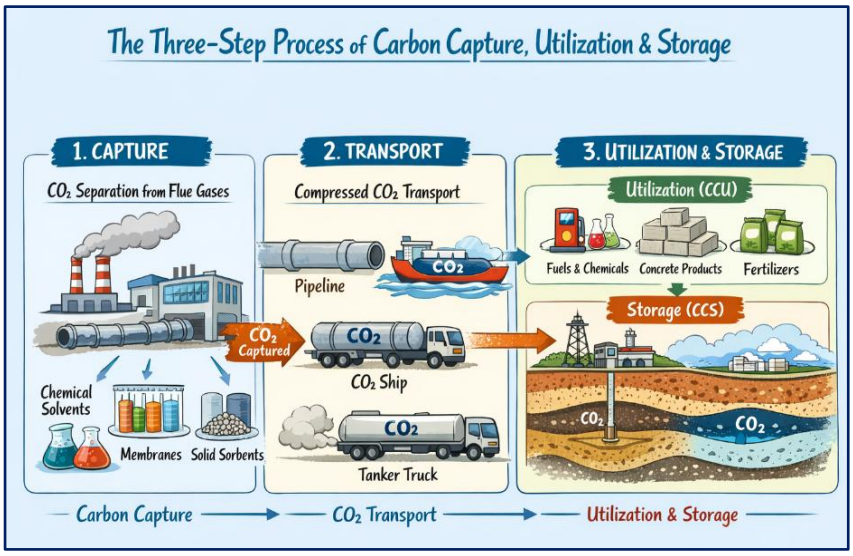
- **Effective Coral Translocation:** Instead of mere "scattered" translocation, adopt international best practices (like the **Biorock technology**) for coral regeneration and monitor the survival rate of the 20,000+ colonies through third-party audits.
- **Nature-Based Coastal Defense:** Prioritize "Green-Gray" infrastructure—using mangrove restoration and artificial reefs alongside sea walls to mitigate tsunami and erosion risks.
- **Health Safeguards:** Establish a **"Biosecurity Protocol"** to prevent the transmission of outside diseases to the Shompen, maintaining their "limited contact" status even as the island's population grows.
- **Independent Oversight Authority:** Create a multi-stakeholder body comprising environmentalists, tribal representatives, and security experts to oversee compliance with the **Environment Clearance (EC)** conditions.
- **Public Disclosure:** As per the NGT's latest deliberations, the government should release non-sensitive portions of the **High-Powered Committee (HPC)** reports to build public trust.
- **Climate-Resilient Engineering:** Given the Seismic Zone V status, all infrastructure must adhere to the highest **Eurocode 8** or equivalent earthquake-resistant standards, with mandatory periodic "Seismic Audit."

Conclusion

Integrating strategic depth with ecological sanctity, the project must evolve as a **"Green Maritime Hub."** By leveraging sustainable engineering and tribal-inclusive governance, India can transform Great Nicobar into a futuristic frontier that balances Indo-Pacific leadership with high-value biodiversity conservation.

4.9. CARBON CAPTURE AND UTILISATION (CCU) TECHNOLOGIES

Context: In the 2026 Union Budget, India prioritized **"Hard-to-Abate"** sectors (Steel and Cement), providing **Viability Gap Funding (VGF)** for CCU pilot plants to counter the EU's **Carbon Border Adjustment Mechanism (CBAM)**.



About the Carbon Capture and Utilisation (CCU) Technologies

Carbon Capture and Utilisation (CCU) refers to technologies that **capture CO_2 emissions** from industrial sources (thermal power plants, cement, steel, refineries) and either **utilise** them in value-added products (chemicals, fuels, building materials) or store them (CCS – Carbon Capture and Storage).

The Three-Step Process

- These diagrams visually explain the **three-step CCUS process**:
- **Capture** – CO_2 separated from industrial flue gases.
- **Transport** – Compressed CO_2 moved via pipelines/ships/tankers.
- **Utilisation or Storage** –
- **Carbon Capture and Utilisation (CCU):** Converted into fuels, chemicals, concrete and fertilizers.
- **Carbon Capture and Storage (CCS):** Injected into deep geological formations for permanent storage.

Why India Needs Carbon Capture and Utilisation (CCU)

1. **Decarbonizing "Hard-to-Abate" Sectors**
   - **Chemical Necessity:** Sectors like **Cement and Steel** produce CO_2 as a direct chemical byproduct (calcination) that renewables cannot eliminate.
   - **Economic Backbone:** These industries are essential for **"Viksit Bharat @ 2047"**; CCU allows growth without high carbon penalties.
2. **Protecting "Young" Industrial Assets**
   - **Avoiding Stranded Assets:** India's industrial plants are relatively new. CCU allows for **retrofitting** existing coal and gas plants instead of costly, premature shutdowns.
   - **Resource Security:** Extends the utility of domestic coal reserves while aligning with Net Zero 2070 targets.

3. **Circular Carbon Economy (Waste-to-Wealth)**
    - **Import Substitution:** Converts captured CO_2 into **Urea (fertilizer)** and **Methanol**, reducing India's dependence on expensive chemical imports.
    - **Sustainable Infrastructure:** Supports "green" construction by mineralizing CO_2 into **bricks and concrete**.
4. **Economic & Global Competitiveness**
    - **Trade Resilience:** Helps Indian exports bypass international carbon taxes like the EU's **CBAM (Carbon Border Adjustment Mechanism)**.
    - **Green Growth:** Leverages the **₹20,000 crore CCUS allocation** (Budget 2026) to foster start-ups and create specialized "Green Value Chain" jobs.

India's Carbon Capture and Utilisation (CCU) Status

- **Financial Commitment:** A landmark **₹20,000 crore outlay** in the Union Budget 2026-27 to de-risk private investment and scale up CCUS from pilots to commercial industrial plants.
- **Operational Milestones:** Launch of **five integrated CCU Testbeds** in the cement sector via Public-Private Partnerships (PPP) between top institutes like IITs/IISc and major firms (JSW, Dalmia).
- **Market Mechanisms:** Activation of the **Indian Carbon Credit Trading Scheme (CCTS)**, with the first Carbon Credit Certificates (CCC) expected by **October 2026** for 490 obligated entities.
- **Strategic Roadmap:** NITI Aayog's 2026 reports identify CCUS as the **only viable path** for deep decarbonization in sectors like Cement and Aluminium, where demand is projected to grow 7x by 2070.
- **Targeted Sectors:** Strategic focus on **five "hard-to-abate" sectors**—Power, Steel, Cement, Refineries, and Chemicals to ensure "Viksit Bharat @ 2047" goals align with Net Zero 2070.

Global Carbon Capture and Utilisation (CCU) Initiatives

- **COP30 "Belém to Baku" Roadmap:** The official launch of the **Paris Agreement Crediting Mechanism (PACM)** under Article 6.4, allowing international trade of carbon credits from engineered removals like DAC and CCU.
- **EU Industrial Carbon Strategy:** Implementation of the **Net-Zero Industry Act (NZIA)**, which mandates 50 million tonnes of annual CO_2 storage by 2030 and establishes cross-border "open-access" hubs like **Northern Lights**.
- **Mission Innovation (MI):** A 23-country coalition (including India) pushing the **CDR Mission** to remove 100 Mt of CO_2 annually by 2030, supported by global competitions at the 2026 World Energy Congress.
- **Global Capacity Expansion:** Reports from IEA and GCCSI show a **30% annual growth** in the project pipeline, with global capture capacity on track to double by 2030 through shared industrial "hubs."
- **US 45Q Tax Credits:** The Inflation Reduction Act provides up to **$180/tonne** for CO_2 captured via Direct Air Capture, transforming carbon removal into a profitable business model and scaling DAC hubs in Texas and Louisiana.

Key Challenges of Carbon Capture and Utilisation (CCU)

- **The Energy Penalty:** Capturing CO_2 is highly energy-intensive, requiring industrial plants to divert **15–25%** of their power to run capture units, which can lead to higher overall fuel consumption.

- **Techno-Economic Gap:** High operational costs (up to **₹5,000/tonne**) make CCU-derived products like green urea or concrete struggle to compete with cheaper fossil-based alternatives.
- **Green Hydrogen Scarcity:** Production of high-value CCU products, such as **synthetic aviation fuel**, depends on an affordable and steady supply of Green Hydrogen, which remains limited.
- **Non-Permanence Issues:** Unlike deep storage, many CCU pathways (like fuels or plastics) only **delay emissions**, as the CO_2 is eventually released when the product is consumed or incinerated.
- **Infrastructure Bottlenecks:** India lacks a dedicated **national** CO_2 **pipeline network**, making the transport of compressed carbon by road or sea expensive and carbon-heavy.
- **Regulatory & Liability Gaps:** Uncertainties regarding legal responsibility for CO_2 leakage and the lack of global standards for **"Carbon-Neutral" labeling** hinder large-scale investor confidence.

Way Forward

- **Hub and Cluster Model:** Developing regional industrial clusters (e.g., Gujarat, Odisha) to share CO_2 pipeline and storage infrastructure, drastically reducing the per-tonne cost for individual factories.
- **Carbon Market Activation:** Implementing the **Indian Carbon Credit Trading Scheme (CCTS)** by October 2026 to allow companies to monetize captured carbon through tradeable certificates.
- **Viability Gap Funding (VGF):** Utilizing the **₹20,000 crore** budget to provide direct financial support for the first 10–15 commercial-scale projects to bridge the techno-economic gap.
- **High-Value Pathways:** Prioritizing utilization in **"Green Concrete"** (mineralization) and **Sustainable Aviation Fuel (SAF)** by integrating with the National Green Hydrogen Mission.
- **Policy Standardization:** Establishing a clear national framework for CO_2 transport safety, environmental standards, and long-term legal liability to encourage private investment.
- **Indigenous R&D:** Focusing on the development of low-cost, **locally-made chemical solvents** and a specialized workforce trained in carbon auditing and conversion technologies.

Conclusion

Integrating **CCUS** is vital for India's **Net-Zero 2070** goal. By 2026, shifting from pilots to **industrial clusters** will turn CO_2 into a strategic asset, ensuring sustainable, competitive, and circular economic growth.

4.10. DEBUNKING THE PERCEPTION OF SAFETY IN BOTTLED WATER IN INDIA

Context:

- In contemporary India, **packaged drinking water** has transitioned from an **occasional luxury to an indispensable everyday commodity**. This shift is primarily driven by a **systemic decline** in **public trust** regarding **municipal water supplies** and a prevailing perception that **plastic-sealed water is inherently safer**.
- However, emerging scientific evidence suggests that while **bottled water** may meet **basic microbiological standards**, it introduces a suite of **invisible chemical and physical contaminants** that pose significant long-term risks to human health and ecological stability.

Background: Structural Rise of Bottled Water Consumption

The Indian packaged drinking water market is one of the fastest-growing in the world, projected to expand at a **CAGR of 6.5% (2025–2035)**.

A. Expansion of Packaged Drinking Water Usage

- **Bottled water consumption** has increased due to **urbanisation, ageing public water infrastructure, intermittent municipal supply, and groundwater contamination**.
- Packaged water has become embedded in routine daily consumption across railway stations, offices, hospitals, and restaurants.
- A perception has been reinforced that "sealed" water implies "safe" water, without adequate consideration of invisible contaminants.

B. Institutional and Regulatory Framework

- Regulation is undertaken by the **Food Safety and Standards Authority of India (FSSAI)** under the Food Safety and Standards Act, 2006.
- Technical specifications are prescribed by the **Bureau of Indian Standards (BIS)**.
- Regulatory emphasis has historically focused on:
  - **Microbial contamination control**.
  - Specified heavy metals and chemical residues.
- However, standards do not currently mandate routine testing or limits for **microplastics and nanoplastics**, revealing an evolving regulatory gap.

Microplastics: The Invisible Threat

Microplastics (less than 5 millimetres) and their even smaller counterparts, **nanoplastics (<1 micrometer**), represent a new frontier of environmental and health challenges.

- **Pervasiveness in Indian Markets:** Research conducted in major Indian hubs like **Nagpur, Mumbai, and coastal Andhra Pradesh** has detected microplastics in **100% of tested samples**, with concentrations ranging from **72 to 212 particles per litre**.
- **Quality Control Disparity:** Studies indicate that locally bottled water frequently contains higher plastic concentrations than national brands, highlighting critical gaps in bottling hygiene and quality control.
- **The Nanoplastic "Barrier Breach": Nanoplastics** are particularly dangerous as they can cross **biological barriers** (cell membranes, blood-brain barrier, and placenta), entering the human circulatory system and vital organs.
- **Pathophysiological Impact:** These particles trigger **oxidative stress**, **chronic inflammation,** and **cellular damage**. Furthermore, they act as **"Trojan Horses"** by absorbing and transporting heavy metals and pathogens into the body..
- **Chemical Leaching Agents:** Common plasticizers like **Phthalates, Bisphenol A (BPA), and Antimony** (**used in PET production**) can migrate from the bottle into the water.
- **Environmental Triggers:** Exposure to **direct sunlight (UV radiation)** and the high ambient temperatures of Indian summers accelerate the chemical breakdown of plastic, increasing leaching rates.
- **Chronic Toxicity:** Unlike **acute bacterial poisoning**, chemical leaching causes **cumulative toxicity**. Many leached chemicals are known **endocrine disruptors**, which can interfere with hormonal signaling and lead to reproductive or developmental issues over time.

- **Regulatory Blindspot:** Current standards typically test for chemicals in isolation under controlled settings, failing to account for the **"cocktail effect"** of multiple chemicals interacting with microplastics over long durations.

Key Issues and Challenges in the Packaged Water Industry

The packaged water sector in India grapples with profound sustainability and health challenges, exacerbating groundwater stress, environmental degradation, and consumer vulnerabilities.

- **Groundwater Overexploitation**: The industry heavily depends on aquifers already under severe strain, with **minimal investments in recharge mechanisms** like **rainwater harvesting or artificial replenishment**. This intensifies water scarcity in regions like Punjab and Rajasthan, where extraction rates exceed sustainable yields.
- **Mineral Depletion Risks**: Processes such as **Reverse Osmosis (RO) filtration** remove vital minerals like **calcium and magnesium**, potentially leading to deficiencies and long-term cardiovascular issues, as evidenced by WHO concerns over demineralized water.
- **Environmental Footprint**: Single-use PET bottles fuel India's plastic waste crisis, where **less than 13%** undergoes effective recycling. The remainder fragments into microplastics, infiltrating soil, rivers, and food chains, amplifying ecological harm.
- **Information Asymmetry**: Consumers struggle to differentiate "**Natural Mineral Water**" (sourced from protected springs with stringent standards) from "**Packaged Drinking Water**" (**often purified municipal supplies**), undermining informed choices amid opaque labeling.

The Regulatory Landscape and Critical Gaps

India's regulatory framework for packaged water is currently undergoing a significant transition under the **Food Safety and Standards Authority of India (FSSAI)**.

- **The 2024 Regulatory Shift:** In late 2024, FSSAI removed the mandatory **BIS (Bureau of Indian Standards)** certification requirement to streamline licensing. Bottled water is now classified as a **"High-Risk Food Category"**, requiring **mandatory annual third-party audits.**
- **Testing Limitations (IS 14543):** While the **IS 14543** standard covers minerals, heavy metals, and microbes, it currently **does not include limits or testing protocols** for **microplastics** or **nanoplastics**.
- **Enforcement Deficit:** With thousands of **small-scale units, state-level monitoring** (as seen in **Karnataka surveys**) reveals frequent contamination by **pesticide residues** and **fluoride**, highlighting a gap between regulation and ground-level compliance.

Government Initiatives for Safe Water and Plastic Management

1. **Infrastructure and Access: Jal Jeevan Mission (JJM)**

   Launched in 2019, the mission aims to provide **Functional Household Tap Connections (FHTC)** to every rural household by 2024 (now extended with revised targets for 2026).

   - **Progress as of 2026:** Out of 19.36 crore rural households, over **15.8 crore (81.6%)** have been provided with tap water supply.
   - **Water Quality Monitoring:** The mission has established over **2,800 Water Quality Testing Laboratories** and trained over **24 lakh women** at the village level to use **Field Testing Kits (FTKs)** for regular surveillance.
   - **Source Sustainability:** Integrates mandatory groundwater recharge, rainwater harvesting, and greywater management to ensure the long-term viability of water sources.

2. Urban Water Security: AMRUT 2.0

The **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0** focuses on making cities "water secure."

- **Universal Coverage:** Aims for 100% water supply coverage in all **4,700+ statutory towns**.
- **Circular Economy of Water:** Focuses on the rejuvenation of water bodies and the recycling/reuse of treated used water to reduce the burden on fresh groundwater.
- **Technological Integration:** Promotes "**Pey Jal Survekshan"** to foster healthy competition among cities regarding water quality and conservation.

3. Regulatory Reforms: FSSAI's New Testing Scheme (2026)

Following the removal of mandatory BIS certification in late 2024, the **FSSAI** introduced a new, more stringent oversight mechanism.

- **High-Risk Classification:** Packaged water is now a **"High-Risk"** food category, mandating **third-party audits** and stricter compliance.
- **Compulsory Testing Scheme (Effective Jan 1, 2026):** Manufacturers must now conduct **monthly microbiological tests** and **quarterly chemical tests** (for heavy metals, minerals, and radioactive residues) through NABL-accredited labs.
- **Outcome-Based Regulation:** Shifts accountability directly to the Food Business Operators (FBOs), requiring them to maintain inspection-ready digital records for five years.

4. Addressing Microplastics: Plastic Waste Management Rules

The **Plastic Waste Management (Amendment) Rules (2024 & 2025)** have evolved to specifically target microplastic pollution.

- **Definition of Microplastics:** For the first time, the 2024 rules defined microplastics as any solid plastic particle (1 micron to 1,000 microns) that is insoluble in water.
- **Extended Producer Responsibility (EPR):** Producers and brand owners are legally responsible for the collection and recycling of the plastic packaging they introduce to the market.
- **Digital Traceability (2025):** Mandatory **QR codes or barcodes** on all plastic packaging to enable real-time tracking from production to disposal, reducing leakages into water bodies.
- **Ban on Single-Use Plastic (SUP):** A continued nationwide ban on low-utility, high-littering plastic items to prevent their fragmentation into secondary microplastics.

Way Forward: A Multi-Pronged Strategy

Addressing this "silent crisis" demands integrated policy reforms, technological innovation, and behavioral shifts, aligning with India's sustainable development goals.

- **Update Safety Standards**: Mandate FSSAI protocols for routine testing of microplastics, plasticizers (**e.g., phthalates**), and heavy metals, with real-time public dashboards for transparency.
- **Strengthen Municipal Supply**: Restore faith in tap water via initiatives like **Jal Jeevan Mission**, emphasizing infrastructure upgrades, third-party audits, and apps for quality disclosures to reduce packaged water reliance.
- **Promote Sustainable Alternatives**: Incentivize household point-of-use filters (e**.g., UF+UV systems**) and reusable containers like glass or stainless steel through subsidies and awareness campaigns.

- **Foster Circular Economy**: Rigorous enforcement of **Extended Producer Responsibility** (**EPR**) under the **Plastic Waste Management Rules,** 2022, to achieve 100% PET bottle collection, sorting, and high-grade recycling.

Conclusion

The reliance on bottled water in India is a complex symptom of a public utility deficit. While it provides a **temporary solution** for water access, the hidden costs—ranging from microplastic ingestion to groundwater depletion—suggest that the current model is unsustainable. For India to achieve **Sustainable Development Goal 6 (Clean Water and Sanitation)**, the focus must shift from **commercial convenience to a transparent, scientifically-backed regulatory framework** that prioritizes the long-term health of both the citizens and the environment.

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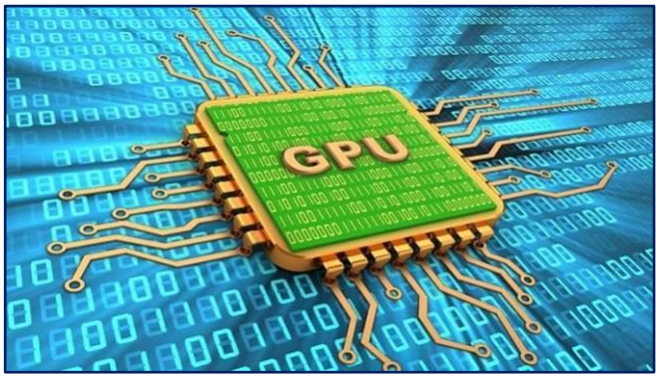
SCIENCE & TECHNOLOGY

5.1. INDIA TO TRIPLE SOVEREIGN GPU CAPACITY



Context: Recently, during the **IndiaAI Impact Summit** in New Delhi, the Government of India announced plans to triple the country's sovereign GPU capacity to **100,000 units** by the end of the year. This initiative, part of the **₹10,372-crore IndiaAI Mission**, aims to provide subsidized high-performance computing to startups and researchers, reducing India's dependence on global technology giants like Nvidia while fostering a domestic ecosystem for Large Language Models (LLMs) and deep learning.

1. **Architectural Philosophy: Serial vs. Parallel**
    - **Central Processing Unit (CPU):** It is designed as a "General Purpose" processor that excels at **Sequential (Serial) Processing**. It contains a few powerful cores (typically 4 to 64) optimized for low-latency, complex logical branching, and system management.
    - **Graphics Processing Unit (GPU):** It is a "Specialized" processor designed for **Parallel Processing**. It houses thousands of smaller, more efficient cores that can handle multiple independent tasks simultaneously.
2. **How a GPU Works: The Technical Mechanism**
    - **SIMD Architecture:** GPUs operate on the **Single Instruction, Multiple Data (SIMD)** principle, where a single command is executed across thousands of data points (pixels or parameters) at once.
    - **The Rendering Pipeline:** For visual tasks, GPUs use a four-step process:
    - **Vertex Processing:** Calculating 3D positions using matrix mathematics.
    - **Rasterization:** Converting geometric shapes into a grid of pixels.
    - **Shading:** Determining color, light, and texture for each pixel.
    - **Output:** Writing the final frame to the **Video RAM (VRAM)**.
    - **AI Transformation:** In AI training, the GPU skips the visual steps and uses its cores for **Matrix Multiplication**, which is the mathematical foundation of neural networks.
3. **Key Internal Components**
    - **Cores:** Standard units like **CUDA Cores** (Nvidia) or **Stream Processors** (AMD) handle general math. Specialized **Tensor Cores** are designed specifically for the "deep learning" math required by AI.
    - **VRAM (Video RAM):** Unlike system RAM, VRAM (e.g., GDDR6X or HBM3) has massive **bandwidth**, allowing it to feed huge amounts of data to the thousands of cores without creating a bottleneck.
    - **Thermal Design:** High-end GPUs in 2026 consume over **1000W** of power, necessitating advanced liquid cooling systems in modern data centers.

4. **Strategic Modern Applications**
    - **Artificial Intelligence:** Training Large Language Models (LLMs) and running real-time "inference" for chatbots and autonomous vehicles.
    - **Cryptocurrency:** Performing "Proof of Work" (PoW) hashing at high speeds (though being phased out by some blockchains like Ethereum).
    - **Scientific Simulation:** Modeling climate change, molecular dynamics for drug discovery, and genomic sequencing.
    - **Digital Twins:** Creating real-time virtual replicas of factories or cities for industrial optimization.

5.2. INDIA ENTERS RARE EARTH MAGNET PRODUCTION

Context:

Recently, on February 19, 2026, Union Minister for Mines G. Kishan Reddy announced that India is set to commence domestic production of **Rare Earth Permanent Magnets (REPMs)** by the end of this year.

This move follows the Union Cabinet's earlier approval of a **₹7,280-crore scheme** aimed at establishing an integrated manufacturing ecosystem to reduce the country's near-total (100%) dependence on imports, particularly from China, which currently controls over 90% of the global processing and manufacturing capacity for these critical components.

1. **What are Rare Earth Magnets?**
    - **Definition:** These are powerful permanent magnets made from alloys of **Rare Earth Elements (REEs)**—a group of 17 metallic elements (15 lanthanides plus scandium and yttrium).
    - **Properties:** They are known for having extremely high magnetic strength (energy density) and high coercivity (resistance to being demagnetized) compared to traditional magnets.
    - **Vulnerability:** While physically strong in magnetic terms, they are often brittle and highly susceptible to corrosion, which is why they are typically coated with protective layers like **Nickel-Copper-Nickel plating**.
2. **Two Primary Types Rare Earth Magnets:**
    - **Neodymium Magnets (NdFeB):** Composed of Neodymium, Iron, and Boron. They are the strongest type of permanent magnet commercially available and are essential for electric vehicle (EV) motors.
    - **Samarium-Cobalt Magnets (SmCo):** These were the first rare earth magnets developed. Although slightly weaker than neodymium magnets, they have a higher **Curie temperature** (can operate at up to 700°C) and superior resistance to oxidation, making them vital for aerospace and missile systems.
3. **Strategic Importance for India**
    - **Clean Energy:** They are indispensable for the "direct drive" generators in wind turbines and traction motors in Electric Vehicles.
    - **Defence:** Used in precision-guided munitions, drones, radar systems, and communication equipment.

- **Economic Security:** India possesses the world's **5th largest reserves** of rare earths (approx. 6.9 million tonnes), yet it currently imports almost all its finished magnets.
- **China Factor:** China's recent export restrictions on rare earth technology and minerals have created a "supply chain squeeze," necessitating India's push for "Atmanirbharta" (self-reliance).

4. **The Rare Earth Magnet Scheme (2025-26)**

- **Outlay:** ₹7,280 crore over a 7-year period.
- **Target:** To create a domestic capacity of **6,000 Metric Tonnes Per Annum (MTPA)**.
- **Focus:** Integrated manufacturing that covers the entire value chain: **Rare Earth Oxides → Metals → Alloys → Finished Sintered Magnets**.
- **Incentives:** Includes ₹6,450 crore as sales-linked incentives and ₹750 crore as capital subsidies.

5.3. SCALING UP BIO-BASED CHEMICALS IN INDIA

Context: Recent policy deliberations and government strategies have emphasized the need to scale up **bio-based manufacturing** as a key component of **India's bio-economy** agenda, with the objective of reducing dependence on **fossil-fuel-derived chemicals** and advancing environmentally sustainable industrial development.

1. **Core Concepts: Definitions & Applications**

- **Bio-based Chemicals:** These are chemicals **made from renewable biological sources** or feedstocks like (e.g., sugarcane, corn, starch, biomass residues). They are produced mainly through fermentation or biological processing and are considered environmentally friendly.
  - **Examples:** Organic acids (lactic acid), **bio-alcohols**, solvents, surfactants, and intermediates for plastics, cosmetics, and pharmaceuticals.
- **Enzymes:** Enzymes are **natural biological catalysts** that speed up **chemical reactions**.
  - **Environmental Benefit:** They function at **lower temperatures and pressures**, significantly **reducing energy consumption** and emissions compared to traditional methods.

2. **India's Strategic Position and Policy**

- **Policy Framework:** India has designated bio-based chemicals and enzymes as a priority area under the **Department of Biotechnology's BioE3 policy**.
- **Economic Drivers:** Scaling this sector aims to reduce import dependence on petrochemicals (e.g., India imported approximately **$479.8 million** worth of acetic acid in 2023) and create new markets for agricultural produce.

About BioE3 Policy

- The Government of India has introduced (in 2024-25 budget) the BIO-E3 Policy to accelerate the growth of the country's **bio-economy** by promoting **bio-based innovation**, **entrepreneurship**, and **environmentally sustainable manufacturing**.
- **Aims and objective**: It aims to achieve a **$300 billion bioeconomy by 2030**, utilizing AI, biofoundries, and hubs to drive innovation in climate-resilient agriculture, precision biotherapeutics, and green chemicals.

- **Strategic Sectors**: The policy focuses on six thematic areas, including high-value **bio-based chemicals and enzymes**, smart proteins**, precision biotherapeutics**, carbon capture & utilization, climate resilient agriculture, and futuristic marine and space research.
- **Policy Impact and Goals:** It supports India's commitment to net-zero carbon emissions by 2070 and Viksit Bharat @2047.

3. Global Perspectives: International Strategies

Region/ Country	Key Strategy/ Program	Focus Area
European Union (EU)	Bioeconomy Strategy and Action Plan	Coordinated support linking industrial transformation to climate goals and waste reduction.
United States (U.S.)	USDA BioPreferred Program	Mandates federal procurement preference for certified bio-based products to create early markets.
China	Bioeconomy Development Plans	Explicitly prioritizes high-value bio-based chemicals and enzyme technologies as strategic sectors.
Japan	METI/NARO Projects	Integrates bio-based chemical research with manufacturing readiness.

4. Challenges and Risks to Scale-up

- **Cost Disadvantage:** High comparative cost of bio-based products relative to established petrochemical alternatives creates a significant entry barrier for private investment.
- **Resource Availability:** Issues regarding the availability of reliable feedstocks and the supporting infrastructure required for large-scale production.
- **Market Adoption:** Challenges in seamlessly substituting existing inputs in manufacturing pipelines and the willingness of downstream manufacturers to switch.

5.4. ISRO LAUNCH VEHICLE DEBRIS FOUND IN MALDIVES

Context: Recently, debris carrying the logo of ISRO and India's National Emblem was discovered on an uninhabited island of the Maldives. The debris is believed to have originated from India's heavy-lift launch vehicle **LVM-3**, highlighting issues related to space missions and debris management.

1. Technical Identification

- **Launch Vehicle Mark-3 (LVM3)**: The debris-specifically a **payload fairing (PLF)**—is believed to be from ISRO's **heaviest rocket**, the LVM3.
- **Mission Links**: The debris likely originated from the **LVM3-M6/BlueBird Block-2 Mission** launched in December 2025 or the **CMS-03 communication satellite** launch in November 2025.
- **Rocket Configuration:** The **LVM3 is a three-stage vehicle** comprising two solid strap-on motors, a liquid core stage, and a cryogenic upper stage.

2. Different types of launch vehicles

Launchers or Launch Vehicles are used to carry spacecraft to space. India has three active operational launch vehicles: Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV), Geosynchronous Satellite Launch Vehicle Mk-III (LVM3).

I. PSLV (Polar Satellite Launch Vehicle)

- It is the Indian Space Research Organisation's (ISRO) reliable third-generation, 4-stage "**workhorse"** launch vehicle, first successful in 1994
- Has **four variants** based on strap-on boosters: 6, 4, 2, and Core-Alone.
- Used for launching:
  - Earth Observation satellites
  - Navigation satellites
- **Key Missions:** Successfully launched India's first space observatory, Astrosat, Chandrayaan-1 in 2008, and Mangalyaan in 2013.

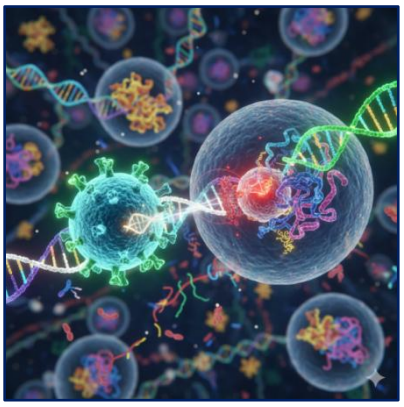
II. GSLV (Geosynchronous Satellite Launch Vehicle)

- It is a **three-stage**, 49–52m tall, 420-tonne rocket developed by ISRO to launch heavy communication satellites (up to ~2.5 tonnes) into **Geostationary Transfer Orbit (GTO).**
- Uses **indigenous Cryogenic Upper Stage**.
- **Key missions** include launching NavIC navigation satellites (NVS-01, NVS-02)

III. Launch Vehicle Mark III (LVM-III)

- The Launch Vehicle Mark III (LVM3), formerly known as **GSLV Mk III**, is ISRO's **most powerful**, **three-stage** medium-lift launch vehicle designed for heavy satellite deployment.
- **Key Missions:** LVM3 successfully launched the Chandrayaan-2 and Chandrayaan-3 missions.
- Can launch:
  - **4-tonne satellites to Geostationary Transfer Orbit (GTO).**
  - **10-tonne payloads to Lower Earth Orbit (LEO)**
- Selected for **Gaganyaan Human Space Mission**.

5.5. PERT STRATEGY IN GENETIC THERAPY



Context: Genetic disorders often stem from small errors in the DNA sequence, such as **nonsense mutations**, which account for approximately **one-quarter of all known disease-causing genetic changes**. These mutations insert a premature "stop signal" in the DNA, causing protein production to end too early and leaving the body without essential functional proteins. Traditionally, each disorder required a unique, expensive, and slow-to-develop therapy.

1. The PERT Strategy: A Unified Approach

Researchers from the Broad Institute, Harvard, and the University of Minnesota have developed a single genome-editing strategy called **Prime-Editing-mediated Readthrough of premature Termination codons (PERT)**.

- **Mechanism**: PERT "reprogrammes" one of the cell's own genes into a tool that overrides premature stop signals, allowing the cell to ignore the faulty instruction and complete the protein.

- **Gene Repurposing**: The technique utilizes **tRNA (transfer RNA)** genes. Human cells contain 448 tRNA genes, many of which are redundant.
  - tRNA act as critical adaptor molecules in translation by carrying specific amino acids to the ribosome and matching them to corresponding codons on the mRNA.
- **The "Suppressor tRNA"**: Using **prime editing**, researchers converted a non-essential natural tRNA gene into a **suppressor tRNA**—a molecule that reads through premature stop signals and inserts an amino acid where there should have been a "stop".

2. Key Components and Innovation

- **Prime Editing (The Tool)**: This precise genome-editing approach uses a specialized molecule called a **prime-editing guide RNA (pegRNA)** to lead the editing machinery to the exact spot on the DNA.
  - **Prime-editing guide RNA (pegRNA)** is a specially engineered RNA used in **prime editing**, a precise CRISPR-based genome editing method.
  - It combines the roles of a **guide RNA** (like in CRISPR-Cas9) and a **template for reverse transcription** to introduce specific edits without making double-strand breaks.
- **Selection Process**: Researchers identified four specific tRNAs- leucine, arginine, tyrosine, and serine—that showed the most promise for therapeutic use.
- **Efficiency**: In cultured human cells, this combination achieved **60-80% editing efficiency**, which is significantly higher than the standard **10-20% efficiency** of traditional precision gene insertion methods like **homology-directed repair**.

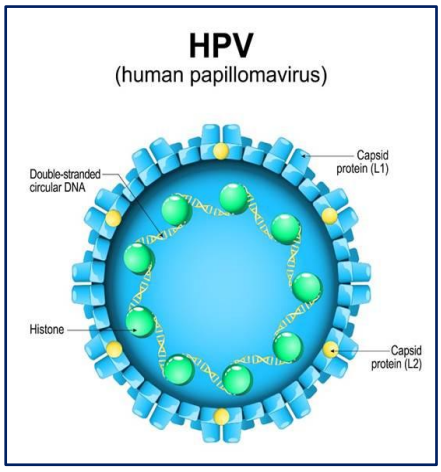
3. Experimental Success and Results

The PERT strategy was tested on models of several rare diseases caused by **nonsense mutations**:

- **Hurler Syndrome**: Restored 1.7-7% of normal enzyme activity in the brain, heart, and liver, which is known to meaningfully reduce disease severity.
- **Tay-Sachs & Batten Disease**: Enzyme activity rose to **17-70% of normal levels** in these models.
- **Niemann-Pick C1**: Cells produced measurable amounts of the full-length NPC1 protein, which is otherwise entirely absent in these patients.

5.6. HPV VACCINATION CAMPAIGN

Context: Recently, the Union Ministry of Health and Family Welfare announced the launch of a nationwide, free Human Papillomavirus (HPV) vaccination campaign targeting adolescent girls aged **14 years** to combat cervical cancer. The government will initially utilize the quadrivalent **Gardasil** vaccine, secured through a partnership with **Gavi, the Vaccine Alliance**, and will track the rollout via the digital **U-WIN** platform.



1. Understanding Human Papilloma virus (HPV)

- **Definition:** HPV is a group of more than 200 related viruses, primarily transmitted through skin-to-skin or sexual contact.
- **Disease Burden:** While most infections are cleared by the immune system, persistent infection with "high-risk" types leads to cancers.

- **High-Risk Strains: HPV types 16 and 18** are responsible for nearly 70-80% of cervical cancer cases globally and in India.
- **Other Conditions:** Low-risk types like **HPV 6 and 11** cause genital warts and respiratory papillomatosis but are rarely oncogenic.

2. National HPV Vaccination Drive (2026)

- **Target Group:** The campaign specifically targets girls aged **14 years** to provide maximum preventive benefit before potential exposure to the virus.
- **Implementation:** The vaccination is **voluntary and free of cost** at government facilities, including Ayushman Arogya Mandirs (Health and Wellness Centers).
- **The Single-Dose Regimen:** Based on recommendations from the **National Technical Advisory Group on Immunisation (NTAGI)** and the WHO, India has adopted a single-dose schedule, which scientific evidence shows provides robust and durable protection.
- **Tracking:** The **U-WIN digital platform** (modeled after Co-WIN) will be used to register beneficiaries and track vaccination events.

3. Types of HPV Vaccines

Vaccine	Type	Strains Covered	Developer/Manufacturer
CERVAVAC	Quadrivalent	6, 11, 16, 18	**Serum Institute of India (SII)**
Gardasil	Quadrivalent	6, 11, 16, 18	MSD (Merck & Co.)
Gardasil 9	Nonavalent	6, 11, 16, 18, 31, 33, 45, 52, 58	MSD (Merck & Co.)
Cervarix	Bivalent	16, 18	GSK

- **Note: CERVAVAC** is India's first indigenous quadrivalent HPV vaccine, developed through a partnership between SII and the Department of Biotechnology (DBT).

4. WHO "90-70-90" Targets by 2030

India is aligning its health goals with the WHO Global Strategy to eliminate cervical cancer:

1. **90%** of girls fully vaccinated with the HPV vaccine by age 15.
2. **70%** of women screened with a high-performance test by age 35 and again by 45.
3. **90%** of women identified with cervical disease receive treatment.

5.7. INS ANJADIP COMMISSIONED BY INDIAN NAVY

Context: Recently, the Indian Navy formally commissioned **INS Anjadip**, the fourth indigenously built **Anti-Submarine Warfare Shallow Water Crafts (ASW-SWC)**, at the Chennai Port. This vessel is designed specifically to detect and neutralize underwater threats in the littoral (shallow) waters of the Indian Ocean Region, marking a major milestone in India's quest for **Aatmanirbharta** (self-reliance) in defense manufacturing.

Classification of Naval Ships in India

The Indian Navy operates a diverse fleet designed for "Blue Water" (deep sea) and "Brown Water" (coastal) operations.

1. **Aircraft Carriers (The Capital Ships)**

   These are seagoing airbases that allow a nation to project power far beyond its shores.

   - **Role:** Command and control of the fleet, providing air cover, and conducting long-range strikes.
   - **Examples:**
   - **INS Vikramaditya:** A modified Kiev-class carrier of Russian origin.
   - **INS Vikrant:** India's first indigenous aircraft carrier (IAC-1).

2. **Destroyers (The Frontline Escorts)**

   Large, fast, and heavily armed with missiles to protect the fleet from surface and air attacks.

   - **Role:** Escorting larger vessels (like carriers), offensive anti-surface warfare, and area air defense.
   - **Examples:**
   - **Visakhapatnam Class (Project 15B):** Most advanced stealth destroyers (e.g., **INS Visakhapatnam**, **INS Mormugao**).
   - **Kolkata Class (Project 15A):** Features advanced AESA radars and BrahMos missiles (e.g., **INS Chennai**).
   - **Rajput Class:** Older Soviet-era destroyers primarily used for escort duties.

3. **Frigates (Multi-Role Workhorses)**

   Slightly smaller than destroyers, they are optimized for versatility in anti-submarine and air-defense roles.

   - **Role:** General-purpose combat, protecting merchant convoys, and specialized anti-submarine warfare.
   - **Examples:**
   - **Nilgiri Class (Project 17A):** Next-gen stealth frigates (e.g., **INS Himgiri**, **INS Udaygiri**).
   - **Shivalik Class (Project 17):** India's first stealth frigates (e.g., **INS Satpura**).
   - **Talwar Class:** Multi-role stealth frigates used for long-range patrols.

4. **Corvettes (Coastal Guardians)**

   Small, maneuverable warships for coastal defense. **INS Anjadip** is a specialized variant of this class.

   - **Role:** Coastal surveillance, shallow-water anti-submarine warfare, and search and rescue (SAR).
   - **Examples:**
   - **Kamorta Class:** Specialized ASW stealth corvettes (e.g., **INS Kiltan**).
   - **Arnala Class (ASW-SWC):** The new "Shallow Water" specialists, including **INS Arnala** and **INS Anjadip**.
   - **Kora & Khukri Classes:** Primarily focused on surface-to-surface missile warfare.

5. **Submarines (The Silent Killers)**

   - **Nuclear-Powered (SSBN/SSN):**
   - **Role:** Strategic deterrence (second-strike capability) and long-endurance underwater combat.
   - **Examples: INS Arihant**, **INS Arighaat**.
   - **Conventional (SSK):**
   - **Role:** Infiltrating enemy waters and destroying surface ships and submarines.
   - **Examples: Kalvari Class** (Scorpene design), **Sindhughosh Class** (Kilo-class).

6. Amphibious Warfare & Support Ships

- **Role:** Transporting troops/tanks for beach landings and providing fuel/supplies to the fleet.
- **Examples: INS Jalashwa** (Amphibious Transport Dock), **INS Deepak** (Fleet Tanker), and **INS Nistar** (Diving Support Vessel).

INS Anjadip: The "Dolphin Hunter"

Technical & Strategic Details

- Role: Known as the "Dolphin Hunter," it is optimized for the detection and neutralization of enemy submarines in shallow, coastal waters where larger ships struggle to operate.
- Propulsion: Utilizes a high-speed Water-Jet Propulsion system, enabling a top speed of 25 knots.
- Sensors: Equipped with the indigenous Sonar Abhay and sophisticated combat management systems.
- Construction: Built by Garden Reach Shipbuilders & Engineers (GRSE) in collaboration with L&T Shipyard, utilizing high-grade steel from SAIL.

5.8. EXERCISE MILAN 2026

Context:

Recently, the 13th edition of **Exercise MILAN 2026** concluded off the coast of Visakhapatnam, marking a historic milestone as one of the largest multilateral naval engagements in the Indo-Pacific. The exercise culminated on February 25, 2026, with a grand closing ceremony held onboard India's indigenous aircraft carrier, **INS Vikrant**. The event gained further international attention following the tragic sinking of the Iranian frigate **IRIS Dena** in the Indian Ocean while it was returning from participating in this exercise and the concurrent International Fleet Review (IFR) 2026.

1. Overview and Evolution

- **Nature:** It is a **biennial** (held every two years) multilateral naval exercise hosted by the **Indian Navy**.
- **Inception:** The exercise was first launched in **1995** at the Andaman and Nicobar Command.
- **Expansion:** It began with just four foreign navies—**Indonesia, Singapore, Sri Lanka, and Thailand**. Over the decades, it has grown exponentially, transitioning from a regional gathering to a global maritime platform.
- **Shift in Venue:** Traditionally held at Port Blair, the exercise shifted to **Visakhapatnam** (Eastern Naval Command) starting from the 2022 edition to accommodate the increasing scale and complexity of participating assets.

2. Objectives and Theme

- **Theme:** The overarching theme is '**Camaraderie, Cohesion, Collaboration**'.
- **Aims:**
  - To enhance professional interaction between friendly foreign navies.
  - To foster interoperability and share best practices in maritime operations.
  - To project India as a '**Preferred Security Partner**' and a responsible maritime power.

- To ensure a free, open, and inclusive Indo-Pacific based on a rules-based international order.

3. Highlights of MILAN 2026

- **Participants:** Over **70 countries** participated, making it the most inclusive edition to date.
- **New Entrants:** For the first time, countries like **Germany, the Philippines, and the United Arab Emirates (UAE)** participated with military assets.

4. Policy Alignment

Exercise MILAN serves as a practical manifestation of several Indian foreign policy and maritime initiatives:

- **Act East Policy:** Strengthening ties with Southeast and East Asian nations.
- **SAGAR (Security and Growth for All in the Region):** India's vision for cooperative maritime security in the Indian Ocean.
- **MAHASAGAR:** An initiative for collective maritime approach in the IOR.

5. Other Major Military Exercises

To excel in the Prelims, it is essential to distinguish between different types of exercises. Below are the most important ones involving India:

I. Multilateral Naval Exercises

Exercise Name	Participants	Strategic Importance
MALABAR	India, USA, Japan, Australia	Primarily a **Quad** engagement focusing on a free and open Indo-Pacific.
RIMPAC	25+ Nations (led by USA)	World's largest international maritime exercise; India is a regular participant.
La Pérouse	India, France, USA, UK, Japan, Australia	Conducted in the Indian Ocean to enhance French-led cooperation in the region.

II. Bilateral Exercises

- **Naval Exercises:**
  - **VARUNA:** With France (Focus: Carrier Battle Group operations).
  - **JIMEX:** With Japan (Focus: Maritime security and ASW).
  - **SIMBEX:** With Singapore (India's longest uninterrupted naval exercise with any foreign country).
  - **KONKAN:** With the United Kingdom (Focus: Surface and sub-surface warfare).
  - **SLINEX:** With Sri Lanka (Focus: Interoperability and anti-piracy).
- **Army Exercises:**
  - **YUDH ABHYAS:** With USA (Focus: Counter-terror and high-altitude warfare).
  - **SHAKTI:** With France (Focus: Semi-desert and counter-terror operations).
  - **DHARMA GUARDIAN:** With Japan (Focus: Jungle and semi-urban warfare).
  - **SURYA KIRAN:** With Nepal (Focus: Mountain warfare and HADR).
- **Air Force Exercises:**
  - **GARUDA:** With France.

- **COPE INDIA:** With USA.
- **DESERT FLAG:** With UAE and other multilateral partners.

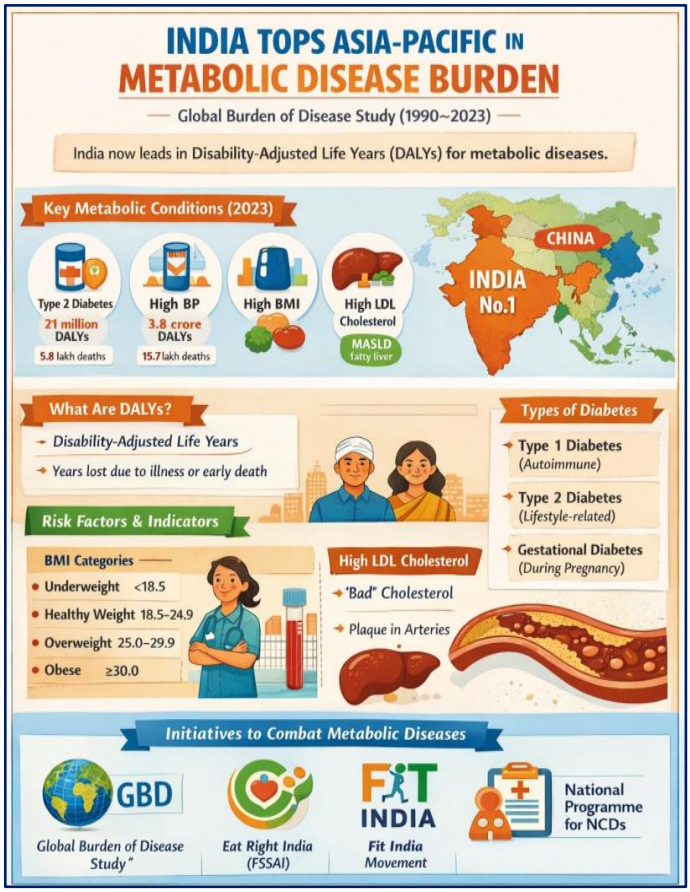
III. Tri-Service Exercises

- **TIGER TRIUMPH:** With USA (Focus: Humanitarian Assistance and Disaster Relief - HADR).
- **INDRA:** With Russia (India's first major tri-service exercise with a foreign nation).
- **TROPEX:** Domestic (The largest theatre-level exercise of the Indian Navy).

5.9. METABOLIC DISEASE

Context:

A recent study published in the journal *Metabolism*, based on the **Global Burden of Disease (GBD) Study (1990-2023)**, highlights that India and China now possess the highest absolute metabolic disease burdens in the Asia-Pacific region.



The report indicates that India has overtaken China in terms of **Disability-Adjusted Life Years (DALYs)** for specific metabolic conditions as of 2023.

1. **Key Findings of the Report**
   - **Major Conditions Tracked**: The study analyzed five specific metabolic diseases and risk factors**: Type 2 diabetes mellitus**, high systolic blood pressure (BP), high body mass index (BMI), **high LDL cholesterol**, and metabolic dysfunction-associated steatotic liver disease (MASLD).
   - **India's 2023 Statistics**:
     - **Type 2 Diabetes**: Accounted for approximately **21 million DALYs** and **5.8 lakh deaths**.
     - **High Systolic BP**: Caused nearly **3.8 crore DALYs** and approximately **15.7 lakh deaths**.
   - **Leading Position**: In terms of DALYs, India replaced China (which held the top spot in 1990) to lead the list of the top 5 countries in the Asia-Pacific region.
   - **Disability-Adjusted Life Year (DALY)**: This is a critical metric used to measure the overall disease burden, expressed as the number of years lost due to ill-health, disability, or early death.
2. **Static Linkages**

   A. Metabolic Diseases

   - **Mechanism**: These diseases occur when the body's normal process of breaking down, storing, or using energy from food is disrupted.

   B. Types of Diabetes

Type 1 Diabetes

- An **autoimmune condition** where the body attacks insulin-producing cells in the pancreas, where the pancreas produces little to no insulin.
- Usually develops in **children or young adults**.
- Requires **lifelong insulin therapy**.

Type 2 Diabetes

- The **most common type**.
- Occurs when the body becomes **resistant to insulin** or does not produce enough insulin.
- Often linked to **lifestyle factors** such as obesity and lack of physical activity.

Gestational Diabetes

- Develops **during pregnancy**.
- Usually disappears after childbirth but **increases the risk of Type 2 diabetes later**.

C. Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD): It involves the buildup of excess fat in the liver not caused by heavy alcohol use. It is often asymptomatic but can progress to inflammation (MASH), cirrhosis, and liver cancer.

3. Indicators and Risk Factors

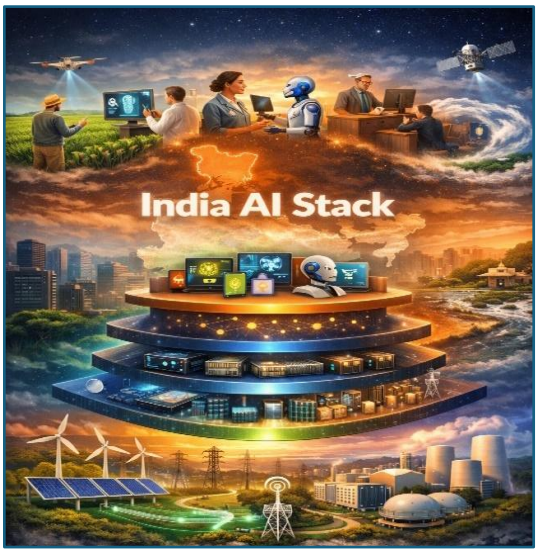
- **BMI (Body Mass Index)**: A measure of body fat based on height and weight. Rising BMI is cited as a steady risk factor in the Indian population.
- **BMI Categories for Adults (Age 20+):**
  - Underweight: Below 18.5
  - Healthy Weight: 18.5 – 24.9
  - Overweight: 25.0 – 29.9
  - Obese: 30.0 or higher
- **LDL (low-density lipoprotein) Cholesterol**: Often termed "bad" cholesterol; LDL carries cholesterol from the Liver to different parts of the body; high levels can lead to a buildup of plaque in arteries.

4. Holistic Overview: Relevant Global & National Frameworks

Initiative	Description
Global Burden of Disease (GBD)	A comprehensive regional and global research program of disease burden.
Eat Right India (FSSAI)	A flagship movement by the Indian government to ensure safe, healthy, and sustainable food.
Fit India Movement	A nation-wide movement to encourage Indians to include physical activity in their lives.
National Programme for NCDs	National program focused on preventing and controlling Non-Communicable Diseases. Funded by the Centre and States (60:40 ratio), with special support (90:10) for Northeastern/hilly states.

5.10. INDIA AI STACK

Context:



India's AI strategy is anchored in **AI for Humanity**, aiming to **democratise access** to artificial intelligence so that benefits are not concentrated among a few firms or countries. The focus is on **population-scale deployment**, integrating AI into **healthcare, agriculture, education, governance, disaster management, and justice delivery**.

What is the AI Stack?

The **AI Stack** refers to the **complete, end-to-end ecosystem of technologies, infrastructure, and systems** that work together to **build, train, deploy, and scale Artificial Intelligence applications** in the real world. An **AI stack** is an integrated system of **five interlinked layers** that together enable AI to move from experimentation to real-world impact:

1. Application Layer
2. AI Model Layer
3. Compute Layer
4. Data Centres & Network Infrastructure Layer
5. Energy Layer

The 5 Layers of the AI Stack

1. **The Application Layer (The "Face")-** This is what the end-user interacts with. It translates complex code into user-friendly services.
    - **High-Impact Adoption in India**
        - **Agriculture:** AI advisories improving sowing, yield, and input efficiency; **30–50% productivity gains** reported in states like **Andhra Pradesh** & **Maharashtra.**
        - **Healthcare:** Early detection of **TB, cancer, neurological disorders**, strengthening preventive care.
        - **Education:** AI integrated via **NEP 2020**, CBSE curricula, DIKSHA, YUVAi for future-ready skills.
        - **Justice Delivery: e-Courts Phase III** uses AI/ML for translation, scheduling, and case management with vernacular access.
        - **Weather & Disaster Management: India Meteorological Department** uses AI for rainfall, cyclone, lightning forecasting; **Mausam GPT** aids farmers and disaster response
2. **The AI Model Layer (The "Brain")-** This layer consists of algorithms trained on data to recognize patterns and make decisions.
    - **India's Focus:** Developing indigenous models like **BharatGen** and **Bhashini** (for Indian languages) to ensure "sovereign" AI that understands local contexts.
3. **The Compute Layer (The "Muscle")-** This provides the raw processing power (GPUs and TPUs) required to train and run the "Brain."
    - **Key Fact:** The **IndiaAI** Compute Portal provides high-end processing at **subsidized rates (under ₹100/hour)**, making it affordable for startups to compete globally.
4. **Data Centres & Network Layer (The "Highways")-** This is the physical infrastructure—the fiber cables and server warehouses—where AI is stored and transmitted.

- **Status:** India holds **~3% of global data centre capacity** (~960 MW); India's 5G network now covers **99.9% of districts**, and data center capacity is projected to grow to **9.2 GW by 2030**.
- Major hubs: **Mumbai–Navi Mumbai (25%)**, Bengaluru, Hyderabad, Chennai, Delhi NCR, Pune, Kolkata.

5. **The Energy Layer (The "Fuel")-** AI is power-hungry. This layer ensures a steady, sustainable electricity supply to keep the servers running.
   - **Sustainability:** Over **51%** of India's power capacity now comes from non-fossil fuel sources, ensuring AI growth doesn't come at a massive environmental cost.
   - Future plans:
     - **100 GW nuclear by 2047**
     - **57 GW pumped storage by 2031–32**
     - **43,220 MWh battery storage**

Significance of the India AI Stack Mission

1. **Democratisation of AI-** Makes AI accessible beyond big tech by providing shared compute, datasets, and models. Example- IndiaAI Compute Portal offers 38,000 GPUs + 1,050 TPUs at < ₹100/hour,
2. **Population-Scale Public Service Delivery-** Enables AI deployment across **agriculture, healthcare, education, justice, and disaster management**. **Example: e-Courts Phase III** uses AI for translation and case management, improving access in Indian languages.
3. **Sovereign & India-Centric AI Models-** Reduces dependence on foreign AI models and aligns AI with **Indian languages, laws, and socio-economic needs**. Example- **12 indigenous AI models** under the **IndiaAI Mission**;
4. **Boost to Startups & Innovation Ecosystem-** Lowers entry barriers through **subsidised compute (up to 25%)**, open datasets, and shared infrastructure.
5. **Technological Self-Reliance (Atmanirbhar Bharat)-** Integrates AI with **semiconductor manufacturing, chip design, and supercomputing**. Example- **40+ petaflops** under the National Supercomputing Mission (PARAM Siddhi-AI, AIRAWAT).
6. **Cost-Efficient & Scalable AI Growth-** Shared infrastructure avoids duplication and reduces national AI costs.
7. **Inclusive Digital Governance-** Supports **vernacular, citizen-centric AI services**, strengthening transparency and trust.
8. **Sustainable AI Development-** Aligns AI expansion with **clean and reliable energy**. Example- India has crossed **509 GW installed power capacity.**

Challenges the India AI Stack Mission

1. **Hardware Monopoly:** Despite the IndiaAI Mission, India remains heavily dependent on foreign-designed chips (NVIDIA/Google). Domestic initiatives like SHAKTI are still in early stages compared to global benchmarks.
2. **High Capital Expenditure:** Maintaining a GPU cluster is incredibly expensive; keeping costs under ₹100/hour requires massive, sustained government subsidies.
3. **Fragmented Data:** While **IndiaAIKosh** hosts thousands of datasets, much of India's public sector data remains siloed, unorganized, or in non-digital formats.
4. **Privacy Concerns:** Scaling AI in healthcare and justice requires a delicate balance between "data democratization" and protecting the sensitive personal information of citizens.

5. **Skill Shortage:** There is a significant gap between the demand for high-level AI researchers and the current supply. Many of India's top AI talents are recruited by global tech giants abroad rather than domestic startups.
6. **Cooling & Power:** AI data centers are "energy vampires." Even with 51% renewable energy, the sheer volume of water required for cooling and the 24/7 "always-on" power demand pose a challenge to local grids and sustainability goals.
7. **Algorithmic Bias:** If models are trained on historical data that contains social biases (caste, gender, or regional), the "AI for Humanity" could inadvertently automate discrimination in justice or hiring.

Way Forward

1. **Chip Autonomy:** Fast-track the **India Semiconductor Mission** to transition from chip design to domestic fabrication, reducing reliance on foreign GPU giants.
2. **Edge AI:** Prioritize "Edge Computing" to allow AI to run locally on devices, reducing the burden on central data centers and the energy grid.
3. **Data Standardisation:** Create unified protocols for public sector data to make it "AI-ready" for the **IndiaAIKosh** repository.
4. **Privacy-First Frameworks:** Implement robust "Privacy Enhancing Technologies" (PETs) to allow data sharing for research without compromising individual citizen identity.
5. **AI-Ready Workforce:** Integrate AI literacy into vocational training and higher education beyond just elite institutions (IITs/IISc).
6. **Incentivizing Domestic R&D:** Offer "Innovation Credits" to startups that contribute back to the open-source **BharatGen** or **Bhashini** models.
7. **AI Audits:** Establish independent bodies to audit sovereign AI models for social bias (caste, gender, or linguistic) before population-scale rollout.
8. **Green AI Mandates:** Incentivize data centers that utilize 100% renewable energy or innovative liquid cooling systems to meet sustainability goals.

Conclusion

The **India AI Stack** transcends technology; it is a **digital public infrastructure** designed for 1.4 billion people. By integrating sovereign models with green energy, India is pioneering a **"Human-Centric AI"** model—transforming data into a democratic utility that powers inclusive growth and global technological leadership.

5.11. AMCA AND INDIA'S DEFENCE INDUSTRIAL ECOSYSTEM

Context:

The government is diversifying India's aerospace ecosystem by proposing to award the **AMCA prototype contract** to private players, bypassing HAL. This shift aims to end HAL's monopoly, address production delays, and foster a competitive **private defense industrial complex**.

AMCA as a National Strategic Project

The **Advanced Medium Combat Aircraft (AMCA)** is not merely another fighter programme; it represents:

- India's entry into **5th-generation air combat**
- Mastery over **stealth design, sensor fusion, avionics, AI-assisted warfare**
- Strategic autonomy in **high-end aerospace manufacturing**

Significance of Private Sector Participation in Fighter Aircraft Development

1. **Breaking the Public Sector Monopoly**

   The most immediate significance is the creation of a **Second Aircraft Manufacturing Line**.

   - **Commercial Discipline:** Introducing private players like Tata, L&T, or Bharat Forge brings market-driven benchmarks for cost, quality, and delivery—concepts often sidelined in PSU environments.
   - **Avoiding "Bottlenecking":** With HAL currently overburdened by orders for 180+ Tejas Mk-1A and Mk-2 aircraft, a private line ensures the AMCA timeline is not cannibalized by existing production loads.

2. **Deepening the "Atmanirbhar" Ecosystem**

   Privatization is the key to building a robust **Military-Industrial Complex (MIC)**:

   - **IP Ownership:** Under the new model, the government retains the Intellectual Property (IP), but the private sector masters the **Lead System Integration (LSI)**—the most complex part of aerospace manufacturing.
   - **Tier-2/3 Growth:** Private lead integrators are structurally more agile at fostering a network of MSME suppliers, creating a pyramid of domestic aerospace expertise.

3. **Global Competitiveness and Exports**

   - **Agility in Innovation:** Private firms can more easily form Joint Ventures (JVs) with global giants (like Safran for engines or Boeing for airframes) to absorb technology.
   - **Export Mindset:** Unlike PSUs, private entities are incentivized to design for the global market, potentially turning the AMCA into an exportable 5th-gen alternative for nations wary of US or Russian restrictions.

4. **Risk Mitigation through Diversification**

   - **Financial Hedging:** Conglomerates can spread the high R&D risks of fighter development across their civilian portfolios, whereas HAL is entirely dependent on government budgetary cycles.
   - **Competitive Bidding:** A multi-vendor environment forces companies to innovate on manufacturing processes (e.g., using **3D printing** or **AI-driven assembly**) to stay cost-competitive.

Challenges of Private Sector Participation in Fighter Aircraft Development

1. **The Experience & Expertise Gap**

   - **"Start-up" Status:** India's private giants (Tata, L&T, Bharat Forge) are globally competitive in component manufacturing but have **zero experience** as Lead Integrators for a complete fighter aircraft.
   - **Complexity:** Building a 5th-generation stealth prototype is vastly more complex than the aerospace parts or airframes they currently produce.
   - **Institutional Memory:** HAL possesses 80 years of "hard-won" expertise in flight testing, weapon integration, and life-cycle support that private entities must now acquire or "poach" rapidly.

2. **Infrastructure & Capital Risk**
    - **Bengaluru Hub Dependency:** The entire design-test ecosystem (DRDO labs, ASTE, National Flight Test Centre) is concentrated in Bengaluru.
    - **Sunk Costs:** Private players may be hesitant to invest the massive capital required for specialized rigs and hangars when the initial contract is limited to **only five prototypes** without an ironclad "series production" guarantee.
    - **The SPV Model:** The initial Special Purpose Vehicle (SPV) model faced hurdles because private firms were wary of the high financial risks and the "black hole" of R&D costs.
3. **Fragmentation of the Design-Build Chain**
    - **Loss of Singular Control:** Historically (e.g., HF-24 Marut), having design and production under one roof ensured seamless resolution of technical differences.
    - **Ownership Ambiguity:** With **ADA (Government)** as the designer and a **Private Firm** as the builder, accountability for flight-test failures or design-to-manufacturing friction becomes a potential legal and operational bottleneck.
4. **Human Resource Bottlenecks**
    - **Test Aircrew:** India has only one school for test pilots. A private developer will struggle to find and fund the specialized crew needed to test a futuristic, unstable stealth platform from day one.
    - **Skilled Workforce:** Private firms will likely need to recruit heavily from retired HAL and ADA personnel to bridge the skill gap, potentially just shifting the same talent pool rather than expanding it.

Way Forward

1. **Collaborative Infrastructure Model**

    India should adopt a **Plug-and-Play** model for infrastructure:
    - **Shared National Assets:** Grant private consortia (like the shortlisted Tata, L&T, or Bharat Forge) access to **HAL's Bengaluru airfield**, ADA's National Flight Test Centre, and DRDO's specialized labs.
    - **Co-location:** Private design and engineering teams should be co-located with the **Aircraft and Systems Testing Establishment (ASTE)** to ensure continuous user (IAF) feedback during the prototype phase.
2. **Refining the Industry Partnership Model**

    The shift from the initial "Special Purpose Vehicle" (SPV) to a more competitive **Industry Partnership Model** requires clear financial de-risking:
    - **Assured Production Commitment:** The Ministry of Defence should provide a clear "buy back" guarantee or a firm commitment for the first two squadrons (Mk-1) to ensure private firms can justify the high R&D and capital expenditure.
    - **Tier-2/Tier-3 Integration:** The lead private integrator must be encouraged to decentralize work packages to a broader **domestic vendor network** (including MSMEs) to prevent a single point of failure in the supply chain.
3. **Addressing the Engine Bottleneck**

    The "heart" of the 5th-Gen fighter remains its propulsion. The Way Forward involves a dual-track approach:

- **Mk-1 (Short-term):** Ensure smooth integration of the **GE F414 engines** for the initial prototypes.
- **Mk-2 (Strategic):** Fast-track the **Safran-GTRE 120kN engine** joint venture. True strategic autonomy is only achieved once India owns the Intellectual Property (IP) for the engine, allowing for future upgrades without foreign clearance.

4. **Human Capital and "Pilot-in-the-Loop" Design**

- **Test Pilot Expansion:** India must scale up its only test pilot school or allow private-sector pilots to train alongside the IAF to build a larger pool of expertise for futuristic flight testing.
- **AI and Sensor Fusion:** Since the private sector leads in software and AI, they should focus on the **"Digital Backbone"** of the AMCA, allowing the aircraft to function as a command node for unmanned systems (Loyal Wingman).

Conclusion

The AMCA project marks a definitive pivot toward **Atmanirbhar Bharat**, transitioning from public-sector dependence to a private-led industrial base. By fostering a competitive ecosystem, India secures technological sovereignty, ensuring its 5th-generation air superiority is developed, manufactured, and sustained entirely within its borders.

5.12. THE APPROACHING AI SURGE, ITS GLOBAL CONSEQUENCES

Context:

Artificial Intelligence (AI) is emerging as a transformative general-purpose technology comparable to the Industrial Revolution and the Internet revolution. The current AI surge—driven by generative AI, **machine learning**, **big data analytics**, and **advanced semiconductor** capabilities— is reshaping economic systems, governance structures, and global power equations. Its implications extend beyond technology into civilizational change.

Drivers of the AI Surge

1. **Rapid Technological Breakthroughs**

- Development of **Large Language Models** (LLMs) and generative AI capable of reasoning, coding, content creation, and decision support.
- Integration of AI with cloud computing, **Internet of Things** (IoT), **robotics**, and **5G networks**.
- Declining cost of data storage and increased computational capacity enabling real-time processing.

2. **Massive Public and Private Investments**

- Strategic funding by major economies (**US, China, EU**) treating AI as a national priority.
- Tech giants investing in AI research, chip design, and global data infrastructure.
- Governments embedding AI in defense, urban planning, welfare delivery, and digital governance.

Significance and Implications:

1. **Productivity Enhancement and Structural Growth**

   Significance:

   - AI as a general-purpose technology transforming production across sectors.
   - Automation i**mproves efficiency**, **reduces costs**, **and minimizes errors**.
   - Predictive analytics strengthens supply chains, agriculture, finance, and manufacturing.

   Implications:

   - Higher economic growth and global competitiveness.
   - Rise of new models (AI-as-a-Service, platform economies, hyper-personalization).
   - Industrial restructuring and creative destruction.
   - Pressure on developing nations to upgrade technological capacity.

2. **Labour Market Transformation**

   Significance:

   - Automation of routine cognitive and clerical tasks.
   - Growth in demand for high-skill AI-related jobs.

   Implications:

   - Short-term job displacement in low- and mid-skill sectors.
   - Shift toward skill-based, digitally adaptive employment.
   - Risk of structural unemployment without effective transition policies.

3. **Rising Inequality Risks**

   Significance:

   - Concentration of AI infrastructure in few corporations and advanced nations.
   - Unequal access to data, chips, and computing power.

   Implications:

   - Widening global digital divide.
   - Technological dependency of developing nations.
   - Income polarization and potential social unrest.

4. **AI, Strategic Dominance and Digital Sovereignty**

   Significance:

   - AI as a strategic asset in defense, surveillance, and cyber operations.
   - Nations asserting control over data and digital infrastructure for autonomy.

   Implications:

   - Intensified global power competition and techno-nationalism.
   - Risk of AI arms race.
   - Fragmentation of global digital order into regulatory blocs.
   - Trade tensions over data and semiconductor supply chains.

5. **Cybersecurity and Information Warfare**

   Significance:

- AI strengthens cyber defense but also enables advanced cyberattacks.
- Use of **deepfakes** and misinformation tools.

Implications:

- Vulnerability of critical infrastructure.
- Threats to democratic institutions and elections.
- Expansion of hybrid warfare.
- Need for global cybersecurity cooperation and AI governance frameworks.

Challenges of Governing AI

1. **Regulatory and Accountability Deficit**
   - Absence of clear legal frameworks for liability in autonomous failures (e.g., self-driving cars, AI diagnostics). Difficulty in fixing responsibility among developers, deployers, and users.
   - Inadequacy of traditional legal principles to address AI-driven harms.
2. **Ethical Concerns: Bias, Privacy, and Surveillance**
   - Algorithmic bias leading to discrimination in hiring, credit, policing, and welfare. Lack of standardized auditing and transparency mechanisms.
   - Privacy risks from facial recognition and mass data analytics.
   - Tension between data-driven governance and constitutional rights (**privacy, equality, due process**).
3. **Societal and Cultural Disruptions**
   - AI-generated content raising intellectual property and authorship disputes.
   - Transformation of work, creativity, and knowledge production.
   - Over-reliance on algorithmic decisions reducing human agency and trust in institutions.
4. **Social Stability and Public Perception**
   - Fear of job displacement and widening inequality. Leading to risk of social unrest if transitions are not inclusive.
   - Digital literacy gaps across regions and generations.
5. **National-Level Capacity Constraints**
   - Limited semiconductor manufacturing and advanced research capacity. Dependence on foreign AI platforms and technologies and need for effective data protection enforcement.
   - Importance of indigenous innovation, AI skilling **(NEP 2020),** and public-private partnerships.

Way Forward

1. **Human-Centric AI**
   - Prioritize human welfare, dignity, and autonomy in AI design. Ensure meaningful human oversight in critical sectors (**healthcare, judiciary, defense**).
   - Embed fairness, accountability, and transparency to build public trust. Focus on augmenting—not fully replacing—human capabilities.
2. **Inclusive Growth**
   - Translate AI-driven productivity gains into broad-based economic benefits. Invest in large-scale reskilling and upskilling initiatives.

- Strengthen social safety nets to address job displacement. Promote digital inclusion, with focus on vulnerable groups and developing regions.

3. **Balanced Regulation**
   - Adopt a risk-based and adaptive regulatory framework.
   - Ensure algorithmic transparency, data protection, and accountability.
   - Avoid overregulation that stifles innovation and entrepreneurship.
   - Introduce periodic review mechanisms to keep laws technologically relevant.
4. **International Cooperation**
   - Develop harmonized global standards on AI ethics and governance. Strengthen cooperation on **data governance**, **cybersecurity**, and autonomous weapons.
   - Use multilateral forums (**UN, G20, OECD**) for dialogue and norm-setting. Prevent regulatory fragmentation and an AI arms race.
5. **Capacity Building**
   - Invest in R&D, semiconductor manufacturing, and digital infrastructure. Promote technological competitiveness and self-reliance.
   - Strengthen higher education and industry–academia collaboration. Build a skilled AI talent pipeline through education reforms.

Conclusion

The AI surge marks a transformative era, promising unprecedented innovation and productivity while posing risks of inequality and geopolitical friction. Its future impact will hinge on visionary governance, global cooperation, and inclusive policies to ensure AI advances human

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ART & CULTURE

6.1. 80 YEARS OF THE ROYAL INDIAN NAVY REVOLT

Context:

The year 2026 marks the **80th anniversary** of the Royal Indian Navy (RIN) Revolt, a watershed moment in India's struggle for independence that transcended communal divides and shook the foundations of British colonial rule.

1. **Genesis of the Uprising**

   The revolt began on **February 18, 1946**, at the shore establishment **HMIS Talwar** in Bombay. What started as a hunger strike by naval ratings quickly escalated into a widespread insurrection. The primary catalysts included:

   - **Inhumane Conditions:** Protest against sub-standard food and low wages.
   - **Racial Discrimination:** Systematic mistreatment by British officers.
   - **Political Undercurrents:** Influence of the **Indian National Army (INA)** trials and the charismatic leadership of Subhas Chandra Bose.

2. **Scale and Spread of the Revolt**

   The uprising was not a localized "mutiny" but a coordinated naval and civilian defiance:

   - **Geographical Reach:** Spread from Bombay to Karachi, Madras, Cochin, Vishakhapatnam, and Kolkata.
   - **Participation:** Involved nearly **20,000 naval ratings**, 78 ships, and 20 shore establishments.
   - **Symbolism:** Ratings hoisted the flags of the **Congress, Muslim League, and Communist Party** simultaneously on naval masts, signaling unprecedented unity.
   - **Central Strike Committee:** Led by **M.S. Khan**, the committee demanded the release of political prisoners and the withdrawal of Indian troops from Indonesia and Egypt.

3. **Popular Mobilization**

   The revolt triggered a massive civilian surge in Bombay, particularly within the mill districts (Kamatipura and Madanpura).

   - **Hindu-Muslim Solidarity:** Protesters from both communities jointly organized *hartals* and engaged in pitched battles against British machine guns.
   - **Casualties:** Over 200 civilians were killed as the British utilized armored vehicles and heavy ammunition to suppress the street-level uprising.
   - **Surrender:** On the advice of **Sardar Vallabhbhai Patel** and **Muhammad Ali Jinnah**, who provided assurances against victimization (which were later largely ignored), the ratings surrendered on February 23, 1946.

4. Historical Significance & Legacy

- **Impact on British Rule:** The revolt convinced the British that the Indian Armed Forces could no longer be relied upon to maintain the Empire.
- **Decolonization Catalyst:** It accelerated the dispatch of the **Cabinet Mission** to India to negotiate the transfer of power.

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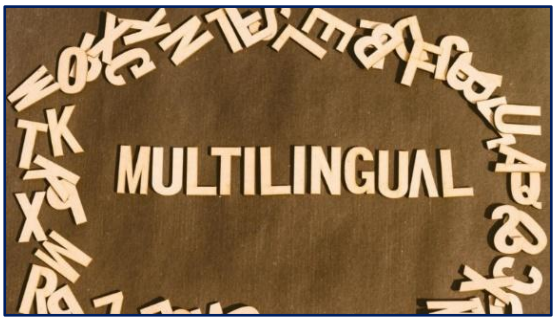
MISCELLANEOUS

7.1. ADVANCING MOTHER-TONGUE-BASED MULTILINGUAL EDUCATION IN INDIA

Context:



- On the occasion of **International Mother Language Day (February 21)**, under the theme *"**Youth Voices on Multilingual Education**,"* the release of the **seventh edition** of the **UNESCO State of the Education Report (SOER) for India 2025**, titled *"**Bhasha Matters: Mother Tongue and Multilingual Education**,"* has brought national attention to the critical role of linguistic identity in the learning process.

Background: The Indian Linguistic Tapestry

India's **extraordinary linguistic diversity**, encompassing **more than 1,300 mother tongues** and **121 constitutionally recognised languages** as per the **2011 Census**, represents a profound national asset.

- **Constitutional Provisions:**
  - **Article 29(1)** protects the right of any section of citizens to conserve its distinct **language, script, or culture**.
  - **Article 30** grants minorities the right to establish and administer **educational institutions of their choice**.
  - **Article 350A** mandates that States provide adequate facilities for instruction in the mother tongue at the primary stage of education**.**
  - **Article 350B** provides for a **Special Officer for linguistic minorities** to safeguard their interests.
  - The **Eighth Schedule** recognises **22 official languages**, while **Part XVII of the Constitution** addresses official languages.
- **Policy Framework**: These provisions, combined with the **National Education Policy (NEP) 2020** and the **National Curriculum Frameworks (NCF) of 2022 and 2023**, place the **child's home or mother tongue** at the centre of early education.

Quality Education on Mother Tongue

1. **Concept and Pedagogical Rationale**
   - **Mother -Tongue -Based Multilingual Education (MTB-MLE)** uses the **child's first language (mother tongue/home language)** as the primary medium of instruction in early grades, with **additional languages** (regional, national, global) introduced **gradually and systematically**.
   - UNESCO and NEP 2020 converge on the principle that **foundational learning** is most effective when children are taught in a language they **fully understand**, which enhances **conceptual clarity, reading comprehension, and classroom participation**.
2. **Cognitive and Developmental Advantages**
   - **Stronger Foundational Literacy and Numeracy**: When instruction begins in the mother tongue, children can focus on **academic content** without the added cognitive load of decoding an unfamiliar language.

- **Improved Retention and Reduced Dropouts**: Evidence from tribal and rural schools shows that MTB-MLE improves **attendance, confidence, and completion rates**, especially among **first-generation learners and girls**.
- **Lifelong Learning and Higher -Order Skills**: A secure base in the mother tongue facilitates smoother transition to **additional languages and complex subjects** in later grades.

3. **Policy anchoring in NEP 2020 and NCFs**
   - The **National Education Policy 2020** recommends that the **medium of instruction** in school should be the **child's home language/local language till at least Grade 5 and preferably till Grade 8**, in line with global MTB-MLE principles.
   - The **National Curriculum Frameworks (NCF) 2022 and 2023** further operationalise this by embedding **multilingual pedagogy, inclusive materials, and teacher-education reforms** into the curriculum design.

A Barrier of Language: The Learning Language Mismatch

- **Language Barrier:** According to the **National Council of Educational Research and Training (NCERT)**, **nearly 44% of children** in India enter school speaking a language different from the medium of instruction, creating an immediate **language barrier**.
  - For these children, learning becomes a **dual task**: they simultaneously **decode the language of instruction** and **grasp academic content**, which often leads to **weak foundational skills**.
- **Cumulative Learning Gaps**: Weak **early grade literacy** and **numeracy** tend to compound over time, widening the gap between children from **dominant language and minoritised language backgrounds**.
- **Reduced Confidence and Higher Dropout Risk**: Children who struggle to understand classroom instruction are more likely to feel alienated, disengage, and eventually drop out, particularly in **tribal, rural, and socio-economically marginalised communities**.
- **Reinforcement of Social Hierarchies**: When only dominant languages are privileged in schools, it **marginalises linguistic minorities** and reinforces existing social and educational inequalities.

Significance of 'Bhasha' Matters

1. **Educational Equity and Inclusion:** MTB-MLE is positioned as a **key strategy for inclusive education**, ensuring that **tribal, Dalit, Adivasi, and other minoritised groups** are not left behind due to language mismatch.
   - By recognising the child's **home language as a legitimate medium of learning**, schools become spaces of **identity affirmation** rather than cultural erasure.
2. **Preservation of Linguistic and Cultural Diversity:** When a language disappears, a **distinct worldview, oral traditions, and indigenous knowledge systems** are lost, which UNESCO frames as a **loss of humanity's accumulated knowledge**.
   - MTB-MLE helps **document, revitalise, and transmit** endangered and minoritised languages, thereby preserving India's **intangible cultural heritage**.
3. **Social Cohesion and National Identity:** A multilingual education system that values **all languages**, not just Hindi or English, fosters **unity in diversity** and strengthens **social cohesion**.
   - It also aligns with India's constitutional commitment to **linguistic pluralism**, as reflected in the **Eighth Schedule** and various language-related provisions.

Evidence from the Ground: Promising Practices

- **Odisha's Multilingual Education Programme:** Odisha runs a **long-standing MTB-MLE programme** covering **21 tribal languages** across **17 districts**, supporting around **90,000 tribal children** with bilingual teaching materials and trained teachers.
  - Evaluations indicate **improved reading comprehension, classroom engagement, and retention** among tribal students.
- **Telangana and Digital Multilingual Resources:** In **Telangana**, the **Digital Infrastructure for Knowledge Sharing (DIKSHA)**-enabled multilingual resources allow teachers and students to access **learning materials in local languages**, including tribal and minority languages.
  - This demonstrates how **digital public infrastructure** can scale multilingual education even in resource-constrained settings.
- **National Digital and Language-Technology Initiatives: PM eVIDYA** and **Adi Vaani** (a national consortium-developed platform) provide **multilingual audio-visual and digital content** for foundational learning.
  - **BHASHINI** (BHash-based ANd Intelligent Node for InclusioN in India) and **AI4Bharat's community-developed language technologies** support **speech-to-speech translation, text-to-speech, and machine-translation tools** for Indian languages, helping document endangered languages and generate local-language content.

Issues and Challenges in Implementation of Multilingual Model

Transitioning to a multilingual model faces significant structural and social hurdles.

- **Structural Barriers:**
  - **Policy Gaps:** Many states lack context-specific MTB-MLE frameworks, leading to fragmented implementation.
  - **Teacher Shortage:** There is a critical dearth of educators proficient in **tribal languages** and trained in multilingual pedagogy.
  - **Material Quality:** Textbooks and assessments in minoritised languages are often missing or of poor pedagogical quality.
- **Socio-Cultural Factors:**
  - **Parental Preference:** Many parents view **English-medium education** as the only route to social mobility, creating resistance to mother-tongue instruction.
  - **Linguistic Hierarchies:** The dominance of Hindi or English continues to marginalize regional and tribal dialects.
- **Resource Constraints:**
  - **Financing:** Initiatives often rely on short-term projects rather than **sustained, mission-mode funding**.
  - **Digital Divide:** Unequal access to connectivity limits the reach of digital multilingual resources in remote areas.

Way Forward: Policy and Implementation Pathways

To realize the vision of the UNESCO report and NEP 2020, a multi-pronged strategy is required.

- **Institutional Reforms**
  - **National Mission for MTB-MLE:** Establish a coordinated mission to harmonize Centre-State efforts and scale successful pilots into systemic reform.

- **Localized Policies:** States must develop policies that reflect their specific linguistic realities rather than a one-size-fits-all approach.

- **Teacher Education**
  - **Prioritize Recruitment:** Hire teachers fluent in **local dialects** and embed **MTB-MLE principles** in **B.Ed. and D.El.Ed.** programs.
  - **Capacity Building:** Continuous professional development for teachers to use multilingual digital tools and inclusive assessment methods.
- **Curriculum and Community**
  - **Multilingual Materials:** Develop high-quality textbooks and digital content across all grades, including minoritised languages.
  - **Indigenous Knowledge:** Integrate local ecological knowledge and oral histories into the school curriculum to make learning culturally rooted.
  - **Institutionalize Participation:** Involve parents and community elders in **curriculum design and material development**.
- **Technological and Financial Commitment**
  - **Expand Digital Tools:** Platforms like **DIKSHA, PM eVIDYA, BHASHINI, and AI4Bharat** should be expanded to provide **multilingual content, teacher mentoring, and language-technology tools**.
  - **Sustainable Financing:** Allocate dedicated, long-term funds for material development and teacher training.
  - **Robust Monitoring:** Track language-wise learning outcomes and dropout rates to ensure accountability and course correction.

Conclusion

India's **multilingual moment** offers a historic opportunity to transform the educational landscape by centering **Mother Tongue-Based Multilingual Education (MTB-MLE)** in policy and practice. Far from being a liability, linguistic diversity serves as a **powerful engine for equity, inclusion, and innovation** when children learn in languages they understand and value. This shift is **not merely a pedagogical preference** but a **fundamental prerequisite for achieving SDG 4**, ensuring **quality education** is **truly inclusive and culturally rooted**.

7.2. BONDED LABOUR IN INDIA

Context: 2026 marks 50 years of the **Bonded Labour System (Abolition) Act, 1976**. While "traditional" feudal bondage (like Kamaiya or Vettichakiri) has declined, new forms have emerged in the informal economy.

About Bonded Labour:

Bonded labour (also called debt bondage/Bandhua Mazdoori) is a form of **modern slavery** where a person (or family) is forced to work to repay a loan or debt under exploitative terms, often for **nominal or no wages**, and cannot freely leave the work until the debt is extinguished.

Key features:

- Debt and labour tied; work done in lieu of repayment
- Loss of freedom to change employer, move freely, or refuse work
- Debt often inflated with interest, trapping labourers (sometimes generationally)

Key Legal Framework on Bonded Labour

1. **Constitutional Provisions**
    - **Article 23:** Explicitly prohibits **"begar"** (forced labour without payment) and other similar forms of forced labour.
    - **Article 21:** Interpreted by the SC to include the **Right to Live with Dignity**; bonded labour is a violation of this fundamental right.
    - **Article 24:** Prohibits the employment of children in hazardous factories/mines.
    - **Directive Principles (DPSP):**
    - **Article 39:** Directs the State to prevent the abuse of workers' health and strength.
    - **Article 42:** Mandates just and humane conditions of work.
2. **Legal Framework**
    - **Bonded Labour System (Abolition) Act, 1976:** Formally ends the bonded labour system.
    - **Debt Extinguishment:** All existing bonded debts are legally discharged/cancelled.
    - **Enforcement:** Grants the **District Magistrate (DM)** the power to identify, release, and rehabilitate victims.
    - **Bharatiya Nyaya Sanhita (BNS), 2023: Section 143:** Criminalizes trafficking and unlawful compulsory labour (replaces older IPC sections).
    - **SC/ST (Prevention of Atrocities) Act, 1989:** Provides enhanced protection and penalties as most victims are from marginalized communities.
3. **Recent Judicial Interpretations (2026)**
    - **Kerala High Court Ruling:** Clarified that preventing an employee from resigning or withholding their salary to force continued service constitutes **Bonded Labour** under Article 23.
4. **International Obligations**
    - **ILO Conventions:** India has ratified **Convention No. 29** (suppressing all forced labour), **No. 105** (prohibiting forced labour for economic/political purposes), and **No. 182** (eliminating debt bondage for children).
    - **SDG Target 8.7:** Commits India to end modern slavery, forced labour, and human trafficking by **2030**.
    - **UDHR Article 4:** Aligns with the UN declaration that prohibits holding any individual in slavery or servitude.

Reasons for Bonded Labour

1. **Economic Factors**
    - **Poverty & Indebtedness:** Extreme poverty forces families to take "bridge loans" for health emergencies, weddings, or funerals.
    - **Lack of Formal Credit:** Marginalized groups lack collateral, making them dependent on predatory local moneylenders/landlords.
    - **Informalization:** Over **90%** of India's workforce is in the informal sector (brick kilns, stone quarries, agriculture) where labour laws are poorly enforced.

2. **Socio-Cultural Factors**
    - **Caste Hierarchy:** Bondage is deeply rooted in the caste system; **80–90%** of victims belong to SC/ST or OBC communities.
    - **Illiteracy:** Lack of education prevents workers from understanding contract terms or their legal rights under the 1976 Act.
3. **Administrative & Legal Gaps**
    - **Poor Identification:** Bonded labour has shifted from "traditional feudalism" to "hidden commercial bondage," making it harder for authorities to detect.
    - **Dysfunctional Vigilance Committees:** District-level committees, mandated by law to monitor bondage, often remain inactive or underfunded.
    - **Low Conviction Rates:** Despite rescues, employers are rarely prosecuted under the **BNS (2023)** or the **1976 Act**, leading to a lack of deterrence.
4. **Modern Triggers**
    - **Climate Vulnerability:** Agricultural distress due to erratic weather (like the **2025-26 droughts**) drives distressed migration, where workers fall into the debt-traps of labour contractors.

Government Initiatives

- **Central Sector Scheme for Rehabilitation (2021):**
    - Financial assistance: **₹1 lakh** for adult males, **₹2 lakh** for women and children, and **₹3 lakh** for extreme cases (transgender, sexual exploitation).
    - Creation of a **Rehabilitation Fund** (corpus of ₹10 lakh) at the district level for immediate relief.
- **Standard Operating Procedure (SOP):** States like Karnataka and Tamil Nadu have developed SOPs for faster identification and rescue.
- **International Alignment:** India has ratified **ILO Convention 182** (Worst Forms of Child Labour) and is committed to **SDG 8.7** (ending modern slavery by 2030).
- **Labour Codes (2020/2025):** The **Code on Wages** and **Social Security Code** aim to formalize contracts and ensure universal minimum wages, removing the economic vacuum that leads to debt-bondage.
- **Convergence with Other Schemes**
    - **MGNREGA:** Guaranteed 100 days of work to prevent re-entry into debt.
    - **PM-Awas Yojana:** Priority allotment of housing for rescued families.
    - **Samagra Shiksha Abhiyan:** Rescued child labourers are mainstreamed into formal schools.

Way Forward

To move from "legal abolition" to "practical eradication" by the **SDG 8.7 target of 2030**, a multi-dimensional strategy is required:

1. **Strengthened Governance & Enforcement**
    - **Active Vigilance Committees:** Ensure statutory district-level committees meet quarterly (as mandated) to proactively identify hidden bondage in newer sectors like shopping malls, call centers, and massage parlors.
    - **Summary Trials:** Strict adherence to **Section 21** of the 1976 Act and **BNS 2023** to conclude trials within **three months** to create a credible deterrent for employers.

2. **Comprehensive Rehabilitation**
    - **Digital Integration:** Link the **e-Shram portal** with the Bonded Labour Rehabilitation Scheme to track rescued workers and ensure they don't slip back into the debt cycle during migration.
    - **Immediate Relief Transparency:** Solve the "Implementation Gap" by automating the transfer of the **₹30,000 immediate relief** through Direct Benefit Transfer (DBT) within 24 hours of rescue.
3. **Preventive & Structural Reforms**
    - **Financial Inclusion:** Promote **Micro-credit facilities** and SHGs (Self-Help Groups) in vulnerable districts (e.g., Bolangir, Kalahandi) to provide alternatives to predatory local moneylenders.
    - **Social Awareness:** Conduct grassroots legal literacy camps (like the **NSS initiatives in 2026**) to educate workers on their right to "Release Certificates," which legally extinguish all their bonded debts.
4. **Inter-State Coordination**
    - **Migration Governance:** Establish a **Centralized Tracking System** for interstate migrant workers to monitor those moving from "source" states (Bihar, Odisha) to "destination" industries (brick kilns in Punjab, cattle farms in Tamil Nadu).

Conclusion

Fifty years after the 1976 Act, eradicating bonded labour requires shifting from mere rescue to holistic rehabilitation. Strengthening district vigilance, ensuring timely DBT relief, and strictly enforcing the **BNS 2023** are vital to breaking the debt-poverty cycle and achieving **SDG 8.7**.

Indian Scientific Service (ISS)

7.3. A SEPARATE CLASSIFICATION FOR DENOTIFIED TRIBES

Context:

- The **Ministry of Social Justice and Empowerment** has recently assured leaders of the **Denotified, Nomadic, and Semi-Nomadic Tribes (DNTs)** that their communities will be **enumerated in the second phase of the Census 2027**.
- The move follows decades of demand for a **"separate Census column"** to address the **statistical invisibility of over 10 crore people**.
- Its primary aim is to rectify **historical marginalisation** by enabling **constitutional recognition** comparable to **SCs, STs, and OBCs**.
- While the **Office of the Registrar General of India** has agreed in principle, the absence of a **distinct constitutional category** remains a key concern for these communities.

Who are Denotified Tribes (DNTs) in India?

- **Denotified, Nomadic and Semi-Nomadic Tribes (DNTs)** are communities that were once branded as **"criminal tribes"** by British administrators, who believed that certain communities were inherently "**addicted**" to crime.

- **Nomadic Tribes (NTs):** These communities follow a **mobile lifestyle**, periodically shifting locations without permanent settlements to sustain livelihoods through **pastoralism, trade, or traditional services** (e.g., **Banjara, Rabari**).
- **Semi-Nomadic Tribes (SNTs):** Such groups combine **seasonal migration with partial settlement**, often practising **transhumance**—maintaining a base while moving livestock seasonally (e.g., **Gaddi, Maldharis**).

Historical Background: Evolution of Denotified Tribes (DNTs) in India

- **Criminal Tribes Act (CTA), 1871:** Enacted in **1871**, the **CTA** enabled the **registration, surveillance, and control** of certain communities, labelling them as "criminal tribes" habitually involved in **non-bailable offences**. Colonial authorities justified this by linking **criminality to caste**, portraying it as hereditary.
- **Denotification after Independence (1952):** In **1952**, the Government of India repealed the **CTA** on the recommendation of the **Ayyangar Committee (1949)**. Previously notified groups were officially **"denotified,"** giving rise to the term **Denotified Tribes (DNTs)**.
- **Habitual Offender Laws:** Despite repeal, several States enacted **Habitual Offender laws (1952)**, which, though removing the hereditary label, continued **surveillance and targeting** of these communities.
- **Continuing Marginalisation:** Although the legal "**criminal tribe**" tag was abolished, **structural stigma, policing bias, and social exclusion** persisted long after Independence.

History of Enumeration of Denotified Tribes (DNTs) in India

- **Early Census Classification (1871–1931):** Although the **Criminal Tribes Act (CTA), 1871** and synchronous Censuses began together, communities were explicitly recorded as **"criminal tribes"** from **1911** onwards. The **1911 and 1931 Census reports** enumerated them separately, with **1931** being the last Census to do so.
- **Post-Independence Discontinuation (1952):** Following the **repeal of the CTA** and formal **denotification**, separate enumeration ended. The Republic adopted the position **that caste-based enumeration** would be limited to **Scheduled Castes (SCs)** and **Scheduled Tribes (STs)**, leaving DNTs without distinct statistical recognition.
- **Early Institutional Measures (1949 onwards):** The **Ayyangar Commission (1949)** examined their condition. After 1952, several communities were listed as **"Vimukt Jatis"** under **Backward Classes**, and over time, most were absorbed into **SC, ST, or OBC categories**.
- **Lokur Committee (1965):** Recommended treating **denotified and nomadic groups as a distinct category** for targeted development.
- **Civil Society and Commissions (1998 onwards):** In **1998**, **Mahasweta Devi** and **G.N. Devy** formed **Denotified, Nomadic and Semi-Nomadic Tribes – Rights Action Group (DNT-RAG)**, which led to the creation of a **Technical Advisory Group** and subsequently the first **National Commission for DNTs**, chaired by **B.S. Renke** (**Report, 2008**). A **second Commission** under **Bhiku Ramji Idate** submitted its report in **2017**. Both stressed that accurate **identification and classification** require a **dedicated Census enumeration**.
- **Pending NITI Aayog-Commissioned Study:** A **NITI Aayog-commissioned study** by the **Anthropological Survey of India** recommended classification for these groups, but the report has not been implemented and remains pending.

Key Recommendations of Idate Commission on DNTs

The **Bhiku Ramji Idate Commission** was established to examine the status of DNTs. Key findings and suggestions included:

- **Identification of Communities:** Recognition of nearly **1,200 communities** as **Denotified, Nomadic and Semi-Nomadic Tribes (DNTs, NTs, SNTs)**, with about **267–268 communities** found to be **outside any constitutional category (SC/ST/OBC)**.
- **Constitutional Amendment Proposal:** Recommendation to introduce a **third Schedule** titled **"Scheduled Denotified, Nomadic and Semi-Nomadic Tribes"**, alongside **SCs and STs**, to ensure **dedicated constitutional safeguards**.
- **Permanent National Commission:** Proposal to establish a **permanent National Commission for DNTs, NTs and SNTs**, replacing ad-hoc bodies, to oversee **policy implementation and welfare measures**.
- **Extension of PoA Act:** Suggestion to extend the **Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act** to DNT/NT/SNT communities through inclusion in a **separate schedule**, ensuring protection from **violence and discrimination**.
- **Sub-Classification within DNTs:** Emphasis on **sub-classification** to address **"graded backwardness"** among **settled and nomadic groups**, in line with evolving **Supreme Court jurisprudence** on internal categorisation within reserved classes.

Significance of Separate Classification for DNTs

- **Addressing Data Deficit:** A **dedicated Census entry** would eliminate long-standing **statistical invisibility**, enabling accurate data collection for informed and region-specific policy formulation.
- **Robust Legal Backing:** Explicit **constitutional recognition** would strengthen the foundation for targeted **affirmative action, scholarships, welfare measures, and protective safeguards** for DNT/NT/SNT communities.
- **Equitable Internal Prioritisation: Sub-classification within DNTs** would help identify and prioritise the most marginalised **nomadic and semi-nomadic groups**, reflecting the concept of **"graded backwardness"** upheld by the **Supreme Court**.
- **Improved Governance Outcomes:** Formal classification would streamline **certification processes**, enhance policy oversight, and promote more transparent and need-based **resource distribution**.

Key Challenges Faced by Denotified, Nomadic, and Semi-Nomadic Tribes (DNTs)

Despite the formal end of colonial-era labels, DNT communities remain at the extreme periphery of India's development narrative, facing a unique convergence of historical, legal, and social hurdles.

- **Socio-Economic Marginalization & Asset Deficit:**
  - **Generational Poverty:** Structural exclusion has led to critical deficits in **literacy, healthcare, and permanent housing**, with almost no intergenerational wealth or land ownership.
  - **Documentary Invisibility:** Their **nomadic lifestyle** results in a lack of permanent addresses, making it nearly impossible to acquire essential identity markers (**Ration cards, Voter IDs, Caste certificates**). This excludes them from the "paper-based" welfare state.
- **The "Double Burden" of Social Stigma:**
  - **Systemic Profiling:** The **"stigma of criminality"** persists in the administrative psyche long after the 1952 repeal.

- **Criminalization of Lifestyle:** Traditional movements and occupations are frequently viewed with suspicion. This leads to **targeted policing** and frequent harassment under various **Habitual Offenders Acts**, which often function as a modern proxy for colonial-era surveillance.

- **Intra-Category Competition & Invisibility:**
  - **Dilution of Benefits:** Most DNTs are fragmented across existing **SC, ST, or OBC lists**, which prevents a focused policy approach for their specific needs.
  - **The "Graded Inequality" Trap:** Within these broad categories, DNTs cannot compete with **politically organized and socially advanced groups**. Consequently, their unique grievances are overshadowed by the dominant groups in the same reserved pool.
- **Administrative and Legal Limbo:**
  - **Non-Classification:** Approximately **268 DNT communities** are not included in any SC, ST, or OBC list. This lack of classification places them entirely outside the protection of **Articles 15(4) and 16(4)**, leaving them without any constitutional or legislative safety net.

Government Initiatives: SEED Scheme

The **Scheme for Economic Empowerment of DNTs (SEED)**, launched by the **Ministry of Social Justice and Empowerment**, provides integrated support in **livelihood, education, housing, and health** for **DNT/NT/SNT communities**.

- **Financial Outlay & Mechanism:** Allocated **₹200 crore (2020–25)**, the scheme operates through existing platforms such as **NRLM**, **Free Coaching**, **IAY-linked housing programmes**, and the **National Health Authority**.
- **Problems with the SEED Scheme:**
  - **DNT Certificate Requirement:** A central condition for availing benefits is the issuance of a **DNT certificate** by State governments, which must be **distinct yet not exclusive of SC/ST/OBC status**.
  - **Certification Bottlenecks:** In practice, only select districts in a few States issue **DNT certificates**, while many others delay or deny certification despite **Central government advisories**.
  - **Low Utilisation of Funds:** Due to these administrative hurdles, actual expenditure has remained **significantly below the allocated amount**, limiting the scheme's on-ground impact.
  - **Lack of a Single Nodal Authority:** Implementation is fragmented across multiple agencies (**NRLM, housing bodies, health authorities**), with no dedicated **nodal institution** solely accountable for DNT-specific outcomes.

Way Forward: Strategic Policy and Governance Reforms

To transition from colonial-era suspicion to constitutional parity, the following streamlined reforms are essential for the holistic empowerment of DNTs:

- **Data-Driven Governance via Census 2027**
  - **Specific Identification:** The Office of the Registrar General must implement a **dedicated column or code** for DNTs/NTs/SNTs to end statistical invisibility.
  - **Standardized Protocols:** Develop clear guidelines for **self-identification** that account for nomadic movement, ensuring no sub-group is excluded during the enumeration process.
- **Constitutional and Legislative Empowerment**

- **The "Distinct Schedule":** Enact a **Constitutional Amendment** to create a distinct Schedule for DNTs, as recommended by the Idate Commission, to provide a clear legal identity.
- **Atrocity Prevention:** Extend legal safeguards equivalent to the **SC/ST (Prevention of Atrocities) Act** to protect these communities from persistent social profiling and institutional harassment.

- **Institutional and Administrative Strengthening**
  - **Permanent Statutory Body:** Establish a **Permanent National Commission for DNTs** with statutory powers to monitor welfare outcomes and investigate rights violations.
  - **Unified Certification: Centralize and digitize** the DNT certification process to ensure uniform issuance across all States and UTs, removing current administrative bottlenecks.
- **Optimizing Welfare Delivery (SEED Scheme)**
  - **Direct Implementation:** Re-orient the **SEED scheme** for direct execution by a specialized DNT Welfare Board to improve fund utilization and reduce inter-agency delays.
  - **Mobile Outreach:** Deploy **mobile enrollment units** and digital records to ensure that education, health, and housing benefits "follow" nomadic families during migration.

Conclusion

The **Denotified, Nomadic, and Semi-Nomadic Tribes** remain "**the most marginalized of the marginalized**." While the **2027 Census enumeration** is a welcome step, it must be supported by a robust legal framework and a separate constitutional identity. Without these, these communities will continue to exist in the shadows of the Indian republic—statistically invisible and socially excluded.

7.4. REDEFINING TRIBAL WOMEN'S INHERITANCE RIGHTS

Context:

- The question of **women's inheritance rights** in **tribal communities** remains unresolved. Most **tribal customary laws** deny women absolute rights over property.
- Moreover, the **Hindu Succession Act, 1956**, which grants **daughters equal rights in ancestral property**, does not apply to **Scheduled Tribes**, thereby excluding tribal women from its protection.
- However, recently, the **Supreme Court of India** has dealt with cases concerning inheritance rights of tribal women. In some instances, it granted rights to those who had adopted **Hindu customs** ("**Hinduisation**"), while in others it **upheld their exclusion based on statutory exemptions.** This inconsistent approach has created **legal uncertainty for tribal women** whenever questions of inheritance arise.

Background: The Hindu Succession Act and Tribal Exclusion

The primary legal hurdle for tribal women lies in the statutory architecture of the **Hindu Succession Act (HSA), 1956**.

- **The Scope of Section 2(1):** This section defines the **applicability of the Act to anyone who is a Hindu by religion** or **falls under the broad category of "Hindus"** (**including Buddhists, Jains,**

and Sikhs). Historically, courts often used this section to "bring in" tribal individuals who had adopted Hindu customs, a process known as **"Hinduisation."**

- **The Overriding Effect of Section 2(2):** Crucially, **Section 2(2)** acts as a proviso, stating that notwithstanding anything in **Section 2(1),** the Act **shall not apply** to any Scheduled Tribe within the meaning of **Article 342** (which empowers the President to specify tribes or tribal communities as Scheduled Tribes, thereby providing them a distinct legal status separate from the HSA), unless the **Central Government** specifically notifies otherwise in the Official Gazette.
- **The 2005 Amendment:** The **Hindu Succession (Amendment) Act, 2005** granted daughters equal **coparcenary rights** (the legal right to be a joint heir to ancestral property from birth, enjoying the same rights as sons to claim partition and ownership).
    - However, because of Section 2(2), these benefits did not extend to tribal women. This has created **"invidious discrimination,"** where a **non-tribal woman** enjoys **statutory property rights** while a tribal woman in the same region is left to the mercy of restrictive customs.
- **Resultant Vacuum:** In the absence of statutory law, succession is governed by **un-codified customary practices**. These are frequently **patrilineal**, aiming to keep land within the **male lineage** to prevent "**alienation**" to outsiders through marriage.

Defining 'Hindu' and the "Hinduisation" Critique

The term "Hindu" lacks a rigid definition, encompassing diverse practices rather than a singular creed, which has historically complicated tribal legal status.

- **Broad Judicial Interpretation:** In ***Sastri Yagnapurushadji v. Muldas Brudardas Vaishya (1966),*** the Supreme Court famously described the Hindu religion as a **"way of life"** that does not claim any one prophet, worship one God, or subscribe to a single dogma or set of rites.
- **The Mechanics of Identity:** A person can be a **Hindu by birth** or through **bona fide conversion**, which requires a clear intention and unequivocal conduct.
    - A converted person remains a member of their tribe unless they and their ancestors have long abandoned tribal customs, including customary laws of marriage and inheritance.
- **Implications for Tribals:** Previously, courts broadened Section 2(1) to include tribes by arguing they weren't "expressly excluded" there. However, this contradicted Section 2(2) and forced tribal women into a coercive choice: abandon their indigenous identity to become "Hindu" for the sake of economic rights, or retain their identity and remain landless.

Landmark Judicial Interventions: A Shift in Jurisprudence

Recent verdicts have reframed the debate by applying the principles of **Transformative Constitutionalism** to the traditionally insulated sphere of tribal customary law.

- **The Principle of Equality (*Ram Charan v. Sukhram*, 2025):** The Court recognized that excluding daughters from ancestral property violates the fundamental right to equality under **Article 14** and the prohibition of discrimination under **Article 15(1)**. It emphasized that biological differences should not be a basis for denying succession and that in the absence of codified law, principles of **justice, equity, and good conscience** must apply to grant women their share.
- **Reaffirming Jurisdictional Boundaries (*Nawang v. Bahadur*, 2025):** A Bench of Justices Sanjay Karol and Prashant Kumar Mishra overturned a Himachal Pradesh High Court order that had granted rights to 'Hinduised' tribal daughters. The Supreme Court clarified that the judiciary cannot overstep its jurisdiction to "legislate" by extending the HSA to tribes; that power rests solely with **Parliament**.

- **Protecting Indigenous rubric:** The Court affirmed that tribal inheritance remains governed by the **customary practices** of the community unless the Central Government officially intervenes. This ruling ended the inconsistent practice of granting rights based on "Hinduisation," which had previously created legal uncertainty and forced a choice between tribal identity and property rights.

Strategic Significance: Why This Matters

The rethinking of tribal inheritance is not merely a legal technicality; it has deep socio-economic implications for the progress of indigenous communities:

- **Economic Empowerment:** Establishing **property rights** provides tribal women with **collateral for credit**, enabling entrepreneurship and financial independence. It creates a robust safety net against poverty and mitigates the risk of domestic vulnerability by ensuring shelter and land security.
- **Social Justice and Equity:** Correcting this legal exclusion dismantles the "second-class citizen" status of tribal women compared to their non-tribal counterparts. It fulfills the constitutional promise of **Substantive Equality**, where **justice is determined by outcomes rather than just formal procedures.**
- **Integration without Assimilation:** By advocating for a **separate law** rather than a forced merger into the HSA, the state acknowledges that equality can—and should—exist within the framework of **Cultural Pluralism**. It allows tribes to modernize their internal structures without losing their unique identity.

Multidimensional Challenges: The Roadblocks to Reform

Despite judicial nudges, several hurdles persist in the transition to a gender-just inheritance system:

- **Land Alienation Paradox**: Communities resist female inheritance under **Fifth/Sixth Schedules** fearing **exogamous marriages** transfer land to non-tribals, as **Chhotanagpur customs** (reinforced by **CNTSP Act, 1908**) mandate **Khandan**-male succession to safeguard communal land bases.
- **Orality-Legal Uncertainty**: Uncodified **customary laws** allow patriarchal elites to manipulate interpretations, with **Article 371A (Nagaland)** enabling village-specific variations that burden women with proving "**ancient and certain**" usage per **Madhu Kishwar (1996)**.
- **Patriarchal Inertia**: Land is entrenched as a **male lineage preserve**, compelling women to relinquish High Court-won shares (e.g., **Santhal** cases) under social coercion for "familial harmony," violating **Article 21** dignity amid **NCRB**-tracked violence surges.
- **Jurisdictional Limbo**: While **Ram Charan (2025)** affirms equity-based equality, **Nawang (2025)** prohibits **HSA** extension, stranding tribal women in a statutory void dependent on **Parliamentary action** to fulfill **Article 39(b)-(c)** resource equity.
- **Implementation Disparities**: **Patrilineal dominance** in tribes like Gonds and Oraons, coupled with illiteracy and remoteness, undermines **PESA Gram Sabha** enforcement; **Mizoram**'s codification contrasts mainland inconsistencies, encouraging **forum shopping**.
- **Lingering Jurisdictional Dilemma:** While ***Ram Charan* case** established the moral and constitutional right to equality, ***Nawang* case** restricted the judicial path to achieving it. This leaves tribal women in a state of **legal limbo**: they are entitled to equality in theory, but cannot claim it through existing statutes like the HSA, leaving the resolution entirely dependent on legislative will.

Way Forward: Bridging the Parity Gap

To resolve tensions between **Constitutional Morality** and **Customary Autonomy**, a structured multi-pronged strategy is essential, harmonizing **tribal identity** with **gender equality** through legislative, judicial, and policy innovations.

- **Codification on Mizoram Model**: States with significant **Scheduled Tribe** populations (e.g., Jharkhand, Odisha, Chhattisgarh) must codify succession laws, emulating Mizoram's framework where daughters receive shares while safeguards like youngest son's **elder-care premium** prevent **land alienation** to non-tribals and preserve matrilineal elements.
- **Parliamentary Intervention**: **Hindu Succession Act (HSA), 1956** cannot be judicially extended per **Nawang v. Bahadur (2025)**; Parliament should enact a dedicated **Tribal Succession Act** mirroring HSA's equality provisions (post-2005 coparcenary rights) but customized to **tribal land-holding patterns** under **FRA, 2006** and **PESA, 1996**.
- **Institutional Strengthening**: Empower **National Commission for Scheduled Tribes (NCST)** and **Tribal Advisory Councils** for custom audits, gender sensitization, and awareness campaigns; establish **fast-track tribal inheritance courts** integrated with **e-Courts** for rural access.
- **Policy Synergies and Monitoring**: Link reforms with **Forest Rights Act (2006)** titling and **PESA (1996)** Gram Sabhas via mandatory **gender audits**; launch SHG-led land pooling initiatives; mandate annual **Ministry of Tribal Affairs** reports to Parliament tracking tribal women's property ownership metrics.

Conclusion

The rethinking of tribal women's inheritance rights is a step toward **substantive equality**. By moving beyond the binary of "Hinduisation" and acknowledging that Articles 14 and 15 apply to every citizen, the Indian legal system can finally bridge the gender parity gap. True empowerment lies in a framework where a tribal woman does not have to sacrifice her identity to claim her rightful share of ancestral dignity.

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