



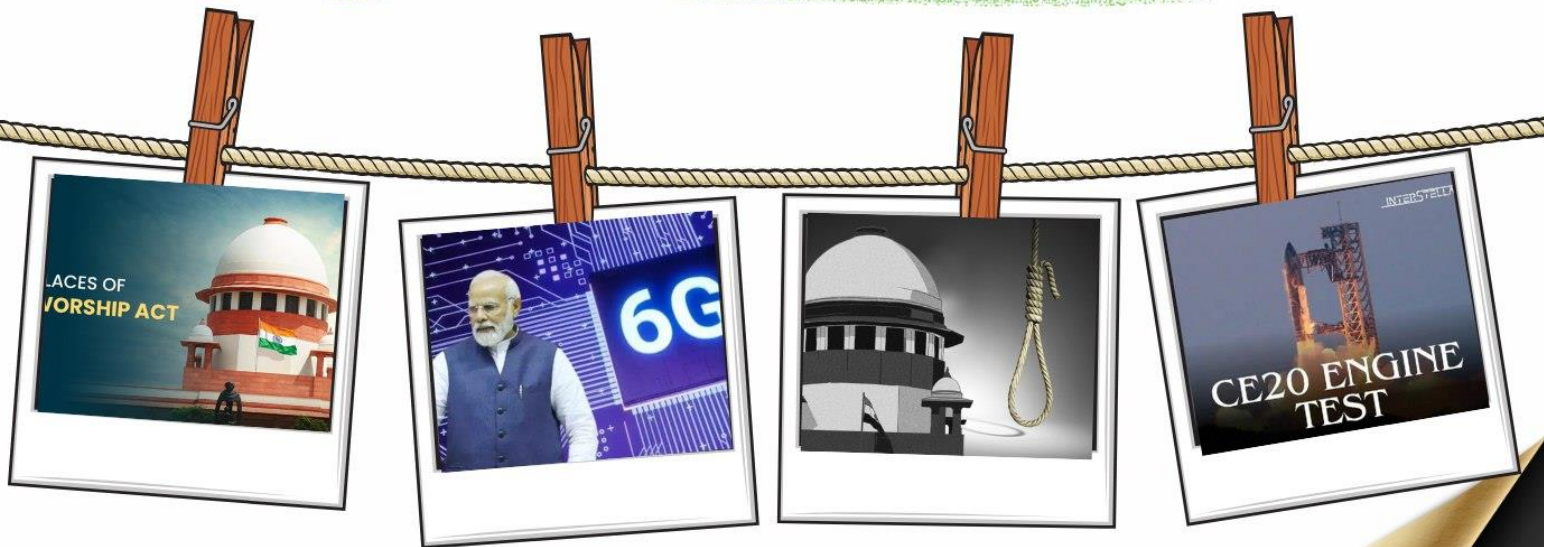
# Weekly Current Affairs



## To The Point

by Dhananjay Gautam

08 - 14 Dec 2024



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**PM-DevINE: Accelerating Development in the North East Region**

**Context:** The government recently announced in the Rajya Sabha that **35 projects worth 4857.11 crore** under the **PM-DevINE scheme** have been sanctioned, including seven key initiatives introduced in the **Union Budget 2022-23**.

**What is the PM-DevINE Scheme?**

**Overview:**

**PM-DevINE** (Prime Minister's Development Initiative for North East Region) is a **Central Sector Scheme** launched in the **Union Budget 2022-23**. Its purpose is to foster **rapid and inclusive development** in the **North East Region (NER)**. Approved on **12th October 2022**, the scheme has a financial allocation of **6600 crore** for the period **2022-23 to 2025-26**.

**Key Features:**

- **Implementation:** Managed by the **Ministry of Development of the North Eastern Region (MDoNER)** to address region-specific challenges and ensure efficient execution.
- **Infrastructure Focus:**
  - **17 infrastructure projects** worth 2806.65 crore have been approved.
  - Aligns with **PM GatiShakti**, emphasizing seamless connectivity across the NER.
- **Social and Livelihood Priorities:**
  - Supports projects addressing **critical social challenges**.
  - Promotes **sustainable livelihood opportunities** for **youth and women**, enabling greater participation in regional development.
- **Bridging Disparities:** Addresses gaps in sectors not covered by other government schemes, ensuring **balanced development**.

**Achievements Under PM-DevINE:**

- **35 Projects Approved:** Total worth 4857.11 crore, including cancer care facilities, university upgrades, and radiation oncology centers.
- **Road Connectivity:** New roads connecting remote villages, reducing travel time, and boosting local economies.
- **Smart Water Supply Systems:** Over **1 lakh residents** benefited from integrated drinking water systems.

**Ineligible Projects:**

- Projects involving **Direct Benefit Transfers (DBT)** or those offering long-term individual benefits.
- Administrative buildings, government offices, or sectors already addressed by **existing MDoNER schemes** or listed in the **Negative List**.

**Other Development Initiatives in the North East:**

**1. Infrastructure Development**

- **Bharatmala Pariyojana**, **Kaladan Multi-Modal Transit Project**, and the **India-Myanmar-Thailand Trilateral Highway** improve **regional and international connectivity**, enhancing trade and economic growth.
- The **Regional Connectivity Scheme (UDAN)** makes air travel affordable and accessible, linking remote areas of the NER.

**2. Industrial Growth**

- **North East Industrial Development Scheme (NEIDS)** (2017–2022): Provides **incentives to MSMEs**, boosting employment and industrial growth.
- **UNNATI Scheme (2024):** Focuses on **industrialization**, offering benefits such as **capital investment support** and **interest subventions**.

**3. Agriculture and Environment**

- **National Bamboo Mission:** Promotes sustainable bamboo development.





- **North Eastern Region Agri-Commodity e-Connect (NE-RACE):** Connects farmers with global markets, increasing agricultural incomes.

#### 4. Digital Transformation and Innovation

- **Digital North East Vision 2022:** Utilizes **digital technologies** to transform lives and improve governance.
- **North East Science and Technology Cluster (NEST):** Encourages grassroots innovations and eco-friendly technological solutions.

#### 5. Tourism, Culture, and Entrepreneurship

- **Swadesh Darshan Scheme:** Develops **tourism circuits** to showcase the region's natural beauty and heritage, boosting **eco-tourism**.
- Cultural festivals like the **Hornbill Festival**, **Pang Lhabsol**, and the **Ashtalakshmi Mahotsav** promote local traditions, handicrafts, and tourism.

#### Conclusion:

The **PM-DevINE scheme**, alongside other government initiatives, is a transformative step towards creating a more connected, prosperous, and self-reliant **North East Region**. With a focus on **infrastructure**, **livelihoods**, and **regional balance**, the initiative is set to unlock the untapped potential of the NER and integrate it seamlessly into the national growth narrative.

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## Collapse of France's Government: A Political Crisis Unfolds

**Context:** French Prime Minister Michel Barnier resigned following a **no-confidence vote**, triggered by an unlikely alliance of **far-right and leftist lawmakers**. This marks the **first government collapse via no-confidence** in over six decades, leaving France in a **political crisis** just three months after the government took office.



Barnier now holds the distinction of being **France's shortest-serving Prime Minister** in modern history. Until a new government is formed, his administration will function in a **caretaker capacity**. **President Emmanuel Macron** is set to address the nation regarding the next steps.

### France's Electoral System:

#### System of Governance:

France operates under a **semi-presidential system**, established by the **Fifth Republic in 1958**. This hybrid model blends **presidential** and **parliamentary systems**, with shared powers between the **President** and the **Prime Minister**.

- **President:** Handles **foreign policy** and **strategic decisions**.
- **Prime Minister:** Manages **domestic policies** and **parliamentary affairs**.

#### Parliamentary Structure:

- **National Assembly:** The lower house, comprising **577 deputies**, elected for a five-year term via a **two-round voting system**.
- **Senate:** The upper house, whose members are indirectly elected by a local **electoral college**.

#### Key Roles in Governance:

- **President's Powers:**
  - Appoints the Prime Minister.
  - Commands the armed forces.
  - Can dissolve the National Assembly.
  - Holds emergency powers under **Article 16** of the Constitution.
- **Prime Minister's Role:**
  - Implements laws and oversees ministries.
  - Accountable to the National Assembly.

#### Prime Minister Appointment Process:

- The **President appoints the Prime Minister** without requiring National Assembly approval, though the PM must command a **majority in the Assembly** for legislative stability.
- The PM's government can be forced to resign via a **no-confidence vote**.

#### Background of France's Current Political Crisis:

**Dissolution of Parliament:** Political instability arose when **President Macron dissolved parliament** in June following **centrist losses** in the European Parliament elections.

#### Fragmented Political Landscape:

The subsequent elections created a **deeply divided parliament**, with three nearly equal blocs:

1. **Left-wing coalition (NFP):** Emerged as the largest group but was denied the chance to form a government.
2. **Centrist and center-right alliance:** Formed a fragile government under Barnier.
3. **Far-right bloc:** Held significant sway in legislative decisions.

Barnier's appointment created a **"cohabitation" scenario**, where the **Prime Minister and President** come from opposing parties.

#### Barnier's Strategy:

To gain support, Barnier adopted rhetoric addressing issues like **crime, immigration, and economic relief**. However, his strategies failed to secure stable backing.



## Why Did the Government Fall?

### Trigger: Austerity Budget:

- The crisis began when **leftist lawmakers proposed a no-confidence motion** in response to Barnier's controversial **austerity budget**, which aimed to save **€60 billion** through **spending cuts** and **tax hikes**.
- To bypass parliamentary approval, Barnier invoked **Article 49.3** of the Constitution, escalating tensions and sparking the no-confidence vote.

### What Does This Mean for France?

1. **Political Uncertainty:** The government's collapse has left France in a **state of limbo**, with concerns over functioning without a stable government or a finalized **2025 budget**. This instability has shaken investor confidence, briefly driving **France's borrowing costs** above **Greece's**.
2. **Emergency Budget Provisions:** Despite the turmoil, France's Constitution allows a **caretaker government** to implement emergency measures, including extending the previous year's budget, ensuring continuity in **public sector salaries** and avoiding a **US-style government shutdown**.
3. **Broader Impact on the EU:** The political crisis in France adds to the European Union's challenges, including:
  - **Germany's coalition government collapse.**
  - Concerns about maintaining EU unity amidst the possible return of **Donald Trump to the US Presidency**.

### Conclusion:

The fall of France's government underscores the fragility of its political landscape, with implications reaching beyond national borders. As President Macron works to stabilize the situation, this crisis serves as a stark reminder of the challenges in navigating a fragmented democracy amidst global economic and political pressures.

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## PM e-VIDYA: Revolutionizing Digital Education in India

**Context:** The Union Minister for Education recently inaugurated **PM e-VIDYA DTH 24x7 Channel No. 31**, dedicated to **Indian Sign Language (ISL)**, in New Delhi. This initiative marks a significant step toward inclusive education for students with hearing impairments.

**What is PM e-VIDYA?**

**Introduction:**

- **Launched on 17th May 2020** under the **Atmanirbhar Bharat Abhiyaan**, PM e-VIDYA aims to bridge the **digital divide** and promote **quality education** across India.
- The program is designed to provide **multi-modal access** to learning resources and minimize learning gaps, ensuring **inclusivity** and **equality** in education.

**Alignment with NEP 2020:**

- The initiative supports the goals of the **National Education Policy (NEP) 2020**, emphasizing equitable access to **high-quality education**.
- By leveraging technology, PM e-VIDYA ensures that students, especially those in **rural and remote areas**, benefit from an extensive array of **digital content**.

**Key Components of PM e-VIDYA:**

**1. DIKSHA (Digital Infrastructure for School Education):**

- A **national digital platform** offering **e-content** for students and teachers.
- Features **QR-coded Energized Textbooks** for all grades, aligning with the concept of "**One Nation, One Digital Platform**".

**2. PM e-VIDYA DTH TV Channels:**

- Originally launched with **12 DTH channels**, the program has now expanded to **200 channels**, covering classes **1 to 12** in multiple **Indian languages**.
- This ensures that students from various linguistic and regional backgrounds have access to supplementary education.

**3. SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds):**

- A **national MOOC platform** offering courses for **higher education** and **school-level content (Classes 9–12)** via **NIOS** and **NCERT**.
- Features over **10,000 courses**, with **credit transfer provisions** and an active enrollment of **4.1 lakh students** for NCERT courses.

**4. Radio, Community Radio, and CBSE Podcast - Shiksha Vani:** Educational content is broadcast through **radio** and **podcasts**, reaching students in areas with limited or no **internet connectivity**.

**5. e-Content for Teachers:**

- Includes a range of **interactive videos**, **audiobooks**, and **digital tools** for teacher education.
- Features quizzes and activities to enhance teaching and learning experiences.

**How PM e-VIDYA is Transforming Education:**

- **Accessibility for All:** Focuses on **inclusive education** by reaching students in underserved areas and catering to those with special needs.
- **Multi-Mode Learning:** Combines **digital platforms**, **on-air programs**, and **offline resources** to make education accessible anytime, anywhere.
- **Expanding Educational Horizons:** Offers **regional language support**, enabling students across states to benefit from personalized learning content.

**Conclusion:**

PM e-VIDYA is a groundbreaking initiative that embodies the vision of "**Education for All**" by integrating technology, inclusivity, and innovation. With its **multi-modal learning approach**, it not only addresses the challenges of accessibility but also paves the way for a **digitally empowered** education system in India.



**NHAI Contractor Rating System: Ensuring Excellence in Highway Development**

**Context:** The National Highway Authority of India (NHAI) has introduced a new **Contractor Rating System** to evaluate the performance of concessionaires responsible for the construction and maintenance of **National Highways**.

**About the NHAI Contractor Rating System:**

**Overview:**

- This system provides a **detailed methodology** for assessing concessionaires, aimed at promoting **accountability** and improving the quality of **highway infrastructure**.
- Concessionaires will be **evaluated every six months**, and their ratings will be published on the **NHAI website** and its social media platforms.

**Assessment Methodology:**

**1. Performance Metrics**

The evaluation is based on:

- Pavement Condition Index (PCI):** A scientific metric ranging from **0 to 100**, assessing the pavement's condition from 'Excellent' to 'Failed' as per **IRC 82:2023 guidelines**.
- Defect Rectification Compliance:** Tracked digitally via the **NHAI One App**, which monitors over **95 defect types**.

**2. Weightage Allocation:**

- 80% weightage:** Based on the **PCI score**.
- 20% weightage:** Based on compliance data from the **NHAI One App**.

**3. PCI Calculation Parameters:**

PCI is determined using six functional criteria:

- Roughness**
- Potholes**
- Cracking**
- Ravelling**
- Rut Depth**
- Patchwork**

**Technology Involved:** Advanced tools like **Laser Crack Measurement Systems** and **Network Survey Vehicles (NSV)** are used to gather data, which is processed centrally under NHAI's supervision.

**Rating and Categories:**

- Contractors will be scored on a scale of **0 to 100**.
- Those scoring **below 70** will be classified as **non-performers** and will be **ineligible for new projects** until their ratings improve.

**Two-Level Assessment:**

- Project Level:** Performance evaluated for individual projects.
- Concessionaire Level:** Overall performance assessment across projects.

The ratings will be reviewed every six months, incorporating **NSV survey data** and compliance records from the **NHAI One App**.

**Significance of the Rating System:**

- Enhancing Accountability:** The system ensures concessionaires are held accountable for delivering high-quality infrastructure and timely maintenance.
- Improved Travel Experience:** By focusing on **safer and smoother highways**, the system aims to provide a **seamless travel experience** for road users.
- Promoting Transparency:** Publicly accessible ratings encourage **transparency** and motivate contractors to prioritize **performance excellence**.

The **NHAI Contractor Rating System** is a progressive step toward maintaining **world-class highway standards**, ensuring that India's road infrastructure continues to meet the needs of a growing nation.



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## Uproar Over Hindi and Sanskrit Names for Bills in Parliament

**Context:** A heated debate has erupted in Parliament over the government's decision to use **Hindi and Sanskrit names** for new legislative Bills. Opposition MPs have criticized the move, accusing the government of **Hindi imposition** and violating **constitutional provisions**.



The controversy was ignited during discussions on the **Bharatiya Vayuyan Vidheyak** (Indian Aircraft Bill), sparking strong objections from various political parties.

### Opposition's Concerns:

#### 1. Alleged Violation of Article 348:

- **Article 348(1B)** of the Indian Constitution mandates that the **authoritative text of laws** should be in English.
- The Opposition argued that naming Bills in **Hindi or Sanskrit** could be seen as a breach of this constitutional requirement.

#### 2. Imposition of Hindi:

- Opposition MPs claimed the move reflects **Hindi imposition**, disregarding India's **linguistic diversity**.
- With nearly **60% of India's population** speaking non-Hindi languages, naming Bills in Hindi or Sanskrit risks **excluding non-Hindi speakers**.

#### 3. Practical Challenges:

- MPs raised concerns over the **pronunciation difficulties** associated with Hindi titles.
- They questioned the rationale behind using **Hindi names with English script**, further complicating accessibility for non-Hindi speakers.

### Government's Defense:

#### 1. Celebration of Heritage:

- The government dismissed the allegations as a reflection of a **colonial-era mindset**, defending the use of Hindi names as a way to honor India's **cultural pride and linguistic heritage**.
- Terms like **"Bharatiya"** (Indian) and **"Vayu"** (air) are common across many Indian languages, symbolizing **linguistic unity** rather than division.

#### 2. Inclusivity of Language:

- The government emphasized that many Indian languages, including **Telugu**, share similar words, making these terms **universally relatable** across India.

### Constitutional Provisions on Language:

#### Key Articles from the Indian Constitution:

- **Article 348(1):** All proceedings in the **Supreme Court and High Courts** shall be conducted in English unless Parliament provides otherwise.
- **Article 348(2):** States may authorize the use of Hindi or another local language for High Court proceedings, subject to **Presidential approval**, but **judgments and decrees** must still be issued in English.

#### Status Quo:

- Despite provisions allowing for changes, no law has been enacted by Parliament to alter the **primacy of English** in court and legal proceedings.

### Key Issues in the Debate:

1. **Linguistic Diversity:** India's **22 official languages** and numerous dialects make language a sensitive issue. Critics argue that prioritizing **Hindi and Sanskrit** undermines the **pluralistic ethos** of the nation.
2. **Compliance with Article 348:** While the **text of Bills remains in English**, the use of Hindi or Sanskrit for naming them raises questions about adherence to constitutional provisions.





3. **Balancing Unity and Diversity:** The debate underscores the challenge of balancing **national unity** with the **linguistic diversity** that is central to India's identity.

**Conclusion:**

The controversy over **naming Bills in Hindi and Sanskrit** highlights the complexities of governing a **multilingual nation** like India. While the government sees it as a step toward celebrating **cultural heritage**, the Opposition perceives it as a threat to the nation's **linguistic harmony**.

This debate reinforces the need for **inclusive language policies** that respect **India's diversity** while promoting **national unity**.





## Including Non-Mineralised Areas in Mining Leases

**Context:** Recently, the Centre has allowed state governments to include **non-mineralised areas** within existing mining leases for **dumping mine waste** and **overburden**, aiming to streamline operations and address industry challenges. This move is a clarification under the **Mines and Minerals (Development and Regulation) Act, 1957**.

**What are the Supreme Court Rulings for Regulating Mining and Minerals?**

**Centre's Authority Over Mining:**

- In **1989**, a landmark ruling in the **India Cement Ltd. v. the state of Tamil Nadu** case established the Centre's primary authority over **mining regulation** via the **Mines and Minerals (Development and Regulation) Act, 1957**, and **Entry 54 of the Union List**.
- The **State of Orissa v. M.A. Tulloch & Co.** case further clarified that states could only collect **royalties**, not impose **additional taxes**.
- July 2024** saw the Supreme Court overturn the 1989 verdict, affirming states' authority to **tax mineral rights** under **Entry 50 of List II (State List)**, although this raised concerns about potential **federal disruptions** in mineral pricing and development.
- Goa Foundation v. Union of India, 2014:** The Court ruled against **dumping mine waste** outside valid lease areas, emphasizing the need for **environmental compliance**.

**Recent Developments:** The **Mines and Minerals (Development and Regulation) Amendment Act, 2023:** Focuses on **critical minerals** such as **lithium, graphite, cobalt, and rare earth elements**, paving the way for **private sector exploration** and reducing **import dependence** for these crucial resources.

**Implications of the Recent Inclusion of Non-Mineralised Areas:**

**Streamlined Operations:**

- Inclusion** of non-mineralised areas within mining leases ensures **efficient management** of overburden and waste.
- Overburden**, consisting of **rocks, soil, and materials** removed to access minerals, must be **properly managed** for safe mining practices.

**Compliance with Supreme Court Rulings:** This move aligns with the **2014 Supreme Court ruling**, which prohibited **dumping outside valid lease areas**, ensuring **environmental protection**.

**Efficient Land Utilisation:** **Non-mineralised areas** lacking significant mineral deposits can be allocated by **state governments** for waste disposal, **streamlining operations** without the need for **separate auctions**.

**Industry Growth:**

- Eases **operational hurdles**, fostering **sustainable mineral extraction** and **growth** in the **mining sector**.
- States can allocate **contiguous** or **non-contiguous** non-mineralised areas for waste management if it benefits **mineral development**, offering **operational flexibility**.

**Safeguards Against Misuse:**

- States must **verify** non-mineralised areas, **consult** the **Indian Bureau of Mines (IBM)** for extent determination, and **notify** IBM about supplementary leases, preventing **illegal mineral extraction**.

**The Mines and Minerals (Development and Regulation) Act, 1957**

**Pivotal Legislation:**

- Aimed at developing India's mining sector**, conserving **minerals**, and ensuring **transparency** and **efficiency** in **exploitation**.

**Amendments Over the Years:**

- 2015 Amendment:** Introduced **Auction Method** for **transparency**, **District Mineral Foundation (DMF)** for mining-affected areas, **National Mineral Exploration Trust (NMET)** to boost exploration, and **stricter penalties** for **illegal mining**.





- **2021 Amendment:** Allowed **captive mines** to sell up to **50%** of annual production in the open market.
- **2023 Amendment:** Focuses on **reducing import dependence** and **engaging junior mining companies** in exploring **deep-seated** and **critical minerals**.

**Economic and Environmental Impact:**

- **Encourages private sector participation** in **exploration** and **extraction**, supporting **India's energy transition** and commitment to **net-zero emissions by 2070**.

**Significance of India's Mineral Policy:****Economic Governance:**

- **Streamlines the allocation** and **utilisation** of **mineral resources**, fostering **sustainable** and **economic growth**.

**Sustainable Resource Management:**

- Ensures **environmental** and **social safeguards** in **mining operations**, aligning with **Supreme Court rulings** and **constitutional provisions**.

**Environmental Regulations:**

- **Protects non-lease areas** from unauthorized **mining activities**, preserving **biodiversity** and **environmental integrity**.

**Key Takeaways:**

- The recent inclusion of non-mineralised areas in mining leases represents a significant shift in **India's mineral policy**, balancing **economic development** with **environmental sustainability**. This aligns with the country's broader goals of **economic governance** and **net-zero emissions**.

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## RBI's Strategy on De-Dollarization and Risk Diversification

**Context:** The Reserve Bank of India (RBI) has clarified its stance on **de-dollarization**, asserting that recent measures aim at **diversifying risks** rather than completely moving away from the **US dollar**.

- **De-dollarization** refers to reducing dependence on the **US dollar** in **international trade** and **reserves**.
- This strategy often stems from **geopolitical tensions** and the pursuit of **economic sovereignty**.
- The RBI's approach reflects a balance between **global economic realities** and **India's financial stability**.



The clarification comes amidst geopolitical statements, including threats of "**100% tariffs**" by the US if countries, including BRICS nations, sought alternatives to the **dollar**.

### Key Highlights:

#### 1. Emphasis on Diversification Over Complete De-Dollarization:

- RBI Governor **Shaktikanta Das** emphasized that initiatives like **local currency trade agreements** and **Vostro accounts** are designed to **reduce dependency** on the dollar, not eliminate it.
  - **Vostro accounts** are Indian rupee-denominated bank accounts held by foreign banks in India.
  - They enable **trade in local currencies**, reducing reliance on third-party currencies like the dollar.
- The primary aim is to **mitigate risks** from over-reliance on a single currency for trade and reserves.

#### 2. Central Banks' Shift to Gold:

- Central banks, including the **RBI**, are increasingly buying **gold** to diversify reserves.
  - In **2022**, global central banks purchased a record **1,136 tonnes** of gold, followed by **1,037 tonnes** in **2023**.
  - The RBI added **27 tonnes of gold** in October **2024**, the largest acquisition among central banks during this period.
- This shift is driven by global **uncertainties**, including the **Ukraine war** and fears of **secondary sanctions** against countries like **Russia** and **China**.

#### 3. Addressing Dollar Dominance:

- The **US dollar's share** in global foreign reserves is gradually declining, partly due to the rise of the **Chinese yuan**.
- Emerging markets like **India** are seeking alternatives to mitigate **geopolitical** and **economic risks** tied to dollar dominance.

#### 4. Encouraging Domestic Currency Trade:

- India is promoting **domestic currency trade** with partners like **Russia** and the **UAE** to reduce risk exposure.
- However, international trade in rupees remains limited due to **India's trade deficits** with most nations, except the US.

### Geopolitical Context:

#### 1. BRICS and Currency Discussions:

- **BRICS nations** have explored the idea of a **shared currency**, but challenges persist due to their diverse **economic** and **geographic landscapes**.
- India has resisted adopting the **Chinese yuan** for Russian oil imports, emphasizing the importance of **economic sovereignty**.

#### 2. Challenges in South Asia:

- In neighboring countries like **Sri Lanka**, **Pakistan**, and **Bangladesh**, rising **oil prices** and declining **dollar reserves** have triggered **economic turmoil**.
- While India has maintained **healthy reserves**, the country remains alert to the **volatility of the dollar**.

**Conclusion:**

The RBI's cautious approach to managing **dollar dependence** highlights a **strategic balance** between mitigating **economic risks** and maintaining **global trade stability**.

- Initiatives like **increased gold reserves** and promoting the **rupee** for international trade underscore India's efforts to diversify risk.
- However, challenges such as **trade deficits** and **high transaction costs** in local currency trade hinder a full-scale move away from the **dollar**.

This strategy reflects India's commitment to **financial stability**, **economic sovereignty**, and navigating a complex global landscape with resilience.



## New Genetic Study Reveals Close Ties Between Nicobarese and Southeast Asian Htin Mal Community

**Context:** A groundbreaking genetic study reveals that the **Nicobarese tribe**, indigenous to the **Nicobar Islands**, shares a significant genetic connection with the **Htin Mal community** of **Thailand** and **Laos**.

This study, published in the **European Journal of Human Genetics**, involved a comprehensive analysis of **1,559 samples**, offering fresh insights into ancient migrations and cultural exchanges across **South and Southeast Asia**.



### Why in News?

The study highlights the **Austroasiatic linguistic and genetic linkages** between the **Nicobarese** and the **Htin Mal**, providing a deeper understanding of the tribe's ancestral roots.

The findings mark the **first detailed genetic analysis** of the Nicobarese population, emphasizing their migration patterns and evolutionary history.

### Tribals in the Andaman & Nicobar Islands

#### Key Tribes:

The **Andaman & Nicobar Islands** are home to several indigenous tribes, each with distinct cultures and identities:

- **Great Andamanese**
- **Onges**
- **Sentinelese**
- **Jarawas**
- **Nicobarese**

#### Steps for Tribal Welfare:

1. **Building Communication and Trust:** The administration has established effective communication channels with tribes like the **Jarawas**, enhancing trust and collaboration.
2. **Protecting the Sentinelese**
  - A strict **"eyes-on and hands-off"** policy ensures minimal interference with the isolated **Sentinelese** tribe.
  - A circumnavigation protocol prevents poaching and safeguards their environment.

### The Htin Mal Community:

#### Who are the Htin Mal?

The **Htin Mal community** resides in mainland **Southeast Asia**, primarily in **Thailand** and **Laos**. They speak an **Austroasiatic language**, part of the **Khmuic branch**, which connects them linguistically to the **Nicobarese tribe**.

#### Ethnic Significance:

- Despite their genetic closeness to the Nicobarese, the Htin Mal have maintained a distinct ethnic identity.
- Their study is vital in understanding **ancient migrations** and **cultural exchanges** across Southeast Asia.

### Key Findings of the Genetic Study:

#### About the Study:

The research was led by scientists from the **CSIR-Centre for Cellular and Molecular Biology (CCMB)**. It analyzed **DNA markers** inherited from both parents to trace the genetic history of the **Nicobarese population**.

#### Major Discoveries:

- The **Nicobarese** share a strong **ancestral connection** with **Austroasiatic populations** in **South and Southeast Asia**.
- The tribe likely settled in the **Nicobar Islands** approximately **5,000 years ago**, possibly during the **Neolithic era**.





- A close genetic affinity was identified with the **Htin Mal**, reinforcing their **shared ancestry**.

### **Nicobarese Tribe: A Closer Look:**

#### **Location and Habitat**

The **Nicobarese tribe** inhabits the **Nicobar Islands**, located in the eastern **Indian Ocean**. Key islands include **Car Nicobar**, **Great Nicobar**, **Little Nicobar**, and **Nancowry**.

#### **Historical Migration:**

- The Nicobarese are believed to have migrated to the islands **4,500–5,000 years ago**, with men and women relocating together.
- Earlier theories suggested migration during the **early Holocene (11,700 years ago)**, but this new study revises the timeline.

#### **Cultural and Genetic Preservation:**

- Isolation from mainland populations has preserved the **Nicobarese tribe's genetic lineage**, language, and ethnic identity.
- Stable **DNA markers** allowed researchers to trace their **ancestral roots** accurately.

#### **Current Lifestyle:**

- The **Nicobarese**, numbering approximately **25,000**, live sustainably in **forested regions**.
- Their livelihood includes **farming, animal husbandry** (pigs, goats, hens), and the use of **forest resources** like **coconut palm**.

#### **Need for Protection:**

To preserve their unique genetic and cultural heritage, researchers stress the importance of shielding the tribe from exposure to mainland pathogens, which could jeopardize their health and identity.

#### **Conclusion:**

This genetic study reaffirms the deep historical ties between the **Nicobarese** and **Southeast Asian communities**, shedding light on ancient migration patterns and cultural exchanges.

As a critical link in understanding human history in the region, the **Nicobarese tribe** underscores the importance of safeguarding **indigenous communities** and their unique legacies.

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## Debate over Tungsten Mining in Madurai: A Clash of Priorities

**Context:** A recent decision to permit **tungsten mining** in the **biodiversity-rich Melur region** of **Madurai, Tamil Nadu**, has sparked intense debate.

The project, initiated by the **Union Ministry of Mines**, has drawn sharp criticism from **environmentalists, local activists**, and the **state government**, citing concerns over **biodiversity loss** and **cultural disruption**.



### What is Tungsten?

#### A Critical Mineral:

Tungsten is a **rare, dense metal** renowned for its **hardness, heat resistance**, and the **highest melting point** among all metals (**3,422°C**).

It is deemed a **critical resource** due to its vital role in **defense, high-tech industries**, and **green energy** applications.

#### Key Applications:

##### 1. Industrial Tools:

- Utilized in **cutting tools, drills**, and **abrasives** due to its exceptional durability.
- Tungsten carbide**, a compound of tungsten, is highly valued for manufacturing robust tools.

##### 2. Electronics:

- Integral to **light bulb filaments, X-ray tubes**, and **electrical contacts**.
- Used in **semiconductors** and **heating elements**.

##### 3. Aerospace and Defense:

- Forms **high-strength alloys** for **military armor** and **aerospace components**.
- Employed in **missile tips** and **radiation shielding** due to its density.

##### 4. Medical and Green Energy:

- Critical for **medical imaging devices** and **radiation shielding** in cancer treatment.
- Essential in **wind turbines** and **superalloys** for green energy technologies.

### India's Tungsten Landscape:

#### • Major Deposits:

- Rajasthan** (Degana Mines), **Andhra Pradesh**, and **Karnataka**.

#### • Current Status:

- Limited production has led India to **rely on imports** for most of its tungsten needs.

### Global Leaders in Tungsten:

- China:** Dominates production with over **80% of global output**.
- Other major players: **Russia, Canada, Vietnam**, and **Austria**.

### The Controversy:

#### The Project:

On **November 7, 2024**, **Hindustan Zinc Limited**, a **Vedanta subsidiary**, was awarded rights to mine tungsten in **Nayakkarpatti, Madurai**.

The site, spanning **2,015.51 hectares**, contains rich deposits of **scheelite**, a primary tungsten ore.

#### Concerns Raised:

The site overlaps with the **Arittapatti-Meenakshipuram Biodiversity Heritage Area**, notified in **2022** to protect its unique flora, fauna, and cultural landmarks.

#### Opposition to the Mining Project:

##### Environmental Concerns:

- The biodiversity site, covering **193.63 hectares**, is home to rare **flora and fauna**.
- Activists warn of potential harm from **tailings**, which may release harmful metals like **arsenic, cadmium**, and **lead**, threatening both the **environment** and **human health**.

##### Cultural Significance:

- The region holds **ancient temples** and **Jain relics**, vital to Tamil Nadu's **cultural heritage**.
- Locals fear mining will **distort the identity** of this historic area.

**Public Outcry:**

- Environmental groups, including **Poovulagin Nanbargal**, have opposed the project.
- Activist **R.S. Mugilan** criticized **Vedanta's environmental track record**, citing past incidents like pollution from its **Thoothukudi copper plant**.

**Government's Stance:****State Government's Position:**

- Tamil Nadu's **Chief Minister M.K. Stalin** has pledged to **block the project**, citing ecological and cultural concerns.
- The state claims it **notified the Centre** about the biodiversity heritage status during initial discussions.

**Union Government's Argument:**

- The **Union Ministry of Mines** stated there was **no objection** from Tamil Nadu during the **auction process**.
- It highlighted the strategic significance of tungsten for **national security** and **technological progress**.

**Conclusion:**

The **Madurai tungsten mining project** reflects a broader conflict between **economic priorities** and **environmental preservation**.

While the Union government stresses the **strategic importance** of mining for critical minerals, Tamil Nadu and environmentalists argue for safeguarding **biodiversity** and **cultural heritage**.

The final decision could set a crucial precedent for balancing **resource exploitation** with **sustainability** in India.

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## India-Bhutan Strengthen Ties: Key Areas of Cooperation

**Context:** The recent visit of **King Jigme Khesar Namgyel Wangchuck of Bhutan** to India has further deepened the enduring partnership between the two nations. The visit focused on enhancing cooperation in **hydropower, regional connectivity, and sustainable development**, reaffirming the **strategic and economic ties** between the neighbors.

### Key Outcomes of the Visit:

#### Advancing Hydropower Collaboration:

- **Punatsangchhu Hydropower Project:** Both sides stressed the importance of completing **Phase I & II** of this vital project.
- **New Reservoir Projects:** Discussions showcased a shared vision for expanding **energy cooperation** through **innovative hydropower initiatives**.

#### Gelephu Mindfulness City Project:

- India extended its support to develop **Gelephu**, a southern Bhutanese town near the **Assam border**, into a hub of **sustainable urban planning and development**.
- **Strategic Location:** Gelephu's proximity to Assam positions it as a **key point for regional trade and connectivity**.

#### Boosting Cross-Border Connectivity:

- **Rail and Digital Projects:** Talks focused on enhancing **cross-border trade**, improving **rail connectivity**, and upgrading **digital infrastructure** for seamless integration.
- **Integrated Check Post (ICP):** The opening of the **ICP at Darranga, Assam**, represents a significant step toward improving **regional connectivity and logistics**.

#### Private Sector Partnerships:

- Bhutan emphasized collaboration with Indian giants like the **Adani Group**, focusing on **renewable energy** projects, including **solar power, hydropower, and urban infrastructure** in Gelephu.

### Significance of Hydropower in India-Bhutan Relations:

#### Economic Benefits for Bhutan:

- **Revenue Generation:** Hydropower accounts for a substantial portion of Bhutan's **national income** through electricity exports to India.

#### Mutual Advantages:

- **Energy Security for India:** These projects support India's **renewable energy targets** and bolster its **energy security**.
- **Strengthened Cooperation:** Hydropower serves as a cornerstone of the partnership, fostering mutual growth and interdependence.

#### Future Prospects:

- Both nations are committed to exploring **new hydropower projects**, ensuring the **long-term sustainability** of this collaboration.

### Challenges and Opportunities for India:

#### Challenges:

1. **Project Delays:** Long-standing delays, such as in the **Punatsangchhu-I project**, hinder progress.
2. **Geopolitical Rivalry:** Increased **Chinese investments** in the region pose a challenge to India's influence in Bhutan.

#### Opportunities:

1. **Diversification of Cooperation:** Beyond hydropower, India and Bhutan can expand into areas like **urban development and digital infrastructure**.
2. **Private Sector Engagement:** Involvement of Indian firms like the **Adani Group** brings **new investments, technologies**, and strengthens India's role in Bhutan's development.





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## Conclusion:

The visit of King Jigme Khesar Namgyel Wangchuck underscores the importance of **India-Bhutan relations** in fostering **regional stability** and **economic progress**. With a renewed focus on **hydropower**, **connectivity**, and **sustainable development**, the partnership remains pivotal in addressing challenges and leveraging opportunities for mutual growth.



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## India's 100-Day TB Elimination Campaign: A Bold Step Towards a Healthier Future

**Context:** India is taking a significant stride in its fight against **tuberculosis (TB)** with the launch of the **100-Day TB Elimination Campaign** by the **Ministry of Health and Family Welfare**. This initiative aligns with India's ambitious goal of eradicating TB by **2025**, five years ahead of the **global target of 2030**.

**About the 100-Day TB Elimination Campaign:**

- The campaign will be implemented across **33 States and Union Territories**, focusing on:
  - Enhancing TB case detection.
  - Reducing diagnostic delays.
  - Improving treatment outcomes.
- With **India carrying the highest TB burden globally**, this initiative is critical in addressing the epidemic effectively.



**Understanding Tuberculosis (TB):**

**What is TB?**

- TB is an **infectious disease** caused by the bacterium **Mycobacterium tuberculosis**, primarily affecting the **lungs** but also impacting the **kidneys, brain, spine, and skin**.
- Symptoms:** Persistent **cough, chest pain, fatigue, weight loss, fever, and night sweats**.
- Transmission:** Spread through the air when infected individuals **cough, sneeze, or spit**.
- Treatment:** Preventable and curable using antibiotics.
- Vaccine:** The **Bacillus Calmette-Guérin (BCG)** vaccine offers moderate protection against severe TB forms, particularly in children.

**India's TB Burden and Global Impact:**

- Global TB Cases:** TB surpassed COVID-19 as the **leading infectious killer** in 2023, with **8.2 million new cases**.
- India's TB Burden:**
  - 2.8 million cases** recorded in 2023.
  - India accounts for **26% of global cases** and **29% of global TB deaths** (315,000 fatalities).
  - Home to **27% of the world's multidrug-resistant TB cases**, requiring specialized treatment approaches.

**Challenges in Eliminating TB in India:**

- Drug-Resistant TB:**
  - Multidrug-resistant TB (MDR-TB)** demands expensive and prolonged treatments.
  - India faces a significant challenge in managing these cases effectively.
- Diagnostics and Case Detection:** Limited access to **modern diagnostic tools** leads to reliance on outdated methods, delaying treatment.
- Inadequate Healthcare Infrastructure:** Rural and remote areas lack **quality healthcare facilities**, resulting in delayed diagnoses and treatment.
- Social Stigma and Awareness:** **Stigma** around TB prevents individuals from seeking timely medical help, while lack of awareness perpetuates the disease.
- Private Sector Coordination:** A large portion of healthcare services in India is provided by the **private sector**, necessitating standardized treatment protocols and better collaboration.
- Treatment Adherence:** Ensuring patients complete their **prolonged antibiotic courses** remains a critical challenge.
- Vulnerable Populations:** Migrant workers, urban slum dwellers, and individuals living in **crowded conditions** are at heightened risk.



**Government Initiatives to Combat TB:**

1. **Revised National Tuberculosis Control Program (RNTCP):** Launched in 1997, this flagship program has been strengthened over time to improve TB management.
2. **National Tuberculosis Elimination Program (NTEP):** The **National Strategic Plan (2017–2025)** focuses on achieving TB-free India by 2025.
3. **Pradhan Mantri TB Mukht Bharat Abhiyan (PMTBMBA):** Introduced in 2022, this initiative provides **nutritional, diagnostic, and vocational support** to TB patients.
4. **Universal Drug Susceptibility Testing (DST):** Enables **early detection** of drug-resistant TB strains for customized treatment.
5. **Ni-kshay Portal:** Tracks and monitors **notified TB cases** to ensure better management.
6. **Introduction of New Drugs:** Inclusion of advanced drugs like **Bedaquiline** and **Delamanid** for treating drug-resistant TB.
7. **Research and Vaccine Development:** Trials for new vaccines like **Immuvac** and **VPM1002** are underway to provide better protection against TB.

**Suggestions for Enhanced TB Control:**

- Establish **global norms and standards** for TB prevention and care.
- Promote **evidence-based policies** and strengthen their implementation.
- Monitor progress in **TB financing, diagnosis, and treatment** at regional and national levels.

**Conclusion:**

India's **100-Day TB Elimination Campaign** is a decisive step toward achieving its **2025 TB-free goal**. While challenges like drug resistance, infrastructure gaps, and stigma remain, continued government initiatives, private sector collaboration, and increased public awareness can significantly reduce the burden of TB and set an example for the global fight against this deadly disease.

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**SAARC: Navigating Challenges and Opportunities on Its 40th Charter Day**

**Context:** On 8th December 2024, the South Asian Association for Regional Cooperation (SAARC) marked its 40th Charter Day, commemorating the establishment of this key regional organization.

**What is the South Asian Association for Regional Cooperation (SAARC)?**

- **Origins of SAARC:** The concept of regional cooperation in South Asia was first discussed at several key conferences: the **Asian Relations Conference (1947)**, the **Baguio Conference (1950)**, and the **Colombo Powers Conference (1954)**.
- **Formation:** The idea took shape in **1980** when **Bangladesh's President Ziaur Rahman** proposed the notion of regional cooperation to promote **peace and stability**.
- **Establishment:** SAARC was officially founded on **8th December 1985** in **Dhaka, Bangladesh**, with **7 founding members**—**Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka**. **Afghanistan** joined as the **8th member** in **2007**.
- **Objectives:**
  - **Promote welfare and improve quality of life in South Asia.**
  - **Accelerate economic growth, social progress, and cultural development.**
  - **Strengthen self-reliance and mutual trust** among member states.
  - **Enhance collaboration in economic, social, cultural, technical, and scientific fields.**
  - **Cooperate with other developing countries and international organizations.**
- **Key Principles:** **Sovereign equality, territorial integrity, non-interference, and consensus-based decision-making** are central to SAARC.



**Significance of SAARC Today:**

- **Demographic and Economic Relevance:**
  - **3% of the world's land area.**
  - **21% of the world's population.**
  - **5.21% (USD 4.47 trillion) of the global economy as of 2021.**
- **Scope of Cooperation:**
  - The **South Asian Free Trade Area (SAFTA)**, established in **2004** and effective from **2006**, aimed at **reducing tariffs and promoting free trade** in South Asia.
  - The **SAARC Agreement on Trade in Services (SATIS)**, coming into force in **2012**, aimed to **enhance intra-regional investments and liberalize trade** in services.

**India's Contribution to SAARC:**

- **SAARC Summits:**
  - Hosted **three** out of the **eighteen SAARC Summits**: the **2nd summit in Bengaluru (1986)**, the **8th summit in New Delhi (1995)**, and the **14th summit in New Delhi (2007)**.
- **Technological Cooperation:**
  - **National Knowledge Network (NKN)** extended to **Sri Lanka, Bangladesh, and Bhutan**, fostering **educational and technological exchange**.
  - **South Asian Satellite (SAS)** launched in **2017**, providing **satellite-based services** to SAARC countries.
- **Currency Swap Arrangement:**
  - In **2019**, India approved a '**Standby Swap**' in the **Currency Swap Arrangement** for SAARC members, amounting to **USD 400 million**, aimed at enhancing **financial cooperation**.
- **Disaster Management:**
  - **Interim Unit of the SAARC Disaster Management Center** hosted in **Gujarat** provides **policy advice, technical support, and training** for **disaster risk management** across SAARC countries.



- **South Asian University (SAU):**

- Established through an **Inter-Governmental Agreement** at the **14th SAARC**, SAU provides **world-class education** and **research opportunities** for students and scholars from SAARC nations.

**Role India Can Play in Strengthening SAARC:**

- **Leadership Role:**

- As the **largest economy**, **India** constitutes over **70%** of the area and **population** among the SAARC nations and is strategically connected to almost all member nations.
- **Initiatives** like the **SAARC satellite** and **support for infrastructure development** underscore **India's commitment**.

- **Proposed Measures:**

- India must continue offering **unilateral concessions** like **duty-free access** for **least developed SAARC nations**.
- Smaller nations should **leverage India's growth** for their own **development** rather than perceive it as a threat.
- **Strengthen regional connectivity projects** like the **BBIN Motor Vehicle Agreement** and integrate them with **global value chains**.
- **Counter** China's growing influence in South Asia while managing the **'Big Brother' perception** among **smaller neighbors**.
- Utilize platforms like **QUAD** and **Indo-Pacific partnerships** to **counterbalance** external pressures and ensure **regional cooperation**.
- Engage with **South and Southeast Asian nations** through **BIMSTEC**, bypassing **Pakistan**.
- Promote **people-to-people contact** through **scholarships**, **cultural exchanges**, and **tourism-focused initiatives**.

**Key Challenges Facing SAARC:**

- **Political Tensions and Bilateral Conflicts:**

- **India** and **Pakistan** dominate SAARC but their **strained relations**—including issues like **terrorism** and **territorial disputes**—have hindered cooperation.
- **Pakistan's refusal** to address **cross-border terrorism** led to **India** boycotting the **19th SAARC Summit** in **2016**, resulting in its **postponement**.

- **Low Economic Integration:**

- Intra-regional **trade** in SAARC is a mere **5%** of its total trade, compared to **65%** in the **European Union (EU)** and **26%** in the **Association of Southeast Asian Nations**.
- Limited **implementation** of **SAFTA** and **lack of product diversification** stymie **economic growth**.

- **Asymmetric Development:**

- India's dominance often leads to the **'Big Brother Syndrome'**, causing **mistrust** among smaller nations.
- Smaller member states often **perceive** India as **overly dominant**, leading to **resistance** against **Indian initiatives**. This perception discourages **collective action** and fosters **reliance** on **external powers** like **China**.
- **Nepal, Bhutan, and Maldives** struggle with **infrastructure deficits** and **limited resources**.

- **Institutional Weaknesses:**

- SAARC's **charter** requires **unanimous agreement** for decisions, enabling any **member** to **veto** progress on critical issues.
- **Pakistan** has frequently used this mechanism to **block agreements** like the **SAARC Motor Vehicles** and **Railways** pacts.
- **Observers** like **China, the EU, and the US** lack clarity on their roles, limiting external support.

- **External Influences:**



- China's growing presence through the **Belt and Road Initiative (BRI)** and its **strategic investments** in **Sri Lanka, Bangladesh, and Pakistan** complicates **intra-SAARC dynamics**.
- The **China-Pakistan Economic Corridor (CPEC)** and **Hambantota port** developments amplify **China's influence**.

#### Way Forward:

- **Promoting Economic Cooperation:**
  - Accelerate the operationalization of **SATIS**.
  - Expand initiatives like the **SAARC Development Fund** to support **regional projects** in **infrastructure, healthcare, and education**.
- **Resolving Political Conflicts:**
  - **Mediation mechanisms** within SAARC could help **address bilateral tensions**.
  - Promote **Track-II diplomacy** involving **academia, business leaders, and civil society** to reduce tension.
  - **Prioritize** issues like **disaster management, education, and public health** which are less politically sensitive.
- **Leveraging Sub-regional Groupings:**
  - Initiatives like **BBIN (Bangladesh, Bhutan, India, Nepal)** and **BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation)** can **complement SAARC's objectives** and **foster trust**.
- **Combating Non-traditional Security Threats:**
  - Strengthen **regional cooperation** on **counter-terrorism, disaster management, and enhance intelligence-sharing frameworks** among member nations.
- **Reform Institutional Mechanisms:**
  - Replace the **consensus-based decision-making model** with **weighted voting** to prevent a single country from **blocking progress**.
  - **Strengthen the SAARC Secretariat** with **greater autonomy and financial resources**.
- **Encouraging Youth Participation:**
  - Utilize **South Asia's demographic dividend** by **fostering student exchanges, scholarships, and youth-centric development programs** through the **South Asian University** and other regional platforms.

#### Conclusion:

SAARC remains a crucial platform for **regional cooperation** despite challenges like **political tensions** and **low economic integration**. **India's** growing leadership can **strengthen** the organization's potential. To **realize** its full potential, **SAARC** must focus on **enhancing economic cooperation, resolving political conflicts, and fostering sub-regional partnerships**.





## FDI Inflows into India Cross \$1 Trillion Milestone

**Context:** Foreign Direct Investment (FDI) refers to investments made by foreign entities—either individuals or companies—in the business interests of another country. This typically involves acquiring **ownership** or **controlling stakes** in enterprises within that country.

**Prohibited Sectors for FDI in India:**

FDI is not allowed in the following sectors:

- Lottery, gambling, and betting.
- Chit funds and Nidhi companies.
- Real estate business (excluding infrastructure).
- Tobacco-based products, including cigars and cigarettes.

**Routes for FDI in India:****1. Automatic Route:**

- Investments under this route do **not require prior approval**.
- Investors need to inform the **Reserve Bank of India (RBI)** post-investment.
- Common sectors: **Manufacturing, software**, and other non-sensitive industries.

**2. Government Approval Route:**

- Requires prior approval from the **concerned Ministry or Department**.
- Relevant sectors: **Telecom, media, pharmaceuticals**, and **insurance**.

**Key Trends in FDI Inflows:****Cumulative Achievements (2000–2024):**

- **Total Inflows:** Surpassed **\$1 trillion** during **April 2000–September 2024**.
- **Since 2014:** India has attracted **\$667.4 billion**, a **119% increase** compared to the **2004–2014 decade**.
- **Source Countries:**
  - **Mauritius:** 25% of inflows.
  - **Singapore:** 24%.
  - **United States:** 10%.
  - **Netherlands:** 7%.
  - Others: **Japan (6%), UK (5%), UAE (3%), and Germany, Cyprus, and Cayman Islands (2% each)**.
- **Top Sectors:**
  - **Services, computer software and hardware, telecommunications, trading, construction development, automobiles, chemicals, and pharmaceuticals.**

**Why is FDI Important for India?**

1. **Infrastructure Development:** FDI provides the much-needed capital to boost **infrastructure projects** critical for **economic growth**.
2. **Balancing Current Account Deficit:** Inflows help bridge gaps in **Balance of Payments (BoP)** by bringing in foreign capital.
3. **Currency Stability:** Healthy FDI inflows support the **Indian rupee's stability** in global markets.
4. **Technology Transfer & Job Creation:** FDI enables the transfer of **modern technologies** and creates **employment opportunities** across industries.

**Challenges in Attracting FDI:**

1. **Geopolitical Uncertainty:** Global tensions, including trade wars and conflicts, disrupt supply chains and impact investor confidence.
2. **Regulatory Complexities:** India's approval processes and varying sectoral caps can deter potential investors.





3. **Global Economic Volatility:** Recession risks, high inflation, and economic uncertainties globally affect capital flows.
4. **Infrastructure Bottlenecks:** Delays in **project execution** and inadequate infrastructure pose significant challenges.

#### Steps Taken by the Indian Government:

1. **Liberalized FDI Policies:**
  - **Defense:** Increased limit to **74%**.
  - **Insurance:** Raised to **74%**.
  - **Single-brand retail:** Allowed up to **100%**.
2. **Production-Linked Incentive (PLI) Schemes:**
  - Sectors: **Electronics, pharma, textiles, automobiles**, and more.
  - Encourages foreign companies to set up **manufacturing units** in India.
3. **Infrastructure Development Initiatives:** Gati Shakti, Bharatmala, and Sagarmala focus on improving **transport and connectivity**.
4. **Digital Ecosystem Promotion:** E-governance, digital payments, and **technology-driven reforms** aim to ease doing business.

#### The Way Forward:

1. **Prioritize Infrastructure Spending:** Ensure timely completion of **infrastructure projects** through **public-private partnerships (PPPs)**.
2. **Workforce Skilling:** Collaborate with the private sector to **upskill workers** and meet **industry demands**.
3. **Foster Research and Innovation:** Encourage **R&D** to boost **productivity** and **innovation** in key sectors.
4. **Simplify Regulations:** Streamline **approval processes** to make India a more attractive investment destination.

#### Conclusion:

India crossing the **\$1 trillion FDI inflow milestone** is a testament to its growing global appeal. With continued reforms, a focus on infrastructure, and workforce skilling, India is poised to remain a **preferred investment hub** in the years to come.

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## Railways (Amendment) Bill, 2024: A Move Towards Modernization

**Context:** The Railways (Amendment) Bill, 2024 was introduced in the Lok Sabha by the Union Minister of Railways, marking a major step toward reforming Indian Railways. The Bill aims to enhance the **autonomy, efficiency, and governance** of the rail network while addressing key operational challenges.

### Key Objectives of the Bill:

- Statutory Backing to the Railway Board:** The Bill amends the **Railways Act, 1989**, granting legal status to the **Railway Board**, which has been functioning without statutory backing since its inception.
- Decentralization of Powers:** It empowers **railway zones** to independently manage their **budgets, infrastructure development, and recruitment** processes, promoting faster decision-making.
- Independent Regulator:** The Bill proposes establishing an **autonomous regulatory body** to oversee **tariffs**, ensure **safety standards**, and encourage **private sector participation**.
- Simplified Legal Framework:** The **Indian Railway Board Act, 1905**, will be merged with the **Railways Act, 1989**, simplifying the legal landscape.



### Proposed Reforms and Structural Changes:

- Independent Regulator:**
  - Role:** Regulate tariffs, infrastructure access, and service standards.
  - Origin:** Based on the recommendations of the **2015 Committee on Restructuring Railways**.
- Greater Autonomy to Railway Zones:**
  - Empowers zones to take **operational and financial decisions** independently.
  - Supported by the **Sreedharan Committee (2014)**, emphasizing decentralized management.
- Railway Board Appointments:** The government will define the **structure, qualifications, and appointment processes** for Board members and the Chairman.
- Infrastructure Upgrades:**
  - Introduces **Section 24A** to fast-track superfast train operations and infrastructure improvements.
  - Example: The extension of the **Arunachal Express** via the **Siwan-Thawe-Kaptanganj-Gorakhpur** route will boost connectivity in Bihar, with an estimated upgrade cost of **300 crore** and recurring expenses of **250 crore annually**.

### Potential Benefits:

- Improved Governance:** **Streamlined legal frameworks** and a clarified role for the Railway Board can enhance **accountability and governance**.
- Enhanced Efficiency:** **Decentralization** allows zones to implement projects faster, utilize resources better, and improve service delivery.
- Increased Investment:** An independent regulator creates a level playing field for **private investors**, fostering **infrastructure development**.
- Regional Development:** Infrastructure projects like the Arunachal Express extension demonstrate the potential for **targeted development** and enhanced connectivity in underserved regions.

### Concerns and the Way Forward:

- Fear of Privatization:** The opposition has raised concerns about potential **privatization**. While private participation can bring **investment and expertise**, it is critical to safeguard **public interests** and ensure **accessibility for all**.
- Balancing Autonomy and Oversight:**
  - Striking a balance between **autonomous railway zones** and **effective oversight** is essential.
  - Transparent and merit-based appointments to the Railway Board will ensure **independence and integrity**.
- Passenger Welfare:** Special attention must be given to **passenger concessions** and **affordable fares** for vulnerable sections to uphold the railways' **social responsibility**.



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## Conclusion

The **Railways (Amendment) Bill, 2024**, presents a bold vision for the **modernization** and **decentralization** of Indian Railways. While the reforms hold immense potential for **efficiency, investment, and regional growth**, addressing concerns over privatization and ensuring passenger welfare will be key to its successful implementation. The Bill is a significant stride toward creating a more **efficient, inclusive, and future-ready railway system** for India.



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## India's Geospatial Market Set to Hit 25,000 Crore by 2025

**Context:** The **India Geospatial Market Outlook 2024** reveals that the country's **geospatial market** is projected to grow at a robust **CAGR of 16.5%**, reaching **25,000 crore** by 2025. Between 2019 and 2024, over **\$1 billion** has been invested across **126 companies**, highlighting the sector's immense potential.



### Understanding Geospatial Technology:

**Geospatial Technology** refers to tools and techniques like:

- **Location-based analytics**
- **Real-time data mapping**
- **Hyperspectral imaging**
- **Drone-based surveys**

These technologies provide critical insights for diverse sectors, including **urban planning, agriculture, infrastructure, and climate studies**.

### Key Applications of Geospatial Technology:

1. **Agriculture: Precision farming:** Utilizes drones and satellite imagery to enhance crop yields and optimize resource use.
2. **Disaster Management:** Enables **early warnings** for natural disasters such as floods and droughts, improving preparedness and response.
3. **Urban Development:** Facilitates efficient traffic management, waste collection, and public service delivery in **smart cities**.
4. **Environmental Monitoring:** Tracks deforestation, water quality, and pollution, contributing to **climate action goals**.
5. **Defence and Security:** Assists in **border surveillance, strategic mapping, and operational planning** for enhanced security.

### Government Initiatives Driving Growth:

1. **PM Gati Shakti:** Promotes **infrastructure development** through real-time geospatial mapping.
2. **National Geospatial Policy 2022:** Aims to **democratize geospatial data** and foster public-private collaboration.
3. **Smart Cities Mission:** Uses **location-based analytics** for better urban planning and management.

### Technological Advancements:

1. **Hyperspectral Imaging:**
  - Captures hundreds of light wavelengths for applications like:
    - Early detection of **crop diseases** and **soil nutrient levels**.
    - Monitoring **water pollution** and detecting **methane leaks**.
2. **Drone Technology:** Companies such as **ideaForge** are leading advancements in **real-time, high-resolution mapping**, offering **centimeter-level accuracy** for sectors like **defense, mining, and agriculture**.

### Challenges in the Sector:

1. **Data Security:** The sensitive nature of geospatial data poses **national security risks**.
2. **Limited Awareness:** Many small enterprises are unaware of the potential of **geospatial tools**.
3. **Infrastructure Deficit:** Developing robust geospatial infrastructure requires **significant investment**.
4. **Skill Shortage:** There is a need for trained professionals in **data analysis and drone technology**.

### Way Forward for India's Geospatial Sector:

1. **Policy Implementation:** Focus on **data-sharing frameworks** and strengthening public-private partnerships under the **National Geospatial Policy 2022**.
2. **Building Capacity:** Train professionals in geospatial technologies through **academic programs** and **research incentives**.



3. **Encouraging Startups:** Support indigenous startups like **Skyroot Aerospace** and **ideaForge** to boost domestic capabilities.
4. **Global Collaboration:** Partner with **international space agencies** and private companies to expand India's **geospatial exports**.

**Conclusion:**

India's geospatial market is on the brink of unprecedented growth, driven by **cutting-edge technology** and **government initiatives**. With strategic investments, capacity-building efforts, and global partnerships, the country can emerge as a **global leader in geospatial technologies**, transforming industries and fostering sustainable development.



## Opposition's Move to Impeach Vice President Jagdeep Dhankhar

**Context:** The **INDIA bloc opposition parties** have announced plans to submit a notice for a **no-confidence or impeachment resolution** against Vice President and **Rajya Sabha Chairman Jagdeep Dhankhar**. While the opposition lacks the necessary numbers to ensure the resolution's success, the move is seen as a **political statement** targeting the ruling party.



**Understanding the Vice President's Role in India:**

**About the Vice President:**

- The **Vice President of India** holds the **second-highest constitutional office**, modeled on the lines of the **American Vice President**.
- Serves a **dual role** as the Vice President and **Ex-Officio Chairman of the Rajya Sabha**.

**Eligibility (Article 66):**

**To qualify, a candidate must:**

- Be an **Indian citizen**.
- Be at least **35 years old**.
- Be qualified to be elected as a **Rajya Sabha member**.
- Not hold any **office of profit** under the Central or State Government.

**Election Process:**

- The **electoral college** comprises members of **both Houses of Parliament**, including elected and nominated members, using a **proportional representation system** via a **single transferable vote**.
- The **state legislatures** are not involved in the Vice President's election.

**Tenure and Removal:**

- The Vice President serves a **5-year term** and is eligible for **re-election**.
- Resignation must be submitted to the **President**.
- Removal requires a resolution passed by an **effective majority** in the Rajya Sabha and agreed upon by a **simple majority** in the Lok Sabha.

**Roles, Responsibilities, and Powers:**

- Ex-Officio Chairman of Rajya Sabha (Article 64):**
  - Presides over **Rajya Sabha sessions**, ensuring orderly conduct.
  - Votes only to **break a tie**.
- Acting President (Article 65):**
  - Assumes the responsibilities of the **President** in case of absence, resignation, or death until a new President is elected.
- Ceremonial Role:** Represents the **dignity and neutrality** of the office without engaging in governance.

**Impeachment Process (Article 67(b)):**

**The Vice President can be removed through:**

1. A resolution passed by a **majority of all members** of the Rajya Sabha.
2. Approval of the Lok Sabha by a **simple majority**.
3. A **14-day notice** is required before moving the resolution.

**Opposition's Allegations and Grievances:**

**Basis for Impeachment:**

- The notice relies on **Article 67(b)**, enabling removal of the Vice President via a parliamentary resolution.
- Allegations of **partisanship** against Vice President Dhankhar have escalated, especially after he raised concerns involving **Congress MP Abhishek Manu Singhvi** in a currency recovery case.

**Political Concerns:**

- Claims of **bias** and misuse of constitutional offices by the ruling party.
- Concerns over the **erosion of parliamentary democracy** and impartiality in Rajya Sabha proceedings.

**Unprecedented Nature of the Move:**

- No **Vice President or Rajya Sabha Chairman** has faced impeachment or no-confidence proceedings in India's history.
- However, a similar **no-confidence motion** was brought against **Deputy Chairman Harivansh** in 2020 during the contentious **farm bills debate**.

**Historical Context: Resolutions Against Lok Sabha Speakers****Instances of resolutions targeting Lok Sabha Speakers include:**

1. **G. V. Mavalankar (1951)**
2. **Sardar Hukam Singh (1966)**
3. **Balram Jakhar (1987)**

In all cases, the resolutions were discussed and eventually **negated by the House**.

**Conclusion:**

The opposition's move against Vice President Dhankhar reflects **rising political tensions** and concerns about the functioning of constitutional offices. While it lacks the numerical strength to succeed, the initiative emphasizes **symbolic dissent** in an evolving political landscape.

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## UGC's New Guidelines to Foster Lifelong Learning

**Context:** The University Grants Commission (UGC) has unveiled new guidelines titled “Recognition of Prior Learning (RPL) in Higher Education” to bridge the gap between informal learning and formal education. These guidelines aim to **enhance accessibility**, promote **lifelong learning**, and address the needs of India’s **informal workforce**.

**What is Recognition of Prior Learning (RPL)?**

RPL is a structured process to evaluate and acknowledge the **skills, knowledge, and experience** individuals acquire through **informal, non-formal, or experiential learning**.

- It offers **formal recognition** for prior learning, enabling individuals to gain qualifications and boost their **career prospects** and **employability**.

**How RPL Aligns with NEP 2020:**

The initiative is aligned with the goals of the **National Education Policy (NEP) 2020**, which emphasizes **inclusive and skill-based education**.

- Supported by the **National Credit Framework (NCrF)**, RPL allows individuals to **convert their skills into academic credits**, recognizing various forms of learning—academic, vocational, or experiential.
- UGC Chairman M. Jagadesh Kumar** highlighted its importance in fostering inclusivity and expanding access to higher education.

**Key Objectives of the Guidelines:****1. Increasing Accessibility:**

- Enable learners** with informal competencies to join higher education programs.
- Offer **flexible pathways** for individuals from diverse professional and educational backgrounds.

**2. Promoting Lifelong Learning:**

- Equip individuals with **up-to-date skills** to thrive in evolving job markets.
- Encourage **continuous learning** to create an adaptable workforce.

**3. Encouraging Social Equity:**

- Recognize informal learning** to empower **marginalized and disadvantaged communities**.
- Foster **equity and inclusion** in higher education by bridging socio-economic divides.

**Benefits of RPL:**

- Boosts Economic Growth:** Builds a skilled workforce to drive **national development**.
- Advances Careers:** Provides formal qualifications, improving **employment opportunities**.
- Bridges Knowledge Gaps:** Integrates **real-world experiences** with formal education for better professional alignment.

**Implementation Priorities:****1. Governance and Collaboration:**

- Policymakers, institutions, and employers** must work together to maintain fairness and ensure proper implementation.

**2. Ensuring Quality:**

- Develop systems to uphold **reliability and integrity** in assessing prior learning.

**3. Inclusive Opportunities:**

- Special focus on **marginalized groups**, ensuring equal access to RPL opportunities.

**Impact of the Guidelines:****The RPL framework seeks to:**

- Build a **competent workforce** ready to meet dynamic industry demands.
- Promote **career mobility, lifelong learning**, and **social equity** by valuing prior experience.
- Empower individuals** through skill recognition, contributing to a more inclusive and resilient society.



To the Point

# Weekly Current Affairs

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## Conclusion:

The UGC's **Recognition of Prior Learning (RPL)** guidelines are a transformative step toward creating an **inclusive, skill-oriented education system** in India.

By **recognizing diverse learning experiences** and promoting **lifelong education**, the initiative not only addresses societal challenges but also prepares the workforce for a rapidly evolving job market, fostering a **more equitable and empowered nation**.



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## Tensions Between RBI Governors and the Indian Government: A Persistent Power Struggle

**Context:** As Shaktikanta Das concludes his tenure as the **Governor of the Reserve Bank of India (RBI)** on **December 10, 2024**, his leadership period has highlighted ongoing tensions between the **RBI and the government**. This friction—especially over **monetary policy decisions**—is not new and continues to reflect a **longstanding struggle for balance** between the two institutions.



### Historical Conflicts: RBI Governors vs. Government:

#### 1. YV Reddy (2003–2008)

- **Clashes with Finance Ministry:** Disagreements with then-Finance Minister **P. Chidambaram**, particularly on **financial market development** and a ₹60,000 crore **farm loan waiver**.
- **Forex Reserves Debate:** Opposed the use of India's growing foreign exchange reserves for **government lending**, ensuring **fiscal discipline** remained intact.

#### 2. D Subbarao (2008–2013):

- **Anti-Inflation Stance:** Subbarao frequently resisted pressures from Finance Ministers **Pranab Mukherjee** and **Chidambaram**, who criticized his cautious approach to growth.
- **FSDC Opposition:** Objected to the creation of the **Financial Stability and Development Council (FSDC)**, arguing it undermined the RBI's role in ensuring financial stability.

#### 3. Raghuram Rajan (2013–2016):

- **Defending Autonomy:** Rajan strongly advocated for the RBI's independence, resisting moves to shift **money market regulation to SEBI**.
- **Demonetisation Warning:** He advised against hastily implementing **demonetisation**, cautioning about its costs and the preparation required—advice that went unheeded.

#### 4. Urjit Patel (2016–2018):

- **Surplus Dispute:** Patel stood firm against the government's demand to dip into the RBI's **excess reserves**.
- **Resignation Amid Pressure:** Resigned citing personal reasons after the government invoked **Section 7 of the RBI Act**, which allows it to direct the RBI on matters of public interest.

### Key Issues During Shaktikanta Das' Tenure:

#### Policy Rate Standoff:

- The government pressured the RBI to **cut policy rates** to address economic slowdown.
- However, Das maintained the **repo rate at 6.50%** to control **inflation**, prioritizing price stability over growth.
- This decision was opposed by **Finance Minister Nirmala Sitharaman** and **Commerce Minister Piyush Goyal**, highlighting diverging priorities.

### Recurring Themes in RBI-Government Conflicts:

1. **Autonomy vs. Control:** The government often pushes for accommodative monetary policies, while the RBI prioritizes **fiscal discipline** and **inflation control**.
2. **Interest Rate Disputes:** Governments seek **rate cuts** to spur economic growth, while the RBI exercises caution to mitigate inflationary risks.
3. **Regulatory Jurisdiction:** Conflicts over the RBI's **authority on financial reforms** and its handling of **surplus reserves** are recurring points of contention.
4. **Divergent Priorities:** While governments focus on **short-term economic gains**, the RBI aims to safeguard **long-term economic stability**.

### Meet the 26th RBI Governor:

The **Appointments Committee of the Cabinet** has approved **Sanjay Malhotra** as the **26th RBI Governor**, effective **December 11, 2024**. Currently serving as the **Revenue Secretary**, Malhotra will lead the RBI for a term of **three years**.



### Conclusion:

The recurring tensions between the **RBI and the government** highlight the delicate task of maintaining the **central bank's autonomy** while addressing **economic and fiscal imperatives**. As **Sanjay Malhotra** steps into the role, he inherits not just a prestigious position but also the responsibility of **navigating the complex relationship** between the RBI and the government. This dynamic remains crucial in ensuring India's **financial stability** and **economic growth**.







## India Skills Report 2025: A Snapshot of Employability Trends

**Context:** The **India Skills Report 2025** predicts a **7% rise in employability** among **Indian graduates**, projecting a **global employability rate of 54.81%** in 2025, compared to 51.2% in 2024.

### About the Report:

The **India Skills Report 2025** is a collaborative effort by:

- **Confederation of Indian Industries (CII)**
- **Wheebox**, a leading talent assessment agency
- **All India Council for Technical Education (AICTE)**



### Key Inputs:

- Analysis of data from over **6.5 lakh candidates** who participated in the **Global Employability Test (G.E.T.)**.
- Insights from **1,000+ corporations** across **15 diverse industries**.

### Highlights of the Report:

#### Rising Employability:

- **Nearly 55% of Indian graduates** are projected to be employable globally by 2025, marking a **7% increase** from 2024.
- **Management graduates** lead the way with a **78% employability rate**, followed by:
  - **Engineering graduates:** 71.5%
  - **MCA graduates:** 71%
  - **Science graduates:** 58%

#### Top Employable States and Cities:

- **States:** Maharashtra, Karnataka, and Delhi are emerging as **key talent hubs**.
- **Cities:** Pune, Bengaluru, and Mumbai dominate in providing a **skilled workforce**.

#### Gender Analysis:

- **Male employability** is expected to rise to **53.5%** in 2025 from **51.8%** in 2024.
- **Female employability** is projected to decline to **47.5%** in 2025 from **50.9%** in 2024.

#### Vocational Training:

- **50% of secondary and tertiary students** in India are anticipated to receive **vocational training** by 2025.
- This positions India as a **global leader in talent development**, especially in emerging fields.

#### Future Workforce Needs:

The report emphasizes integrating **vocational training** with industry demands, particularly in high-growth sectors like:

- **Artificial Intelligence (AI)**
- **Cybersecurity**
- **Green Energy**

#### Conclusion:

The **India Skills Report 2025** underlines India's growing potential as a **global talent hub**, driven by increased employability, a skilled workforce, and targeted vocational training. While challenges such as gender disparity remain, the focus on industry-aligned education and emerging sectors positions India for significant progress in the global job market.

## Female Labour Force Participation Rate Rose During 2017-18 to 2022-23

**Context:** The **Labour Force Participation Rate (LFPR)** represents the percentage of people aged 15 years and older who are either:

1. **Employed**
2. **Unemployed but actively seeking work**

**How is LFPR Calculated?**

- It is the **total number of people demanding jobs** (employed + unemployed actively seeking work) divided by the **working-age population**.
- It reflects the **demand for jobs in the economy**.

**LFPR vs. Unemployment Rate (UER):**

- **LFPR** measures **job demand** in the economy.
- **UER** is the proportion of the labour force that remains unemployed and actively seeking jobs.

**Paper Released by EAC-PM:**

A working paper by the **Economic Advisory Council to the Prime Minister (EAC-PM)** highlights the impressive rise in **female LFPR** from 2017-18 to 2022-23, with rural areas experiencing more growth than urban regions.

**Key Findings:**

**National Trends:**

- **Rural LFPR:** Increased from **24.6% (2017-18)** to **41.5% (2022-23)**, a remarkable **69% growth**.
- **Urban LFPR:** Improved from **20.4% to 25.4%** during the same period.
- The rise remains significant even after excluding **unpaid family workers**, indicating genuine workforce inclusion.

**Regional Disparities:**

- **Low LFPR States:**
  - **Bihar, Punjab, and Haryana** continue to report low female LFPR, despite differing economic statuses.
- **High-Growth Regions:**
  - **North-eastern States** (e.g., Nagaland and Arunachal Pradesh) witnessed notable gains in rural LFPR.
  - **Eastern States:** While rural Bihar had the lowest LFPR, recent years show progress, particularly among **married women**.

**Demographic Insights:**

- **Marital Status:**
  - **Married women** show lower LFPR than men, especially in urban areas.
  - Male LFPR remains consistently high across all age groups.
- **Age Distribution:**
  - Female LFPR peaks between **30-40 years** and declines sharply, forming a **bell-shaped curve**.
  - Male LFPR remains high (close to **100%**) for ages **30-50**, tapering off gradually afterward.

**Government Initiatives Supporting Women's Employment:**

1. **Skill India Mission:** Focused on equipping women with market-relevant skills.
2. **Maternity Benefit (Amendment) Act, 2017:** Extended maternity leave to support working mothers.
3. **Stand-Up India Scheme:** Aims to promote women entrepreneurs by providing easier credit access.
4. **Mahila Shakti Kendra:** Encourages skill development and digital literacy among rural women.

**Criticism and Challenges:**

- **Regional Inequalities:** States like Bihar and Punjab lag behind despite efforts.
- **Workplace Constraints:** Social and cultural barriers, coupled with lack of childcare facilities, hinder women's sustained workforce participation.





- **Age and Marital Barriers:** A sharp decline in participation after the age of 40, especially for married women, highlights systemic issues.

**Conclusion:**

The steady rise in **female LFPR** between 2017-18 and 2022-23 reflects India's progress toward a more inclusive workforce. However, challenges like **regional disparities, societal barriers, and age-related declines** must be addressed to sustain this momentum. Empowering women with **targeted policies and supportive ecosystems** can ensure their continued contribution to India's economic growth.



## CII Recommends Sticking to Fiscal Deficit Targets

**Context:** The **Confederation of Indian Industry (CII)** has advised the government to adhere to the **fiscal deficit targets** of **4.9% of GDP** for 2024-25 and **4.5% for 2025-26**, emphasizing the importance of fiscal discipline for economic stability.

### What is Fiscal Deficit?

The **fiscal deficit** is the shortfall between the government's **total expenditure** (revenue and capital) and its **total receipts** (excluding borrowings) during a fiscal year.

### Formula:

**Fiscal Deficit = Total Expenditure – (Revenue Receipts + Non-Debt Creating Capital Receipts)**

### Fiscal Deficit vs. National Debt

- **Fiscal Deficit:** Represents the yearly shortfall that necessitates borrowing.
- **National Debt:** The cumulative total of borrowings from years of fiscal deficits, reflecting the government's overall debt burden.

### Implications of Fiscal Deficit:

#### Negative Effects:

1. **Inflationary Pressure:** Persistent fiscal deficits can fuel inflation as governments rely on central bank-issued funds.
2. **Crowding Out Effect:** High government borrowing reduces the availability of credit for private businesses and individuals, impacting private investments.
3. **Limited Fiscal Space:** A high deficit restricts the government's ability to address economic crises or shocks effectively.
4. **Increased Borrowing Costs:** Poor fiscal health forces governments to offer higher interest rates to attract lenders.

#### Benefits of Lower Fiscal Deficit:

1. **Improved Credit Ratings:** Better fiscal discipline boosts global credit ratings, reducing borrowing costs.
2. **Reduced Debt Servicing Costs:** Lower interest payments free up funds for development projects in **education, healthcare, and infrastructure**.
3. **Stronger Balance of Payments:** Reduced reliance on foreign loans stabilizes exchange rates and strengthens the current account.
4. **Investor Confidence:** Fiscal prudence attracts domestic and foreign investments, fostering economic growth.

### CII's Fiscal Recommendations:

#### State-Level Fiscal Monitoring:

- **Regular Financial Health Reports:** States should implement **fiscal stability reporting systems** to assess and maintain financial discipline.
- **Direct State Borrowing:** States can borrow directly from markets as recommended by the **12th Finance Commission**.
- **Monitoring Guarantees:** Borrowing by **State Public Sector Enterprises (PSEs)** on state guarantees must be closely monitored to avoid fiscal instability.

### Independent State Credit Ratings:

An **independent and transparent credit rating system** for states can incentivize them to maintain fiscal responsibility and discipline.

### The Way Forward:

1. **Adopt NK Singh Committee Recommendations**
  - Implement the proposed **Debt Management and Fiscal Responsibility Bill, 2017** to ensure sustainable fiscal practices.







## 2. Encourage Financial Savings

- Increase household financial savings through:
  - **Tax incentives** on financial products.
  - Higher returns on **long-term savings schemes**.
  - Enhanced **financial literacy programs**.

## 3. Revamp Infrastructure Financing

- Focus on funding infrastructure projects through:
  - **Public-private partnerships (PPP)**.
  - Development of **infrastructure bonds**.
  - Establishing dedicated **finance institutions**.

### Conclusion:

Sticking to fiscal deficit targets is vital for ensuring **economic stability, improving investor confidence, and fostering long-term growth**. By implementing **fiscal reforms** at both the national and state levels and adopting prudent financial strategies, India can pave the way for sustainable development and robust fiscal health.



## Why a Free Fall in the Rupee Seems Unlikely

**Context:** India's **economic resilience** and prudent financial management provide strong reasons why the rupee is unlikely to experience a dramatic decline despite challenges like capital outflows and reduced foreign exchange reserves.

### Key Factors Supporting Rupee Stability:

#### 1. Strong Balance of Payments (BoP):

##### Current Account Deficit (CAD):

- India's **CAD for 2023-24** stands at **\$23.29 billion**, significantly lower than the **\$78 billion** recorded in 2011-12.
- This manageable CAD is bolstered by surpluses in the **invisibles account**, driven by:
  - IT and software services exports:** \$142.07 billion (2023-24).
  - Remittances:** A record \$106.63 billion (2023-24).

##### Goods Trade Deficit:

- Despite a high **merchandise trade deficit** of **\$242 billion (2023-24)**, the strong invisibles surplus offsets much of its impact, maintaining overall stability.

#### 2. Stable Foreign Exchange Reserves:

- India's **forex reserves** remain substantial at **\$658.09 billion** (as of November 29, 2024), among the **world's largest**.
- Although reserves dipped from the peak of **\$704.89 billion** in September 2024 due to **Foreign Portfolio Investor (FPI) outflows**, they still provide a robust **buffer against external shocks**.

#### 3. Nature of Capital Flows:

##### Foreign Direct Investment (FDI):

- While FDI declined to **\$26.47 billion** in 2023-24, it remains a **stable and long-term capital source**, unlike the volatility of portfolio investments.

##### Foreign Portfolio Investors (FPIs):

- FPIs withdrew **\$11.47 billion** in October 2024 and **\$2.54 billion** in November 2024, leading to temporary rupee depreciation.
- However, such outflows are **cyclical** and not reflective of **structural weaknesses**.

#### 4. Favorable Comparisons to Past Crises:

##### The 2011-12 Scenario:

- During the 2011-12 and 2012-13 crises, India faced:
  - A **high CAD (~\$78 billion)**.
  - Capital flow disruptions caused by the US Federal Reserve's tapering policy.
  - Dwindling forex reserves, leading to rupee depreciation.

##### The Current Situation:

- India's **smaller CAD**, **ample forex reserves**, and improved financial health provide a cushion against sudden shocks.
- Even if capital flows tighten, reserves can stabilize the rupee effectively.

#### 5. Global Dynamics and Policy Preparedness:

- Post-pandemic digitization and the rise of **Global Capability Centres (GCCs)** have boosted **invisibles revenue** through exports and IT services.
- Policies to attract **stable FDI** and regulate **External Commercial Borrowings (ECBs)** strengthen India's **Balance of Payments (BoP)**.

#### Understanding Balance of Payments (BoP):

The **Balance of Payments (BoP)** is a comprehensive record of all economic transactions between a country and the rest of the world, reflecting its **economic stability** and **global financial position**.

#### Components of BoP:





### 1. Current Account:

Tracks the flow of goods, services, income, and transfers:

- **Trade in Goods:** Exports minus imports of physical products.
- **Trade in Services:** IT services, tourism, and transportation.
- **Income:** Net earnings from foreign investments.
- **Transfers:** Remittances, foreign aid, and gifts.

### 2. Capital Account:

Focuses on capital transfers and asset transactions:

- **Grants:** Funds for infrastructure or debt forgiveness.
- **Asset Transfers:** Transactions involving patents or trademarks.

### 3. Financial Account:

Records financial investments and reserve changes:

- **FDI:** Stable investments in businesses or real estate abroad.
- **Portfolio Investments:** Equities and debt securities.
- **Reserve Assets:** Central bank-held forex reserves.
- **Loans and Banking Capital:** Borrowings and deposits in foreign banks.

### External Commercial Borrowings (ECBs):

- **ECBs** refer to loans obtained by Indian entities from foreign lenders in **foreign currencies**, primarily for:
  - Financing **specific projects**.
  - Expanding **infrastructure development**.
  - Supporting **business expansion**.

### Conclusion:

India's **manageable CAD**, substantial **forex reserves**, and robust **policy measures** position the rupee to withstand global financial pressures. While challenges like capital outflows exist, India's **economic fundamentals** and preparedness ensure that a **free fall in the rupee** remains an unlikely scenario.

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## India's MGNREGS: A Key Contributor to Global Nature-Based Solutions

**Context:** India's Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has emerged as a pivotal player in advancing Nature-based Solutions (NbS) worldwide, as highlighted in the Decent Work in Nature-based Solutions 2024 Report, launched at CoP16 of the UN Convention on Biological Diversity (CBD) in Riyadh.



### Nature-Based Solutions (NbS): Transforming Global Challenges:

#### What are NbS?

**Nature-based Solutions (NbS)** utilize natural ecosystems to address societal challenges like climate change, biodiversity conservation, and sustainable livelihoods. The UN defines NbS as “actions to protect, conserve, restore, sustainably use, and manage ecosystems.”

#### Key Features of NbS:

- **Ecosystem-Based Approach:** Leverages natural processes through initiatives like afforestation, wetland restoration, and sustainable agriculture.
- **Multi-Dimensional Benefits:**
  - **Climate Resilience:** Mitigates and adapts to climate change.
  - **Biodiversity Conservation:** Protects ecosystems.
  - **Community Development:** Enhances resilience and creates jobs.
- **Global Policy Integration:** Embedded in frameworks like the CBD, UNFCCC, and aligned with Sustainable Development Goals (SDGs).

#### Key Findings of the Report:

##### Global NbS Employment Trends:

- 93–95% of NbS jobs are concentrated in the Asia-Pacific region, with India leading contributions.
- Over 59 million people are employed globally in NbS, with 50% being women.
- NbS employment accounts for 1.8% of global employment, with India's MGNREGS contributing 85–87% of full-time equivalents (FTE).

##### Investment and Projections:

- Increasing global annual investment in NbS by \$542 billion by 2030 could create 20–32 million new jobs in agriculture and forestry.
- Investing \$2.9 trillion in Nature-based Infrastructure (NbI) can significantly enhance employment while bolstering climate-resilient infrastructure.

### MGNREGS: A Flagship Initiative in NbS:

#### About MGNREGS:

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is the world's largest public works program, introduced in 2005 under the MGNREGA Act. It guarantees at least 100 days of wage employment annually to rural households.

#### Key Objectives:

- Provide a legal right to work and reduce rural poverty.
- Promote sustainable development by creating assets like water conservation systems, afforestation projects, and roads.
- Empower marginalized groups, including women, Scheduled Castes (SCs), and Scheduled Tribes (STs).

#### Features of MGNREGS:

##### 1. Legal Entitlement

- Any rural household can demand employment.
- Failure to provide work within 15 days entitles households to an unemployment allowance.





## 2. Women's Empowerment:

- At least **one-third of the workforce** is reserved for women.
- Ensures **equal wages** for men and women, fostering **financial independence**.

## 3. Community Participation:

Projects are selected and monitored by the **Gram Sabha (village assembly)**, ensuring **transparency and accountability** through social audits.

## 4. Environmentally Focused Initiatives:

- Projects focus on **afforestation, watershed management, and irrigation systems**, contributing to **climate resilience** and **ecological restoration**.

## Achievements of MGNREGS:

1. **Employment Generation:** MGNREGS is a lifeline for millions, particularly during crises like the **COVID-19 pandemic**, when it absorbed migrant labor.
2. **Women's Participation:** Significant involvement of women has fostered greater **decision-making power** and **economic independence**.
3. **Rural Infrastructure Development:** Projects under MGNREGS have improved rural **connectivity, irrigation, and water resource management**.
4. **Climate Adaptation:** NbS projects, such as **reforestation** and **water conservation**, contribute to climate change mitigation while supporting rural livelihoods.

## Challenges Hindering MGNREGS' Potential:

Despite its achievements, MGNREGS faces several hurdles:

- **Implementation Issues:** Delays in wage payments and poor-quality assets.
- **Corruption:** Mismanagement and fund misuse in certain regions.
- **Lack of Awareness:** Many rural households remain unaware of their rights under the scheme.
- **Budgetary Constraints:** Limited funding restricts its scope and effectiveness.

## The Way Forward:

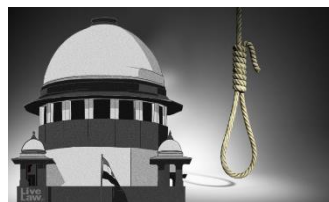
To strengthen MGNREGS and NbS globally:

- **Increase Investments:** Boost funding for **nature-based infrastructure** to unlock new jobs and enhance climate resilience.
- **Focus on Training:** Develop skills in **geospatial analysis, environmental economics, and indigenous knowledge systems** to meet the growing demand for NbS expertise.
- **Enhance Awareness:** Promote rights and benefits under MGNREGS through grassroots campaigns.
- **Improve Governance:** Ensure transparency through regular audits and effective monitoring systems.

India's MGNREGS stands as a **global model** for leveraging **nature-based solutions** to address climate challenges while fostering **employment and social equity**. With increased investments and improved implementation, it can further drive sustainable development and resilience worldwide.

## Supreme Court Issues Guidelines on Mercy Petitions to Streamline Processes

**Context:** In a significant move aimed at ensuring **timeliness** and **fairness** in the handling of mercy petitions, the **Supreme Court (SC)** has issued comprehensive guidelines in the **State of Maharashtra Vs. Pradeep Yashwant Kokade** case. These guidelines are designed to streamline the processes involved in mercy petitions and the execution of death penalties, thereby safeguarding the **legal rights** of convicts.



### Key Guidelines Issued by the SC:

#### Establishment of Dedicated Cells:

- **Purpose:** To manage mercy petitions efficiently, dedicated cells must be established by **States and Union Territories (UTs)**.
- **Structure:** These cells should be equipped with **judicial officers** from the **Law and Judiciary Department** to oversee the process.

#### Information Sharing and Documentation:

- **Procedure:** **Prison authorities** are required to forward mercy petitions to these dedicated cells.
- **Requirements:** Gather necessary information from **police stations, investigating agencies**, and other relevant bodies.
- **Communication:** Utilize **electronic means** for communication wherever possible, with exceptions for cases demanding confidentiality.

#### Coordination with Higher Authorities:

- **Role of the Governor and President's Secretariats:** Mercy petitions should be promptly forwarded to these offices for further consideration.
- **Coordination Mechanism:** The states/UTs must liaise closely with these secretariats to expedite the process.

#### State Government Directives:

- **Executive Orders:** States must issue detailed executive orders outlining procedures for handling mercy petitions in compliance with the SC guidelines.
- **Reporting:** **States and UTs** are required to report their compliance with these guidelines to the SC within three months.

#### Sessions Courts' Responsibilities:

- **Record Keeping:** Maintain accurate records of cases involving mercy petitions.
- **Notifications:** Issue notices to **public prosecutors** or **investigative agencies** for pending appeals related to these petitions.

#### Execution Warrants:

- **Issuance:** **States** are instructed to issue execution warrants immediately once the death penalty becomes enforceable.

### Understanding the Mercy Petition Process:

#### Constitutional Framework:

- **Presidential and Gubernatorial Powers:** The **Constitution** grants **Article 72** to the President and **Article 161** to the Governor, giving them the authority to grant pardons or commute sentences.
- **Legal Precedent:** The SC in **Maru Ram vs. Union of India (1981)** ruled that the President's decision on mercy petitions should be based on the **advice** of the **Council of Ministers**.

#### Legal Framework:

- **Bharatiya Nagarik Suraksha Sanhita (BNSS) 2023:** Outlines the procedural framework under **Section 472(1)** for handling mercy petitions and death penalty appeals.



### Importance and Impact:

These guidelines are a crucial step towards **avoiding undue delays** in the processing of mercy petitions, ensuring that **convicts' legal rights** are upheld throughout the judicial process. By establishing dedicated cells and enforcing clear communication channels, the SC aims to foster **efficiency** and **accountability** in the handling of such sensitive matters. The immediate issuance of execution warrants following the enforceability of death penalties further underscores the SC's commitment to timely justice.

With these measures in place, **States and UTs** are better equipped to align their processes with the SC's directives, ensuring **fair treatment** and **legal protection** for all individuals involved in mercy petitions.



## The Code of Conduct for Judges: Upholding Ethics and Accountability

**Context:** Recent remarks by an **Allahabad High Court Judge** targeting the Muslim community during a **Vishwa Hindu Parishad event** have sparked public outrage. This incident highlights the critical need for judges to adhere to ethical guidelines and maintain public trust in the judiciary.



### What is the Judicial Code of Conduct?

#### Restatement of Values of Judicial Life (1997):

- Adopted by the **Supreme Court of India**, this document outlines the **ethical principles** that judges of the Supreme Court and High Courts must follow.
- Focuses on ensuring **impartiality, integrity, and transparency** in judicial behavior.

#### In-House Procedure:

- A mechanism to address cases where judges fail to uphold the **standards of judicial conduct**.
- Allows complaints to be directed to the **Chief Justice of India (CJI)** or the **High Court Chief Justice**, providing a framework for remedial action.

#### Core Principles of Judicial Ethics:

##### The judiciary's credibility rests on two fundamental pillars:

- Public Confidence in Judicial Authority**
- Integrity and Impartiality of Judges**

#### Key Guidelines in Judicial Ethics:

- Reaffirming Public Faith:** Judges must act in ways that enhance public trust in the judiciary's impartiality.
- Awareness of Public Scrutiny:** Judges must maintain the **highest ethical standards**, knowing their actions are constantly under public observation.
- Respect for Diversity:** Judges should demonstrate respect for all communities, avoiding any remarks that reflect bias.

#### Bangalore Principles of Judicial Conduct (2002):

- Global Standards:** Codifies international benchmarks for judicial ethics.
- Emphasizes **impartiality, dignity, and restraint** in public expression while advocating for diversity and fairness.

#### Mechanisms for Removing Judges:

##### Constitutional Provisions:

Under **Article 124(4)** and **Article 217** of the Indian Constitution, judges can be removed for “**proved misbehavior or incapacity**.”

##### Impeachment Process:

- Initiation of Motion:**
  - Requires support from at least **one-third** of the total members of a House of Parliament.
  - Must secure a **two-thirds majority** of members present and voting.
- Presidential Approval:**
  - Once the motion is passed, the **President of India** issues an order for the judge's removal.

##### In-House Procedure for Misconduct:

An alternative to impeachment, the **in-house procedure** ensures accountability without the formalities of parliamentary intervention.

##### Steps Involved:

- Filing Complaints:**
  - Complaints can be submitted to the **CJI**, High Court Chief Justice, or the **President**.
- Preliminary Inquiry:**
  - The **High Court Chief Justice** investigates and forwards findings to the CJI.





### 3. Fact-Finding Committee:

- A committee comprising two **Chief Justices of other High Courts** and one **High Court Judge** investigates serious allegations.

### 4. Outcome:

- If the charges are validated, the CJI may advise the judge to resign.
- If the judge declines, the matter can proceed to **impeachment**.

### Why Judicial Ethics Are Crucial:

#### Maintaining Public Trust:

- Any breach of **impartiality** erodes the public's faith in the judiciary.

#### Preserving Judicial Independence:

- External influences or personal biases compromise the judiciary's role as a fair and independent authority.

#### Upholding the Rule of Law:

- Ethical lapses undermine the delivery of justice and impact the fair application of laws.

### Conclusion: The Judiciary as a Beacon of Justice

Judges hold a position of immense trust, and their conduct must reflect the **highest ethical standards**. Adherence to these principles safeguards the **rule of law** and maintains the **credibility of the judiciary** as the guardian of constitutional values. By demonstrating **integrity, impartiality, and transparency**, the judiciary can continue to serve as the foundation of a just and equitable society.

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## Surge in Urban Sector Investments: Building the Future of India

**Context:** The Union Minister for Housing and Urban Affairs and Power highlighted a significant **16-fold increase in urban sector investments**, reflecting the government's focus on achieving the vision of **Vikshit Bharat (Developed India) by 2047**.



**Milestones Under Key Urban Development Schemes:**

**Atal Mission for Rejuvenation and Urban Transformation (AMRUT):**

- **Objective:** Enhancing basic urban services like water supply, sewerage, and urban transport, with a special focus on improving the quality of life for the urban poor.
- **Key Achievements:**
  - Created **4,649 MLD (Million Liters per Day)** of water treatment capacity.
  - Established **4,429 MLD sewage treatment capacity**.
  - **AMRUT 2.0:** Prioritizes stormwater drainage projects to combat waterlogging and enhance drinking water and sewerage systems.

**Smart Cities and New Cities Initiative:**

- **Launched in 2015:** Aims to foster **sustainable and inclusive cities** by leveraging smart technologies to improve infrastructure, transport, and services.
- **Progress:** Expansion of the metro network to new cities and emphasis on regional rapid transit systems (**RRTS**) to boost urban mobility.

**Urban Housing: Pradhan Mantri Awas Yojana (PMAY) 2.0:**

- Conversion of government-funded vacant houses into **Affordable Rental Housing (ARH)** through **PPP models** or public agencies.
- Provisional sanctions for **7% of the planned 1 crore urban houses** to expedite timely allocation.

**Swachh Bharat Mission:**

- **Landmark Achievements:**
  - Remediation of **major dumpsites** in Ahmedabad and Hyderabad, clearing **2.5 lakh metric tonnes** of legacy waste.
  - Under the **PM SVANidhi Scheme**, 13,422 crore in loans disbursed to street vendors.

**Urbanization in India: A Mixed Landscape:**

**The Indian Urbanization Story:**

- Unlike Western nations, where **industrialization drove urbanization**, India's urban growth often stems from **economic distress**, leading to **poverty-driven urbanization**.
- **Migration Patterns:** Both rural-to-urban and urban-to-urban migration have shaped Indian cities.
- The **COVID-19 pandemic** exposed significant gaps in urban planning, with reverse migration highlighting infrastructure shortcomings.

**Urban Population Trends:**

- India's urban population grew from **27.7% in 2001 to 31.1% in 2011** (Census 2011), increasing at a rate of **2.76% per year**.
- Estimates by the **World Bank** suggest that around **40% of India's population** now resides in urban areas, spread across **9,000 towns**.

**Key Challenges in India's Urban Landscape:**

1. **Outdated Urban Planning:** Many urban plans fail to account for **population growth**, leading to inadequate infrastructure.
2. **Overcrowding and Slums:** **40% of urban residents** live in slums due to deindustrialization and lack of affordable housing in peri-urban areas.
3. **Environmental Concerns:** Climate change exacerbates issues like **urban flooding, pollution, and heat island effects** in cities.



4. **Inequality in Urban Development:** Exclusive developments benefit the wealthy, while millions lack access to **basic housing and amenities**.
5. **Waste Management Woes:** Rapid urbanization has overwhelmed cities with **increased waste**, leading to **environmental degradation**.
6. **Transportation and Traffic:** Poor public transport coupled with a rise in private vehicle ownership results in **traffic congestion** and **pollution**.

#### Way Forward: Strategies for Sustainable Urban Growth:

1. **Infrastructure Development:** Focus on **roads, water supply, sanitation, and waste management** to support growing urban populations.
2. **Affordable Housing:** Build more **affordable housing units** to reduce slums and address the needs of lower-income groups.
3. **Sustainable Urbanization:** Prioritize **renewable energy, green spaces, and waste recycling** to promote environmentally friendly urban growth.
4. **Rural-Urban Integration:** Improve rural infrastructure and connectivity to balance growth and reduce the strain on major metropolitan areas.

#### Conclusion: Shaping India's Urban Future:

The significant rise in **urban sector investments** reflects India's commitment to building sustainable and inclusive cities. By addressing existing challenges and focusing on infrastructure, housing, and sustainability, India is paving the way for a **developed urban landscape by 2047**. This transformative journey will be crucial in realizing the nation's ambition of becoming a global powerhouse.

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**India's Malaria Milestone: Insights from WHO's World Malaria Report 2024**

**Context:** The World Health Organization (WHO) has released the **2024 World Malaria Report**, highlighting **India's significant strides** in reducing **malaria incidence and mortality**. This achievement underscores India's commitment to eradicating malaria and improving public health.

**Understanding Malaria:****What is Malaria?**

- **Malaria** is a **life-threatening disease** caused by **Plasmodium** parasites transmitted through bites of infected **female Anopheles mosquitoes**.
- While primarily affecting tropical regions, it is **preventable and curable**.

**How is Malaria Transmitted?**

- Malaria is **not contagious** and cannot spread from person to person.
- The disease is caused by five species of parasites, with **Plasmodium falciparum** and **Plasmodium vivax** posing the greatest threat.

**Key Highlights of the WHO's 2024 World Malaria Report:****Global Burden of Malaria (2023):**

- **263 million cases** and **597,000 deaths** were reported globally.
- The **WHO African Region** accounted for **95% of malaria deaths**, disproportionately affecting **young children and pregnant women**.

**Global Progress Since 2000:**

- **2.2 billion cases** and **12.7 million deaths** have been averted.
- Case incidence has dropped significantly with steady improvements globally.

**Certification of Malaria-Free Countries:**

- As of **November 2024**, **44 countries** and one territory, including Egypt, have been certified as **malaria-free**.
- Certification requires maintaining **zero indigenous cases** for three consecutive years.
- **25 malaria-endemic nations** now report fewer than 10 cases annually, up from just 4 in 2000.

**Country-Specific Trends:**

- **Notable Reductions in Cases (2022-2023):**
  - Nepal: **-58.3%**
  - India: **-9.6%**
  - Bangladesh: **-9.2%**
- **Rising Cases:**
  - North Korea: **+47.9%**
  - Thailand: **+46.4%**
  - Myanmar: **+45.1%**
- **Timor-Leste and Bhutan** reported **zero indigenous cases** in 2023.

**India's Achievements in Malaria Control:****A Milestone Achievement: Exiting the HBHI Group:**

- India has exited the **High-Burden-High-Impact (HBHI)** group, marking a significant reduction in its malaria burden.
- **Malaria Cases:** Reduced by **69%**, from **6.4 million in 2017** to **2 million in 2023**.
- **Malaria Deaths:** Dropped by **68%**, from **11,100 in 2017** to **3,500 in 2023**.

**Strategies Behind India's Success:**

1. **Artemisinin-Based Combination Therapy (ACT):** A dual-drug treatment where **artemisinin** eliminates most malaria parasites, and a **partner drug** clears the rest.
2. **Long-Lasting Insecticidal Nets (LLINs):** Widely used **insecticidal nets** effectively block and kill mosquitoes, reducing mosquito populations.







### 3. Targeted Interventions in High-Burden Areas:

- Focused efforts in **forested and tribal regions** (e.g., Jharkhand, Odisha, Chhattisgarh, and the North-East).
- Improved access to **diagnostics, treatments, and next-generation insecticide-treated nets**.

### 4. Robust Monitoring and Case Management:

Continuous evaluations ensured the **proper implementation** of interventions, driving sustained progress.

#### Challenges Highlighted in the Report:

##### African Region: A Persistent Struggle:

- Despite global progress, **Africa remains the most affected** region.
- Challenges include:
  - Insufficient **funding** (only \$4 billion in 2023 vs. \$8.3 billion target).
  - **Drug and insecticide resistance**, fragile health systems, and weak surveillance.
  - Compounding factors like **conflicts, climate change, and population displacement**.

##### Global Challenges:

- Gaps in access to **insecticide-treated nets**, medicines, and diagnostic tools.
- Need for improved data systems to monitor **health inequities**.

#### The Way Forward:

##### Recommendations from WHO:

1. **Invest More:** Increase funding for anti-malaria programs, especially in high-burden regions like Africa.
2. **Innovate:** Focus on developing new tools and strategies for prevention and treatment.
3. **Community Involvement:** Engage affected communities in designing and evaluating interventions.
4. **Promote Equity:** Advocate for **gender equality** and **human rights** in anti-malaria initiatives.

##### Conclusion: A Call to Action:

India's achievements in malaria control demonstrate the **power of strategic interventions**, innovation, and robust monitoring. However, **global challenges persist**, particularly in Africa. By sustaining momentum and addressing persistent gaps, the world can move closer to eradicating malaria, ensuring a healthier and brighter future for all.

## Ecologist Madhav Gadgil Honored with UN's Champions of the Earth Award

**Context:** Renowned Indian ecologist **Madhav Gadgil** has been awarded the prestigious **Champions of the Earth Award** by the **United Nations Environment Programme (UNEP)**, the UN's highest environmental honor. Gadgil is the sole Indian recipient of this esteemed award in 2024, recognizing his exceptional contributions to environmental conservation.



### Madhav Gadgil's Contributions to Environmental Protection:

#### Role as Chair of the WGEEP:

- Gadgil chaired the **Western Ghats Ecology Expert Panel (WGEEP)**, formed by the Government of India to address the challenges facing the fragile **Western Ghats ecosystem**.
- His work focused on evaluating the impacts of **population pressure, climate change, and development activities** on the ecologically rich Western Ghats region.

#### Key Recommendations by the WGEEP:

- Declare the Western Ghats as an Ecologically Sensitive Area (ESA):**
  - The report proposed classifying **64% of the Western Ghats**, spanning six states, into **Ecologically Sensitive Zones (ESZ 1, ESZ 2, and ESZ 3)**.
- Restrict Development Activities:**
  - Advocated halting environmentally harmful activities like **mining, dam construction, and thermal power plants** in the sensitive zones.
- Establish a Western Ghats Ecology Authority (WGEA):**
  - Suggested the formation of this body to manage the region and ensure **sustainable development** practices.
- Adopt a Bottom-to-Top Governance Approach:**
  - Emphasized community involvement, starting from **Gram Sabhas**, for effective ecological management.

#### About the Champions of the Earth Award:

- The **Champions of the Earth Award** is the **highest environmental accolade** bestowed by UNEP.
- It celebrates **individuals, organizations, and governments** for their exceptional contributions to **environmental protection and sustainable development**.

#### 2024 Award Honorees:

This year's award recognized **six exceptional leaders and initiatives**:

- Sonia Guajajara** – Indigenous rights advocate.
- Amy Bowers Cordalis** – Attorney and environmentalist.
- Gabriel Paun** – Conservationist.
- Lu Qi** – Forest ecologist.
- Madhav Gadgil** – Ecologist and sustainability pioneer.
- SEKEM Initiative** – Sustainable development project in Egypt.

#### Conclusion:

The recognition of **Madhav Gadgil** with the **Champions of the Earth Award** underscores the critical role of scientific expertise and community-led approaches in conserving biodiversity and fostering sustainable development. His work on the **Western Ghats** serves as a blueprint for balancing environmental conservation with development, inspiring global action to safeguard fragile ecosystems.

## Gene Therapy Success in India: A Transformative Medical Breakthrough

**Context:** Indian scientists have achieved a **remarkable milestone** in medical science by using **gene therapy** to treat severe **Hemophilia A**, a rare genetic disorder causing life-threatening bleeding episodes. This **pioneering trial** conducted on five patients in Tamil Nadu has shown **promising outcomes**, with no bleeding episodes reported during a follow-up period averaging 14 months.



### What is Gene Therapy?

Gene therapy involves modifying or manipulating genes to treat or cure diseases. It can address various conditions, including cancer, genetic disorders, and infectious diseases.

### Key Mechanisms of Gene Therapy:

1. **Replacing a faulty gene** with a healthy copy.
2. **Inactivating a malfunctioning gene** causing disease.
3. **Introducing a new or modified gene** to aid in treatment.

### Types of Gene Therapy Products:

- **Plasmid DNA:** Circular DNA engineered to carry therapeutic genes into human cells.
- **Viral Vectors:** Modified viruses used as carriers to deliver therapeutic genes.
- **Bacterial Vectors:** Altered bacteria employed to transfer genes into tissues.
- **Gene Editing Technology:** Tools like CRISPR to repair or disrupt faulty genes.
- **Patient-Derived Cellular Products:** Cells removed, modified, and reintroduced to the patient.

### Understanding Hemophilia A:

#### What is Hemophilia?

Hemophilia is a rare genetic disorder that prevents proper blood clotting, leading to excessive bleeding. It is classified based on the percentage of clotting factors in the blood.

#### What Makes Hemophilia A Unique?

- **Cause:** A hereditary deficiency of Factor VIII, a critical blood-clotting protein.
- **Severity:** Severe cases have less than 1% of normal clotting factors.
- **Prevalence in India:** With 40,000–100,000 cases, India has the world's second-largest patient pool.

### Current Treatments:

- Frequent **Factor VIII infusions** or monoclonal antibodies.
- Extremely **high costs**—around ₹2.54 crore per patient over 10 years—make treatment inaccessible to many.

### The Promise of Gene Therapy:

#### How Does It Work?

Gene therapy offers a **one-time solution** by introducing a functional gene that enables the body to produce sufficient Factor VIII. This reduces or eliminates the need for repeated infusions.

### Innovative Techniques in India

The Indian trial used **lentivirus** to deliver the clotting factor gene into stem cells, a safer method compared to adenovirus vectors. This approach eliminates the need for **immunosuppressive drugs**.

### Results of the Trial

- **Participants:** Five patients experienced no bleeding episodes during the 14-month follow-up.
- **Team:** Led by **Dr. Alok Srivastava** at Christian Medical College (CMC), Vellore.
- **Support:** Funded by the Union Department of Biotechnology.

### Global Context of Gene Therapy:

#### Advancements Worldwide:

- **Roctavian:** Approved by the **U.S. FDA in 2023**, significantly reducing bleeding incidents in Hemophilia A patients.
- **Mechanism:** Uses adenovirus vectors but requires **immune suppression**, unlike the Indian trial

**Significance of India's Success:****Why It's Groundbreaking:**

1. **Resource Constraints:** Demonstrates the feasibility of conducting advanced gene therapy in a developing country.
2. **Cost Reduction:** Localising gene therapy manufacturing in India could make treatments **more accessible and affordable**.
3. **Broader Accessibility:** Eliminating the need for immunosuppressive therapy makes treatment possible for **younger patients**, overcoming challenges like liver immaturity.

**Conclusion:**

India's success with gene therapy for Hemophilia A marks a **transformative step** in medical science, offering a **safer, more accessible, and effective treatment** for this rare disorder. This breakthrough not only promises **better care** for Indian patients but also sets a **global precedent** for advancing medical research in resource-limited settings.





## Bharat 6G Vision Document: A Leap into the Future of Wireless Technology

**Context:** The **Bharat 6G Vision** positions India as a key contributor in the **design, development, and deployment** of **6G technology** by the year 2030, aiming to lead the global technological landscape.

**What is 6G?**

**6G (sixth-generation wireless)** is envisioned as a groundbreaking technology that offers **internet speeds up to 100 times faster** than 5G.

- **Speed:** While 5G delivers speeds up to **10 gigabits per second**, 6G promises speeds up to **1 terabit per second** with **ultra-low latency**.
- **Designation:** The International Telecommunication Union (ITU) has termed this technology as '**IMT 2030**'.
- **Frequency Bands:** Studies by the ITU have focused on frequency bands like **4400–4800 MHz**, **7125–8400 MHz**, and **14.8–15.35 GHz** for 6G usage.



**The Bharat 6G Vision:**

India's 6G project is structured into two distinct phases:

- **Phase 1 (2023–2025):** Focus on **exploratory research**, testing innovative ideas, and conducting proof-of-concept studies.
- **Phase 2 (2025–2030):** Shift towards **conceptualization** and **commercialization** of 6G technology solutions.

**Key Use Cases of 6G:**

1. **Remote-Controlled Factories** for efficient industrial operations.
2. **Self-Driving Cars** with seamless communication capabilities.
3. **Smart Wearables** that interact directly with human senses.

**Bharat 6G Alliance:**

This alliance brings together **domestic industries, academia, research institutions, and standards organizations** to drive the 6G initiative.

- **Objective:** To craft a **national action plan** that keeps India at the forefront of **technological innovation** in the coming decades.

**Pillars of the 6G Vision:**

**Benefits of 6G Technology:**

**6G is expected to revolutionize multiple sectors:**

- **Healthcare:** Facilitating **telemedicine, robotic surgeries, and AI-powered diagnostics**.
- **Agriculture:** Enabling **precision farming** and **smart monitoring** using IoT sensors.
- **Education:** Real-time, immersive learning experiences via **AR/VR technologies**.
- **Industrial Automation:** Boosting **Industry 4.0** through enhanced **machine-to-machine communication, Digital Twins, and IoT-based smart industries**.

**Challenges in Implementing 6G:**

1. **Investment in R&D:** A significant focus on **semiconductors, AI processors, and advanced SoCs (System on Chips)** is necessary.
2. **Cybersecurity Concerns:** Ensuring data privacy and security in a hyper-connected 6G environment.

**Recommendations for Bharat 6G Mission:**

1. **Global Standards Participation:** Actively contribute to international forums to ensure **interoperability and global relevance**.
2. **Space-Terrestrial Integration:** Develop solutions for **seamless connectivity** across terrestrial and satellite networks.
3. **Innovative Funding Mechanisms:** Support R&D through funding for **startups, academia, and national laboratories**.



4. **Spectrum Sharing:** Optimize the use of **higher frequency bands** to meet growing demands.

**Conclusion:**

The **Bharat 6G Mission** aligns with the vision of **Atmanirbhar Bharat**, ensuring that India emerges as a **global leader** in telecom technology. By delivering **affordable and advanced solutions**, India is poised to make a significant contribution to the global technological ecosystem, fostering innovation for the **greater good of humanity**.



## Supreme Court's Landmark Ruling on the Places of Worship Act, 1991

**Context:** The **Supreme Court of India** has issued directives barring **civil courts** from registering new cases or ordering surveys concerning the ownership or title of **places of worship**. Pending suits are also restricted from issuing **interim or final orders** until further hearings scheduled for **February 17, 2025**.

**The Places of Worship Act, 1991: An Overview:**

**Historical Context:**

The Act was enacted during the **Ramjanmabhoomi movement** in the late 1980s, a period marked by calls for building a Ram temple at the **Babri Masjid site in Ayodhya**. The **PV Narasimha Rao-led government** introduced the Act to avert similar disputes and maintain communal harmony.

**Objective of the Act**

**The Act aims to:**

- **Preserve the religious character** of places of worship as it existed on **August 15, 1947**.
- Prohibit **conversions of religious sites**, whether within a religion (e.g., one denomination to another) or between religions.

**Key Provisions of the Act:**

1. **Section 3:** Bars any conversion of places of worship.
2. **Section 4(1):** Maintains the **religious character** of all places of worship as it stood on August 15, 1947.
3. **Section 4(2):** Prevents new suits related to conversions and mandates abatement of pending suits regarding conversions prior to the cutoff date.
4. **Section 5:** Excludes the **Ram Janmabhoomi-Babri Masjid dispute** from its provisions.

**Exceptions to the Act:**

**The Act does not apply to:**

- **Protected Sites:** Classified as ancient monuments or archaeological sites.
- **Resolved Legal Cases:** Disputes settled before the Act came into effect.
- **Mutual Agreements:** Where parties agreed to the change before the Act's enactment.
- **Historical Time-Barred Cases:** Conversions that occurred before the cutoff date but cannot be contested due to time limits.

**Background of the Case:**

**Core Legal Challenge:**

The constitutional validity of the Places of Worship Act, 1991, has been challenged on the following grounds:

1. It allegedly bars **judicial review**, a basic feature of the Constitution.
2. It imposes an **arbitrary retrospective cutoff date**, infringing on the **religious rights** of Hindus, Jains, Buddhists, and Sikhs.

**Relevant Timelines and Observations:**

- **2022 SC Observations:** The court clarified that conducting surveys of religious sites does not inherently violate the Act.
- **Ayodhya Verdict (2019):** The court upheld the Act as part of the **basic structure of the Constitution**, viewing it as essential for **secularism** and **communal harmony**.

**December 2024 Ruling: Key Directions:**

**Supreme Court's Stance:**

1. **Fresh Suits:** No new suits can be registered, and no action can proceed on pending cases.
2. **Union Government Response:** Directed the government to clarify its stand on the constitutional validity of the Act within **four weeks**.

**Observations by the Bench:**

- Emphasized that lower courts must adhere to principles laid out in the Ayodhya judgment.





- Stated that larger constitutional principles, even in the absence of the Act, may bar suits seeking to alter the religious character of places of worship.

**Key Takeaways:****The Supreme Court has:**

- Reinforced the importance of the Places of Worship Act, 1991, in maintaining **communal harmony**.
- Reiterated the need for adherence to **constitutional principles** in matters involving **religious sites**.
- Highlighted the larger implications of any action that could disturb the **status quo** of places of worship.

**Conclusion:**

The **Supreme Court's ruling** underscores the critical role of the **Places of Worship Act** in safeguarding India's **secular fabric** and promoting **peaceful coexistence**. The judgment sets a precedent for maintaining communal harmony while addressing historical grievances through constitutional principles, rather than contentious legal battles.





## Dark Eagle Anti-Missile System: A Game-Changer in Missile Defense

**Context:** The **United States** has successfully tested a new **anti-missile system** called **Dark Eagle**, which is now approaching operational readiness. This advanced system is designed to bolster missile defense capabilities and enhance strategic deterrence.



### What is the Dark Eagle Anti-Missile System?

#### A Revolutionary Hypersonic Defense System:

The **Dark Eagle** is a **long-range hypersonic anti-missile system** engineered by the United States to intercept and neutralize a wide range of threats, including:

- **Ballistic missiles**
- **Cruise missiles**
- **Hypersonic missiles**
- **Advanced warheads**

#### Unparalleled Range and Speed:

- **Operational Range:** Over **2,775 kilometers (1,724 miles)**, enabling strikes deep within enemy territory.
- **Hypersonic Glide Warhead (C-HGB):** Equipped with a cutting-edge warhead capable of reaching speeds up to **Mach 17**. This incredible velocity makes it highly challenging for adversaries to intercept.

#### Advanced Features:

1. **Two-Stage Ballistic Missile Design:**
  - One stage incorporates the **C-HGB warhead**, designed for extreme speed and precision.
2. **Hypersonic Capabilities:**
  - Reaches speeds of **3,000 to 3,700 meters per second** at altitudes below **50 kilometers**.

#### Strategic Superiority:

The Dark Eagle system is designed to **outperform advanced air defense systems**, including:

- **Russia's S-300V4**
- **S-400**
- **S-500**

With its unmatched speed, range, and technological sophistication, the Dark Eagle poses a significant challenge to existing missile defense systems.

#### Why is Dark Eagle Important?

- **Enhanced Security:** Provides robust defense against emerging missile threats.
- **Strategic Deterrence:** Strengthens the U.S. position in the global defense landscape.

**Technological Edge:** Showcases advancements in hypersonic weaponry and missile interception technologies.

#### Conclusion:

The **Dark Eagle Anti-Missile System** represents a monumental leap in missile defense technology. With its **unparalleled range, hypersonic capabilities**, and ability to counter diverse missile threats, it underscores the United States' commitment to maintaining **strategic superiority** and ensuring **global security**.

## Supreme Court Criticizes Rising Misuse of IPC Section 498A

**Context:** The **Supreme Court of India** has expressed concerns over the growing misuse of **Section 498A** of the Indian Penal Code (now **Section 84** of the **Bharatiya Nyaya Sanhita, 2023**). This section, originally intended to safeguard married women from cruelty, is increasingly being exploited for personal vendettas.



**Understanding Section 498A (Now Section 84):**

**What Does It Address?**

Section 498A penalizes **cruelty against married women** by their husbands or in-laws. It aims to protect women from:

- **Physical or mental harassment**
- **Dowry-related abuse**
- **Coercion or violence within marriage**

**Definition of Cruelty:**

**Cruelty includes:**

1. **Wilful conduct** likely to drive a woman to suicide or cause **grave harm** to her physical or mental health.
2. **Harassment** intended to coerce the woman or her relatives into meeting **unlawful demands** for money or valuables.

**Punishment**

- Imprisonment up to **three years**
- Liability to pay a **fine**

**Key Features:**

- **Cognizable and non-bailable:** Immediate arrest is possible.
- **Time-bound complaints:** Complaints must be filed within **three years** of the incident.

**Why Was Section 498A Introduced?**

Section 498A was enacted in response to increasing cases of **dowry deaths** and **domestic violence** during the 1980s. It aimed to provide legal protection to women suffering from:

- **Physical and mental abuse**
- **Dowry-related coercion**
- **Marital violence**

**Misuse of Section 498A:**

**Emerging Concerns:**

1. **Personal Vendetta:** The law is often used to settle scores in **matrimonial disputes**.
2. **Financial Coercion:** False allegations are leveraged to extort money from the husband and his family.
3. **Vague Complaints:** Allegations often lack **specific details** or supporting evidence.
4. **Reputational Damage:** Accusations, even if proven false, leave a **social stigma** for the accused.
5. **Immediate Arrests:** The provision for quick arrests can lead to undue pressure before guilt is established.

**Ethical Implications:**

The misuse of such legal provisions undermines their original intent and raises questions about **integrity and fairness** in the judicial process.

**Reasons Behind the Misuse:**

1. **No Preliminary Verification:** Arrests are possible without a thorough **investigation**, increasing scope for abuse.
2. **Marital Disputes:** False accusations are often weaponized during **divorce** or interpersonal conflicts.
3. **Lack of Accountability:** The absence of penalties for filing **false complaints** encourages misuse.

**Supreme Court's Stand:**

**Key Observations:**

- **Scrutiny of Allegations:** Courts must scrutinize **vague complaints** to prevent harassment of innocent parties.
- **Specific Details Needed:** FIRs should include **concrete allegations** with details like time, date, and place of harassment.
- **Contextual Examination:** The court considers the **timing and circumstances** of the complaint to assess its authenticity.
- **Protecting Innocents:** Ensures that family members are not unnecessarily implicated without substantial evidence.
- **Judicial Oversight:** Emphasizes the judiciary's role in filtering **malicious complaints**.

**Way Forward:**

1. **Balanced Laws:** Ensure legal frameworks are **gender-neutral**, protecting the rights of all individuals.
2. **Preliminary Inquiry:** Mandate a **preliminary investigation** before registering FIRs to screen false cases.
3. **Family Welfare Committees:** Independent bodies can review complaints before arrests, as suggested in the **Rajesh Sharma case**.
4. **Accountability for False Complaints:** Introduce penalties for individuals filing **malicious complaints** to deter misuse.

**Conclusion:**

While **Section 498A** plays a critical role in protecting women from cruelty, its **misuse undermines justice** and burdens the judicial system. A balanced approach, incorporating **preliminary scrutiny** and **accountability mechanisms**, is essential to preserve the integrity of this important provision while safeguarding the rights of the accused.

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## Union Cabinet Approves Bills for Simultaneous Polls

**Context:** The **Union Cabinet** has recently approved two critical Bills aimed at implementing **simultaneous elections** for the **Lok Sabha** and **State Legislative Assemblies**. One of these Bills proposes constitutional amendments, while the other focuses on amending laws related to **Union Territories** with Legislative Assemblies.

This development follows recommendations by a **high-level committee**, led by former President **Shri Ram Nath Kovind**, outlining a roadmap for conducting simultaneous elections across **Parliament**, **State Assemblies**, and **Local Bodies**.

### What Are Simultaneous Elections?

**Simultaneous Elections** involve conducting polls for:

- **Lok Sabha**
- **State Legislative Assemblies**
- **Local Bodies** (Municipalities and Panchayats)

all at the same time. This concept aims to streamline the election process and ensure governance efficiency.

### Why Are Simultaneous Elections Necessary?

1. **Improved Governance:** Frequent elections disrupt **development programs** and delay **policy decisions** due to the imposition of the **Model Code of Conduct (MCC)**.
2. **Reduced Financial Burden:** Holding elections together will significantly cut down the **massive expenditure** incurred during separate elections every year.
3. **Optimized Human Resources:** Simultaneous polls prevent the diversion of **security forces**, teachers, and other officials from their primary duties for extended periods.
4. **Other Benefits:**
  - Increased **voter participation**
  - Reduced burden on courts due to fewer election-related disputes.

### Concerns About Simultaneous Elections:

While the idea has several benefits, it also poses challenges:

1. **Impact on Regional Parties:** Simultaneous polls might affect the **electoral prospects of regional parties** by amplifying national issues over local concerns.
2. **Reduced Accountability:** With elections held every five years, **public scrutiny** of elected officials may diminish.
3. **Logistical Challenges:** The need for a **large number of EVMs** and extensive logistical arrangements makes the implementation complex.

### Key Recommendations of the High-Level Committee:

The **Ram Nath Kovind-led committee** proposed the following measures to facilitate simultaneous elections::

1. **Constitutional Amendments:**
  - Amendments to **three Articles** and the inclusion of **12 new sub-clauses** in the Constitution.
  - Changes to laws related to Union Territories with Legislative Assemblies.
2. **Unified Electoral Roll:**
  - A **single electoral roll** to be prepared by the **Election Commission of India (ECI)** in collaboration with **State Election Commissions**, through an amendment to **Article 325**.
3. **Local Body Elections:**
  - Elections for **municipalities** and **panchayats** to be conducted within **100 days** of Parliamentary and Assembly polls.
4. **Appointed Date for Synchronization:**







- The President will notify the **first sitting date** of the Lok Sabha after a general election as the **appointed date** to align elections.

5. **Handling Interim Situations:**

- In the case of a **hung House** or a **no-confidence motion**, fresh elections would be held for the **remaining term** of the preceding full term.

**Conclusion:**

The move towards **simultaneous elections** marks a significant step in reforming India's electoral process, aligning with goals of **efficiency**, **cost-effectiveness**, and **better governance**. However, addressing logistical and constitutional challenges will be crucial to ensuring its smooth implementation.





## ISRO Successfully Tests CE20 Cryogenic Engine

**Context:** The Indian Space Research Organisation (ISRO) recently conducted a **successful sea-level hot test** of the **CE20 Cryogenic Engine** at the **ISRO Propulsion Complex**, Mahendragiri, Tamil Nadu. This marks a significant milestone in India's advancements in **cryogenic rocket technology**.

**What is Cryogenic Engine Technology?**

**Cryogenic engines** utilize rocket propellants stored at extremely low temperatures, ensuring efficient propulsion.

- **Liquid Hydrogen (LH2)** serves as the **fuel**, remaining in liquid form at temperatures below **-253°C**.
- **Liquid Oxygen (LOX)** acts as the **oxidizer**, staying liquid at temperatures below **-183°C**.

These propellants are combined in precise proportions to achieve high-efficiency combustion.

**Features of the CE20 Cryogenic Engine:**

1. **Engine Restart Capability:**
  - Equipped with a **multi-element igniter**, this engine can be restarted, an essential feature for complex missions like **Gaganyaan**.
  - Ensures **reliable performance** in space.
2. **Nozzle Protection System:**
  - A newly tested **Nozzle Protection System** prevents **flow separation** and **vibrations**, enhancing engine stability and testing outcomes.
3. **Advanced Combustion Process:**
  - The staged combustion process ensures optimal mixing of LH2 and LOX, improving **engine efficiency** and thrust.

**Significance of Cryogenic Engines in India's Space Program:**

1. **Boost to Space Missions:**
  - Cryogenic engines provide the necessary thrust for launching **heavy payloads**, enabling missions like **Gaganyaan**, **satellite deployments**, and **interplanetary exploration**.
2. **Indigenous Development:**
  - Mastery over cryogenic technology enhances **self-reliance**, reducing dependence on **foreign expertise**.
  - India joins an elite group of nations, including **the US, France, Russia, China, and Japan**, capable of developing indigenous cryogenic engines.
3. **Enhanced Payload Capacity:**
  - The higher **specific impulse** of cryogenic engines allows rockets to carry **heavier payloads**, making them ideal for **advanced space missions**.

**Conclusion:**

The successful test of the **CE20 Cryogenic Engine** showcases ISRO's engineering excellence and highlights India's growing capabilities in **space exploration**. This development strengthens the nation's position in the global space arena, paving the way for future ambitious missions.

## Climate Footprint of Space Exploration

**Context:** The rapid expansion of space exploration has brought environmental impacts—such as rocket emissions and satellite debris—to the forefront, often overlooked by global sustainability frameworks like the **Paris Agreement**. Urgent action is required to address these concerns and ensure a sustainable future in space.



### How Are Space Activities Affecting the Environment?

#### 1. Rocket Emissions:

- **Carbon Dioxide (CO<sub>2</sub>)**, **black carbon**, and **water vapor** are released during rocket launches.
- **Black carbon** absorbs sunlight around 500 times more efficiently than CO<sub>2</sub>, exacerbating **global warming**.
- **Chlorine-based rocket propellants** deplete the **ozone layer**, leading to **increased UV exposure** and disrupting **atmospheric circulation**.

#### 2. Space Debris:

- As of September 2024, there are **19,590 satellites** launched, with **13,230** still in orbit, and **10,200** being operational.
- The **total mass of space objects** exceeds **13,000 tonnes**, contributing significantly to **pollution by space debris** due to **overcrowding in low Earth orbit (LEO)**.
- Non-functional satellites and debris from collisions add to the **growing problem of space junk**, making space increasingly **inaccessible**.
- This debris can **disrupt radio waves** and **sensor accuracy**, affecting critical systems for **disaster tracking, climate monitoring, and communication**.

#### 3. Satellite Manufacturing:

- The **production of satellites** involves **energy-intensive processes**, particularly through the use of **metals and composites**.
- **Satellite propulsion systems** also release additional emissions during **orbital adjustments**.
- Satellites **burn up during re-entry**, releasing **metallic "satellite ash"** which can alter **atmospheric dynamics** and harm the **climate**.

#### 4. Emerging Threats:

- **Space mining**, although not yet operational, poses a potential threat to both **Earth and space environments**.
- Increased **industrial activity** in orbit could intensify environmental impacts, compounding the **challenges posed by current space operations**.

### Barriers to Sustainable Space Exploration:

#### 1. Lack of Regulations:

- Space activities are not covered by agreements like the **Paris Accord**, leaving emissions and debris largely unregulated.
- Without **clear guidelines**, the rapid increase in satellites and debris has led to **overcrowded orbits**, making future missions more costly and riskier.
- The **Outer Space Treaty, 1967**, emphasizes **responsible use** but lacks **binding provisions for environmental sustainability**.
- In 2019, the **United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)** adopted **21 voluntary guidelines** for the **long-term sustainability of space activities**. However, the lack of **binding regulations** and **conflicting national and commercial priorities** hinder their implementation, making it challenging to achieve a unified approach to **space sustainability**.

#### 2. Commercial Exploitation of Space:



- **Profit-focused companies** are driving activities such as **space resource recovery** from asteroids, **developing commercial space stations**, and **offering space tourism**.
  - These activities may **undermine sustainability efforts**, as commercial interests often clash with the need for environmental protection.
3. **High Costs:**
- **Developing and implementing sustainable technologies** for space exploration is expensive, including costs related to **debris mitigation**, **sustainable fuel alternatives**, and **long-term missions**.
  - Many of these technologies are still in development and require substantial investment.
4. **Data-Sharing Issues:**
- **Security and commercial interests** often hinder **real-time satellite and debris tracking**, which is crucial for **coordinated space traffic management**.
  - Overcoming **data-sharing resistance** and **building trust** with **security protocols** are key for **effective space traffic management**.

### Where Does India Stand on Space Sustainability?

1. **Private Sector Engagement:**
- The establishment of the **Indian National Space Promotion and Authorization Centre (IN-SPACe)** is expected to boost the role of **private companies**.
  - Startups like **Agnikul**, **Skyroot**, and **Dhruva Space** are developing **sustainable satellite launch vehicles** and technologies.
  - **Manastu Space Technologies** has delivered the **iBooster Green Propulsion System** to the Defence Research and Development Organisation, which uses **hydrogen peroxide-based fuel** for **safer, cost-effective** satellite operations like **orbit raising** and **deorbiting**.
2. **Space Debris Management:**
- The **Indian Space Research Organisation (ISRO)**'s **Network for Space Objects Tracking and Analysis (NETRA)** project aims to track **space debris**, providing critical data to **protect space assets** and help manage risks.
  - This initiative helps manage risks and **prevent Kessler Syndrome**, where collisions create more debris.
  - India has also collaborated with the **US** on space object monitoring under a pact signed in 2022.
3. **In-Orbit Servicing:**
- **ISRO** is developing the **SPADX (Space Docking Experiment)** to dock satellites for **refuelling** and other **services**, which will enhance **satellite longevity** and **mission flexibility**.

### Way Forward:

1. **Technological Innovations:**
- **Reusable rockets**, like those developed by **Elon Musk's SpaceX**, reduce **waste** and **costs**.
  - **Green hydrogen** and **biofuels** can lower **emissions** in launches.
  - **Electric propulsion** is efficient for **low-thrust missions** but not suitable for **heavy-lift operations**.
  - **Nuclear propulsion** presents a potential option but carries the risk of **nuclear radiation pollution** in the event of an accident within **Earth's atmosphere**.
2. **Mitigating Orbital Debris:**
- **Biodegradable satellites**, such as Japan's **LignoSat**, where components could disintegrate on re-entry, help reduce space debris.
  - Investment in **Autonomous Debris Removal (ADR)** technologies such as **robotic arms** and **lasers** is essential for cleaning up existing debris.
  - Deorbiting satellites from **LEO to Geostationary Orbit (GEO)** or **higher orbits** can reduce the **risk of re-entry** into **Earth's atmosphere** and minimize debris accumulation in **LEO**.





### 3. Global Traffic Management:

- A **global system to monitor satellite movements** in real-time would reduce **collision risks** and ensure **safer orbital use**.
- Overcoming **data-sharing resistance** and **building trust** with **security protocols** are key for **effective space traffic management**.

### 4. Policy and Governance:

- Aligning **sustainability goals** with the **Outer Space Treaty** and introducing **binding agreements** under **COPUOS** is essential for **enforcing environmental responsibility** in space.
- Governments can **enforce emission caps, debris mitigation**, and offer **incentives** for **green technologies** through **subsidies** and **penalties** to promote a **sustainable space industry**.

### 5. Public-Private Partnerships:

- Collaboration between **governments** and **private entities** is key to funding **sustainable technologies**.
- Shared **accountability frameworks** ensure **mutual responsibility** for **sustainability** in space.

