

Monthly Current Affairs

September 2025



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SEPTEMBER 2025

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September Focus

Gen Z Revolution- Nepal

Context: In September 2025, Nepal experienced a significant youth-led movement, often dubbed the "Gen Z revolution," which led to the resignation of the prime minister and other major political changes.



Immediate cause of the protest: The protests, rooted in decades of systemic corruption, nepotism, and economic hardship, were sparked by a government ban on social media platforms.

Background and causes

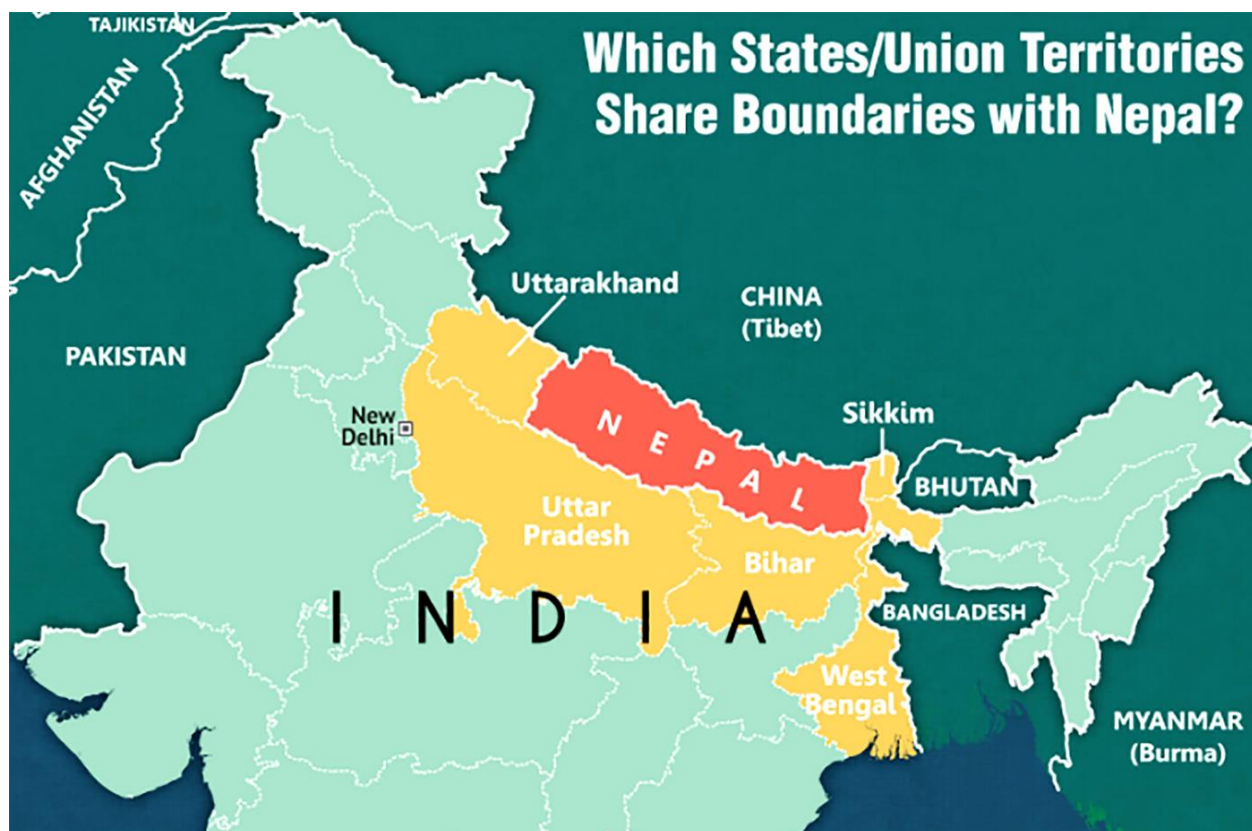
Triggering event: The protests began on September 4, 2025, after the government of then-Prime Minister K.P. Sharma Oli banned 26 major social media platforms, including Facebook, YouTube, and X (formerly Twitter). The official reason given was non-compliance with local registration laws, but the move was widely viewed as an attempt to stifle online dissent.

Deep-rooted issues: The social media ban was the catalyst for a wider public frustration over long-standing problems:

Corruption and nepotism: A series of scandals involving the political elite and their families ("nepo kids") intensified public anger over government impunity.

Economic hardship: High youth unemployment (over 20%) and a lack of quality job opportunities have driven many young Nepalis to seek work abroad under exploitative conditions. Nepal's reliance on remittances (about one-third of its GDP) highlights the domestic economic stagnation.

Political instability: Decades of frequent government changes since the monarchy was abolished in 2008 have led to inconsistent policy and governance failures.



How was the revolution organized?

Digital mobilization: Gen Z activists, organized through online platforms like Discord and activist groups such as Hami Nepal, used creative methods like flyers with QR codes and VPNs to bypass the social media ban.

Violent escalation: Initially peaceful rallies on September 8 turned violent as protesters clashed with security forces, who responded with tear gas, rubber bullets, and live ammunition.

Symbolic attacks: Protesters set fire to government buildings, including the federal parliament, the prime minister's and president's residences, and offices of political parties, symbolizing a rejection of the entire political establishment.

Political fallout: The escalating violence resulted in:

The resignation of Prime Minister K.P. Sharma Oli.

The resignation of several ministers.

The Nepali Army taking a quasi-governing role to restore order.

A death toll of at least 72 people and over 2,113 injuries

Aftermath and implications

Interim government: On September 12, 2025, former Chief Justice Sushila Karki was appointed as the interim prime minister following extensive online consultation and negotiation between Gen Z representatives, the Nepali Army, and the President.

Call for elections: Parliament was dissolved, with new general elections set for March 2026.

Lessons for democracy: The movement demonstrated the power of digitally-networked youth movements to challenge entrenched elites and demand accountability, even without traditional leadership structures.

India's perspective:

Neighbourhood policy: The events are a crucial case study for India's "Neighbourhood First Policy," as instability in Nepal has regional implications.

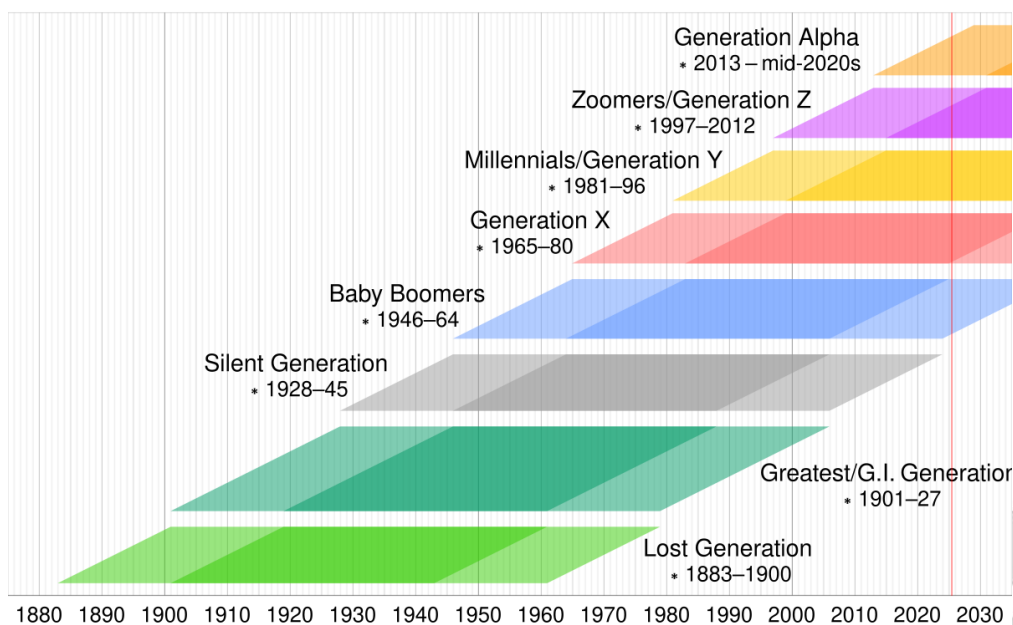
Security concerns: India's security apparatus studied the protests to prepare for potential similar digitally-driven uprisings, with the Delhi Police commissioning a report on the matter.

Geopolitical implications: The political vacuum and instability could be exploited by external powers, particularly China, to expand their influence in the region.

What is Gen Z?

Generation Z refers to people born between 1996 and 2010. They're the second-youngest generation, between millennial and Generation Alpha. Gen Z identity has been shaped by the digital age, climate anxiety, a shifting financial landscape, and COVID-19. They're known as 'digital natives'—the first generation to grow up with the internet.

Gen Z is currently the second-youngest generation, with millennials coming before them and Generation Alpha after.



Reasons for discontentment among Gen Z:

- Lack of opportunities: while the politicians send their children to study abroad, the ordinary residents- the young people in particular face lack of opportunities.
- Poverty: It remains a persistent issue in these countries, which also suffer from low social mobility.
- Corruption: Multiple studies have shown that corruption reduces economic growth and deepens inequality.

Political solidarity across nations

Technology has also brokered a sense of solidarity among protesters in different countries.

A cartoon skull logo popularised by Indonesian demonstrators has been adopted by Philippine and Nepalese protesters too, appearing on protest flags, video clips and social media profile pictures.

The hashtag #SEAbings (a play on siblings in South East Asia or near the sea) has also trended online, as Filipinos, Indonesians and other nations express support for one another's anti-corruption movements.



Destruction:

These protests have all led to serious consequences offline. Buildings have burnt down, homes have been looted and ransacked, and politicians have been dragged from their houses and beaten.

The damage to buildings and businesses alone is worth hundreds of millions of US dollars.

More than 70 people were killed in Nepal, and 10 people have died in Indonesia.

Impact of Gen Z revolution?

Nepal is not the only country where the new generation has erupted into revolt. Indonesians have staged demonstrations, as have Filipinos, with tens of thousands protesting in the capital Manila in September itself. They all have one thing in common: they are driven by Generation Z, many of whom are furious at what they see as endemic corruption in their countries.

Governance and Polity

1. 15th Vice-President of India

Context: Shri C.P. Radhakrishnan is elected as the fifteenth Vice President of India and Chairman of the Rajya Sabha.

About Vice-President of India:

a. Constitutional provisions

- **Article 63:** States that "there shall be a Vice-President of India".

- **Article 64:** Declares the Vice President the *ex-officio* Chairman of the Rajya Sabha (Council of States).
- **Article 65:** Outlines the Vice President's role in acting as or discharging the functions of the President in case of a vacancy or absence. The Vice President can act as President for a maximum of six months.
- **Article 66:** Details the election process.
- **Article 67:** Specifies the term of office (five years) and the process for removal

b. Election process

The Vice President is elected by an electoral college consisting of all members of both the Lok Sabha and the Rajya Sabha. This Electoral College includes both elected and nominated members of Parliament, but excludes members of State Legislative Assemblies. The election is conducted through proportional representation using a single transferable vote and a secret ballot, administered by the Election Commission of India

c. Qualifications for office

To be eligible, a person must be a citizen of India, be at least 35 years old, and be qualified for election as a member of the Rajya Sabha. They must not hold any office of profit under the government. If a Member of Parliament or a State Legislature is elected, they must vacate their seat

d. Functions of the Vice President

- The Vice President primarily serves in two capacities:
- As the *ex-officio* Chairman of the Rajya Sabha, presiding over its proceedings, maintaining order, and casting a tie-breaking vote.
- As Acting President when there is a vacancy or the President is unable to perform their duties. While acting as President, they do not perform the duties of the Rajya Sabha Chairman

e. Removal from office

The Vice President can be removed by a resolution initiated in the Rajya Sabha, passed by an effective majority, and agreed to by the Lok Sabha by a simple majority. A 14-day notice must be given to the Vice President. This process is distinct from the President's impeachment, which requires a special majority in both houses, and the Constitution does not specify grounds for the Vice President's removal.

- f. **Powers of the President-** The powers of the Vice President of India are primarily defined by two main roles: acting as the *ex-officio* Chairman of the Rajya Sabha and

serving as the Acting President during a vacancy. The Vice President does not have any direct executive powers unless assuming the role of Acting President.

Powers as the ex-officio Chairman of the Rajya Sabha

In this legislative capacity, the Vice President's powers are comparable to those of the Speaker of the Lok Sabha. These duties include:

Presiding over sessions: Conducting the proceedings of the Rajya Sabha and maintaining order and discipline within the House.

Controlling the proceedings: The Vice President ensures adherence to parliamentary rules and decorum during debates and discussions.

Casting vote in a tie: While not a member of the Rajya Sabha, the Vice President can cast a deciding vote in the event of a tie on any question before the House.

Referring matters to committees: The Chairman can refer bills and other matters to relevant parliamentary committees for consideration.

Powers as Acting President

In the event that the President's office falls vacant due to death, resignation, removal, or other causes, the Vice President assumes the role of Acting President.

Assumes presidential duties: While acting as President, the Vice President exercises all the powers, privileges, and immunities of the President.

Term limit: This role is temporary, lasting a maximum of six months until a new President is elected.

Ceases Rajya Sabha duties: During this period, the Vice President does not perform the functions of the Rajya Sabha Chairman. The Deputy Chairman of the Rajya Sabha takes over that role.

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2. Mana Mitra Model

In News: The Mana Mitra model is Andhra Pradesh's WhatsApp-based digital governance platform that provides citizens access to government services through a single WhatsApp number.

Key Objectives

- **Easy Access:** Provide public services instantly on WhatsApp.

- **Transparency:** Issue QR-coded digital certificates linked to official websites, eliminating the risk of fake documentation and fostering trust.
- **Digital Inclusivity:** Empower rural and marginalized citizens with mobile-first governance tools, bridging the digital divide.

Key Features & Developments- Andhra Model

Feature /

Development

Service expansion	Plans to expand services from the initial 161 to 360 in the next phase
Integration & departments	It brings together many departments (revenue, municipal, energy, transport, etc.) under one interface
Digital certificates & QR codes	Certificates issued through the system come with QR codes for verification, to prevent forgeries.
Language & accessibility	The chatbot works in both Telugu and English .
Future enhancements	Plans include AI / voice integration, further services (e.g. health sector reports) via Mana Mitra.
Adoption & awareness campaigns	The government has started “Mana Mitra at Every Home” campaigns, door-to-door awareness, and mandated that certificates should be delivered via the platform, not by summoning citizens to offices.
Administrative backing	The Chief Minister directed that WhatsApp-governance cells be set up in all district collectorates to support the platform.
Scale & current status	As of recent reports, Mana Mitra is offering 738 services across departments.

Key Features and Objectives of Mana Mitra

- a. **WhatsApp-based Platform:** Citizens can access a wide array of services by sending messages to a dedicated WhatsApp number, such as 9552300009.
- b. **Single Window for Services:** The platform integrates numerous state departments and services, reducing the need for citizens to visit multiple government offices.

- c. **Digital Inclusion:** It aims to bring governance to citizens' fingertips, enhancing digital inclusion, even for those in rural areas.
- d. **Efficient Service Delivery:** Mana Mitra streamlines the delivery of certificates (like birth and death), bill payments (electricity, water), and other government services.
- e. **Transparency and Grievance Redressal:** Real-time dashboards are used to improve transparency and address public grievances effectively.

Significance for Digital India

- a. **People-Centric Governance:** This system brings government services directly to the people, removing the need for middlemen, long waits, or complex processes. It reflects the idea of "Minimum Government, Maximum Governance."
- b. **Digital Inclusion:** By using WhatsApp a platform many people already use even those in rural areas or with limited digital skills can access government services. This helps promote equal access and digital awareness.
- c. **Easy Access to Services:** People no longer need to travel or wait in lines to get services. It saves time and money for citizens, and reduces paperwork and costs for the government through automation.
- d. **Better Administrative Efficiency:** Real-time tracking helps officials monitor how services are delivered, respond to issues faster, and approve requests quickly. This builds public trust in the system.
- e. **Model for the Whole Country:** The Department of Administrative Reforms and Public Grievances (DARPG) has praised this system (Mana Mitra) as a success. It can be used by other states and eventually adopted across India, helping to build a more connected and efficient digital government.

Challenges:

- **Digital Divide**
 - Many remote and tribal areas still lack proper internet and smartphone access.
 - Without offline options or better digital infrastructure, the most vulnerable groups may be left out.
- **Cybersecurity Risks**
 - Using a popular app like WhatsApp can make the system a target for scams, fake messages, or data theft.
 - Strong encryption and secure login processes are essential to protect users.
- **Training and Capacity Building**
 - Government staff need proper training to handle digital services, respond to complaints quickly, and move away from paperwork-based systems.
- **Data Privacy**

- The platform must follow the Digital Personal Data Protection Act (DPDPA) 2023 strictly.

Protecting sensitive personal information from misuse or leaks is a top priority.

- **System Integration (Interoperability)**
 - The backend must be strong enough to manage heavy traffic without crashing.
 - It should also connect smoothly with other platforms like **DigiLocker**, **Aadhaar**, or **UPI**, which requires advanced technical coordination

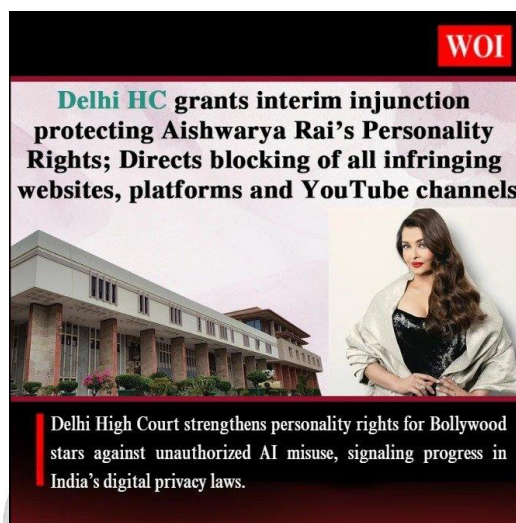
Way Forward for Mana Mitra

- a. **Use AI & Voice Bots:** Deploy smart chatbots and voice assistants for faster service, timely updates, and support in multiple languages.
- b. **Strengthen Security:** Add two-factor authentication, blockchain for certificate verification, and conduct regular security checks.
- c. **Increase Awareness & Training:** Run outreach programs, especially for women, elderly, and marginalized groups, to build trust and usage.
- d. **Create Strong Legal Framework:** Set clear rules, service standards, and accountability measures to make WhatsApp governance more effective.
- e. **Integrate with National Platforms:** Link with DigiLocker, UPI, CoWIN, etc., to offer all services in one place, supporting the idea of “**One Nation, One Digital Platform.**”

Mana Mitra is a promising step toward citizen-centric digital governance. The initiative embodies the principle of minimum government, maximum governance by leveraging technology to make services more accessible and efficient for the public.

3. How are courts protecting personality rights?

In News: The Delhi High Court has recently expanded protection of personality rights for Bollywood stars against unauthorized use of their images, voices, and likeness.



What are Personality Rights?

- Personality rights refer to an individual's right to control the **commercial use of their identity**, including their name, image, voice, likeness, and other personal traits.
- Though not codified under a single statute, they are safeguarded through judicial precedents and common law doctrines of privacy, defamation, and publicity rights.
- Courts can grant injunctions, damages, or takedown orders to prevent misuse in ads, merchandise, AI-generated content, or digital platforms.

Constitutional Backing – Article 21

- The **right to life and personal liberty** under Article 21 includes **protection of reputation, dignity, and privacy**, forming the foundation for personality rights.
- Recognized after **Puttaswamy Judgment (2017)** — Supreme Court ruled that **right to privacy** is a fundamental right.

Statutory Safeguards for Personality Rights in India

Protection of personality rights is spread across different laws, mainly in **intellectual property law**.

a. Copyright Act, 1957

- **Section 38A:** Gives **performers** (like singers, actors) the **exclusive right** to control how their performance is used or copied.
- **Section 38B:** Gives them the **moral right** to stop any changes or distortion of their work that harms their reputation.

b. Trade Marks Act, 1999

- Celebrities can **register their names, signatures, or catchphrases** as trademarks.

- This helps stop others from using their identity for **commercial gain** without permission.
- Celebrities like **Shah Rukh Khan, Priyanka Chopra, Ajay Devgn, and Amitabh Bachchan** have done this.

c. Passing Off (Common Law + Section 27)

- Protects a person's **reputation or brand** from being misused by others.
- If someone falsely uses a celebrity's name or image to sell a product, it can be stopped through a "**passing off**" action.
- However, the celebrity must prove they have a strong **reputation or public recognition** before the court gives relief.

Personality Rights and Free Expression: How are courts striking balance?

Indian courts protect personality rights but also stress the importance of **free speech under Article 19(1) (a)**.

- **Freedom of speech** includes the right to criticize, parody, or create satire about public figures.
- In *DM Entertainment v. Baby Gift House* (2010), the Delhi High Court stopped the commercial misuse of singer Daler Mehndi's image. But it clarified that parody and caricature usually don't violate personality rights.
- In *Digital Collectibles v. Galactus Funware* (2023), the court said publicity rights can't override free expression, especially if the content is already public. It allowed the use of celebrity names or images in news, art, satire, music, or education, calling it a valid part of free speech.

Concerns Around Personality Rights in India

- a. India lacks a clear law on personality rights, so courts rely on case-by-case decisions, which leads to confusion. Without proper rules, it's hard to separate artistic freedom from infringement.
- b. Experts say there must **be** clear exceptions to avoid using personality rights to **cancel** free speech.
- c. These rights aren't just for celebrities — ordinary people, especially women, suffer from deepfakes, impersonation, and revenge porn.

Though courts ask governments to block harmful content, the high number of cases makes it hard to enforce.

Personality rights are increasingly important in the digital age, where identity misuse is common. While Indian courts have taken significant steps to protect these rights, the

absence of a clear law leads to inconsistent enforcement and risks curbing free speech. A balanced, comprehensive legal framework is urgently needed.

4. Provincial Citizenship

Context: The debate on **provincial citizenship** has gained fresh urgency with recent academic focus on domicile politics in States like Jharkhand, Jammu & Kashmir, and Assam.

Alok Ranjan's forthcoming work points out how domicile-based movements are challenging the idea of a unified Indian citizenship, raising important constitutional, political, and social concerns that merit deeper examination.

This debate also mirrors the complexities seen in India-Israel relations, where balancing national unity with regional interests requires careful negotiation and policy sensitivity.

REGISTER OF GENUINE CITIZENS	
MAR 23, 1946: UK Cabinet Mission clubs Assam and Bengal	 SARBANANDA SONOWAL
APR 1946: Gopinath Bordoloi, leader of Assam, protests the move, saying it was already a province formed on linguistic and cultural basis	
1951: National Register of Citizens (NRC) with names of Indian citizens of Assam prepared after the Census	1983: Muslim Front leader Abdul Muhib Majumdar comes up with Illegal Migration (Determination by Tribunal) (IMDT) Act, passed by Indira Gandhi govt
1966: Proposal to issue identity card to Indians based on it. Project not implemented	1984: All Assam Students Union (AASU) decides to form a political party to contest elections
1971: Bangladesh gains freedom. Volume of illegal immigrants from Bangladesh goes up	AUG 1985: Historic Assam accord signed between Centre and AASU
JUNE 1979: Statewide bandh called, which marks the	➤ Sarbananda Sonowal, as President of AASU and principal of North East Students Organization (NESO), organized seminars and talks at national level to raise Assam issues. He challenged IMDT in SC
	JULY 2005: IMDT struck down

What is provincial citizenship?

Provincial Citizenship is **an unofficial, politically constructed notion of belonging to a specific Indian state**. It emerges from nativist politics, tied to the idea of being “native,” “indigenous,” “local,” or “son of the soil.”

It is not part of the Constitution, but is used in politics to give special rights to locals. This challenges the constitutional guarantee of a singular Indian citizenship under Articles 5–11.

Reasons behind the Rise in Demand for Provincial Citizenship

Economic Competition

- Locals fear that migrants take away jobs and limit access to government benefits and resources.
- Provincial citizenship is seen as a way to protect employment and opportunities for historically disadvantaged communities.

Cultural Anxiety

- Migration is perceived as a threat to local language, customs, and identity.
- Provincial citizenship is used to preserve the culture, land, and heritage of indigenous or native groups.

Political Vacuum

- India lacks a central law to regulate domicile policies across States.
- The absence of a uniform framework allows States to create their own rules, leading to inconsistencies and regional tensions.

Judicial and Policy Safeguards

Supreme Court Interventions:

In *Sunanda Reddy v. State of Andhra Pradesh* (1995), the Court struck down full reservation for local residents in medical courses, stressing that reservations should not affect merit and quality.

In *Dr. Pradeep Jain v. Union of India* (1984), the Court said that reservations based only on place of birth or residence are generally unconstitutional under Article 16(2).

States Reorganisation Commission (SRC) 1955:

- Warned that excluding people based on domicile can weaken national unity.

Constitutional Framework:

- Citizenship in India is singular and national, governed by the Citizenship Act.
- Fundamental rights protect freedom of movement and prohibit discrimination based on residence

Concerns about provincial citizenship

- Fragmentation of citizenship:** It can contradict the idea of a single, unified national citizenship by promoting a layered identity and fostering a sense of belonging to the province over the nation.
- Violation of fundamental rights:** Domicile-based restrictions conflict with constitutional provisions guaranteeing equal opportunity, such as Articles 14, 15, 16, and 19, which ensure equality, non-discrimination, and freedom of movement.
- Exclusion and discrimination:** Internal migrants who move to different provinces may be excluded from jobs, education, and welfare benefits, potentially creating a “second-class” status for them.
- Rise of nativist politics:** It can encourage “sons of the soil” movements that foster hostility towards outsiders and promote regionalism, as seen in states like Jharkhand, Maharashtra, and Assam.
- Economic inefficiency:** Restricting the mobility of the workforce can negatively impact urban economies and overall productivity, particularly in sectors reliant on migrant labour.

- f. **Judicial burden:** Conflicts over domicile and reservation policies often lead to extensive litigation, further straining an already overburdened judiciary.
- g. **Erosion of national unity:** The emphasis on provincial identity over national identity can weaken the bonds of a common Indian citizenship and lead to social, economic, and political crises.

Provincial citizenship may address local fears, but it risks **undermining India's unity, equality, and sense of fraternity**. India must adhere to the provisions and value of the constitution at the same time, it should strive to achieve SDG 10 which reiterates reduced inequalities. This will also help India in realising the goal of One Nation, One Citizenship.

International Relations

5. India-Israel Bilateral Investment Treaty

In news: The Government of the Republic of India and the Government of the State of Israel signed a Bilateral Investment Agreement (Agreement), in New Delhi, in September 2025. The Agreement was signed by Union Minister for Finance and Corporate Affairs Smt. Nirmala Sitharaman, and H.E. Mr. Bezalel Smotrich, Finance Minister of the State of Israel.



Historic milestone for both countries: Why?

- The agreement is expected to boost investments, provide greater certainty and protection for investors, facilitating the growth of trade and mutual investments by ensuring a minimum standard of treatment, and an independent dispute resolution mechanism through arbitration.
- The Agreement also includes provisions to safeguard investments against expropriation, ensure transparency, and enable smooth transfers and compensation for losses.
- At the same time, it carefully balances investor protection with the State's regulatory rights, preserving sufficient policy space for sovereign governance.

A **Bilateral Investment Agreement (BIA)** is a **legal agreement** between two countries to protect and promote investments in each other's territories.

- BITs grant rights to investors, allowing them to seek remedies through **investor-state dispute settlement (ISDS) mechanisms**, or to home states, through state-to-state dispute settlement.

- The Agreement is expected to pave the way for increased bilateral investments between the two countries, which presently stands at total of USD 800 million, thereby benefiting businesses and economies in both countries



India–Israel Relations: Chronological Highlights

Year	Event / Development
1950	India officially recognized Israel, becoming one of the first non-Arab countries to do so
1992 (Jan 29)	India and Israel established full diplomatic relations and opened embassies.
2000s–Present	Strong growth in defense ties, with India becoming a major buyer of Israeli arms.
2016	Launch of India-Israel Industrial R&D and Innovation Fund (I4F) to promote joint tech and research.
2017	First visit by an Indian Prime Minister (Narendra Modi) to Israel, marking a diplomatic milestone.
2022	First I2U2 Summit (India, Israel, and UAE, USA) held to promote regional economic cooperation.
2023–2027	New phase of I4F fund launched to continue support for joint innovation.
2023–24	Bilateral trade (excluding defense) reached USD 6.53 billion, with India holding a trade surplus.

Challenges ahead of India and Israel:

Geopolitical Instability: Escalating regional tensions in the Middle East could disrupt progress on key economic projects, like the India-Middle East-Europe Economic Corridor (IMEC), and complicate India's balancing act between its relationships with Israel, Arab nations, and Iran.

- **Trade Imbalances:** The agreement, which emphasizes investment, may not fully address underlying trade imbalances, particularly India's high imports of Israeli technology

India's Investment Framework: Legal and procedural challenges within India's own investment framework need to be addressed, including lack of clarity in terms like "investment" and "customary international law," and delays in dispute resolution due to the requirement of exhausting local remedies.

- **Investor Confidence:** The exclusion of standard provisions like Most-Favoured-Nation (MFN) and Fair and Equitable Treatment (FET) in some Indian bilateral investment treaties (BITs) could reduce investor confidence, although the new Israel agreement aims to provide stability and clarity.
- **Third-Party Competition:** China's deep economic ties with Israel present a potential competitive factor for India's economic engagement, despite Beijing's political stances

Israel's significance for India:

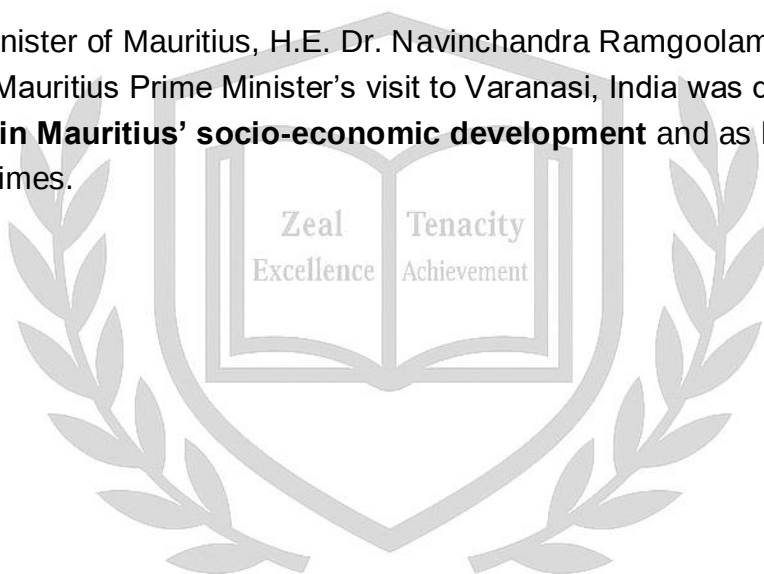
- a. **Defense and security cooperation:** Israel is one of India's largest suppliers of military equipment, providing advanced technology such as missiles, drones, and surveillance systems. This equipment has enhanced India's defense capabilities, particularly in areas like border security and counter-insurgency. The two countries are jointly developing advanced defense systems. The Barak-8 surface-to-air missile is a key example, developed by India's DRDO and Israel Aerospace Industries (IAI).
- b. **Agricultural advancements:** Israel's advanced expertise in water-efficient technologies, including drip irrigation and water recycling, is crucial for India's water-scarce regions. Through technology transfer and capacity building, cooperation extends to protected cultivation, advanced farm mechanization, and the introduction of new crop varieties.
- c. **Growing trade:** Bilateral trade, excluding defense, has grown significantly since the 1990s and has diversified beyond traditional areas like diamonds and chemicals to include high-tech products, machinery, and electrical equipment.
- d. **Multilateral initiatives:** Both countries are part of the I2U2 Group (India, Israel, the UAE, and the US), a platform for fostering economic development and strategic collaboration.
- e. **De-hyphenation policy:** India has adopted a policy of separating its relationship with Israel from its relationship with Palestine, allowing it to pursue its strategic interests with each country independently. This policy reflects a maturation of India's foreign relations and a focus on national interest.

The recent Bilateral Investment Treaty (BIT) with Israel reflects India's evolving investment strategy.

Israel is the first OECD country to sign a BIT based on India's new model treaty, which balances investor protection with India's right to regulate in public interest. The agreement aims to promote trade and investment by offering greater legal certainty for investors.

6. India- Mauritius

Context: Prime Minister of Mauritius, H.E. Dr. Navinchandra Ramgoolam visited India in September 2025. Mauritius Prime Minister's visit to Varanasi, India was described as a **trusted partner in Mauritius' socio-economic development** and as having steadfastly supported it at all times.



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\$680 MN ECONOMIC PACKAGE

GRANT-BASED PROJECTS (USD 215 million)

- Construction of Sir Seewoosagur Ramgoolam National Hospital
- Establishment of AYUSH Centre of Excellence
- Setting up of a veterinary School and animal hospital
- Provision of helicopters

GRANT-CUM-LOC PROJECTS (USD 440 million)

- Completion of the Air Traffic Control tower at SSR International Airport
- Development of the Motorway M4
- Expansion of the Ring Road (Phase II)
- Procurement of port-related equipment

\$25 MN BUDGETARY ASSISTANCE TO MAURITIUS

STRATEGIC COOPERATION

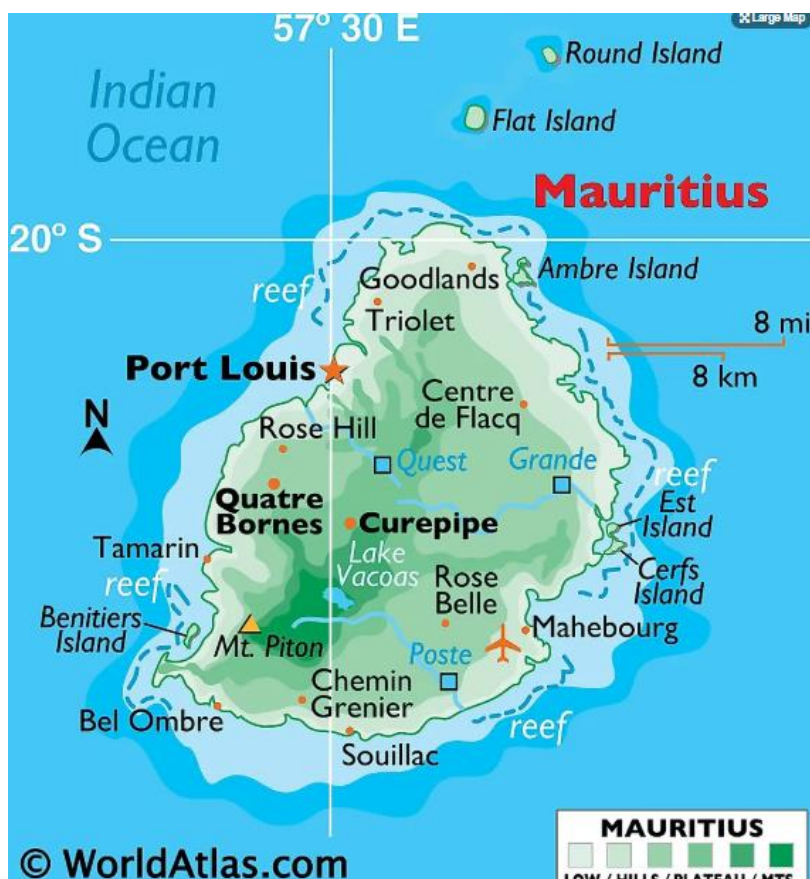
- Redevelopment and restructuring of the Mauritius port
- Development and surveillance of Chagos Marine Protected Area

MoUs INKED: 7

From cooperation in the field of science and technology to cooperation in power sector. The two countries also signed an MoU Cooperation for Establishment of Telemetry, Tracking, and Telecommunications Station for Satellites and Launch Vehicles, and for cooperation in the fields of space research, science and application.

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Key outcomes of the visit:

A. Development & Economic Support- India announced a **Special Economic Package** for Mauritius. It includes support for:

- **Port Louis development**
- **Monitoring the Chagos Marine Protected Area**
- **Projects in infrastructure, jobs, and healthcare**
- **First Jan Aushadhi Kendra** (affordable medicine centre) outside India opened in Mauritius.
- India to help set up an **AYUSH Centre of Excellence** (for traditional medicine).

B. Community Development & Capacity Building

- **MoU signed for Phase 2** of High Impact Community Development Projects.
- India to support **training of civil servants** in Mauritius using India's **Mission Karma yogi** model.

C. Energy Cooperation

- MoU signed for cooperation in **energy and power sectors**.

- India to help Mauritius with a **17.5 MW floating solar power plant**.

D. Space Cooperation: MoU signed for joint work in:

- **Satellite telemetry**
- **Navigation**
- **Remote sensing**
- **Capacity building** in space technology

7. US Immigration and Visa policy

In News: The US has imposed a new \$100,000 one-time fee for new H-1B visa applications, which went into effect on September 21, 2025.

This policy change has significant implications for Indian and Chinese professionals, tech companies, and the broader US economy, impacting a large segment of the skilled workforce and potentially shifting talent towards other countries

Trump hikes H-1B visa fees to \$100,000

Order comes into effect at midnight on September 20 by New York time

Measure is likely to have humanitarian consequences, says Union government

Indian missions abroad told to help visa holders rushing back to the U.S.

Kallol Bhattacharjee
NEW DELHI

In a move that is likely to disrupt the mobility of skilled workers from India to the U.S., U.S. President Donald Trump sharply raised H-1B visa fees on Friday, from the current \$2,000-\$5,000 range to a flat \$100,000, or almost ₹90 lakh.

Noting that the decision will have "humanitarian consequences", the Indian government said it was studying the order and directed its missions abroad to aid H-1B visa holders and their families who are scrambling to return to the U.S. before the order comes into effect, at midnight on September 20 by New York time.

The presidential proclamation directed the U.S. Secretary of Homeland Security to "restrict approvals" for H-1B visa petitions from applicants who are "currently" outside the Un-



The H-1B non-immigrant visa ... has been deliberately exploited to replace, rather than supplement, American workers with lower-paid, lower-skilled labour
—DONALD TRUMP, U.S. PRESIDENT

ited States, unless they are accompanied by the new fees.

Trade pact negotiations
Mr. Trump's latest order, which comes ahead of crucial negotiations for an India-U.S. trade pact, directed the U.S. Departments of State, Labour and Homeland Security to enforce

the hike in visa fees and take necessary administrative measures.

"American workers are being replaced with lower-paid foreign labor, creating an economic and national security threat to the nation. The share of IT workers with H-1B visas has risen from 32% in FY 2003 to over 65% in recent years,"

the White House said, announcing the U.S. President's signing of the order.

"No more will these big tech companies or other companies train foreign workers. They have to pay the government a hundred thousand dollars and then they have to pay the employee. So it's just non-economical. If you are going to

Tech service companies will be hit: Nasscom

NEW DELHI
Apex industry body Nasscom has said the move would impact India's technology services companies as business continuity would be disrupted for onshore projects which may require "adjustments". The association also flagged concerns over the September 21 timeline, saying a one-day deadline creates considerable uncertainty for businesses and professionals. » PAGE 9

Congress calls Modi 'weak PM' over H-1B visa fee

NEW DELHI
The Congress on Saturday cited U.S. President Donald Trump's imposition of a \$100,000 annual fee on H-1B visas to target Prime Minister Narendra Modi. Leader of the Opposition in the Lok Sabha Rahul Gandhi highlighted reports, on social media platform X, that the H-1B visa fee hike would hit Indians hardest. "I repeat, India has a weak PM," he said. » PAGE 9

train somebody, you are going to train one of the recent graduates from one of the great universities across our land," U.S. Commerce Secretary Howard Lutnick said, emphasising the impact of the order.

"A hundred thousand dollars a year for H-1B visas and all of the big companies are on board," Mr. Lut-

nick added.

In India's first response, the Ministry of External Affairs (MEA) said the full implications of the order are being studied by "all concerned".

CONTINUED ON
» PAGE 8
60% EARN LESS THAN FEE
» PAGE 9

H1-B Fee hike:

- **Fee structure:** A new, one-time fee of \$100,000 is now required for all new H-1B visa applications. This is a drastic increase from the previous fees, which typically ranged from \$2,000 to \$5,000

Why has the US hiked the fee?

The US administration states the policy is intended to protect American jobs and prioritize hiring American workers.

Fee hike and US mandates

- The fee applies to all H-1B petitions for workers outside the US, including those needing consular stamping after travel.
- The Secretary of Homeland Security may waive the restriction for individuals, companies, or industries if deemed in the US national interest.
- The measure will last for 12 months, after which agencies will review it before the White House decides on an extension.

What Remains Unclear

*The order does not specify which sectors may receive exemptions, though fields like healthcare, defence, and critical technology have usually been prioritised in the past.

* It is also unclear how universities and non-profit organisations will be treated, as they are normally exempt from H-1B caps but are not specifically mentioned in the order.

Importance of H-1B Visa Fee Hike

- Indians constitute 71% of all approved H-1B applications, with China as the next largest group.
- Tech companies rely heavily on H-1B visas to hire skilled workers, and international students use it to transition from study to work in the U.S.

Implications for India

- a. Impact on IT and Service Companies: Major Indian IT companies like Infosys, TCS, and Wipro are heavily affected as the fee increases the cost of hiring junior and mid-level employees, who are central to their business model for onsite work.
- b. Shift in Talent Mobility: The increased cost and uncertainty are making students and professionals consider other countries like Germany, Finland, and Canada, potentially impacting India's "brain drain" advantage.
- c. Economic and Bilateral Relations: The policy creates tension between US protectionism and India's strategic interests in the tech and trade sectors, complicating bilateral relations.
- d. Impact on Indian Professionals: The fee creates confusion and financial burden for Indian professionals, especially since it applies to new applicants and is a significant increase from previous fees.

Implications for India–US Relations:

- Economic Frictions:** Tighter H-1B policies can strain trade and technology ties, as India often raises such issues in bilateral dialogues.
- Strategic Cooperation:** Despite short-term visa concerns, strategic cooperation in defence, critical technologies, and Indo-Pacific security is likely to continue, as both nations share long-term geopolitical interests.
- Diplomatic Engagement:** India may seek exemptions or policy clarity through diplomatic channels, emphasising the mutual benefits of high-skilled migration.
- Perception and People-to-People Ties:** Restrictive measures could affect goodwill among the Indian diaspora, which has been a strong bridge in India–US relations.

While tighter immigration controls may create short-term challenges for Indian professionals and firms, the long-term India–US relationship rooted in technology, innovation, and strategic alignment is likely to remain resilient. Continued dialogue and mutually beneficial visa reforms can help balance domestic US priorities with India's skilled workforce potential.

8. India Condemns Violation of Qatar's Sovereignty at UNHRC

In News: India defended Qatar's sovereignty at the U.N. Human Rights Council.

Why did India condemn Doha strike?

How does India's reaction differ from its past responses? Why is Qatar treated differently from other countries? What role do India-Qatar ties play? Why has India stayed largely silent on Gaza? What does this mean for India's West Asia policy?

EXPLAINER

Suhassini Haldar

The story so far:

India's condemnation of Israel's bombing in Doha last week as a "violation of sovereignty" is a shift from its more muted positions on previous Israeli operations in other countries, leading some to wonder if there's a larger change in New Delhi's stand on the crisis in West Asia. However, experts said that while the strong wording of the statement denotes growing distress over mounting civilian casualties in the war in Gaza, India's intervention has more to do with its close ties with Qatar and the Gulf region than with an assertion of principles of sovereignty and territorial integrity. This has become particularly important, given New Delhi's concerns over the Saudi-Pakistan mutual defence agreement signed in Riyadh on Wednesday.

Why did India criticise the Doha strike?

On September 16, India referred to the Israeli Defence Forces (IDF) bombing on September 9 of a home in Doha where leaders of Hamas gathered to discuss the United States' latest ceasefire proposal, as actions that "threaten peace, stability and security" in the region and worldwide. Israeli Prime Minister Benjamin Netanyahu defended the strike, which killed five, saying that it was "justified" as Qatar "harbours and funds" Hamas operatives.

"India is deeply concerned about the recent attacks in Doha and their impact on the security situation in the region. We unequivocally condemn the violation of the sovereignty of Qatar," said India's Ambassador to the UN Mission in Geneva Arindam Bagchi, speaking at the UN Human Rights Council, also invoking the UN charter and international law.

"Any escalation must be avoided, and respect for the sovereignty and territorial integrity of States must be upheld," Mr. Bagchi added, in a statement that built on an earlier statement by the Ministry of



A damaged building, following an Israeli attack on Hamas leaders, in Doha, on September 9. REUTERS

External Affairs, and another statement issued after Prime Minister Narendra Modi spoke to Qatari Emir Sheikh Tamim Bin Hamad Al Thani on September 10, expressing "solidarity with the Qatari people".

How does this differ from India's past reactions?

The statements are in stark contrast to New Delhi's reactions to Israel's bombings of several other countries in the region, including Lebanon, Yemen, Tunisia, Syria, and Iran.

When Israel bombed the Iranian Embassy in Damascus last April, the MEA had expressed some "concern", as it had when Israeli forces attacked a UN Peacekeeping post in southern Lebanon, but remained largely silent over other Israeli attacks on other countries. When Israeli intelligence detonated hundreds of pager bombs against Hezbollah in Beirut in September 2024, Indian Army Chief General Upendra Dwivedi called the operation a "masterstroke". On Iran – a country with close ties with India and where investments such as the Chabahar port are at stake – the government's reactions have been more puzzling. In June, India called for dialogue after Israel

and U.S. strikes on Iranian nuclear facilities, which Iran responded to. However, New Delhi dissociated from a statement issued by the Shanghai Cooperation Organisation (SCO) days later, which condemned the strikes on Iran. In a subsequent flip-flop, India signed on to the SCO joint declaration on September 1 that "condemned" Israel and the U.S. for the June strikes.

Why is Qatar treated differently?

"India's ties with the other countries mentioned are not the same as ties with Qatar, with its large Indian diaspora and personal relations at the highest levels between PM Modi and the Qatari Emir," explained former Ambassador to the UAE and Egypt, Navdeep Suri. "Eventually, in an age of 'transactionalism', this is not as much about values and principles as about the bilateral relationship with each of these countries, including Israel," he told *The Hindu*.

The MEA declined to respond to a question from *The Hindu* on why the Modi government has taken conflicting positions on the issue. Experts said a number of reasons explained the varied statements, from geopolitical to regional and bilateral. According to former

Ambassador and author of *West Asia at War*, Talmiz Ahmad, India's response to the attack on Qatar had "no larger strategic purpose" but focused on Qatar being a "crucial supplier of gas".

He also pointed out that Israel's attack on Qatar had put Gulf countries that house U.S. military bases and count on the U.S. to guarantee security "on notice", indicating a "fundamental geopolitical shift in the region", which India may need to take note of.

"The message Israel has given is that every Arab country, every Gulf country, is within their target zone and put them all on notice. Israel has now ended the process of normalisation and made it clear that ties with other West Asian countries are not a priority over its operations. Thirdly, Israel has shown that the U.S. is no longer a guarantor of security for these GCC countries," Mr. Ahmad said, speaking at a seminar organised by the India-America Friendship Association on Tuesday.

The alarm among Gulf countries was visible at an emergency joint session of the Arab League and the Organisation for Islamic Cooperation (OIC) conference in Doha this week, which condemned Israel's actions, even as the Gulf Cooperation Council committed to building a "joint defence mechanism" to deal with future threats.

What does this mean for India's

broader West Asia policy? In addition, experts said India's silence on Gaza – where more than 65,000 have been killed, including at least 20,000 children, in Israel's incessant bombardment of Gaza, including the latest offensive against Gaza City – is straining its ties with the Arab world. In a rare response to media queries on August 27, the MEA called the killing of journalists and civilians by the IDF "shocking and deeply regrettable". India also voted in favour of a UNGA resolution endorsing the two-state solution for Palestine on September 12, indicating that, despite the steadfast relationship with Israel, the Modi government's shifts may indicate that it needs to factor in the rest of the region as well.

THE GIST

India condemns Israel's bombing in Doha as a "violation of sovereignty" and expresses concern over regional peace and security.

The strong stance reflects India's close ties with Qatar and the Gulf region rather than a shift in principles on sovereignty.

India's silence on Gaza and varied reactions to other Israeli strikes show a careful balancing of strategic, regional, and bilateral interests.

Background:

Israeli Defence Forces (IDF) carried out an airstrike in **Doha, Qatar**, targeting a house where senior Hamas leaders were meeting to discuss a U.S. backed ceasefire proposal.

Why is India's decision significant?

Traditionally, India has responded cautiously or stayed silent on Israeli attacks in West Asia, usually only expressing concern. Even when these strikes affected Indian interests in Iran, India's reaction was not consistent. It first avoided supporting an SCO statement condemning Israel but later agreed to a similar declaration.



Why did India choose a different stance with Qatar?

Qatar is important for India for several reasons:

- Over 7.5 lakh Indians live in Qatar, and their welfare and remittances are significant for India.
- Qatar is a major supplier of liquefied natural gas (LNG), making it vital for India's energy security.
- There are strong personal ties between the Indian Prime Minister and the Qatari Emir, which strengthen bilateral relations.
- The Israeli strike in Doha poses risks to Gulf security, where U.S. bases are located, and this affects India's wider regional interests.
- Although India has close defence and technology ties with Israel, its silence on Gaza's civilian casualties has affected its image in the Arab world.

By condemning the strike in Doha and supporting a two-state solution at the UN, India appears to be balancing its relations—reassuring Arab partners while keeping good ties with Israel.

About UNHRC:

About the United Nations Human Rights Council (UNHRC)

The UNHRC was created by the UN General Assembly on **15 March 2006**, replacing the earlier **Commission on Human Rights**.

It is an inter-governmental body within the UN that works to promote and protect human rights worldwide.

Mandate: To ensure respect for human rights and fundamental freedoms for all people, and to address and make recommendations on serious human rights violations.

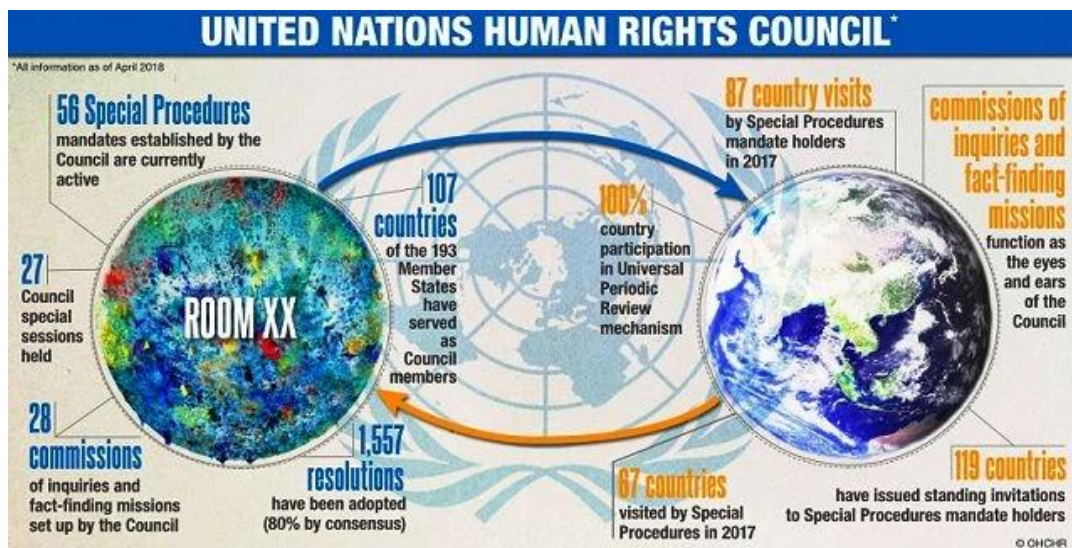
- The Council has 47 member countries, elected by the UN General Assembly through a secret ballot.
- Membership is based on fair geographical representation.
- Members serve a three-year term and cannot be re-elected immediately after serving two consecutive terms.



Functions of the United Nations Human Rights Council (UNHRC)

- It investigates cases of human rights violations in UN member countries.

- It deals with key human rights issues such as freedom of expression, women's rights, LGBT rights, and the rights of racial and ethnic minorities.
- It works closely with the **Office of the High Commissioner for Human Rights (OHCHR)** to promote and protect human rights globally.



9. India-Bhutan

In News: The India-Bhutan Development Cooperation Talks were held in July to review the full spectrum of India-Bhutan development partnership.

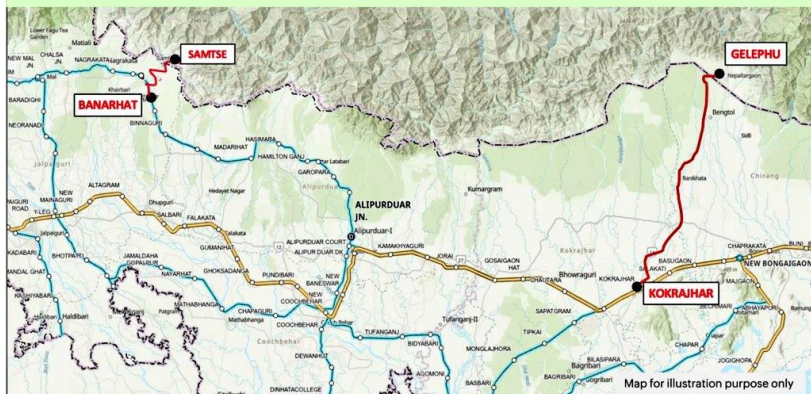
A total of 10 projects, covering sectors such as healthcare, connectivity and urban infrastructure in Bhutan, were approved.

India has committed support of 10,000 Crore (100 billion) for **Bhutan's 13th Five Year Plan period (2024-2029)**.

The two sides agreed to hold the next Development Cooperation Talks in Thimphu at a mutually convenient date.

In September India announced the first-ever **railway links with Bhutan**, namely the **Kokrajhar–Gelephu** (Assam) and **Banarhat–Samtse** (West Bengal) lines, totalling **89 km**, marking a milestone in bilateral connectivity and regional integration.

India - Bhutan regional rail connectivity



Gelephu and Samtse: Key Hubs in India–Bhutan Cooperation

- **Gelephu** and **Samtse** are major trade points along the 700-km India–Bhutan border.
- **Gelephu** is being developed as a “**Mindfulness City**”, focused on sustainable and wellness-based growth.
- **Samtse** is being developed as an **industrial town** by the Bhutanese government.

Better connectivity between these towns and India will greatly boost **bilateral trade** and economic activity.

Strategic Importance:

- The new railway links support India’s **Neighbourhood First Policy**, strengthen trust-based ties with Bhutan, and help **counter China’s influence** in the region. For Bhutan, seamless rail connectivity to India provides access to the **1.5 lakh km Indian Railways network**, giving it greater reach to global markets through Indian ports.

- India already handles about **80% of Bhutan's total trade**, so improved connectivity will promote **tourism, industry, and people-to-people exchange**.

India's Developmental Support to Bhutan:

- India has pledged **₹10,000 crore** for Bhutan's **13th Five-Year Plan (2024–2029)** — double the amount given in the previous plan.
- An **Integrated Check Post (ICP)** was opened at **Darranga, Assam**, to make cross-border movement easier, including for third-country nationals.
- Bhutan will also benefit from the **Jogighopha Inland Waterways Terminal**, improving regional trade routes.
- The two countries have partnered in **five major hydropower projects** — **Chukha, Tala, Kurichhu, Mangdechhu, India–Bhutan Relations: Key Milestones**

- | Year(s) | Event / Development |
|----------------|---|
| 1910 | Treaty of Punakha signed between Bhutan and British India. Made Bhutan a <i>protectorate</i> ; British managed Bhutan's foreign affairs. |
| 1947 | India gained independence; initiated talks for a new treaty with Bhutan. |
| 1949 | Treaty of Friendship and Cooperation signed. Established peace, friendship, and free trade between independent India and Bhutan. |
| 1961 – Present | India began providing financial and development assistance to Bhutan, especially in Five-Year Plans. Focus on education, health, and infrastructure. |
| 1968 | Formal diplomatic relations established between India and Bhutan. |
| 1972 | India-Bhutan Trade, Commerce and Transit Agreement signed. Created a free trade regime between the two countries. |
| 1973–1984 | Border demarcation talks held to finalize the India-Bhutan border. |
| | Punatsangchhu-II — which are key pillars of their economic cooperation. |

India-Bhutan joint custom meeting

The 6th Joint Group of Customs (JGC) Meeting between India and Bhutan was held on 24th-25th April 2025 in Thimphu, Bhutan.

- The India-Bhutan Joint Group of Customs meetings are held annually to discuss issues relating to re-defining and re-engineering of Customs procedures, promote Customs cooperation and Cross-border trade facilitation with alignment to global best practices. There are 10 Land Customs Stations along the India-Bhutan Border in the States of West Bengal (6) and Assam (4).
- India is Bhutan's top trade partner both as an import source and as an export destination accounting for about 80% of Bhutan's overall trade. Trade with Bhutan through the land Customs Stations is significant as Bhutan is a land-locked country.

Bhutan is important for India due to its strategic location as a buffer state, which enhances national security by acting as a buffer between India and China. India plays the role of Bhutan's main development partner and provider of military support and air defense. Thus the two countries share amicable relation with each other ranging from hydropower, technology, defence to cultural relations.

10. Saudi Arabia- Pakistan defence pact

In News: Pakistan and Saudi Arabia have signed a landmark mutual defence agreement, solidifying a strategic security partnership that dates back to the 1960s. This new agreement changes security in the region and around the world, creating new challenges for India.

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ACTS OF AGGRESSION

The "Strategic Mutual Defence Agreement" states that any aggression against either Saudi Arabia or Pakistan shall be considered an aggression against both, said a joint statement issued after the pact was signed.

JOINT DETERRENCE

The pact "reflects the shared commitment of both nations to enhance their security and to achieving security and peace in the region and the world".



IMPLICATIONS OF THE DEAL

- The agreement institutionalises Pakistan's role in the security architecture of West Asia.
- Saudi Arabia has worked to build its defence ties with Pakistan, with an eye on benefiting from its nuclear arsenal.
- The pact was also a signal from Saudi Arabia to the leadership of the US and Israel following the latter's attacks on Gaza and in countries such as Qatar, Iran.

MEA ISSUES STATEMENT

"We will study the implications of this development for our national security as well as for regional and global stability. The government remains committed to protecting India's national interests and ensuring comprehensive national security in all domains."

HT



Key Highlights of the pact:

The Strategic Mutual Defence Agreement (SMDA) between Saudi Arabia and Pakistan states that an attack on one will be treated as an attack on both. It sets up permanent coordination through a joint military committee, intelligence-sharing, and expanded training. It also formalizes Pakistan's military presence in Saudi Arabia and shows Saudi intent to involve Pakistan more in Gulf security. While nuclear cooperation is implied, the deal does not include a formal nuclear guarantee.

Timing and Strategic Context:

The pact was signed soon after an Israeli attack on Qatar, raising Saudi concerns about

regional security. With the U.S. slow to respond, Saudi Arabia sees the need to rely less on American protection. The agreement reflects growing threats in the Gulf and decreasing U.S. involvement.

Key Reasons behind the Pact:

- **U.S. Pullback:** The U.S. is focusing more on East Asia and has been less responsive to attacks on Saudi Arabia, like in 2019.
- **Gaza War & Israel:** The 2023 Hamas-Israel conflict disrupted Saudi plans to normalize ties with Israel.
- **Houthi Threats:** The Houthis in Yemen have advanced weapons and continue to target Saudi interests, creating ongoing security risks.

Implication of the pact

a. Shift in Gulf Security Landscape:

The SMDA gives Pakistan a formal security role in West Asia, a region long reliant on U.S. protection. Like NATO's Article 5, it commits both nations to defend each other if attacked.

By partnering with nuclear-armed Pakistan, Saudi Arabia is moving toward a multi-alignment strategy, reducing dependence on the U.S. This could open space for China and Russia to expand their influence.

b. Nuclear Concerns:

The pact may include extending Pakistan's nuclear protection to Saudi Arabia, raising fears of nuclear proliferation. This adds to regional tensions and risks widening conflicts involving nuclear powers.

c. Boost for Pakistan, New Risks for India:

The agreement strengthens Pakistan's strategic confidence, possibly encouraging a tougher stance toward India, especially on Kashmir. Saudi support in a potential India-Pakistan conflict shifts regional power dynamics.

India-Saudi Ties Remain Important

Despite closer Saudi-Pakistan ties, Saudi Arabia remains a key energy and economic partner for India. Riyadh has reassured New Delhi of continued cooperation while balancing its new alliance with Islamabad.

While the Saudi Arabia–Pakistan Strategic Mutual Defence Agreement (SMDA) introduces new security dynamics in the region, it may not significantly affect India for several key reasons:

A. India-Saudi Relations Are Strong and Multi-Dimensional

Economic ties: Saudi Arabia is one of India's largest energy suppliers and a major trading partner.

Investment and cooperation: Both countries collaborate on infrastructure, technology, and security. Saudi investments in India have grown steadily.

Strategic dialogue: India and Saudi Arabia maintain regular high-level diplomatic and security engagements.

B. Saudi Arabia Is Not Likely to Support Pakistan Militarily Against India

Despite the pact's language on mutual defence, it's unlikely Saudi Arabia would actively support Pakistan in a conflict with India, especially a conventional war.

Riyadh's primary security concerns lie in the **Gulf region (Iran, Yemen, internal threats)**—not South Asia.

C. India Is a Regional Power with Independent Deterrence

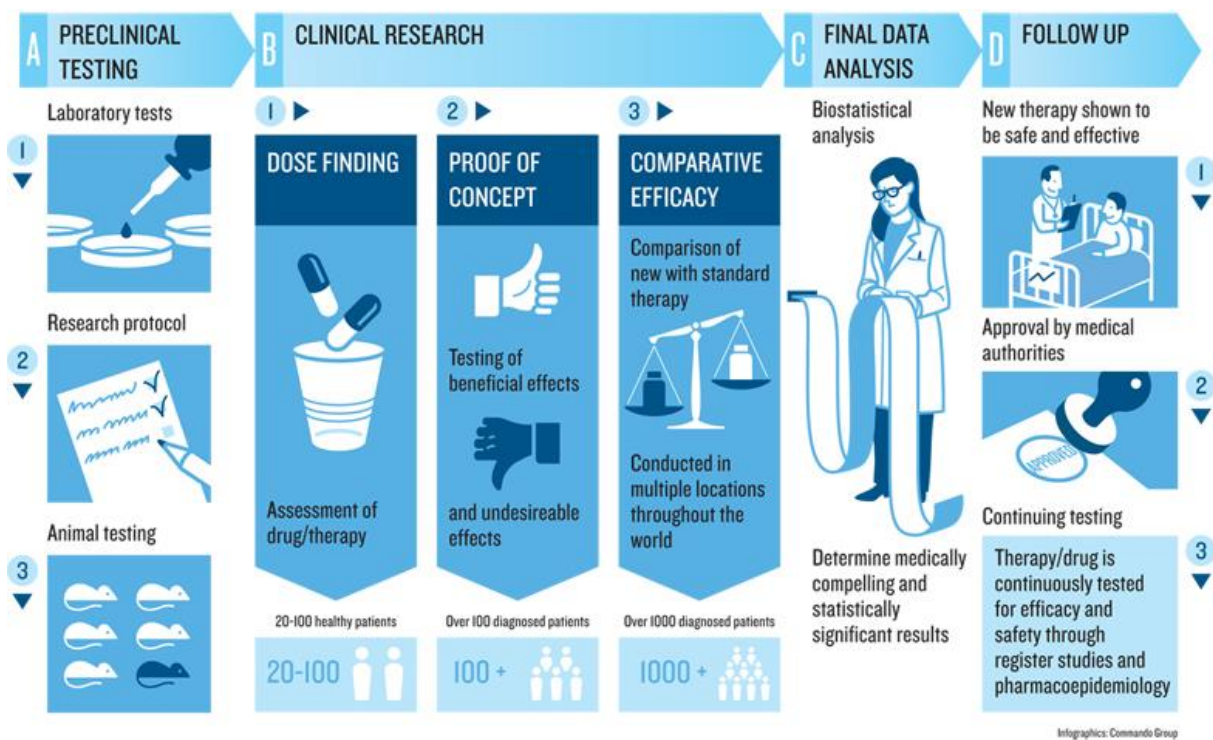
- India has strong **military capabilities and diplomatic weight** in the region.
- It maintains strategic autonomy and has defense ties with countries like the **UAE, Israel, the U.S., and France**, balancing out any potential Pakistan-Saudi tilt.

The SMDA reflects Saudi Arabia's changing security strategy in the Gulf more than a direct shift in South Asia's balance. India's strong bilateral ties with Saudi Arabia, global partnerships, and regional strength ensure that this pact is unlikely to significantly harm its interests.

Health

11. New Drugs and Clinical Trial Rules (NDCT Rules) - Amendments

In News: Recent amendments to India's New Drugs and Clinical Trial Rules (NDCT Rules) focus on simplifying regulations, enhancing ethical practices, and promoting India's role in global clinical research.



Key highlights of the proposed amendments are as under:

- Test Licence Applications:** Under the proposed amendment, the present license system for test licenses has been converted to a notification/intimation system. Through this, the applicants need not wait for test licenses (except a small category of high risk category drugs) but will need to just intimate the Central Licensing Authority. Additionally, the overall statutory processing time for test licence applications will be reduced from 90 days to 45 days.
- Bioavailability/Bioequivalence (BA/BE) Study Applications:** Under the proposed amendment, the existing licence requirement will be dispensed with for certain categories of BA/BE studies, which may instead be initiated upon submission of an intimation or notification to the Central Licensing Authority.
- Reduced animal testing:** An amendment to the 2023 rules allows researchers to use non-animal methods for drug testing. This includes advanced technologies like 3D organoids and organs-on-a-chip, which mimic human organs.
- Regulation of Clinical Research Organizations (CROs):** The 2024 amendment introduces a definition for CROs. CROs must now register with the Central Licensing Authority before conducting clinical trials on humans. Standard operating procedures (SOPs) are being established to ensure quality and safety in clinical trials conducted by CROs.
- Waiver of local clinical trials:** In certain cases, the Central Drugs Standard Control Organization (CDSCO) can waive local clinical trials for new drugs that have already been approved in developed countries like the US, UK, Japan, and EU. This waiver

applies to drugs for rare diseases, gene therapy, and new drugs for pandemics, among other categories.

This initiative underscores the Government of India's commitment to ongoing regulatory reforms in the pharmaceutical sector. It forms a part of the broader efforts toward Ease of Doing Business to promote the growth of the Indian pharma industry and align domestic regulations with global best practices. These steps are expected to increase attractiveness of India for clinical research thereby strengthening India's position as a global hub for pharmaceutical research and development.

12. Swasth Nari Sashakt Parivar Abhiyaan

In News: Swasth Nari Sashakt Parivar Abhiyaan (SNSPA) is a landmark initiative by the Ministry of Health and Family Welfare (MoHFW) and the Ministry of Women and Child Development (MoWCD) was inaugurated on September 17, 2025 by Prime Minister Narendra Modi.

Aim: to improve healthcare for women and children in India by ensuring better access, quality services, and greater awareness. Private hospitals will also take part through the **Jan Bhagidaari Abhiyaan** (people's participation) model.

SNSPA will deploy more than **one lakh health camps** across Ayushman Arogya Mandirs and **Community Health Centres** to ensure comprehensive screenings for women's health issues like anaemia, hypertension, diabetes, and cancer.

The SASHAKT portal will track progress in real-time, ensuring transparency and efficient implementation.

SNSPA encourages **community participation** through Nikshay Mitras and volunteer support, especially in **tribal and rural areas**.

Promotes awareness on **menstrual hygiene, nutrition, and wellness** through education at Anganwadis and **health camps**.

The **Swasth Nari Sashakt Parivar Abhiyaan (SNSPA)** prioritises women's health by providing comprehensive health screenings and services tailored to their needs. Through health camps and other related initiatives, the campaign offers screenings for conditions like **dermatological concerns, hypertension, anaemia, reproductive health**

issues, breast and cervical cancer, diabetes, tuberculosis (TB), and sickle cell disease (SCD), with specialised counselling in tribal areas.

Rashtriya Poshan Maah

- It is an annual campaign launched in 2018, celebrated every September as part of a Jan Andolan to promote nutrition literacy, healthy practices, and behaviour change.
- Over 7 editions of Poshan Maah and Poshan Pakhwada, more than 130 crore nutrition-centric activities have been conducted.
- The 8th edition in 2025 focuses on critical themes like Anaemia prevention, Growth Monitoring, Complementary Feeding, Poshan Bhi Padhai Bhi, Technology for Better Governance, and the environmental initiative Ek Ped Maa Ke Naam.

Women and Society

13. Beyond maternal leave- reintegration is the real test of inclusion for mothers

Context: According to the Marching Sheep Inclusion Index 2025, 63% of listed Indian companies do not have women in Key Managerial Positions (KMP). The representation of women thins down at senior level/ another stark reality is that about 46% of women in India drop out of workforce within two years of maternity.

Maternal Reintegration:

Maternity reintegration is the process of a new mother returning to the workforce after maternity leave. It involves a smooth transition back into her job, addressing both the emotional and practical challenges, and requires support from both the individual and the employer to rebuild confidence and re-establish a work-life balance.

What do women want and challenges they face:

- a. **Maternity leave alone is insufficient:** The author argues that simply granting maternity leave is not enough for true inclusion. The harder challenge lies in reintegrating mothers back into the workplace in a respectful, supportive, and non-penalizing way.

- b. **Hidden costs and biases on return:** Even after leave, working mothers often face bias, role downgrading, invisible productivity expectations, and culture that treats them as “less committed.” Their contributions may be undervalued because they are perceived to have “left” or taken a break.
- c. **Career penalties & attrition:** Many women drop out or stagnate in their careers after having children—not because they can’t perform, but because organizations don’t adequately support their return. This leads to loss of talent and weakens the leadership pipeline.

CHALLENGES FACED BY WOMENS IN THE WORKPLACE AFTER MATERNITY LEAVE

Maternity leave is a critical period that allows women to recover from childbirth and care for their newborns. However, the transition back to the workplace after maternity leave can present a range of challenges for women. Despite efforts to promote gender equality and work-life balance, many women continue to encounter various problems in the workplace upon their return from maternity leave. This article delves into some of the key challenges faced by women in the workplace after maternity leave and discusses potential solutions to address these issues.



- Guilt and Self-Doubt:** Many women feel guilty about not being able to dedicate as much time to their children or their jobs. This guilt can contribute to self-doubt about their capabilities in both spheres.
- Workload and Expectations:** Women often face unrealistic expectations upon their return, including pressure to quickly resume their full pre-maternity leave workload. Balancing the demands of work and parenting can become overwhelming, leading to burnout.
- Work-Life Balance Struggles:** Balancing the demands of a newborn and professional responsibilities can be overwhelming. Juggling meetings, deadlines, and childcare responsibilities calls for flexible work arrangements and a supportive work culture.
- Changing Dynamics and Networking:** Maternity leave can lead to a temporary disconnect from colleagues and networks. Reestablishing professional connections while managing new parental responsibilities can feel daunting.
- Career Progression Concerns:** Apprehensions about career growth often arise as women worry that extended leave might impact their advancement opportunities. A transparent conversation about career paths and options can alleviate these concerns.

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d. **Organizational responsibility:** It calls for structural changes — flexible work options, childcare support, managerial training, protected roles during transition, and culture shifts — so that coming back from maternity leave doesn’t mean a setback.

e. **Reinclusion = Real inclusion:** The article frames reintegration—not just the leave period—as the real test of whether workplaces are genuinely inclusive. If mothers’ return is smooth, respected, and enabling, then leave policies become meaningful rather than symbolic.

What happens when women drop-out of workforce?

When women leave the workforce, the economy suffers from a loss of talent, productivity, and innovation, which can lower the country’s GDP and hinder economic growth.

Economic impacts:

a. **Lower GDP:** A large-scale withdrawal of women from the labor force leads to a significant loss of potential economic output. For example, some estimates suggest that India’s GDP could be substantially higher with equal participation of women.

b. **Loss of talent and innovation:** A smaller talent pool due to women leaving the workforce means fewer ideas, less innovation, and a loss of

productivity across various sectors.

- c. **Increased gender wage gap:** Women who leave the workforce or reduce hours may see their skills depreciate, which can lead to a wider gender wage gap that persists even after the initial period of dropping out.
- d. **Skills gap:** A lack of educated women in the workforce can create a skills gap, impacting a country's ability to meet future labor demands and maintain economic momentum.
- e. **Dependence on male earners:** Women's departure from paid employment increases household dependency on male earners, which can reduce their bargaining power within the household and the economy.

Social impacts

- a. **Perpetuation of gender inequality:** A reduced female workforce reinforces traditional gender roles, as it limits women's opportunities and can be seen as a societal acceptance of women's primary role being in the home.
- b. **Reduced empowerment:** Women who leave the workforce and lack an independent income may have less say in household decisions and a reduced ability to speak up for their needs.
- c. **Increased vulnerability:** Financial dependency can make women more vulnerable to issues like domestic violence and other forms of inequality.
- d. **Impact on family well-being:** Having women in the workforce is linked to better health outcomes, more equal distribution of household duties, and greater confidence among women. A decline in female labour participation reverses these positive trends.

Way forward:

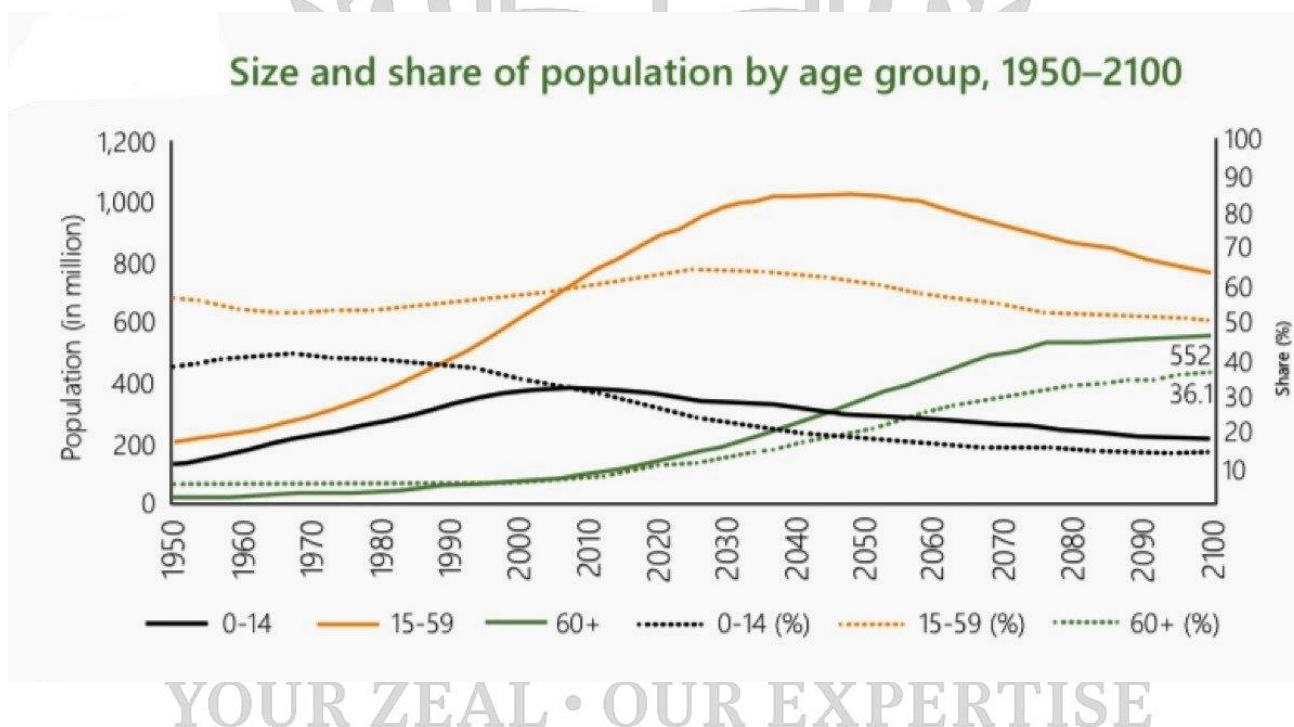
- a. **Policy Enhancement:** Expand provisions under the **Maternity Benefit Act, 1961** to include clear guidelines for **reintegration and career continuity** post-maternity leave.
- b. **Institutional Support:** Mandate the establishment of **workplace crèches**, provide **subsidized childcare**, and promote **paternity leave** to foster shared parental responsibilities.
- c. **Awareness and Advocacy:** Launch **CSR-led campaigns** and foster public dialogue to **normalize the balance between work and motherhood**, reducing stigma and bias.
- d. **Data-Driven Accountability:** Enforce **mandatory reporting** on **gender diversity in Key Managerial Positions (KMPs)** to monitor progress and ensure transparency.
- e. **Adoption of Global Practices:** Implement structured re-entry programs like **“returnships”** (as seen in the UK and US) to support women rejoining the workforce after a career break.

Reintegration should not be viewed as a favour, but as a strategic investment in human capital. In a country where female labour force participation remains critically low, retaining skilled mothers is essential for economic development, gender equality, and inclusive growth. A truly progressive workplace views maternity not as an exit, but as a natural and supported phase in a thriving career.

14. India Ageing report

Context: India's 2025 reports highlight a rapidly aging population facing challenges in healthcare and social security, but also opportunities for economic participation and intergenerational connection.

By 2050, over 300 million Indians are expected to be elderly, a significant increase that requires a coordinated response involving robust healthcare systems, financial security, and social support services.



Demographic and social trends

- e. **Rapid growth:** The elderly population is growing at an unprecedented rate, with projections suggesting it will reach nearly 20% of the total population by 2050.
- f. **Economic insecurity:** A significant portion of the elderly live in poverty, exacerbated by low awareness and coverage of social security schemes; only about 29% receive pensions.

- g. Gender disparity:** Poverty is particularly pronounced among older women due to factors like widowhood and lack of assets
- h. Regional differences:** There are significant variations in the elderly population and growth rates between states, with southern and western states aging faster than the northern and eastern states.

Major Health Concerns of the Elderly:

- **Out-Patient Care:** Elderly frequently seek treatment for chronic pain, fever, hypertension, diabetes, and breathing/heart issues, reflecting the burden of non-communicable diseases.
- **In-Patient Care:** Hospitalisation is commonly required for heart disease, stroke, diabetic complications, infections, and surgeries, increasing financial and physical stress.
- **Recovery Issues:** Longer hospital stays, repeated infections, ICU needs, and poor drug compliance due to costs make recovery slower and more difficult.

Healthcare and well-being

- a. Growing health burden:** The aging population is leading to a rise in chronic and debilitating disorders like heart failure, diabetes, and dementia.
- b. Need for comprehensive care:** There is an urgent need for cohesive healthcare, social security, and support services, with a call for better nutrition and improved healthcare access.
- c. Leveraging technology:** Technology is seen as a key tool for improving access to healthcare and social services, but digital literacy among the elderly must be addressed

Opportunities and policy recommendations

- a. Promoting productive aging:** India should focus on making aging aspirational through lifestyle changes and enabling the elderly to continue contributing to society through their knowledge and skills.
- b. Decentralization:** There is a need to decentralize responsibilities to local self-governments to improve elderly care.
- c. Investment in the "silver economy":** Investing in products and services for the elderly can create economic opportunities.
- d. Disaster preparedness:** The needs of older people must be prioritized in disaster preparedness efforts, drawing lessons from events like the COVID-19 pandemic.

Initiatives Taken:

- a. **PM-JAY Expansion (2024):** Provides universal health coverage for all citizens above 70, regardless of income.
- b. **State Schemes Integration:** States like Tamil Nadu integrate local schemes (CMCHIS) with PM-JAY to Widen access.
- c. **NPHCE:** Establishes geriatric clinics and regional centres for elderly-specific care across the country.
- d. **Health Insurance Reforms:** Simplification of enrolment and broader coverage aims to boost participation among elderly.
- e. **Public Hospital Strengthening:** States such as Kerala and Tamil Nadu have improved public geriatric healthcare infrastructure.

Key Challenges in Elderly Healthcare in India

- **High Out-of-Pocket Expenditure (OOPE):** Nearly half of healthcare costs are paid directly by patients, burdening seniors with limited income.
- **Rural–Urban Disparity:** Urban elderly have better access to private care and insurance, while rural seniors rely on household savings.
- **Insurance Inaccessibility:** High premiums, limited coverage, and low awareness make health insurance unaffordable for most elderly.
- **Shortage of Geriatric Specialists:** With only ~6,000 trained geriatricians, the system is ill-equipped for a rapidly ageing population.
- **Neglect of Preventive & Palliative Care:** Services like vaccination and end-of-life care are underfunded and poorly integrated.
- **Gender Disparities:** Elderly women face greater financial insecurity and are less likely to be insured, increasing their vulnerability.

Ensuring dignified ageing requires a healthcare system that is affordable, accessible, and inclusive. Expanding coverage, regulating costs, and strengthening public infrastructure especially for rural and vulnerable populations are essential steps. With India's elderly population rapidly growing, proactive investment in geriatric care is not just a social responsibility but an economic necessity.

15. Why India's urban definition is failing its growing towns

Context: India's urban areas are growing quickly, with many towns developing between villages and cities. These places often have city-like jobs and lifestyles, but the current definition of "urban" (based on the 2011 Census) still sees many of them as "rural." This

outdated classification means they miss out on proper governance, infrastructure, and resources needed for their growth.

Why India's urban definition is failing its growing towns

In the 2011 Census, an urban unit was defined as either a statutory town or a census town

Niranjana K.P.

The story so far:

Registrar General of India (RGI) and Census Commissioner Mrityunjay Kumar Narayan in a letter dated August 14 to the States' Directorates of Census Operations (DCO) said, "It is proposed to retain the same definition for urban areas for Census 2027 as this will ensure comparability with the previous Census and provide the basis for analysis of urbanisation trends in the country."

In the 2011 Census, an urban unit was defined as either a statutory town or a census town. Statutory towns are areas that are formally notified as urban by the State government. They have urban local bodies like municipal corporations, municipal councils and nagar panchayats. All other places that satisfied the following criteria – a minimum population of 5,000, at least 75% of the

male main working population engaged in non-agricultural activities, and a population density of at least 400 persons per sq. km – are classified as census towns. The census towns remain administratively rural, but they function like urban areas.

What are the limitations?

In India, urban local bodies are more autonomous and have more freedom and control over their finances, while Panchayati Raj institutions are limited to implementing centrally designed welfare schemes. Hence, urban status, if granted to a settlement, would imply development of the area.

The current definition of urban and rural areas is a binary that ignores the complex and evolving nature of the settlements in India. It fails to take into account the settlements that fall in the spectrum between rural and urban. Rapid

urbanisation is transforming many villages into towns both in function and form, yet these areas often lack formal recognition and remain under rural governance.

As a result, settlements such as census towns and peri-urban regions – despite having dense populations, non-agricultural livelihoods, and urban lifestyles – remain excluded from urban governance structures and infrastructure provision, leading to gaps in planning, services, and resource allocation.

Census data from 2001 and 2011 show that 251 census towns identified in 2001 remained under rural governance by 2011, despite meeting urban criteria.

West Bengal illustrates this gap. Data from the 2001 and 2011 Censuses show that a significant number of settlements classified as census towns in 2001 continued to be governed by rural local bodies even a decade later. West Bengal

experienced the highest increase in the number of census towns, with 526 new census towns identified in 2011. However, 251 settlements that had already been classified as census towns in 2001 saw no change in governance status by 2011. This delay highlights how many urbanised settlements are not 'municipalised' – that is, not being converted into statutory towns with elected urban local bodies – leaving infrastructure and planning inadequate.

What are the implications?

As India prepares for its next Census, it is crucial to revisit and revise the definition of what qualifies as 'urban.' A 2019 research paper published in the journal *Population and Environment*, stresses the importance of population size and density in defining what is 'urban.' The study shows that relying solely on a narrow framework – such as a population size above 5,000 and the percentage of non-agricultural workers – can result in a substantial undercount of urban populations. Depending on the density threshold used, India's urban population in 2011 could be 35-57%, higher than the official 31%.

Many settlements that appear rural on paper actually form part of larger, informal urban clusters that lack any recognition under current Census methods, simply because they fall outside

municipal limits or are divided across administrative units.

The 75% male workforce rule is outdated; small towns may not meet this threshold, yet show clear urban traits. Industries, service jobs, and gig economy work are spreading into villages and semi-urban areas, blurring rural-urban distinctions.

The rule also fails to take into account those who engage in both agricultural and non-agricultural work, often seasonally or concurrently. Many people in semi-rural and transitional areas commute daily or seasonally to nearby towns or cities for work, while still maintaining ties to agriculture, either through land ownership or seasonal farming. The expansion of app-based and gig economy jobs into smaller towns and semi-urban or rural areas highlights how urban-type employment is no longer confined to traditionally urban centres. The 'male workforce' criterion is also problematic, as it ignores the women's informal or unpaid work.

Hence, retaining the outdated definition of 'urban' in the 2027 Census risks misclassifying millions, undercounting urbanised areas, and excluding rapidly growing settlements from appropriate governance and services. A rigid, binary framework no longer reflects India's evolving settlement patterns.

How "Urban" is defined today?

The 2011 Census classifies an area as **urban** if it is a **statutory town** (i.e. has an urban local body) or a **census town**.

Census towns must satisfy three criteria:

1. Minimum population of 5,000
2. Population density ≥ 400 persons per km²
3. At least 75% of the male main working population engaged in non-agricultural activities.

However, despite meeting these functional criteria, many census towns remain under **rural administration** (panchayats), not granted urban institutional status

Core Challenges & Faults in Current Definition

Rigid Thresholds & Binary Framework

- The criteria are static and do not reflect evolving settlement patterns.
- They ignore **transitional** or **peri-urban** areas that lie between classic rural and urban boundaries.

Gender Bias in Workforce Criterion

- Focusing only on male employment ignores women's contributions—especially in informal, unpaid, or home-based activities.
- Many women engage in non-agricultural work not captured by "main work" definitions.

Mismatch in Governance & Infrastructure

- Areas that function like urban spaces but remain under rural governance miss out on urban infrastructure (roads, sanitation, waste management, public transport).
- Local bodies lacking urban powers cannot mobilize finances or plan comprehensively.

Underestimation of Urban Population

- Using the narrow definition, India's 2011 Census reported ~31% urbanisation.
- Alternate studies (using density-based methods) suggest it may lie between **35% and 57%**, suggesting millions are “hidden urban” residents.

Lag in Recognition & Conversion

- Some settlements identified as census towns in earlier censuses have not been converted into statutory towns even after fulfilling criteria.
 - Example: By 2011, **251 towns** classified in 2001 as census towns in West Bengal still remained governed under rural bodies.
 - This shows bureaucratic inertia and mismatch between functional and administrative status.

Neglect of Economic & Commuting Links

- The current definition doesn't consider **functional ties** with nearby cities—such as commuting flows or service access.
- Many residents may live in “rural” classified zones but depend on urban centers daily, making them part of the urban economy

Why It Matters

- Planning & Infrastructure Gaps:** Misclassified areas miss out on funding and schemes meant for urban growth (urban transport, drainage, housing).
- Policy Blind Spots:** Government policies targeted at urban areas may exclude fast-growing towns.
- Inequity & Exclusion:** Citizens in de facto urban spaces suffer from services mismatch, lack of municipal accountability and poor spatial planning.
- Data & Governance Distortion:** If Census 2027 retains the old definition, the official statistics will lag behind reality, resulting in misinformed policy decisions.

Way forward:

Redefine “Urban”: Use functional indicators like population density, built-up area, commuting patterns, and service access; adopt gender-inclusive occupational criteria.

Regular Updates: Periodically revise definitions to reflect changing demographics and economic realities.

Municipalise Census Towns: Convert them into statutory towns with urban local bodies and planning powers.

Adopt Global Models: Use frameworks like UN's **DEGURBA** for more accurate urban classification.

Align Boundaries: Ensure administrative limits match real urban growth and service areas.

India's urban growth is outpacing its outdated definitions and governance structures. To ensure inclusive and effective urban development, it is essential to adopt a more dynamic, functional, and gender-sensitive definition of "urban." By aligning policy with ground realities—through updated criteria, proper municipalisation, and global best practices. India can better plan for its rapidly urbanising future and ensure that no settlement is left behind in its development journey.

16. Ladakh protest and sixth schedule

In News: Youth led protest erupted in Ladakh demanding statehood and inclusion under the Sixth Schedule. It turned violent after clashes left four people dead and 30 others injured, prompting a massive shutdown in Leh town led by the Leh Apex Body (LAB).

Root Cause of Ladakh Protests

- The ongoing protests in Ladakh trace back to the 2019 abrogation of Article 370 and the enactment of the Jammu and Kashmir Reorganisation Act, which split the former state into two Union Territories.
- While Jammu and Kashmir was granted a legislature, Ladakh became a Union Territory without legislative powers, placing it under direct control of the Centre.
- This absence of political representation and autonomy has made Ladakh's status a point of ongoing concern, driving demands for statehood and inclusion under the Sixth Schedule for tribal rights and self-governance.

Four-point agenda:

- Statehood for Ladakh to ensure self-governance beyond UT status.
- Inclusion under the Sixth Schedule to safeguard tribal rights.
- A separate public service commission to address high unemployment.
- Two parliamentary seats instead of one, to increase representation at the Centre

What is the Sixth Schedule?

The **Sixth Schedule** (Articles 244(2) & 275(1)) provides **self-governance for tribal areas**, mainly in the **Northeast**, based on the **Bardoloi Committee's** recommendations.

Provisions: It empowers Governors to establish Autonomous District Councils (ADCs) and Autonomous Regional Councils (ARCs), providing self-rule to tribal areas.

Purpose: The Schedule was designed to **protect tribal identity, culture, land, and governance systems** in areas where tribal populations are significant, while still keeping them within the broader framework of the Indian Union.

Powers of ADCs and ARCs:

- a. **Legislative Powers:** Councils can make laws on subjects such as land, forests, agriculture, village administration, inheritance, marriage/divorce, social customs, and mining (with restrictions). All laws require the **Governor's assent**.

Judicial Powers: Councils can establish courts to try cases involving Scheduled Tribes, except for serious crimes.

Executive Powers: Councils can set up and manage schools, markets, dispensaries, roads, water bodies, and local infrastructure.

Financial Powers: Can levy and collect taxes, tolls, and land revenue within their areas.

Key reasons for the demand

- **Protection of tribal identity:** Over 97% of Ladakh's population is Scheduled Tribe, and inclusion would safeguard their cultural and linguistic heritage from demographic changes, similar to protections in other regions under the Sixth Schedule.
- **Land and resource rights:** The Sixth Schedule empowers local councils to control land transfer and manage natural resources, which Ladakhis fear will otherwise be exploited by outside commercial interests and large infrastructure projects.
- **Economic self-governance:** Inclusion would enable local councils to make decisions on development and resource management, addressing concerns about high unemployment and lack of local job creation.
- **Environmental protection:** The fragile ecosystem of Ladakh is under pressure from tourism and development. The Sixth Schedule would grant ADCs the authority to enforce sustainable development and protect traditional land-use practices.

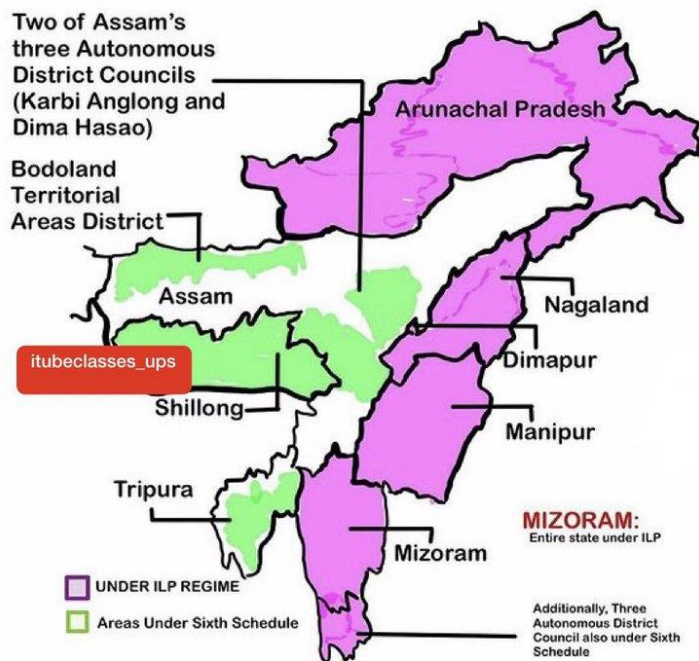
- Greater political autonomy: Current councils lack legislative powers, and Sixth Schedule status would provide a more effective and decentralized model of governance, ensuring more local control over their affairs.



ZETA IAS

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REGIONS UNDER SIXTH SCHEDULE AND ILP REGIME IN THE NORTH EAST



ARUNACHAL PRADESH: Entire state under ILP regime

NAGALAND: Entire state under ILP regime

TRIPURA: Sixth Schedule covers 70% of geographical area

MEGHALAYA: Almost entire state covered under Sixth Schedule, except a part of Shilong

ASSAM: 3 Autonomous District Councils under Sixth Schedule

MANIPUR: Entire state under ILP regime



Challenges in Granting Sixth Schedule to Ladakh:

Legal Hurdle: Sixth Schedule applies to the Northeast; extending it to Ladakh needs a constitutional amendment.

Security Concerns: Ladakh's sensitive border location makes high autonomy harder to manage.

Administrative Gaps: Local councils may lack funds, trained staff, and experience, leading to weak governance.

Development vs. Autonomy: Balancing growth, tourism, and tribal land protection is challenging.

Precedent Risk: Granting this could lead to similar demands from other tribal areas, complicating policy.

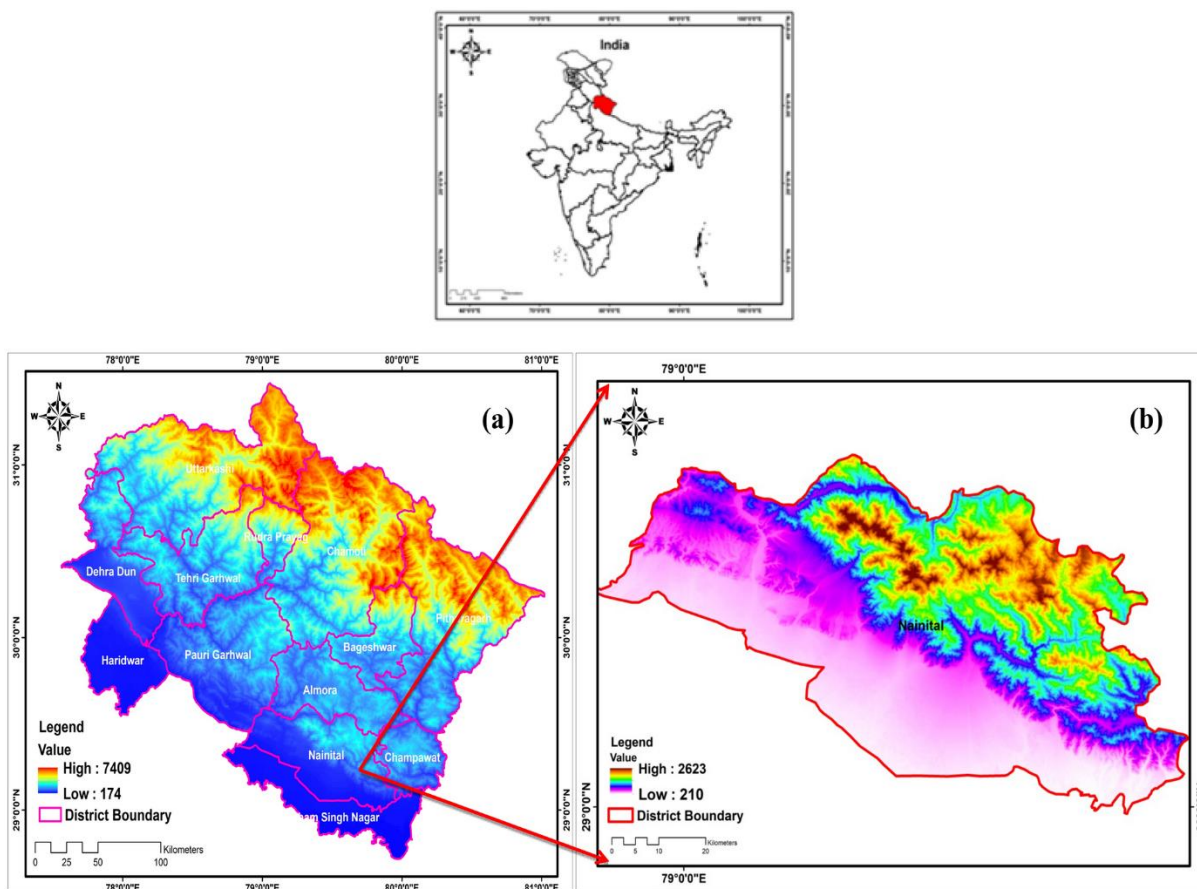
A swift resolution to Ladakh's statehood demand remains unlikely, given India's strategic interests along the China border. The Centre is concerned that granting statehood could complicate military logistics and infrastructure development. With protests expected to continue, led by groups like LAB and KDA, a possible compromise could involve strengthening Hill Councils and ensuring land and job protections for locals, while protestors may have to temporarily accept Ladakh's Union Territory status.

Geography

17. Flash floods in Dehradun

In News: Dehradun and several districts of Uttarakhand saw massive rainfall in September, which triggered landslides, swollen rivers, and left at least 15 people dead.

Over the past month, Uttarakhand and Himachal Pradesh have experienced a series of cloudbursts, flash floods, mudslides, and communication breakdowns. While these events are common during the monsoon, their increasing frequency and severity in recent years have raised serious concerns about the safety and resilience of the Himalayan region.



Why Hilly Regions Receive More Rainfall

This monsoon, **north western India** saw unusually heavy rainfall — **34% surplus in August**, and **67% above normal** in early September.

Multiple **low-pressure systems** from the Bay of Bengal moved further north, intensifying rainfall over the **western Himalayas**.

In these hilly areas, rising moist air forms large clouds that release **heavy, localized precipitation**.

Rainfall levels that are manageable in coastal areas can trigger disasters in mountains — e.g., **Udhampur (J&K)** recorded **630 mm in 24 hours**, and **Leh** saw its highest rainfall since 1973.

Why Hilly Regions Face Greater Disaster Risks

Unlike plains where water drains into rivers, in the **mountains**, rainfall often triggers **landslides, mudslides, and flash floods**.

Recent incidents in **Mandi, Kullu, Dharali, Tharali, and Jammu** show how rainfall can choke rivers with debris, leading to floods and damage.

However, not all cloudbursts cause disasters — **local factors** like slope stability and debris movement determine the impact.

Climate Change and Himalayan Rainfall Extremes

Global warming is causing a **southward shift of western disturbances**, which now interact more with **monsoon currents**, altering rainfall patterns.

This results in **more extreme rainfall events**, **longer dry spells**, and greater uncertainty.

Arctic ice melt and a **weakened jet stream** are further disrupting weather systems, increasing risks in the Himalayas.

Why the Himalayas Are Prone to Cloudbursts

The Himalayas lie at the meeting point of **tropical monsoon winds** and **mid-latitude westerlies**, creating strong uplift and instability.

Warm, moist air rises quickly, cools, and condenses into **intense downpours**.

Climate change is intensifying this, as **warmer air holds more moisture**, and a **slower jet stream** causes storms to linger — leading to prolonged rain and flooding.

Forecasting Tools and Their Limitations

Cloudburst forecasting uses tools like:

Doppler Weather Radars (DWRs) – detailed data but limited coverage in mountains.

Rain gauges/weather stations – accurate but not dense enough.

Satellites (INSAT-3D/3DR, GPM) – helpful but limited by resolution and terrain biases.

Numerical Weather Prediction (NWP) models – simulate storms but need very fine resolution and accurate data.

To improve forecasting, India needs:

- Denser observation networks
- Better models with cloudburst representation, and
- AI/ML-based data assimilation.

National Agency Roles for Hydro-Climatic Risk Management

Hydromet

Provides information for water resources and floodplain management. Leads flood and drought forecasting. Supports agriculture with agro-hydro advisory services.

WRM

Oversees planning and operation of water resources infrastructure. Regulates water allocations and strategic use of groundwater to help mitigate droughts. Key role in flood and drought response.

DRM

Lead coordinating agency for flood, and sometimes drought, disaster response. Provides leadership in floodplain management. Works with other agencies to mitigate risks.

Agriculture

Promotes healthy watersheds through sound agricultural policies and climate-smart agriculture. Helps boost farmer incomes and resilience. Key role in drought response. Collaborates with natural resources and WRM on watershed management.

Natural resources management

Promotes healthy watersheds by sustainably managing forests, wetlands, and coastal barriers. Collaborates with agriculture and WRM on watershed management.

18. India's deep-sea exploration for polymetallic sulphides

In News: India is leading deep-sea exploration for polymetallic sulphides, having secured a 15-year contract from the International Seabed Authority (ISA) for the Carlsberg Ridge in the northwest Indian Ocean.

India's Deep-Sea Mining Breakthrough: Key Points

Major Milestone

- India has secured a first-of-its-kind exploration licence from the International Seabed Authority (ISA).

The licence allows exploration of polymetallic sulphides in the Carlsberg Ridge, NW Indian Ocean.

New Exploration Rights (2025)

- Signed in September 2025 with the Jamaica-based ISA. Covers 3,00,000 sq. km in the Carlsberg Ridge.
- Minerals targeted: **manganese, cobalt, nickel, and copper** — vital for **batteries, renewables, and electronics**.

This is the **first global licence** for this ridge, making India a **pioneer**

Previous Seabed Exploration

2002: Rights in Central Indian Ocean Basin for polymetallic nodules.

2016: Rights for polymetallic sulphides along the Indian Ocean Ridge.

Contracts valid till 2027 and 2031.

So far, limited exploitation due to high costs and environmental concerns.

Strategic and Geopolitical Importance

- Ensures access to critical minerals for clean energy, EVs, and high-tech sectors.
- Counters China's growing presence in the region.
- Strengthens India's position in global mineral supply chains and national security.

Legal & Environmental Aspects

As per UNCLOS, ISA governs mineral rights beyond national jurisdiction (high seas).

Deep-sea mining risks biodiversity loss; India must balance development with environmental responsibility.

Global debates continue over setting strict safeguards before allowing commercial mining.

Global and Future Outlook

- India joins 19 countries with ISA seabed rights.
- The Carlsberg Ridge licence is unique in scale and tectonic significance.
- India is expected to invest in subsea tech, robotics, and impact assessment.
- Access to critical minerals will be key for clean energy transition and industrial self-reliance.

Carlsberg Ridge

The Carlsberg Ridge is a mid-ocean ridge in the Indian Ocean, forming the boundary between the Arabian and Indian tectonic plates. It is rich in polymetallic nodules, which are mineral deposits containing commercially viable quantities of metals like copper, cobalt, and manganese.



19. Samudrayaan Mission

Context: The Samudrayaan Mission is India's first human deep-sea exploration project, part of the larger Deep Ocean Mission. It aims to send three people in a manned submersible called "MATSYA 6000" to a depth of 6,000 meters to explore deep-sea resources and biodiversity.

About Samudrayaan:

Samudrayaan is India's first human deep-sea mission, part of the Deep Ocean Mission.

Developed by the National Institute of Ocean Technology (NIOT), the submersible is built to withstand extreme deep-sea pressure and can operate for 12 hours under normal conditions and up to 96 hours in emergencies.

This mission is a key part of a five-year program approved in 2021, aimed at advancing technologies to support India's Blue Economy initiatives.

Goal: to send **three humans** in the submersible **Matsya-6000** to a depth of **6,000 metres** by **2027**.

Significance: It will place India among a select group of countries (like the US, Russia, China, Japan, France) with **manned deep-sea capability**, boosting strategic and scientific presence.

Key Objectives

Develop tech for deep-sea mining, manned submersibles, and ocean robotics.

Survey seabed for **polymetallic nodules** (rich in iron, manganese, cobalt, nickel, rare earths).

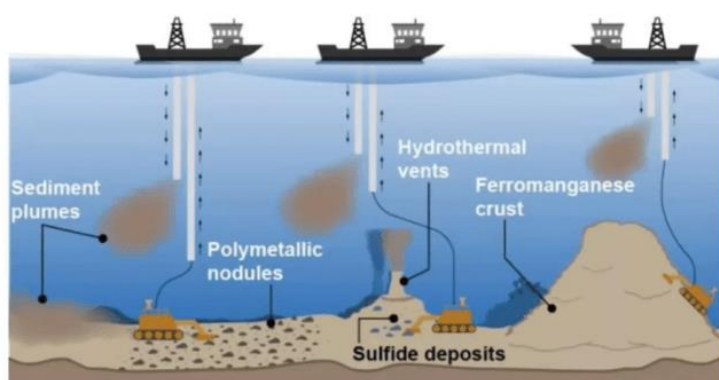
Matsya-6000: India's First Manned Submersible

- **Made of:** Titanium alloy in a **spherical design**.
- **Capacity:** 3 aquanauts for **12 hours** (up to **96 hours** in emergencies).
- **Withstands:** Pressure of **600 bar** and **-3°C temperatures**.
- **Features:** Life support, acoustic communication, Li-Po batteries, escape system, and health-monitoring bio-vests.

What is the Deep Ocean Mission?

It was approved in June 2021 by the Ministry of Earth Sciences. It aims to **explore the deep ocean for resources, develop deep-sea technologies for sustainable use of ocean resources**, and support the **Blue Economy Initiatives** of the Indian Government.

The cost of the Mission has been estimated at Rs. 4,077 crores over a **five-year period** and will be implemented in phases.



DEEP OCEAN MISSION	
➤ Deep Sea Mining through 'Underwater Vehicles' and 'Underwater Robotics' ➤ Asserting exclusive rights to explore polymetallic nodules from seabed over 75,000 sq km of areas in international water ➤ Estimated polymetallic nodules resource potential: 380 million tonnes (MT) ➤ Development of ocean climate change advisory services ➤ Technology for sustainable utilisation of marine bio-resources	THESE POLYMETALLIC NODULES CONTAIN
	Manganese 92.6 MT
	Nickel 4.7
	Copper 4.3
➤ Deep ocean survey and exploration ➤ Energy from the ocean and offshore-based desalination ➤ Krill fishery from southern ocean	Cobalt 1
	(*figures are rounded off)

20. Erra Matti Dibbalu

Context: Erra Matti Dibbalu is dissected and stabilized coastal **red sediment mounds**, located between Visakhapatnam and Bheemunipatnam in Andhra Pradesh.

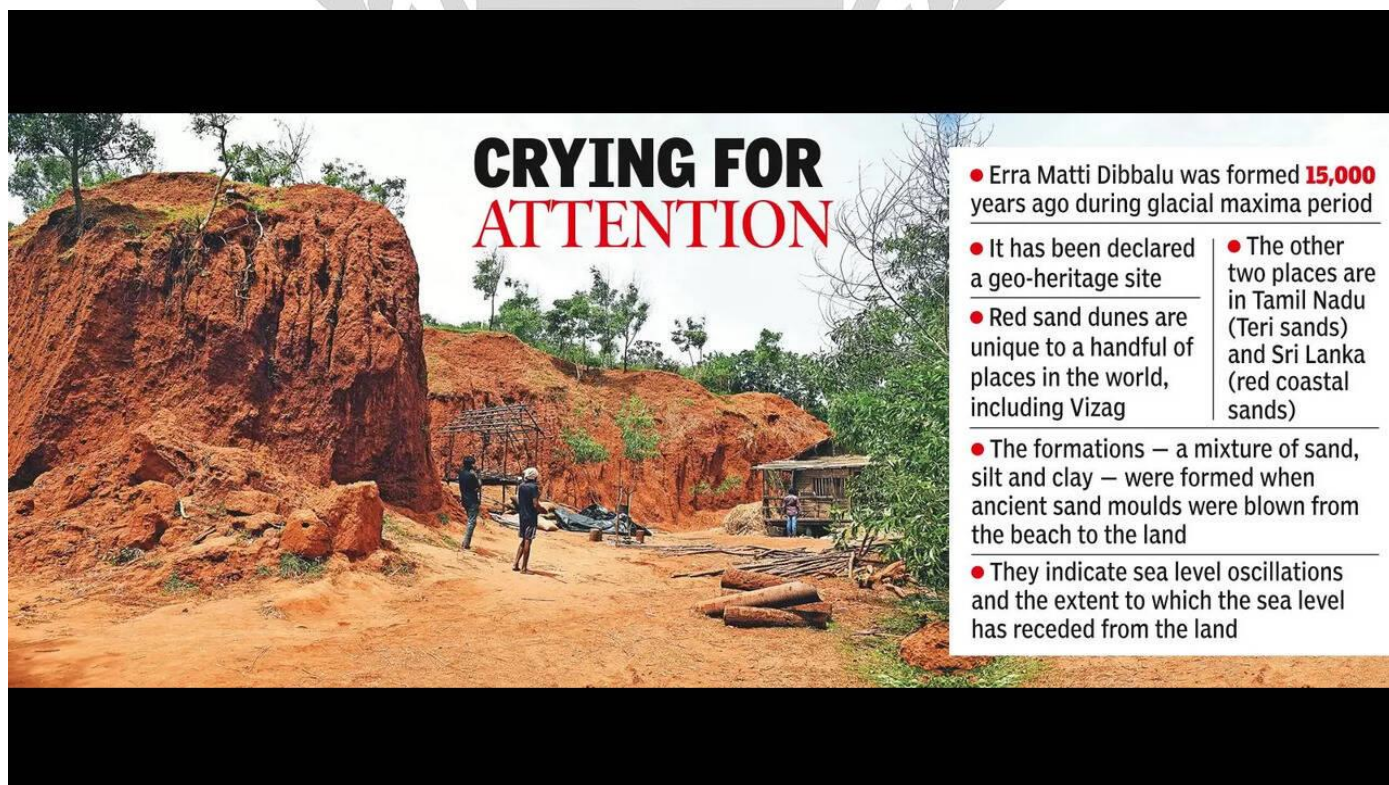
Formation:

Formed around **12,000 years ago** due to interactions between **land and sea**.

Composed of **40–50% sand**, along with **silt and clay**, and their distinct **red colour** comes from **oxidation** of iron-rich minerals.

Significance:

- A. Geological importance:** Reflect the late Quaternary period's history, including sea-level changes, climate variations, monsoon patterns, and tectonic processes.
- B. Archaeological relevance:** May hold Mesolithic and Neolithic cultural artefacts, making them valuable for anthropological research.

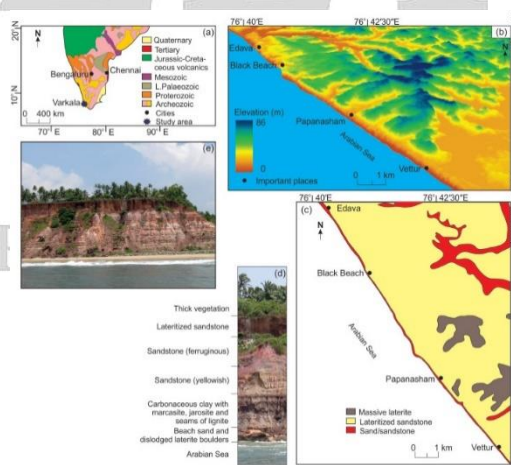


Key Features of Erra Matti Dibbalu (Red Sand Hills)

- Composed of **sand, silt, and clay** with a **reddish colour** due to natural **oxidation** over thousands of years.
- Represents the **late Quaternary geological age**, showcasing earth's evolutionary history.
- Displays badland topography with diverse landforms: gullies, sand dunes, beach ridges, buried channels, terraces, waterfalls, and more.
- Serves as a live scientific site to study climate change and sea-level fluctuations.
- Holds **archaeological value** with artefacts from the **Upper Palaeolithic period** (~20,000 BC).
- Shows **dendritic drainage patterns** and **layered sediments**, recording past climatic events.
- One of only three such sites globally, alongside those in Sri Lanka and Tamil Nadu (Teri Sands).
- Declared a National Geo-heritage Monument by the Geological Survey of India in 2016

21. UNESCO recognition for Kerala's Varkala Cliff sparks celebration — and unease

In News: UNESCO has placed the Varkala Cliff on its tentative list of World Heritage Sites. It is set to become India's first Geo-park.



About Varkala Cliff

Varkala Cliff is a unique natural formation in **Varkala**, a coastal town in **Thiruvananthapuram district, Kerala**.

It exposes the Warkalli Formation of the Mio-Pliocene age (approx. 2.5 to 13 million years ago) and features natural springs and striking erosional landforms.

Locally known as **Sivagiri Thuruthu**, the cliff is made of **laterite and sedimentary layers** that contain **fossils** and **climatic records** of the past.

At its base lies the Papanasam Beach, known for medicinal natural springs believed to have therapeutic value.



The cliff functions as a **natural aquifer and water harvesting system**, supports **microhabitat biodiversity**, and sustains **underwater reefs** vital to local fishing communities.

It was declared the 27th National Geological Monument of India and is the second in Kerala after the Angadipuram Laterite.

Environment and Ecology

22. National Bamboo Mission

BAMBOO BOOST

₹50,000 crore expected investment in Maharashtra's bamboo sector over 10 years

5 lakh jobs to be generated directly and indirectly across the state

15 dedicated bamboo clusters to be set up, including Amravati and Bhandara

₹1,534 crore approved for policy implementation during 2025-30



₹300 crore venture capital fund for bamboo startups and MSMEs

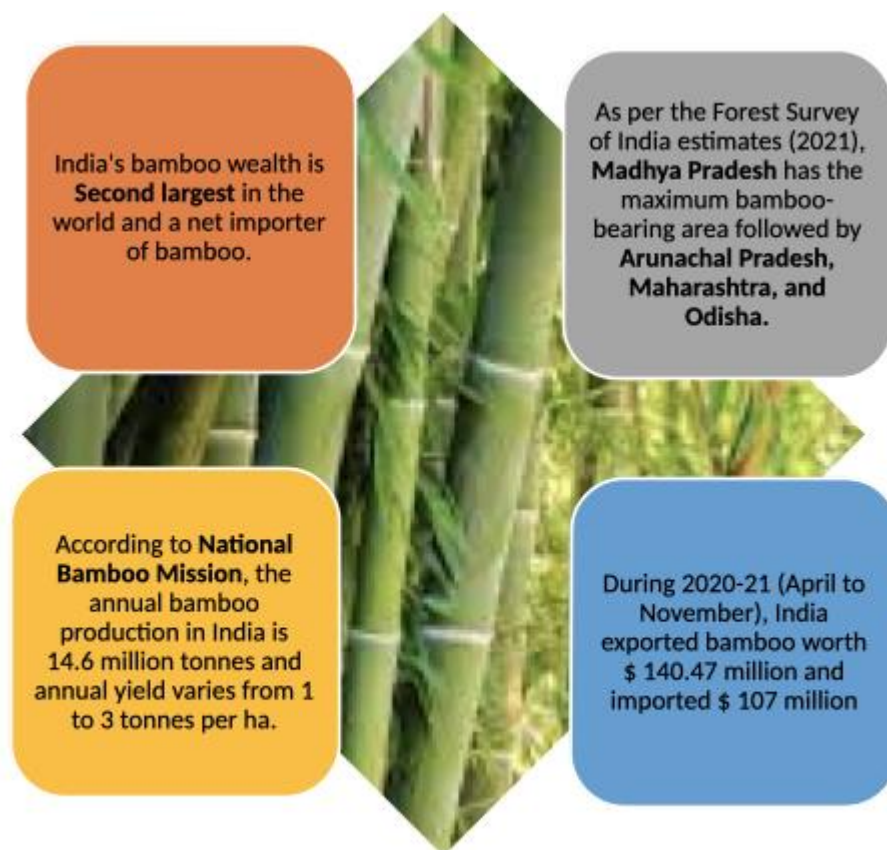
➤ Bamboo to be used in thermal power, industries, FPOs, and artisan micro-CFCs

In News: World Bamboo Day was celebrated on September 18, and a conclave held in Guwahati on the same day to discuss the bamboo economy.

Theme: Emphasizes bamboo's role in solving climate and development challenges through innovation and design.

Focus: Spreading awareness about bamboo's uses and its role in sustainability, as well as promoting it as a sustainable alternative to wood and plastic.

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India's bamboo wealth is **Second largest** in the world and a net importer of bamboo.

As per the Forest Survey of India estimates (2021), **Madhya Pradesh** has the maximum bamboo-bearing area followed by **Arunachal Pradesh, Maharashtra, and Odisha.**

According to **National Bamboo Mission**, the annual bamboo production in India is 14.6 million tonnes and annual yield varies from 1 to 3 tonnes per ha.

During 2020-21 (April to November), India exported bamboo worth \$ 140.47 million and imported \$ 107 million

About Bamboo:

Bamboo is the world's fastest-growing plant, with some species reaching 35 inches a day, due to a unique growth cycle where new shoots rapidly reach their full height and thickness within a single season. It reproduces via an extensive root system of rhizomes and can grow into dense forests.

Green Gold: Bamboo is often called “green gold” due to its wide range of applications and economic value.

Environmental Benefits:

- Grows rapidly with minimal resources
- Restores and enhances soil health
- Plays a significant role in combating climate change

Economic Impact:

- a. Reduces pressure on forests by offering an alternative to timber

- b. Generates employment for millions across various sectors

Significance for India:

India possesses rich bamboo biodiversity and traditional knowledge. A crucial resource for rural development and cultural heritage

Opportunities through Celebration:

- Promotes innovation in bamboo-based products and industries
- Encourages policy support and investment in the bamboo sector

Call for Collaboration:

Emphasizes the need for cooperation among farmers, governments, industries, and communities to unlock bamboo's full potential

Bamboo: Growth and Reproduction

- **Rapid Growth:** Some bamboo species can grow up to **35 inches (90 cm)** per day under ideal conditions.
- **Growth Cycle:** Shoots reach full height and thickness within **60–90 days**; mature culms do not grow further after emerging.
- **Rhizome Network:** Spreads through underground stems called **rhizomes**.

Types of Spread:

- **Running Bamboo:** Long rhizomes; spreads widely; needs containment.
- **Clumping Bamboo:** Short rhizomes; grows slowly in compact clumps.
- **Regeneration:** Regrows quickly from existing roots after cutting—**highly sustainable**.

Growing Conditions

- **Soil:** Likes **moist, fertile soil**, avoid **waterlogged** or soggy areas and grows best in soil rich in **organic matter**
- **Sunlight:** Needs **full sun** for healthy growth
- **Water:** Needs **regular watering** to keep soil moist. **Yellow leaves** may mean it needs **more water**
- **Fertilizer:** Bamboo is a **heavy feeder**. Use **nitrogen-rich fertilizer** for green, leafy growth

Restructured National Bamboo Mission

The Restructured National Bamboo Mission (NBM) is a Centrally Sponsored Scheme launched in 2018-19 to develop the entire bamboo value chain, connecting growers with consumers through activities like plantation, processing, and marketing.

The restructured National Bamboo Mission promotes bamboo cultivation, processing, and marketing across 24 States/UTs.

The Mission supports farmers and MSMEs through **financial assistance**, **FPO formation**, and **skill development**.

NBM also aids in **reviving** the **agarbatti sector** and reducing import dependence.

Success stories from **Madhya Pradesh**, **Maharashtra**, and **Assam** show positive impacts on rural livelihoods and women's empowerment.

The infographic is titled "Objectives of National Bamboo Mission" in a blue banner. It lists six objectives, each preceded by a right-pointing arrow icon. The objectives are: 1. To increase the area under bamboo plantation in non-forest Government and private lands to supplement farm income and contribute towards resilience to climate change as well as availability of quality raw material requirement of industries. 2. To improve post-harvest management through establishment of innovative primary processing units near the source of production, primary treatment and seasoning plants, preservation technologies and market infrastructure. 3. To promote product development keeping in view market demand, by assisting R&D, entrepreneurship & business models at micro, small and medium levels and feed bigger industries. 4. To rejuvenate the under-developed bamboo industry in India. 5. To promote skill development, capacity building, awareness generation for development of bamboo sector from production to market demand. 6. To reduce dependency on import of bamboo and bamboo products by way of improved productivity and suitability of domestic raw material for industry. The source is cited as "National Bamboo Mission".

Objectives of National Bamboo Mission

- ➔ To **increase the area under bamboo plantation** in non-forest Government and private lands to supplement farm income and contribute towards resilience to climate change as well as availability of quality raw material requirement of industries.
- ➔ To **improve post-harvest management** through establishment of innovative primary processing units near the source of production, primary treatment and seasoning plants, preservation technologies and market infrastructure.
- ➔ To **promote product development** keeping in view market demand, by assisting R&D, entrepreneurship & business models at micro, small and medium levels and feed bigger industries.
- ➔ To **rejuvenate the under-developed bamboo industry** in India.
- ➔ To **promote skill development, capacity building, awareness generation** for development of bamboo sector from production to market demand.
- ➔ To **reduce dependency on import of bamboo and bamboo products** by way of improved productivity and suitability of domestic raw material for industry.

Source: National Bamboo Mission

23. Seven Natural Heritage Sites from India Added to UNESCO's Tentative List of World Heritage

In News: In a moment of national pride, seven remarkable natural heritage sites from across the country have been successfully included in UNESCO's Tentative List of World Heritage Sites, increasing India's count on the Tentative List from 62 to 69 properties.

India now has a total of 69 sites under consideration by UNESCO, comprising 49 cultural, 17 natural, and 3 mixed heritage properties. This accomplishment reaffirms India's unwavering commitment to preserving and promoting its extraordinary natural and cultural legacy.

Newly Added Sites:

Deccan Traps at Panchgani and Mahabaleshwar, Maharashtra : Home to some of the best-preserved and studied lava flows in the world, these sites form part of the massive Deccan Traps and are located within the Koyna Wildlife Sanctuary—already a UNESCO World Heritage Site.

Geological Heritage of St. Mary's Island Cluster, Karnataka: Known for its rare columnar basaltic rock formations, this island cluster dates back to the Late Cretaceous period, offering a geological snapshot from around 85 million years ago.

Meghalayan Age Caves, Meghalaya: The stunning cave systems of Meghalaya, particularly the Mawmluh Cave, serve as the global reference point for the Meghalayan Age in the Holocene Epoch, reflecting significant climate and geological transitions.

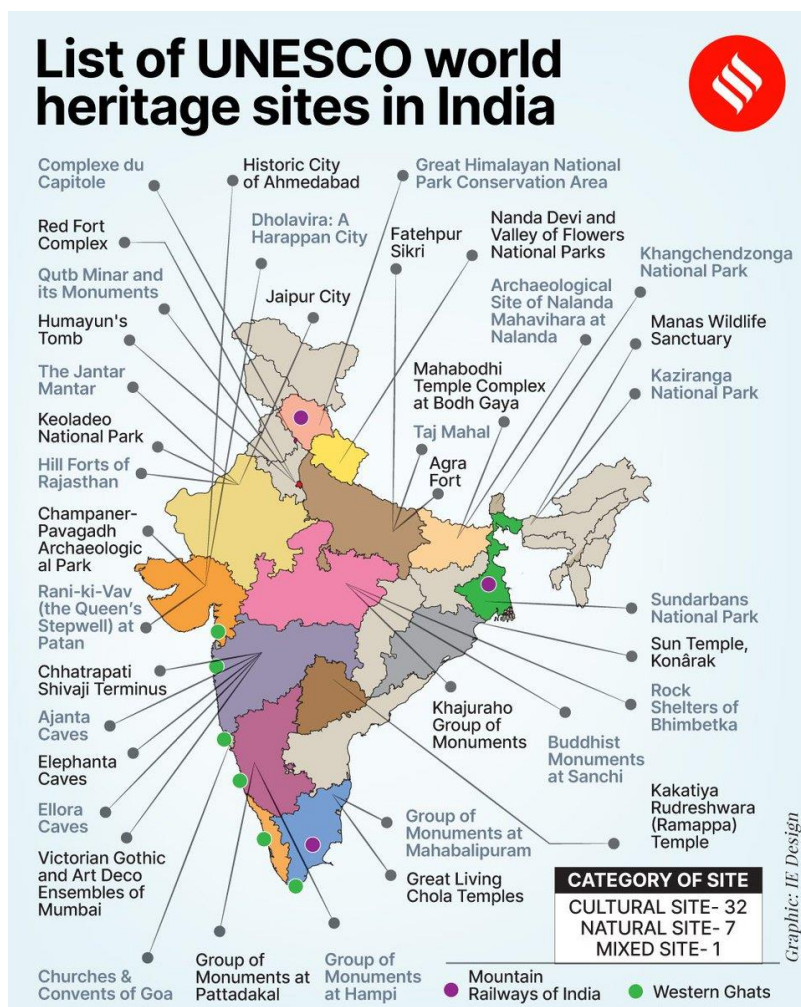
Naga Hill Ophiolite, Nagaland: A rare exposure of ophiolite rocks, these hills represent oceanic crust uplifted onto continental plates—offering deep insights into tectonic processes and mid-ocean ridge dynamics.

Erra Matti Dibbalu (Red Sand Hills), Andhra Pradesh: These visually striking red sand formations near Visakhapatnam showcase unique paleo-climatic and coastal geomorphological features that reveal Earth's climatic history and dynamic evolution.

Natural Heritage of Tirumala Hills, Andhra Pradesh: Featuring the Eparchaeon Unconformity and the iconic Silathoranam (Natural Arch), this site holds immense geological significance, representing over 1.5 billion years of Earth's history.

Varkala Cliffs, Kerala: The scenic cliffs along Kerala's coastline expose the Warkalli Formation of the Mio-Pliocene age, along with natural springs and striking erosional landforms, offering both scientific and touristic value.

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24. Will AI fix India's energy needs or will its own needs surge?

In News: n one hand, AI has the potential to improve energy efficiency, help integrate renewables, and optimize the grid. On the other hand, AI itself is highly energy-intensive especially when it comes to data centres and large-scale computation raising concerns that its growth may exacerbate India's energy demand.

Rising Energy Demand from AI Infrastructure

AI and associated data centres require **massive computational power**, which translates to high electricity consumption.

Globally, data centres consume about **1–2% of electricity today**, and this share could rise to **3–4% by 2030**.

- In India, data centre demand is projected to jump from ~1.2 GW in 2024 to ~4.5 GW by 2030, with an associated increase of **40–50 TWh** annual electricity usage.
- Growth in AI infrastructure also increases demand for cooling (thus water usage) and other supporting infrastructure

Potential Energy Benefits of AI

Grid optimization: AI can forecast load, detect faults, and help “heal” parts of the grid.

Renewable integration: AI can help balance variable generation (solar, wind) by better prediction and dispatch.

Efficiency in buildings and operations: Smart systems (lighting, HVAC, energy management) driven by AI can reduce consumption by significant margins (up to ~25% in some cases).

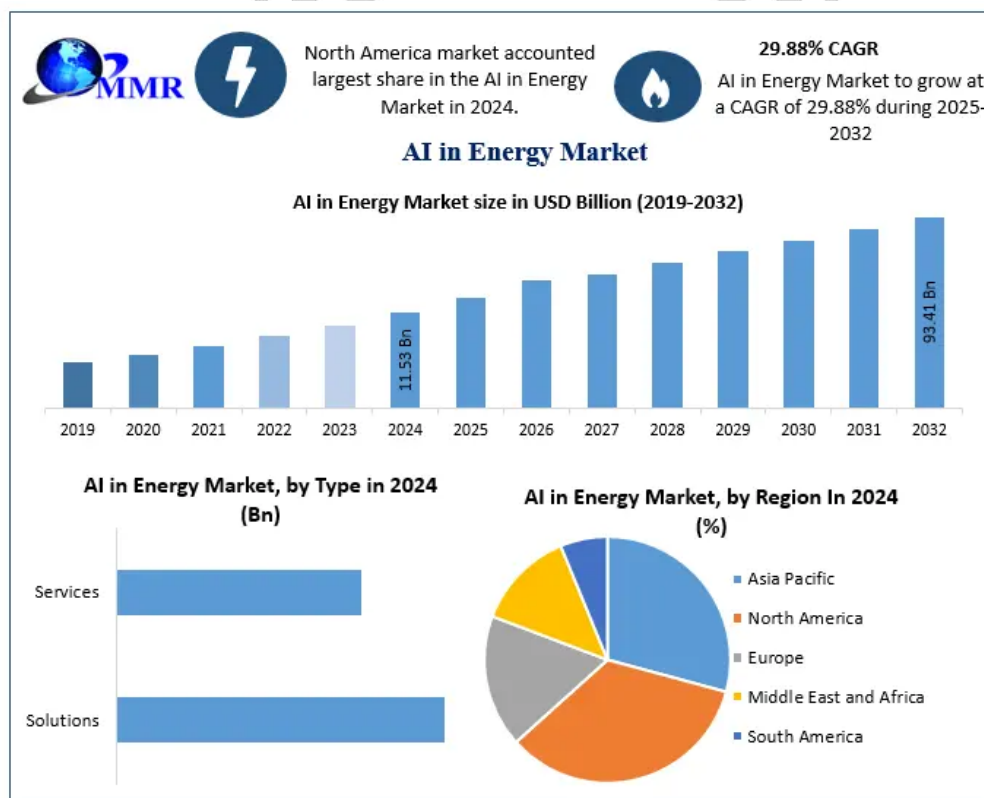
Support for policy instruments: AI can aid in implementing energy efficiency codes, demand-side management, and smart grids.

Challenges, Risks & Trade-offs

- **Strain on energy systems:** If AI demand grows unchecked, it could stress India’s generation, transmission, and distribution systems.
- **Carbon emissions:** Gains from AI-led efficiency might be offset by emissions from its own power use, especially if fossil fuels power the additional load.
- **Resource intensity:** High water use (for cooling), dependency on rare minerals (for hardware), and e-waste are additional concerns.
- **Data & infrastructure gaps:** Many parts of India lack reliable, high-quality data, or modern grids to support AI.
- **Regulatory and governance gaps:** Rules and oversight for large-scale AI deployment in energy are underdeveloped.
- **Security / resilience risks:** If energy systems become more AI-dependent, they may become more vulnerable to cyber-attacks or system failures.

Policy & Strategic Imperatives

- Promote **"clean AI"** (i.e., AI operations powered by renewable energy).
- Encourage investments in **green data centres** and captive renewable energy for AI hubs.
- Develop regulations, standards, and oversight mechanisms tailored to AI in energy.
- Upgrade grid infrastructure and enable interoperable, “smart” systems to fully leverage AI’s benefits.
- Focus on enhancing **data availability**, training AI talent, and fostering public–private collaboration.
- Monitor environmental impacts (emissions, water use, e-waste), and adopt mitigation strategies.



AI can help India meet its energy needs and grow its use of renewable energy by making power grids smarter, improving efficiency, and managing energy better. To make this happen, India needs strong infrastructure, clean and energy-efficient AI, good policies, and skilled workers.

Science and technology

25. India explores Iso-butanol blending with Diesel

In News: Isobutanol is being explored as a biofuel to blend with diesel, primarily as an alternative to the challenging ethanol-diesel blending.

Background: India has already succeeded in blending ethanol with petrol (E20 etc.), but attempts to blend ethanol with diesel have **faced technical and operational problems. To overcome those problems, the government is now investigating blending isobutanol (an alcohol derived from biomass) with diesel**

Is it feasible to blend isobutanol and diesel?

When will the pilot project be completed? Why has ethanol been discarded as the possible alternative? What is the raw material? How is it produced? What are the pros and cons of using this biofuel? Will it have a bearing on ignition and better engine performance?

Saptaparna Ghosh

The story so far: In September 11, Union Transport Minister Nitin Gadkari said the Automotive Research Association of India (ARAI) was exploring the possibility of blending isobutanol with diesel. Isobutanol is an alcoholic compound with inflammable properties and is used as a solvent in several industries, including painting. Mr. Gadkari said ARAI was studying the possibility of blending isobutanol with diesel, after efforts to blend ethanol with diesel was unsuccessful.

Is isobutanol better suited for diesel? The discussion on the potential use of isobutanol primarily stems from the assumption that the alcoholic compound blends better with diesel, and after the blending experiment with diesel and ethanol failed. Ethanol, however, is available in surplus; as a biofuel, it is being seen as an important contributor to the government's objective of scaling the net zero emission target by 2070. At the annual conclave of the India Sugar and Bio-Energy Manufacturers Association (ISMA), Reji Mathai, director of ARAI, explained how isobutanol blended better with diesel

'The pilot project would take about 18 months to complete'

compared with ethanol. "There was no need to add any co-solvent (for efficiency), and isobutanol's properties are better than ethanol for blending diesel. This is one [area] where studies are to be taken up," he said.

More importantly, as Mr. Mathai pointed out, the flash point, or the lowest temperature at which isobutanol yields a vapour igniting a momentary flash, is higher than ethanol. A lower flash point was among the reasons that ethanol was not considered ideal for blending with diesel. Fuels with lower flash points are more volatile and entail a higher risk of catching fire. The other aspect relates to diverting some of the raw material required to produce ethanol to make isobutanol, as there is already a surplus of ethanol. According to an ISMA note, even after catering for industrial use in different States, the potential for ethanol supply is "more than 50% of the requirement" for the one-fifth blending with petrol. In addition to this, the sugar manufacturers' association has also urged the government to revise the procurement prices for ethanol produced from cane juice/syrup or B-heavy molasses. The prices have not been changed since Ethanol Supply Year (ESY) 2022-23, while the Fair and Remunerative prices (FRP), or the minimum price sugar mills are required to pay farmers for sugarcane has increased by 16.5% during the period. "This imbalance has eroded economic viability, discouraged ethanol production and risked a build-up of surplus sugar in the domestic market," it stated. Thus, the proposed blending also opens another avenue for the surplus production to be used.

How economical is it to make isobutanol? Isobutanol can be produced from the same feedstock required to produce ethanol, such as sugarcane syrup and molasses and grains, among others. ISMA's Director General Deepak Ballani explained the process to *The Hindu*, "Natural sugars are fermented by specially designed microbes under sterile conditions, unlike conventional yeast that produces ethanol; these engineered microbes are tuned to produce isobutanol." On the aspect of costs, Mr. Ballani, taking the example of a sugar refinery, pointed

out that producing isobutanol from biomass would require retrofitting a fermentation tank, and a distillation tank to separate ethanol from isobutanol. "A plant with a production capacity of 150 kilo litres per day (klpd) can easily produce 125 klpd of ethanol and 20 klpd of isobutanol without a lot of changes to the overall infrastructure," he stated.

What are some of the issues to consider?

Mathew Abraham, an automobile consultant and researcher who has previously worked with blending fuel types, noted two potential concerns emanating from isobutanol's significantly lower cetane number compared with diesel, and about flash points. At the foremost, according to Mr. Abraham, isobutanol and diesel may have issues on miscibility (ability of two substances to mix to form a homogenous mixture) though it can be sorted out by mixing biodiesel to the blend. The latter refers to the fuel manufactured from non-edible vegetable oils, used cooking oil and/or animal fat.

Further, another point to note is the impact of the blend on the cetane number, which is a measure of combustion quality. An ideal combustion translates to rapid ignition and the fuel combusting completely to produce the necessary energy. Mr. Abraham notes the alcoholic compound's significantly lower cetane number compared with the base fuel, diesel, would reduce the blend's overall cetane number.

Also, a lower cetane number raises concerns about 'diesel knock' which can result in reduced power and can potentially damage engines. Knocking occurs when the fuel burns unevenly and/or prematurely in the vehicle's fuel cylinder, also generating an audible sound. However, Mr. Abraham added that the cetane value can be restored through proper additives which would entail incremental costs.

Mr. Abraham further stated that the proposed blend would have an impact on reducing emission and help with import substitution, but the riders must be addressed, and proper studies should be initiated encompassing varied vehicle classes and types. More importantly, he emphasised, "No more than 10% blending [of isobutanol] should be considered, else it could have an impact on engines."

The blending paradigm is still being studied and the pilot project would take about 18 months to complete, according to Mr. Mathai. If successful, India would be the first country to have blended isobutanol with diesel.



New formulations: Workers harvest sugarcane in Kolhapur district in Maharashtra in 2023. REUTERS

Isobutanol: It is a four-carbon alcohol ($C_4H_{10}O$), **flammable, colorless**, and traditionally used as a **solvent** in paints, coatings, and chemical industries. It is produced both from **petrochemical processes and fermentation of biomass**.

Isobutanol vs Ethanol

Has **higher energy density** than ethanol — closer to diesel.

Absorbs less water than ethanol (lower hygroscopicity), reducing **engine and pipeline corrosion**.

ARAI is testing 10% isobutanol–diesel blends.

Being explored as a **standalone fuel** and for **CNG–isobutanol flex-fuel options** in tractors and agricultural machinery.

Advantages of Isobutanol:

Advantages as a fuel

Higher heating value: Isobutanol has a higher energy content than ethanol, which translates to better fuel efficiency.

Lower hygroscopicity: It absorbs much less water, making it less corrosive and allowing it to be transported and stored in existing infrastructure without the same risks associated with ethanol.

High octane rating: This contributes to better engine performance.

Compatible with existing infrastructure: Its properties allow for its use with the current fuel infrastructure.

Less impact on vapor pressure: When blended with gasoline, it distorts the fuel blend's vapor pressure to a lesser extent than ethanol.

Advantages as a chemical and solvent

Solvent for coatings: It is used in lacquers to improve flow, gloss, and to prevent "blushing" (a milky appearance) under humid conditions.

Industrial feedstock: Isobutanol is a key starting material for producing other chemicals, such as wear inhibitors, anti-corrosion additives for engine oils, and other esters.

Versatile industrial uses: It is used as a solubilizer in the textile industry, an additive in polishes and cleaners, and an additive in de-icing fluids.

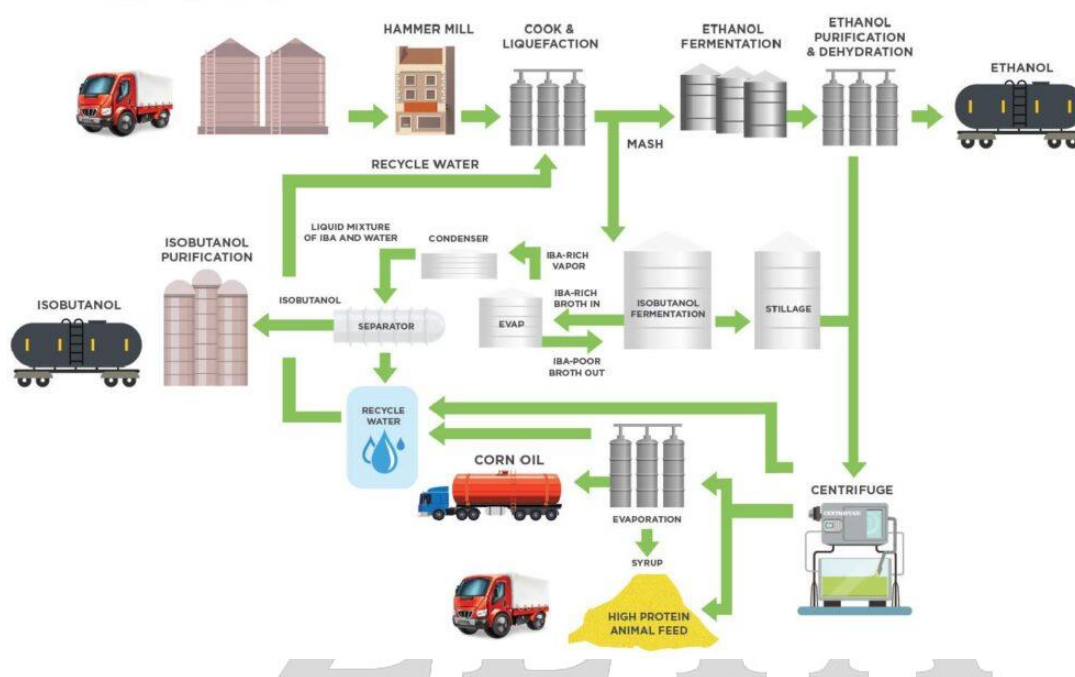
Extractor: It is used as an extractant in the production of pharmaceuticals and other natural substances

Advantages in production

- Renewable source:** It can be produced from renewable feedstocks like corn, wheat, or sugar cane through fermentation.
- Reduced environmental impact:** Fermentation processes can be performed under mild conditions, potentially minimizing environmental impact.

Challenges, Risks & Constraints

Lower cetane number: Isobutanol has poorer ignition quality compared to diesel, which may reduce engine efficiency or lead to knock. Cetane improvers may be needed.



Limit on blending percentage: Experts suggest not exceeding ~10% isobutanol in diesel to avoid performance issues.

Cost & scale: Production costs are higher; retrofitting or upgrading facilities is needed; scale-up is uncertain.

Engine compatibility & certification: Engines (especially older ones) must be tested for durability, material compatibility (seals, fuel lines) etc.

Policy, standardization & regulatory framework: Fuel standards, safety norms, incentive/price mechanisms must be established.

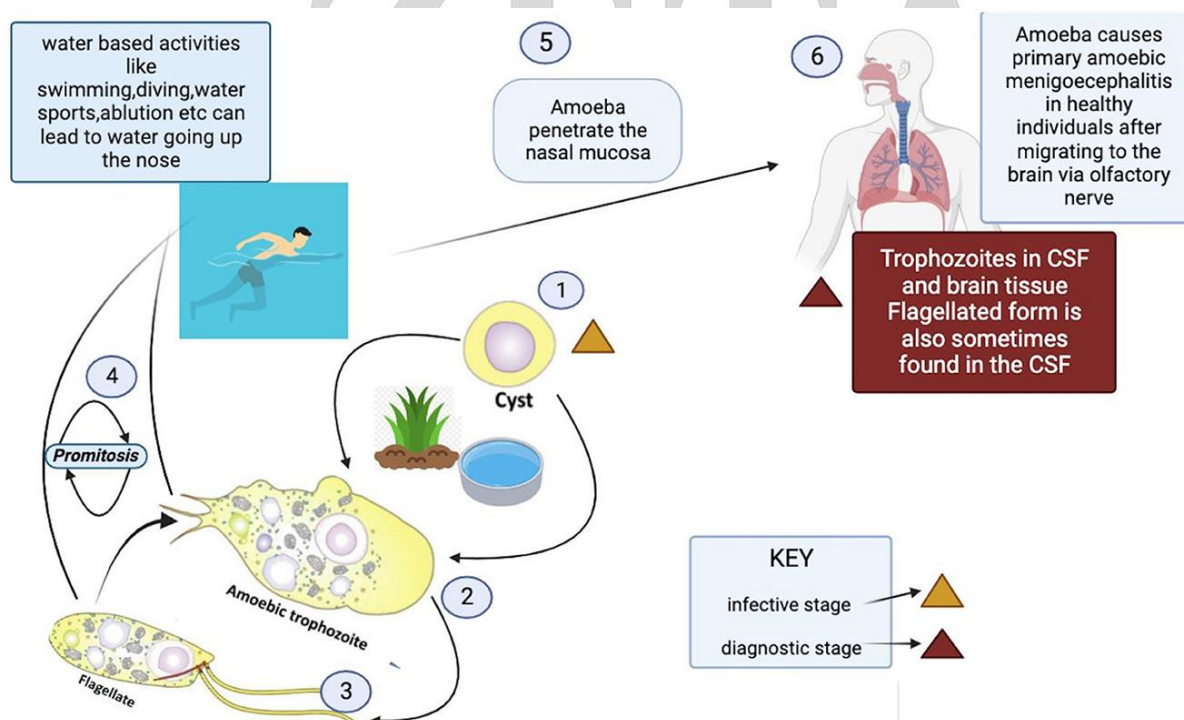
Feedstock & sustainability concerns: As always with biofuels, competition with food crops, land use, and resource constraints are risks.

Blending isobutanol with diesel offers a promising pathway to overcome the technical limitations that made ethanol–diesel blending impractical. Its better miscibility, higher safety margin (flash point), and lower water absorption make it more compatible with diesel engines and infrastructure. However, it is not a guaranteed “silver bullet.”

The pilot trials by ARAI must validate that **engine performance, durability, and emissions** remain within acceptable limits. Additionally, Economic viability must be ensured. India could potentially pioneer the commercial use of isobutanol–diesel blends, reduce diesel import dependence, boost rural/agricultural incomes, and advance its clean energy goals if it overcomes these challenges.

26. Primary Amoebic Meningoencephalitis (PAM)

In News: Kerala has reported several cases of Primary Amoebic Meningoencephalitis (PAM), a brain infection caused by “brain-eating amoeba”.



About: Causes a rare and usually fatal brain infection called *Primary Amoebic Meningoencephalitis (PAM)*. Found in **warm, contaminated freshwater** like ponds, lakes, and wells.

Transmission: Enters the body **through the nose** while swimming or bathing in infected water, then travels to the brain.

Not spread through drinking water or person-to-person contact.

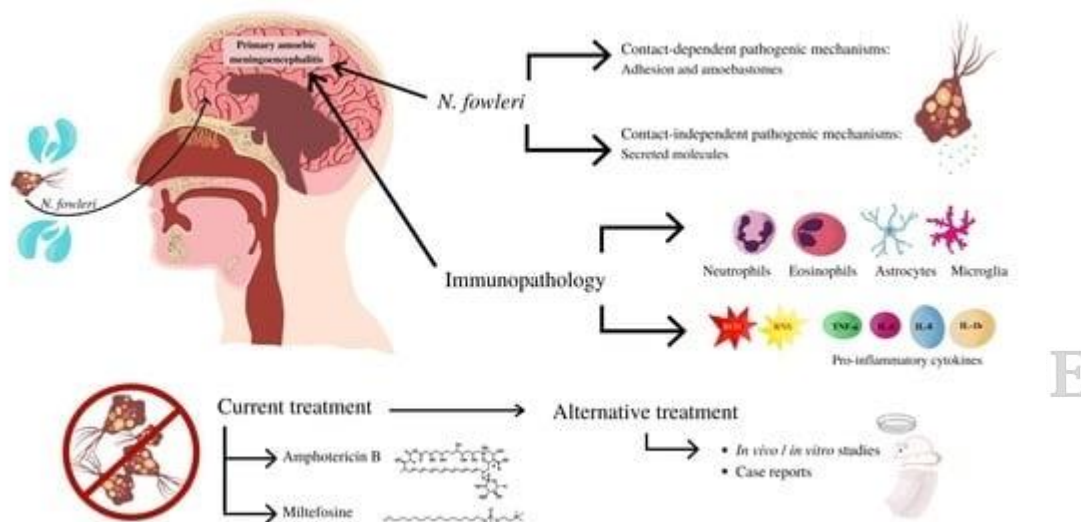
Symptoms: Starts with headache, fever, nausea, and vomiting, followed by stiff neck, confusion, seizures, hallucinations, and coma.

Fatality: Extremely high (**over 95%**); death usually occurs within **1–18 days** (often within 5 days).

Treatment: No fully effective cure. Doctors use a combination of drugs such as amphotericin B, azithromycin, and fluconazole to manage infection.

What is amoeba?

It is a generic term used to refer to a group of single-celled organisms belonging to the biological kingdom Protista. Amoebas are eukaryotic microorganisms that are characterized by their ability to change shape and move using pseudopods, which are temporary extensions of the cell membrane.



27. Arjuna 2025 PN7

In News: - Arjuna 2025 PN7 is a recently discovered quasi-satellite of Earth, classified as an Arjuna asteroid. It orbits the Sun in a 1:1 resonance with Earth's orbit, making it appear to hover nearby without being gravitationally bound to the planet.

Key characteristics

Classification:

Arjuna asteroid and Earth's seventh known quasi-satellite. The Arjuna class includes near-Earth asteroids with Earth-like orbits, low eccentricity, and low inclination.

Discovery:

First spotted by the Pan-STARRS 1 telescope in Hawaii on August 2, 2025.

Orbit:

It orbits the Sun, not Earth, in a path very similar to Earth's, completing one solar orbit in the same time as our planet. This is known as a 1:1 mean-motion resonance.

Earth proximity:

It is not gravitationally bound to Earth and its proximity to Earth varies, coming within about 299,000 km at its closest approach and moving tens of millions of kilometres away at its farthest.

Future:

It will stay in its quasi-satellite orbit for about 128 years before subtly transitioning to a different type of orbit.

Significance:

It is a valuable object for scientific study, and such quasi-satellites could be potential targets for asteroid mining due to resources like water ice and metals.

What is a quasi-satellite?

Unlike a mini-moon, which is temporarily captured by Earth's gravity, a quasi-satellite remains in a stable, but not gravitationally bound, orbit around the Sun that is synchronized with Earth's orbit.

This allows for a longer period of sustained proximity to Earth compared to a temporary capture.



28. India's first bamboo-based bio-ethanol plant

In News: India's first bamboo-based bio-ethanol plant was inaugurated in September 2025 in Golaghat, Assam.

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PM inaugurates India's first bamboo-based ethanol plant

Golaghat facility billed as world's first green bamboo bioethanol plant; ₹7230-crore polypropylene project also initiated at Numaligarh Refinery; the facility aims to reduce dependence on fossil fuels

The Hindu Bureau
GUWAHATI

Prime Minister Narendra Modi on Sunday underscored the need for India to be self-sufficient in energy. He was speaking after inaugurating the country's first bamboo-based ethanol plant in eastern Assam's Golaghat district.

He laid the foundation stone for a ₹7,230-crore polypropylene plant at the Numaligarh Refinery. The project will be established near the ₹5,000-crore bioethanol plant, a "zero-waste" facility described as the world's first to produce ethanol from green bamboo.

Terming the bioethanol plant a step toward ensuring energy security, Mr. Modi said the facility aimed to promote clean energy and reduce dependence on fossil fuels.

"Assam is a land that supports India's energy efficiency," the petroleum products from Assam are accelerating the development of India. The BJP government is trying to take this capacity of Assam to a new level," he said at a public event.

"India is one of the fastest-growing economies in



Clean energy: Prime Minister Narendra Modi during the inauguration of Assam Bio-Ethanol Private Ltd. (ABEL), Numaligarh Refinery Plant, in Golaghat on Sunday. PTI

the world now. Our energy needs have been increasing with our Visions Bharat dream. We spend crores of rupees on imports as we are dependent on other countries for energy. We want to change this by trying to achieve self-sufficiency in energy," the Prime Minister said.

Deep-water exploration

"While we are focusing on hydrocarbon exploration, we are also laying stress on green energy like solar," he said, highlighting the country's national deep-water exploration mission to

look for hydrocarbons under the sea. Referring to the bioethanol plant, Mr. Modi said it would benefit local farmers and tribal communities.

"The government will help them grow and procure the products to ensure a win-win situation," he said. He criticised the erstwhile Congress governments for penalising people for cutting bamboo, which was earlier categorised as a tree. He said the BJP government removed the ban on bamboo cutting and stressed that the decision was helping the locals

in this part of the country.

Numaligarh Refinery Limited (NRL) officials said five lakh tonnes of green bamboo would be sourced yearly from four northeastern States, including Arunachal Pradesh and Assam, to produce 48,900 tonnes of ethanol, 11,000 tonnes of acetic acid, 19,000 tonnes of furfural, and 31,000 tonnes of food-grade liquid carbon dioxide. A joint venture of NRL and Finland's Fortum and Chempolis OY, the plant is expected to give a ₹200-crore boost to Assam's rural economy.

Located at the **Numaligarh Refinery**, the plant converts bamboo into second-generation (2G) bio-ethanol, a renewable fuel, and is a significant step for India's energy self-reliance. This project is a collaboration between **Numaligarh Refinery Limited (NRL)** and **Assam Bio-Ethanol Pvt. Ltd. (ABEL)**

Technology: Converts bamboo into 2G bio-ethanol

Significance:

Reduces dependence on fossil fuels and foreign fuel imports.

Boosts the rural economy by providing an income source for local farmers and tribal communities through the use of bamboo.

Supports the government's goal of achieving 20% ethanol blending by 2025.

Economic Impact:

The bioethanol plant will use **5 lakh tonnes of bamboo annually** from Assam and other Northeastern states.

It will benefit local farmers and tribal communities, giving a ₹200-crore boost to Assam's rural economy.

After the Indian Forest Act, 1927 amendment, bamboo is no longer classified as a tree, allowing its free cutting and trade — improving livelihoods of forest dwellers and private growers.

The project supports India's Viksit Bharat vision, promoting green energy and reduced fossil fuel dependence through sustainable biofuel initiatives.

Bioethanol:

A **high-octane biofuel (C_2H_5OH)** made from **biomass** such as sugarcane, corn, grains, bamboo, and crop residues.

Used mainly as a **gasoline additive**, though modern engines can also run on **pure ethanol**.

Produced through fermentation of sugars, followed by pretreatment, distillation, and dehydration to obtain fuel-grade ethanol.

29. India semiconductor mission

In NEWS: The **Union Cabinet** approved 4 new semiconductor projects in **Odisha, Punjab, and Andhra Pradesh** under the **India Semiconductor Mission (ISM)**, bringing the total to **10 projects** across **6 states**.

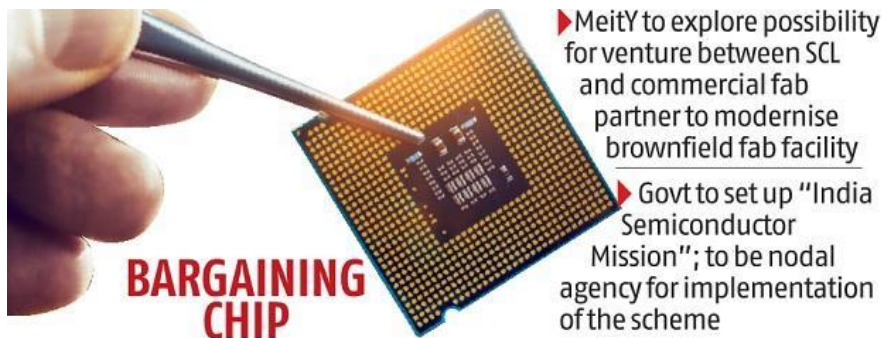
India's Semiconductor Industry

India's semiconductor consumption was valued at USD 52 billion in 2024-25 and is projected to reach USD 103.4 billion by 2030, growing at a CAGR of 13%.

Mobile handsets, IT, and industrial applications account for around 70% of revenue, while automotive and industrial electronics present significant growth potential.

The global semiconductor industry is dominated by **Taiwan, South Korea, Japan, China, and the US**.

India's imports of ICs, memory chips, and amplifiers surged by 2,000%, 4,500%, and 4,800% respectively between FY16 and FY24, with China supplying nearly one-third of these imports.



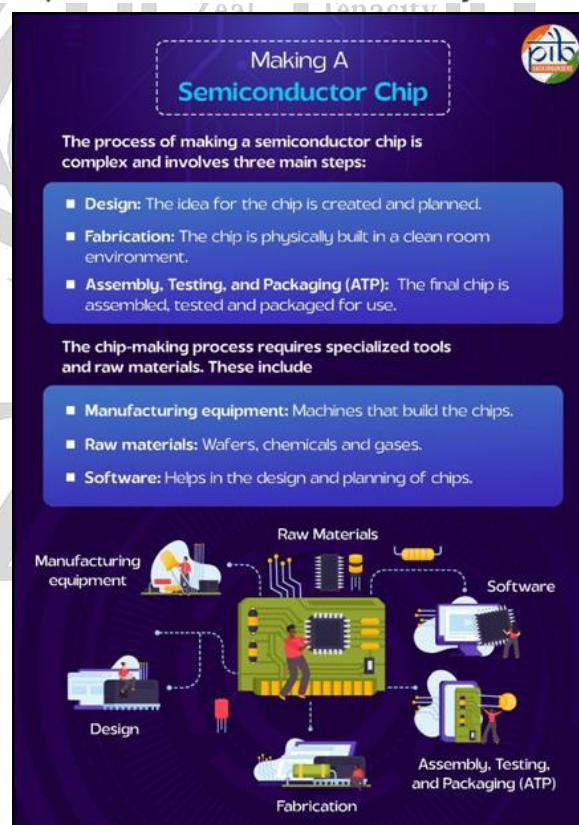
► MeitY to explore possibility for venture between SCL and commercial fab partner to modernise brownfield fab facility

► Govt to set up "India Semiconductor Mission"; to be nodal agency for implementation of the scheme

50% of project cost as max support to be offered to semiconductor and display fab units. Govt expects two of each to come up

30% of capex as max support to compound semiconductor units and ATMP facilities. Govt expects at least 15 such units

50% of expenditure as max design-linked incentive to homegrown fabless firms; 4%-6% product deployment-linked incentive on net sales for five years



SEMICON India 2025

As part of its efforts to position India as a global hub for semiconductor innovation and manufacturing, **Prime Minister Narendra Modi** inaugurated the **SEMICON India 2025** on September 2 at New Delhi.

This fourth edition is India's largest, with over 350 exhibiting companies from 33 countries and regions and a record number of global stakeholders. SEMICON India 2025 is jointly organized by the India Semiconductor Mission (ISM) under the Ministry of Electronics and Information Technology (MeitY) and SEMI, the global semiconductor industry association.

SEMICON India Programme was launched by the central government with an investment of ₹76,000 crore, implemented through the India Semiconductor Mission (ISM).

Key Takeaways

- PM Modi to inaugurate SEMICON India 2025: India's biggest Semiconductor & Electronics show to be held in Yashobhoomi, New Delhi from 2–4 September 2025.
- Theme for SEMICON 2025 is- ***"Building the Next Semiconductor Powerhouse"***
- Bharat to welcome 33 nations, 50+ global CXOs, 350 exhibitors and 50+ visionary global speakers at SEMICON India 2025.
- Event to highlight robust local semiconductor ecosystem expansion and industry trends.
- SEMICON India to address complex challenges of tomorrow while fostering collaboration across the semiconductor ecosystem towards Atmanirbhar Bharat.
- India's chip market is booming, set to hit \$100–110 Bn by 2030.
- India Semiconductor Mission (₹76,000 Cr outlay) boosts local manufacturing, design, and talent.
- Total approved projects under ISM reaches to 10 with cumulative investments of around Rs.1.60 lakh crore in 6 states.
- On 28th August, CG-Semi launched India's first OSAT Pilot Line in Gujarat to produce the country's first 'Made in India' chip

30. Smog eating technology

The Delhi government will conduct a time-bound study on "smog-eating" photocatalytic coatings in Delhi to combat air pollution.

ROAD TO CLEANER AIR?



What Is Photocatalytic Coating

"Smog-eating" photocatalytic coatings are applied on roads, concrete and tiles to reduce nitrogen dioxide (NO₂) and harmful hydrocarbons

These coatings utilise a photocatalyst, predominantly titanium dioxide (TiO₂), which breaks down pollutants—mainly nitrogen oxides (NO_x) and some volatile organic compounds (VOCs)—when exposed to sunlight

DELHI IS MULLING ITS USE, BUT IT'S NOT FIRST TO DO SO

The Netherlands Field trials with TiO ₂ -treated paving blocks in part of Hengelo city showed substantial NO _x reductions in test stretches 	Italy Tests were conducted on building facades and pavements in Milan 	Denmark A study was conducted on photocatalytic-treated asphalt roads in Copenhagen for urban NO _x removal 
Mexico A hospital building facade was made with tiles coated with titanium dioxide 	US Pavements with titanium dioxide coatings exist on some stretches 	

JURY IS OUT ON ITS EFFICACY

- Street environments with variable wind, dust deposition, traffic, shading and humidity reduce effectiveness

- Photocatalysis targets gaseous pollutants; evidence of particulate matter reduction is weak

- Photocatalytic activity declines over time


Smog-Eating Photocatalytic Coatings

- These coatings help clean the air by neutralizing harmful gases like nitrogen dioxide and volatile organic compounds.
- They often use titanium dioxide (TiO₂), which is:
 - Low-cost
 - Chemically stable
 - Compatible with common building materials

How it works:

- TiO₂ uses sunlight to break down air pollutants and organic waste into less harmful or harmless substances. This process is called photocatalysis and helps clean the air and water around buildings.

What is Smog?

Smog = Smoke + Fog (and other pollutants)

It is a type of air pollution formed under specific atmospheric conditions.

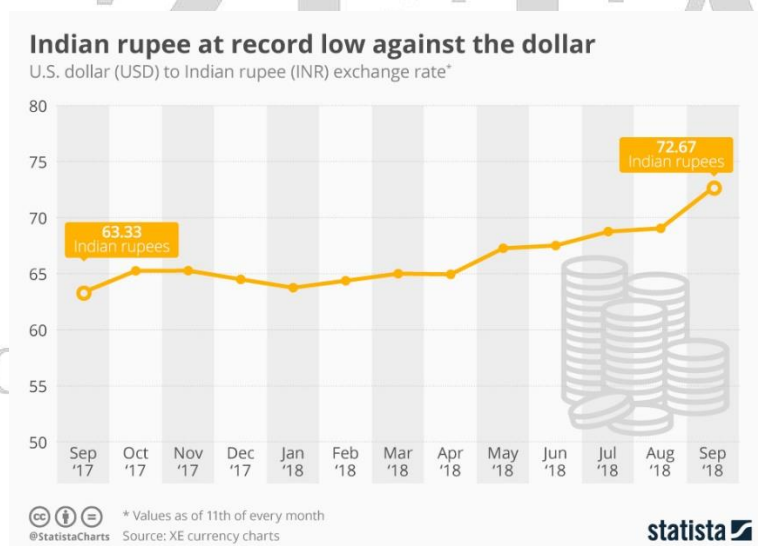
Types of Smog:

- Sulfurous Smog (also called London smog): Caused by burning coal and other sulphur-rich fuels.
- Contains sulphur oxides.: Photochemical Smog (also called Los Angeles smog):
- Common in cities with many vehicles. Formed when sunlight reacts with pollutants from cars.

Economy

31. Rupee falls to record low of 88.75 against US dollar

The Indian Rupee declined against the US Dollar in the midst of H1-B Visa fee hike and persistent trade imbalance and sluggish investment inflows.



Causes Behind Rupee Weakness:

Trade Imbalance: Exports remain stagnant due to global protectionism, while heavy imports of crude (~85% dependence) and electronics widen the Current Account Deficit (CAD).

Investment Outflows: Weak corporate earnings and global uncertainty have led to FPI outflows (~\$1.5 bn recently) and subdued FDI, reducing dollar supply.

Relative Currency Demand: Strong global demand for the US dollar keeps the rupee under pressure.

Growth Concerns: Slower GDP growth (6.1% in Q1 FY26) dampens investor confidence.

Global Financial Tightening: Higher US yields attract capital away from emerging markets like India.

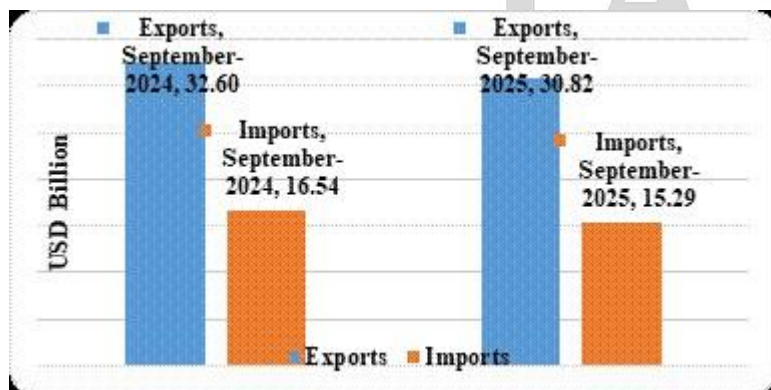
Impacts of Depreciation:

Negative:

- Import Inflation:** Costlier oil, fertilizers, and electronics push up prices.
- Corporate Stress:** Firms with unhedged dollar borrowings face higher repayment costs.
- Widened CAD:** Rising import bills worsen external balances.
- Consumer Burden:** Overseas education, tourism, and healthcare become pricier.

Positive:

- Export Boost:** Makes Indian goods more competitive globally (e.g., pharma, textiles).
- Remittance Gains:** NRIs get higher rupee returns, boosting inflows.
- Import Substitution:** Expensive imports promote domestic manufacturing, aiding Atmanirbhar Bharat.



Policy Response:

- RBI:** Uses forex reserves (~\$570 bn) for limited intervention to smooth volatility.

- **Government:** Expanding PLI schemes and ethanol blending to reduce import dependence.
- **Structural Steps:** Improving trade logistics via IMEC, National Logistics Policy.
- **Global Coordination:** Promoting rupee trade through BRICS+, UAE, and Russia agreements.

Way Forward:

- Boost export competitiveness through FTAs and high-value manufacturing (electronics, semiconductors).
- Diversify energy with renewables and green hydrogen to cut oil imports.
- Attract stable FDI via clear policy and faster approvals.
- Deepen bond markets and encourage rupee invoicing in trade.
- RBI to manage volatility prudently without depleting reserves.

Conclusion:

The rupee's slide mirrors structural issues—import dependence, weak exports, and volatile capital flows. While it aids exports, unchecked depreciation fuels inflation and deters investors. A growth-driven, stable rupee rooted in strong fundamentals and diversified exports will ensure lasting macroeconomic resilience.

32. Pink Tax

Context: As per International Finance Students Association's (IFSA) research 'The Gender Tax: Assessing the Economic Toll on Women,' almost 67% of Indian individuals have never heard of the Pink Tax.

What is pink tax?

The "pink tax" is gender-based price discrimination where women pay more for similar products and services compared to men. For example, a woman's haircut costs more than that of a man.

Global and Indian context

Origin: The term originated in the U.S. in 1994.

Global studies: Studies have found women's personal care products to be around 13% costlier in the U.S., while dry-cleaning services for women's shirts can be up to 90% more expensive.

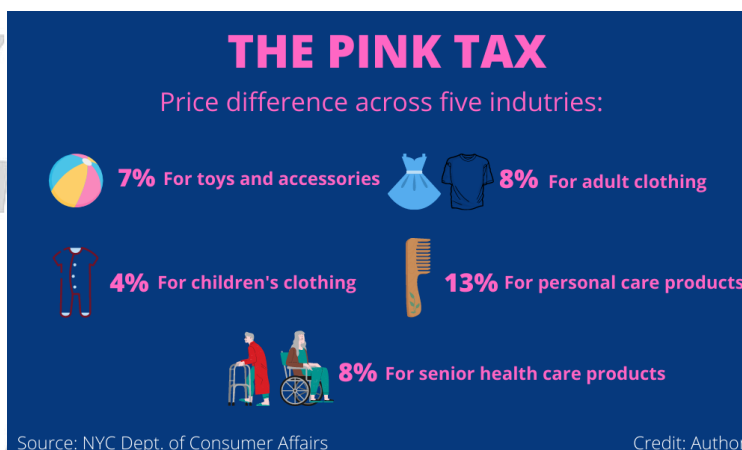
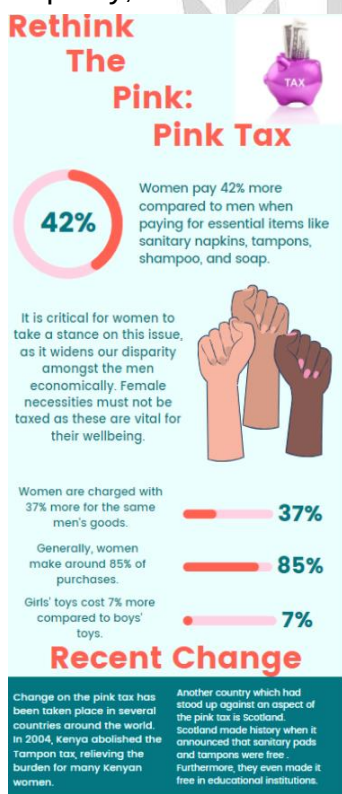
UN stance: The UN urged member states in 2017 to end gender-based price discrimination.

Indian context: A 2018 Union Government exemption of sanitary napkins from GST brought attention to the issue of gender-based pricing.

The National Consumer Disputes Redressal Commission (NCDRC) has ruled that companies must ensure fair pricing and avoid gender-based discrimination

Causes behind the Bias

- **Marketing segmentation & branding:** Firms exploit the willingness of some consumers to pay more for products labeled “for her.”
- **Perceived differentiation:** Even when the underlying product is nearly identical, packaging, scent, color, or “female-friendly” features are used to justify premium pricing.
- **Low consumer scrutiny:** Many buyers may not compare unit prices or notice the disparity, which lets firms get away with it.



Consumer Impacts & Equity Concerns

- Since women already face wage gaps, the pink tax further eats into their purchasing power.
- It undermines fairness in consumption and becomes a hidden economic burden based solely on gender.

Policy & Legal Gaps

- India currently lacks a dedicated law against gender-based pricing discrimination.

- While the Consumer Protection Act and constitutional anti-discrimination norms exist, enforcement is weak in this context.

How Consumers Can Respond

- Choose gender-neutral or male-marketed versions of products when the formulation is identical.
- Compare unit prices (per ml, per gram) rather than relying on packaging.
- Push for brands to adopt equal pricing and boycott blatant gendered mark-ups.
- Leverage consumer rights protections and demand accountability.

Why This Matters?

- The pink tax is not just symbolic, it has real financial consequences for women's budgets, especially for lower-income households.
- It perpetuates gender inequality by making consumption more expensive for women, compounding disparities in income and opportunity.
- Greater awareness, consumer vigilance, and regulatory reform can mitigate though not fully eliminate this hidden bias in pricing.

33. Global innovation index

Context: India has climbed to the 38th position among 139 economies in the World Intellectual Property Organization's (WIPO) Global Innovation Index (GII) 2025, improving from 48th place in 2020.



India's Innovation Strengths & Global Rankings

India ranks **38th** among the **139 economies** featured in the **GII 2025**.



Global Innovation Index

- The Global Innovation Index (GII), introduced in 2007, was developed to provide comprehensive metrics and methodologies for assessing the wide spectrum of innovations across economies.
- Published annually by the **World Intellectual Property Organization (WIPO)**, the GII has become a **key benchmark** for evaluating an economy's **innovation ecosystem**.
- Recognized by the UN General Assembly as an authoritative reference for shaping Science, Technology, and Innovation (STI) policies.

Global Innovation Index (GII) 2025 – Key Highlights

Global Rankings: Switzerland (1st), Sweden (2nd), USA (3rd), South Korea (4th), and Singapore (5th). China entered the top 10 for the first time (10th).

India's Rank: Rose to 38th (from 81st in 2015) — 1st among lower-middle-income countries and in Central & Southern Asia.

India's Strengths: Knowledge & Technology Outputs (22), Market Sophistication (38).

Weaknesses: Business Sophistication (64), Infrastructure (61), Institutions (58).

Innovation Clusters: Shenzhen–Hong Kong–Guangzhou (1st) and Tokyo–Yokohama (2nd) lead globally.

Global Trends: Labor productivity up 2.5%, life expectancy at 73 years, and extreme poverty halved since 2004.

Technological gains seen in AI, supercomputing, and batteries, but progress slowed in wind energy and genome sequencing.

Barriers to Innovation

- a. **Low R&D Investment:** GERD remains under 0.7% of GDP, far below innovation leaders.
- b. **Public Sector Dominance:** Govt funds 64% of R&D; private sector's share only 36%.
- c. **Weak Industry–Academia Link:** Poor collaboration limits commercialization.
- d. **Sector Bias:** Focus on defense and space crowds out industrial innovation.
- e. **Risk Aversion & Bureaucracy:** Firms avoid long-term R&D; tech transfer remains slow.

Reforms Needed

- a. **Raise R&D Spending:** Deploy the Rs 1 lakh crore innovation fund quickly; attract private and philanthropic capital.
- b. **Promote University Research:** Support HEIs to lead basic research and link with industry.
- c. **Create Innovation Hubs:** Build joint government–industry centers in AI, semiconductors, and clean energy.
- d. **Encourage Collaboration:** Form sector-specific councils (e.g., CleanTech Council) to align policy and funding.
- e. **Regional Clusters:** Develop innovation zones in smaller cities to foster inclusive growth.

India's innovation journey shows strong progress — now 38th globally and a leader among peers. Yet, limited R&D funding, weak private participation, and poor industry–research linkages remain bottlenecks. A sustained push toward higher investment, deep-tech focus, and collaborative innovation ecosystems can transform India from a startup hub into a global innovation powerhouse.

34. The public debt of Indian states has significantly increased

In News: The CAG's first decadal report (2013-14 to 2022-23) on states' finances shows a sharp rise in public debt, raising concerns about fiscal sustainability. It highlights growing borrowing by states to fund welfare schemes and capital projects, leading to higher interest burdens and reduced fiscal flexibility. The report urges states to improve revenue generation, control subsidies, and strengthen fiscal discipline to ensure long-term financial stability.

Meaning

- Public Debt refers to "Obligation of Government particularly those evidenced by securities, to pay certain sums to the holders at some future date.
- In simple words, Public Debt can be defined as the amount of debt taken by government from internal as well as external sources to meet out its deficit.
- Government needs to borrow when current revenue falls short of public expenditure.

Debt-to-Gross Domestic Product:

A Debt-to-Gross Domestic Product (GDP) ratio/ a Debt-to-Gross State Domestic Product (GSDP) ratio is a critical metric assessing a country's/ a state's ability to service its debt – indicating its ability to repay debt.

Rise in Public Debt in states:

- Total debt (internal debt and loans and advances from the Centre) increased: From ₹17.57 lakh crore in 2013-14 to ₹59.60 lakh crore in 2022-23 (rose by 3.39 times).
- Debt-to-GSDP ratio: Increased from 16.66% (2013-14) to 22.96% (2022-23).
- Contribution to National GDP: States' debt equaled 22.17% of India's GDP in FY 2022-23.

Sources of State Governments' Public Debt (Borrowings):

- a. **Market Loans:** Money borrowed by selling government securities, bonds, and treasury bills.
- b. **Loans from Banks:** Borrowings from banks like the State Bank of India (SBI).
- c. **Ways and Means Advances (WMA):** Short-term loans taken from the Reserve Bank of India (RBI) to manage temporary cash shortages.
- d. **Loans from Financial Institutions:** Money borrowed from institutions like LIC and NABARD.
- e. **Loans from the Central Government:** Includes special loans such as:
 - Back-to-back loans for GST compensation shortfall
 - Special capital support during emergencies like COVID-19

Fiscal Management Concerns

Golden Rule: Borrow only for capital (infrastructure) spending, not for daily expenses.

Violation: 11 states (e.g., Andhra Pradesh, Punjab) used loans for routine expenses.

Example: Andhra Pradesh spent only 17%, Punjab 26% of borrowings on capital projects.

Risks:

GST and COVID loans have worsened debt conditions.

Risk of debt trap and reduced funds for productive investment.

High debt threatens economic stability and Centre-State relations.

Way Forward

Follow Fiscal Discipline: Use borrowings for capital investment only.

Better Debt Management: Set up Public Debt Management Agency (PDMA) for transparency and monitoring.

Strengthen State Finances:

- Increase own revenues
- Cut unnecessary subsidies
- Improve tax collection
- Reduce over-reliance on Centre
- **Follow FRBM Act:** Stick to debt and deficit limits.
- **Improve Oversight:** Strengthen Finance Commissions and CAG for better fiscal control.

Data Drive

Debt crisis in states

1. As state debt-to-GDP rises

Eight states have debt-to-GDP ratios of more than 40%, causing serious concerns of fiscal instability
2012 budget estimated; %



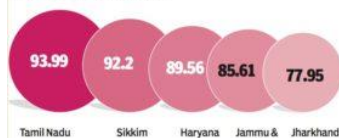
2. Debt repayment spirals

States like Nagaland and Mizoram pay interest of more than half their total revenue receipts
Interest payments to revenue receipts in 2011-12; %



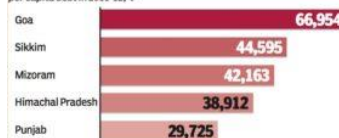
3. Debt rises in the last 5 years

In the past five years, debt has increased by an average of more than 60% in all the states
Increment in total debt (2007-12); %



4. High per capita debt a concern

Goa has the highest per capita debt, of more than ₹66,000, despite high economic growth
per capita debt in 2011-12; ₹



Amit Kapoor & Anshul Pachouri

EIGHT states in India have debt-to-GDP ratios of more than 40%, which will cause a serious problem of debt repayment in the future. As a result of high debt, servicing spiralling interest payments have become one of the most critical issues for the state governments to tackle. In fact, some states like Nagaland, Arunachal Pradesh and Bengal are paying interests that are more than half their total revenue receipts.

In the past five years, debt has increased by an average of more than 60% in all the states, leaving them with little amount to invest for developmental activities. Also, per capita debt is a very effective indicator to understand the depth of debt in an economy. On that count, Goa has the highest per capita debt, of more than ₹66,000, despite high economic growth.

The high gross fiscal deficit of many states has become a big worry and is unsustainable. Punjab and Kerala have gross fiscal deficits to total capital and revenue receipts more than

25%, which shows the economy is highly leveraged. These states need to focus on bringing down their fiscal deficits and increase non-tax revenues.

Moreover, outstanding guarantees of state governments are contingent liabilities and can cause big debt crises suddenly if debtors default. States like Punjab and Rajasthan have outstanding guarantees that constitute more than 85% of their total receipts, which needs urgent attention. The states need to be very cautious and do accurate risk assessment before providing guarantees for any public sector undertakings or bonds.

Dr Amit Kapoor is professor of strategy at Management Development Institute, Gurgaon and Anshul Pachouri is senior researcher at Institute for Competitiveness, India

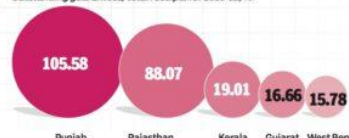
5. Fiscal prudence is needed

States like Punjab and Kerala need to focus on bringing down their fiscal deficit and increasing their non-tax revenues
Gross fiscal deficit/total receipts for 2011-12; %



6. Outstanding guarantees can cause debt crisis

States like Punjab and Rajasthan have outstanding guarantees constituting more than 85% of their total receipts, which needs urgent attention
Outstanding guarantees/total receipts for 2011-12; %



Government Schemes-September 2025

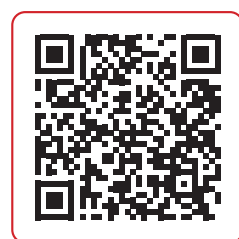
Government Schemes – September 2025

Sector	Scheme / Initiative	Details	Authority / Region
Maritime / Industry	Shipbuilding & Maritime Sector Support	Target: 4.5 million GT/year; ₹4.5 lakh crore investment; 30 lakh jobs	Central Government
	Shipbuilding Financial Assistance Scheme	Extended till 2035-36; ₹24,736 crore allocation	Central Government
	Maritime Development Fund	₹25,000 crore fund for long-term financing in shipping	Central Government

Sector	Scheme / Initiative	Details	Authority / Region
Minority Welfare	Indiramma Minority Mahila Yojana	₹50,000 aid for widows, orphans, divorcees, unmarried women	Telangana Government
	Revanth Anna ka Sahara – Miskeen la Kosam	₹1 lakh grant for marginalized minority groups	Telangana Government
Agriculture	PM Dhan-Dhanya Krishi Yojana	Focus on 100 districts for farm & allied sector boost	Central Government
	Pulse Self-Reliance Mission	Enhance pulses production and self-reliance	Central Government
	Agri Investment Package	₹35,440 crore for crop processing, storage, and allied infra	Central Government
Labour / Social Sec.	Employees' Enrolment Campaign, 2025	For expanding EPFO coverage; runs Nov 2025 – April 2026	Central Government / EPFO
Education / Welfare	UP Scholarships for SC/ST & Minorities	₹126.68 crore for 4.83 lakh students	Uttar Pradesh Government
Water & Irrigation	Drinking water & irrigation projects in Haroli (HP)	₹81 crore projects for local irrigation and clean water	Himachal Pradesh Government
Workers' Welfare	Reconstitution of Construction Workers Welfare Board	Will oversee benefits like housing, education, pensions for workers	Delhi Government

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- Madhav Agarwal (Rank 16)

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(Public Administration)



Gaurav Singh

Thank you, Monish Sir, for your consistent guidance. Your daily feedback on my GS 2 and GS 4 answers helped me identify gaps and improve steadily. Greatful for your time and support.

- Madhav Agarwal, AIR 16

Expressing my gratitude to Monish Sir. I wrote daily GS 2 and GS 4 answers before prelims under his guidance. It helped me to identify mistakes early on.

- Suramya Sharma, AIR 281

Monish Sir helped me improve the quality of my answers. The personal attention given by Sir on my answer copies with detailed feedbacks helped me a lot. I thank Sir for my success.

- Gaurav Singh, AIR 859